Public Participation Summary

Radioactive Material License UT1900479 Renewal
Ground Water Quality Discharge Permit UGW370004 Renewal
And
Sequoyah Fuels Alternate Feed Request
Energy Fuels Resources (USA) Inc. (Energy Fuels)
White Mesa Uranium Mill
San Juan County, Utah

GLOSSARY of Terms

Below is a list of words, terms, and acronyms used for this licensing action. These words, terms and acronyms are based off of regulatory, technical and industry definitions and are not always the same definition found in dictionaries and other common reference sources. The definitions that come from regulatory sources are the required definitions the Utah Division of Waste Management and Radiation Control Staff use. When appropriate, photographs were added to provide context to the definition.

11e.(2) - Refers to the paragraph in the Atomic Energy Act (AEA) of 1954, as amended in which source material byproduct material is defined.

11e.(2) Byproduct Material - As stated in the AEA "The term "byproduct material" means…(2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content"

ALARA - An acronym that stands for As Low As Reasonably Achievable. In the Utah Administrative Code (UAC) R313-12-3 ALARA is defined as "making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical, consistent with the purpose for which the licensed or registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed or registered sources of radiation in the public interest."

Agreement State - As defined in UAC R313-12-3 "Any State with which the Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b. of the Atomic Energy Act of 1954, as amended." (Also found in 10 CFR 40.4)

Alternate Feed - In the September 22, 1995, Federal Register Vol. 60 No. 184 pg. 49296 the NRC defined alternate feed as: "uranium mill feed material other than natural ore" (Also see the definition of "Ore" below)

Approved (U.S. DOT) - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means approval issued or recognized by the DOT unless otherwise specifically indicated in this subchapter."

Aquiclude - A saturated geologic unit that is incapable of transmitting significant quantities of water under ordinary hydraulic gradients (*Groundwater* Freeze & Cherry, p. 47)

Atomic Energy Act of 1954 - Also known by the acronym AEA. The Act requires that civilian uses of nuclear materials and facilities be licensed, and it empowers the NRC to establish by rule or order, and to enforce, such standards to govern these uses as "the Commission may deem necessary or desirable in order to protect health and safety and minimize danger to life or property." Under section 274 of the Act, the NRC may enter into an agreement with a State for discontinuance of the NRC's regulatory authority over some materials Licensees within the State.

The State must first show that its regulatory program is compatible with the NRC's and adequate to protect public health and safety. The NRC retains authority over, among other things, nuclear power plants within the State and exports from the State. (NRC.gov)

Background Radiation - The natural radiation that is always present in the environment. It includes cosmic radiation which comes from the sun and stars, terrestrial radiation which comes from the Earth, and internal radiation which exists in all living things. The typical average individual exposure in the United States from natural background sources is about 300 millirems per year. (NRC.gov)

Bag - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a flexible packaging made of paper, plastic film, textiles, woven material or other similar materials." See a photograph of an example below:

Box - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material. Holes appropriate to the size and use of the packaging, for purposes such as ease of handling or opening, or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during transportation, and are not otherwise prohibited in this subchapter."

Bulk Packaging - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment." Ore, ISL (aka 11e.(2)) material and two alternate feeds are transported to the Mill in Bulk Packaging.

Class 7 - Refers to the Hazard Class for radioactive materials. Please see the definition for Hazard Class below.

Closed Transport Vehicle - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means a transport vehicle or conveyance equipped with a securely attached exterior enclosure that during normal transportation restricts the access of unauthorized persons to the cargo space containing the Class 7 (radioactive) materials. The enclosure may be either temporary or permanent, and in the case of packaged materials may be of the "see-through" type, and must limit access from top, sides, and bottom.

Committed Dose Equivalent - Also known by the acronym CDE. As defined in UAC R313-12-3 "means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake"

Committed Effective Dose Equivalent - Also known by the acronym CEDE. As defined in UAC R313-12-3 "is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues."

Consignee - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the person or place shown on a shipping document, package marking, or other media as the location to which a carrier is directed to transport a hazardous material." The Mill would be considered the consignee for anything shipped to the Mill.

Contamination - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, **"**means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm 2 for beta and gamma emitters and low toxicity alpha emitters or 0.04 Bq/cm 2 for all other alpha emitters. There are two categories of contamination:

> (1) Fixed contamination means contamination that cannot be removed from a surface during normal conditions of transport.
> (2) Non-fixed contamination means contamination that can be removed from a surface during normal conditions of transport." The non-fixed (aka removable) contamination limits are found in 49 CFR 173.443.

Deep Dose Equivalent - Also known by the acronym DDE. As defined in UAC R313-12-3 "which applies to external whole body exposure, means the dose equivalent at a tissue depth of one centimeter (1000 mg/cm^2)."

Designated Facility - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a hazardous waste treatment, storage, or disposal facility that has been

designated on the manifest by the generator." The Mill would be considered the Designated Facility for incoming shipments.

Director - As defined in UAC R313-12-3 "means the Director of the Division of Waste Management and Radiation Control."

Dose - As defined in UAC R313-12-3 "is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent." For purposes of this document, "radiation dose" is an equivalent term.

DOT - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means U.S. Department of Transportation"

Drum - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a flat-ended or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials. This definition also includes packagings of other shapes made of metal or plastic (e.g., round taper-necked packagings or pail-shaped packagings) but does not include cylinders, jerricans, wooden barrels or bulk packagings." Drums are commonly used to transport some of the alternate feed materials to the Mill. See a photograph of an example below:

Effective Dose Equivalent - Also known by the acronym EDE. As defined in UAC R313-12-3 "means the sum of the products of the dose equivalent to each organ or tissue (H_T), and the weighting factor (w_T,) applicable to each of the body organs or tissues that are irradiated."

Exclusive Use - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means sole use by a single consignor of a conveyance for which all initial, intermediate, and final loading and unloading and shipment are carried out in accordance with the direction of the consignor or consignee where required by this subchapter. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must provide to the initial carrier specific written instructions for maintenance of exclusive use shipment controls, including the vehicle survey requirement of § 173.443(c) as applicable, and include these instructions with the shipping paper information provided to the carrier by the consignor." Most radioactive shipments to and from the Mill are Exclusive Use.

Flexible Bulk Containers - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a flexible container with a capacity not exceeding 15 cubic meters and includes liners and attached handling devices and service equipment." Commonly referred as Super Sacs or SuperSaks in Division documents. These containers are commonly used to transport some of the alternate feed materials to the Mill. See a photograph of an example below:

Freight Container - As defined in 49 CFR 171.8 (also see 49 CFR 173.403), as incorporated by reference in UAC R313-19-100, "means a reusable container having a volume of 64 cubic feet or more, designed and constructed to permit being lifted with its contents intact and intended primarily for containment of packages (in unit form) during transportation." Intermodal containers and roll-off boxes are the most common freight containers used to transport materials to the Mill.

Gross Weight or Gross Mass - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the weight of a packaging plus the weight of its contents."

Hazard Class - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the category of hazard assigned to a hazardous material under the definitional criteria of Part 173 of this subchapter and the provisions of the § 172.101 table. A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class." Ore, ISL (aka 11e.(2)) material, alternate feeds and yellowcake shipments are hazard class 7 as defined in 49 CFR 173.403. Other hazardous materials shipped to the Mill (i.e. chemicals used in the milling process) assigned different hazard classes.

Hazardous Material - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a substance or material that the Secretary of Transportation has determined is

capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in Part 173 of this subchapter." Ore, ISL (aka 11e.(2)) material, alternate feeds, yellowcake and chemicals used in the milling process are considered hazardous materials.

Half-life (radiological) - From the glossary on nrc.gov. "The time required for half the atoms of a particular radioisotope to decay into another isotope. A specific half-life is a characteristic property of each radioisotope. Measured half-lives range from millionths of a second to billions of years, depending on the stability of the nucleus. Radiological half-life is related to, but different from, the biological half-life and the effective half-life.

IAEA - Means International Atomic Energy Agency.

Industrial Package - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, means "Industrial package" means a packaging that, together with its low specific activity (LSA) material or surface contaminated object (SCO) contents, meets the requirements of §§ 173.410and 173.411. Industrial packages are categorized in § 173.411 as either:

(i) "Industrial package Type 1 (Type IP-1);
(ii) "Industrial package Type 2 (Type IP-2); or
(iii) "Industrial package Type 3 (Type IP-3)."

Intermodal Container - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a freight container designed and constructed to permit it to be used interchangeably in two or more modes of transport."

ISL - An acronym that stands for the In Situ Leach facility. These facilities are also known as In Situ Recovery facility (ISR). According to NRC.gov they ISL/ISR facilities are another type of uranium recovery facility (11e.(2) facility) that according to the NRC.gov "recover uranium from low-grade ores where other mining and milling methods may be too expensive or environmentally disruptive. This method uses the following process, as illustrated in the figure to the right:

1. A solution called lixiviant (typically containing water mixed with oxygen and/or hydrogen peroxide, as well as sodium carbonate or carbon dioxide) is injected through a series of wells into the ore body to dissolve the uranium.
2. The lixiviant is then collected in a series of recovery wells, through which it is pumped to a processing plant, where the uranium is extracted from the solution through an ion-exchange process.
3. The uranium extract is then further purified, concentrated, and dried to produce a material, which is called "yellowcake" because of its yellowish color.
4. Finally, the yellowcake is packed in 55-gallon drums to be transported to a uranium conversion facility, where it is processed through the stages of the nuclear fuel cycle to produce fuel for use in nuclear power reactors."

The White Mesa Mill takes 11e.(2) material from these facilities and disposes the material directly in to the tailings impoundments.

License - Also known by the acronym RML (Radioactive Material License). As defined in UAC R313-12-3 "means a license issued by the Director in accordance with the rules adopted by the Board."

Licensee - As defined in UAC R313-12-3 "means a person who is licensed by the Department in accordance with these rules and the Act."

Licensed Material - As defined in UAC R313-12-3 "means radioactive material, received, possessed, used or transferred or disposed of under a general or specific license issued by the Director."

Low Specific Activity (LSA) Material - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means Class 7 (radioactive) material with limited specific activity which is not fissile material or is excepted under § 173.453, and which satisfies the descriptions and limits set forth below. Shielding material surrounding the LSA material may not be considered in determining the estimated average specific activity of the LSA material. LSA material must be in one of three groups:

(1) LSA-I:

(i) Uranium and thorium ores, concentrates of uranium and thorium ores, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides; or
(ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, provided they are unirradiated and in solid or liquid form; or
(iii) Radioactive material for which the A2 value is unlimited; or
(iv) Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in § 173.436 or calculated in accordance with § 173.433, or 30 times the default values listed in Table 8 of § 173.433." LSA-I is material shipped to and from the Mill therefore the definition for LSA-II and LSA-III were not included.

Low Toxicity Alpha Emitters - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; and alpha emitters with a half-life of less than 10 days." Ore, ISL (aka 11e.(2)) material and alternate feeds fall into this definition.

Marking - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a descriptive name, identification number, instructions, cautions, weight, specification, or UN marks, or combinations thereof, required by this subchapter on outer packagings of hazardous materials." A common marking is stenciled on ore trucks is "Radioactive LSA for Radioactive Material Use Only". See a photograph of an example below:

MILDOS-AREA - A computer code developed by Argonne National Laboratory. It is used to estimate the radiological impacts from airborne emissions from uranium milling facilities. The code is used by license applicants and U.S. Nuclear Regulatory Commission or Agreement State staff to perform routine radiological impact and compliance evaluations for various uranium recovery operations. (Argonne, 2017)

Mill - Means the White Mesa Uranium Mill.

Mode - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means any of the following transportation methods; rail, highway, air, or water." Highway is the transportation mode that is used for shipments to and from the Mill.

Monitoring - As defined in UAC R313-12-3 "means the measurement of radiation, radioactive material concentrations, surface area activities or quantities of radioactive material, and the use of the results of these measurements to evaluate potential exposures and doses. For purposes of these rules, radiation monitoring and radiation protection monitoring are equivalent terms."

Movement - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the physical transfer of a hazardous material from one geographic location to another by rail car, aircraft, motor vehicle, or vessel."

Natural Uranium - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238 and 0.72% uranium-235 by mass)." From the glossary at nrc.gov: "Uranium containing the relative concentrations of isotopes found in nature (0.7 percent uranium-235, 99.3 percent uranium-238, and a trace amount of uranium-234 by mass). In terms of radioactivity, however, the radiation emitted by natural uranium comes approximately 2.2 percent from uranium-235, 48.6 percent from uranium-238, and 49.2 percent from uranium-234. Natural uranium can be used as fuel in nuclear reactors."

NESHAP - An acronym that stands for National Standards for Hazardous Air Pollutants (40 CFR Part 61). Subpart W is the National Emission Standards for Radon Emissions from Operating Mill Tailings. These standards are part of the Mill's Air Approval Order issued by the Utah Division of Air Quality.

Nuclear Regulatory Commission - Also known by the acronym NRC. The NRC was established by the Energy Reorganization Act of 1974. The NRC is assigned the regulatory and licensing responsibilities for the civilian uses of nuclear materials and facilities. (NRC.gov)

Occupational Dose - As defined in UAC R313-12-3 "means the dose received by an individual in the course of employment in which the individual's assigned duties for the Licensee or registrant involve exposure to sources of radiation, whether or not the sources of radiation are in the possession of the Licensee."

Operator - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a person who controls the use of an aircraft, vessel, or vehicle."

Operation - There are two definitions of operation:

1. As defined by 10 CFR 40 Appendix A as is incorporated by reference in UAC R313-24-4 "means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins."
2. As defined by 40 CFR 61 subpart W (NESHAP) "means that an impoundment is being used for the continued placement of uranium byproduct material or tailings or is in standby status for such placement. An impoundment is in operation from the day that uranium byproduct material or tailings are first placed in the impoundment until the day that final closure begins.

Ore - In the September 22, 1995, Federal Register Vol. 60 No. 184 pg. 49296 the NRC defined ore as: **"**Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill."

OSL Badges - OSL is an acronym for optically stimulated luminescence. These dosimetry badges are made by Landauer. The Mill uses these badges to measure exposure to gamma radiation for occupational dose and environmental/public dose calculations.

Package - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means the packaging together with its radioactive contents as presented for transport."

Packaging - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means, for Class 7 (radioactive) materials, the assembly of components necessary to ensure compliance with the packaging requirements of this subpart. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, service equipment for filling, emptying, venting and pressure relief, and devices for cooling or absorbing mechanical shocks. The conveyance, tie-down system, and auxiliary equipment may sometimes be designated as part of the packaging"

Perched Aquifer - From the Underground Storage Tank Site Guide Glossary at EPA.gov. "A lens of saturated soil above the main water table that forms on top of an isolated geologic layer of low permeability."

Pico - From the glossary at nrc.gov. "A prefix that divides a basic unit by one trillion (10^{-12}). For example picocurie (pCi). 1.00E-12 = 0.000000000001.

Public Dose - As defined by UAC R313-12-3 "means the dose received by a member of the public from exposure to radiation or to radioactive materials released by a Licensee, or to any other source of radiation under the control of a Licensee or registrant. Public dose does not include occupational dose or doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with Rule R313-32, or from voluntary participation in medical research programs." As per R313-15-301 a member of the public may not receive more than 0.1 rem or 100 mrem from a licensed facility.

Quality factor - As defined in UAC R313-12-3 "means the modifying factor, listed in Tables 1 and 2 of Section R313-12-20 that is used to derive dose equivalent from absorbed dose."

Rad - As defined in UAC R313-12-3 "means the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 erg per gram or 0.01 joule per kilogram."

Radiation - As defined in UAC R313-12-3 "means alpha particles, beta particles, gamma rays, x-rays, neutrons, high speed electrons, high speed protons, and other particles capable of producing ions. For purposes of these rules, ionizing radiation is an equivalent term. Radiation, as used in these rules, does not include non-ionizing radiation, like radiowaves or microwaves, visible, infrared, or ultraviolet light."

Radiation Area - As defined in UAC R313-12-3 "means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005

rem (5 mrem), in one hour at 30 centimeters from the source of radiation or from a surface that the radiation penetrates.'

Radiation Leve l- As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means the radiation dose-equivalent rate expressed in millisieverts per hour or mSv/h (millirems per hour or mrem/h). It consists of the sum of the dose-equivalent rates from all types of ionizing radiation present including alpha, beta, gamma, and neutron radiation."

Radiation Safety Officer - As defined in UAC R313-12-3 "means an individual who has the knowledge and responsibility to apply appropriate radiation protection rules and has been assigned such responsibility by the Licensee."

Radioactive Material - As defined in UAC R313-12-3 "means a solid, liquid, or gas which emits radiation spontaneously." In addition, as defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in the table in§ 173.436 or values derived according to the instructions in § 173.433."

Radioactivity - As defined in UAC R313-12-3 "means the transformation of unstable atomic nuclei by the emission of radiation."

Raffinate - In connection with the solution from the recovery of Uranium The part of a liquid remaining after its more soluble components have been extracted by a solvent.

RCRA - An acronym that stands for the Resource Conservation and Recovery Act. RCRA is the public law that creates the framework for the proper management of hazardous and non-hazardous solid waste.

Rem - As defined in UAC R313-12-3 "means the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor."

Reportable Quantity - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, means the quantity specified in column 3 of Table 2 of 49 CFR 172.101. For natural uranium the reportable quantity is 0.1 curie and for radium the reportable quantity is 0.053 curies

Restricted Area - As defined in UAC R313-12-3 "means an area, access to which is limited by the Licensee for the purpose of protecting individuals against undue risks from exposure to sources of radiation."

SERP Committee - SERP is an Acronym for Safety and Environmental Review Panel. This committee is required by License Condition 9.4. At a minimum the committee is comprised by someone from Mill management, someone from Operations and the Radiation Safety Officer. This committee is to evaluate any changes to the facility or its processes, changes to procedure and/or conduct tests or experiments to determine if these changes meet applicable regulations,

do not degrade environmental and safety commitments and are consistent with approved Mill operations.

Shipping Paper - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a shipping order, bill of lading, manifest or other shipping document serving a similar purpose and prepared in accordance with Subpart C of Part 172 of this chapter." Bill of lading is the type of shipping paper that is used for shipment coming to and leaving the Mill. The following information is required on all shipping papers:

- UN Identification Number §172.202(a)(1)
- Proper shipping Name as per §172.101 table §172.202(a)(2)
- Hazard Class §172.202(a)(3)
- Total Activity of each package §172.203(d)(3)
- Number and types of packages §172.202(a)(7)
- Name of each radionuclide §172.203(d)(1)
- Description of Physical form §172.203(d)(2)
- Description of Chemical form §172.203(d)(2)
- Category of label used §172.203(d)(4)
- Transportation Index §172.203(d)(5)
- 24 hour Emergency Telephone number §172.604
- Shipper Certification §172.204

The following is required on shipping paper work for Exclusive use Shipments:

- Specify "exclusive use shipment" §172.203(d)(9)
- Specify instructions for maintaining exclusive use controls §173.427(4)(6)(iv)

SHPO - An acronym that stands for the State of Utah's State Historic Preservation Office. According to their webpage their job is to "State and federal agencies that undertake projects must "take into account" how their project activities will affect historic and archaeological resources"

Site Boundary - As defined in UAC R313-12-3 "means that line beyond which the land or property is not owned, leased, or otherwise controlled by the Licensee or registrant."

Source Material Milling - For this Licensing action this is known as Uranium Milling. As defined in UAC R313-12-3 "means any activity that results in the production of byproduct material as defined by (b) of "byproduct material"."

Source Material - (1)Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. (10 CFR 40.4)

Source of Radiation - As Defined in UAC R313-12-3 "means any radioactive material, or a device or equipment emitting or capable of producing ionizing radiation."

Specific Activity - As defined in 49 CFR 173.403, as incorporated by reference in UAC R313-19-100, "of a radionuclide means the activity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the activity per unit mass of the material."

Super Sac or Super Sack - See definition of Bag and flexible bulk container.

Surety - The term used in this licensing action to describe the decommissioning funding plan that is required by UAC R313-22-35 for facilities that possess radioactive materials with half-lives greater than 120 days such as Uranium Mill facilities. R313-22-35(3)(h) requires Licensee's surety to meet the applicable criteria found in the NRC document NUREG-1757, Volume 3, "*Consolidated NMSS Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness*" (9/2003). The Licensee is also required to follow the requirements found in the RML in License Condition 9.5.

Survey - Also known as Radiological Survey. As defined in UAC R313-12-3 "means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of sources of radiation. When appropriate, such evaluation includes, but is not limited to, tests, physical examinations and measurements of levels of radiation or concentrations of radioactive material present."

Thoron - Is another name for Radon-220. It is associated with the Thorium decay series and has a half-life of 56 seconds.

Transport Vehicle - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means a cargo-carrying vehicle such as an automobile, van, tractor, truck, semitrailer, tank car or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, rail car, etc.) is a separate transport vehicle."

Transportation or Transport - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the movement of property and loading, unloading, or storage incidental to that movement."

Total Effective Dose Equivalent- Also known by the acronym TEDE. As defined in UAC R313-12-3 "the sum of the effective dose equivalent for external exposures and the committed effective dose equivalent for internal exposures." (TEDE=EDE+CEDE)

Total Organ Dose Equivalent - Also known by the acronym TODE. As defined in UAC R313-12-3 "means the sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose. (TODE=DDE+CDE)

Unintentional Release - As defined in 49 CFR 171.8, as incorporated by reference in UAC R313-19-100, "means the escape of a hazardous material from a package on an occasion not anticipated or planned. This includes releases resulting from collision, package failures, human error, criminal activity, negligence, improper packing, or unusual conditions such as the operation of pressure relief devices as a result of over-pressurization, overfill or fire exposure. It

does not include releases, such as venting of packages, where allowed, and the operational discharge of contents from packages."

UAC - An acronym that stands for Utah Administrative Code. The Utah Administrative Code is the body of all effective administrative rules as compiled and organized by the State of Utah's Office of Administrative Rules. The State of Utah's Radiation Control Rules are found in Title R313 and the Ground Water Protection Rules are found in Title R317.

Units of Exposure and Dose - As defined by UAC R313-12-20(2)(b)&(c)(2) As used in these rules, the units of dose are:

(b) Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 erg per gram or 0.01 joule per kilogram. One rad equals 0.01 Gy.
(c) Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor. One rem equals 0.01 Sv.

Units of Radioactivity - As defined by UAC R313-12-40. For purposes of these rules, activity is expressed in the SI unit of becquerel (Bq), or in the special unit of curie (Ci), or their multiples, or disintegrations or transformations per unit of time.

Unrestricted Area - As defined by UAC R313-12-3 "means an area, to which access is neither limited nor controlled by the Licensee or registrant. For purposes of these rules, "uncontrolled area" is an equivalent term."

Waste - As defined in UAC R313-12-3 "means those low-level radioactive wastes containing radioactive material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in paragraphs (b), (c), and (d) of the definition of byproduct material found in Section R313-12-3."

Week - As defined in UAC R313-12-3 "means seven consecutive days starting on Sunday."

Whole Body - As defined in UAC R313-12-3 "means, for purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knees."

Worker - As defined in UAC R313-12-3 "means an individual engaged in work under a license issued by the Director and controlled by a Licensee or registrant, but does not include the Licensee or registrant."

Year - As defined in UAC R313-12-3 "means the period of time beginning in January used to determine compliance with the provisions of these rules."

Yellowcake - From the glossary at nrc.gov. "The solid form of mixed uranium oxide, which is produced from uranium ore in the uranium recovery (milling) process. The material is a mixture of uranium oxides, which can vary in proportion and color from yellow to orange to dark green

(blackish) depending on the temperature at which the material is dried (which affects the level of hydration and impurities), with higher drying temperatures producing a darker and less soluble material. Yellowcake was commonly referred to as U_3O_8, because that chemical compound historically comprised the majority of the yellowcake produced by uranium recovery facilities utilizing conventional milling methods. Most modern uranium recovery facilities utilize in situ recovery methods and produce a yellowish compound comprised mostly of uranyl peroxide dihydrate. This material is then transported to a uranium conversion facility, where it is transformed into uranium hexafluoride (UF_6), in preparation for fabricating fuel for nuclear reactors."

INTRODUCTION

The Radiation Control Act, Utah Code Title 19 Chapter 3, provides the Department of Environmental Quality's Waste Management and Radiation Control Board the authority to make rules to protect the public and environment from significant sources of radiation. The Division of Waste Management and Radiation Control (DWMRC or the Division) is the agency charged with administering these rules and regulating activities in the State of Utah that involve radioactive materials. Pursuant to regulation implementation, the Division has issued a RML to the Licensee to possess and manage radioactive materials and 11e.(2) byproduct material. In order to assist the Division in ensuring that all applicable regulatory requirements are currently being satisfied and will continue to be satisfied, the applicable statutes require EFRI to renew its RML every ten years. Whenever a Licensee submits a complete renewal application, the existing license is automatically extended in legal effect until such time as the Division has completed its review of the renewal application and is prepared to take final action. The review process typically occurs relatively swiftly. However, in this matter, significant public comments were received in 2011 that resulted in the Division requiring EFRI to undertake new work. At that time, the Division also took responsibility for completing an exposure model, a process that required several years.

As part of its legal responsibility, the Division enforces requirements defined by the State of Utah rules. The specific rule that deals with uranium mills is found in the Utah Administrative Code (UAC), Section R313-24, "Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements." Section R313-24 references other rules that are contained in the UAC including: Sections R313-12 "General Provisions", R313-15, "Standards for Protection Against Radiation", R313-18 "Notices, Instructions and Reports to Workers by Licensees or Registrants - Inspections", R313-19 "Requirements of General Applicability to Licensing of Radioactive Material", R313-21 "General Licenses", R313-22, "Specific Licenses" and R313-70 "Payments, Categories and Types of Fees." Federal regulations and NRC Regulatory Guides are also applicable via reference in UAC R313-24, in License Conditions contained in EFRI's RML and in the License Renewal Application.

The White Mesa Mill is licensed by the Division under State of Utah Radioactive Materials License No. UT1900479 (License or RML). This license and its amendments authorize Energy Fuels Resources (USA) Inc. (Energy Fuels or EFRI)[1] to receive and process natural uranium-bearing ores and certain specified alternate feed materials, to dispose of certain specified byproduct materials, and to possess byproduct material in the form of uranium milling tailings and other uranium byproducts generated by milling operations.

[1] The entity that owns the White Mesa Uranium Mill has changed or gone by different names over the life of the Mill, including International Uranium Corporation, Denison Mines Corp., and Energy Fuels Inc. To avoid confusion and unless otherwise specified, the name "Energy Fuels" will be used in this Public Participation Summary to refer to the owner of the White Mesa Mill.

The Division prepared a Technical Evaluation and Environmental Assessment (TEEA) to supplement the Safety Evaluation Report (SER) that the Utah Division of Radiation Control (formerly DRC) released in October of 2011. The SER and the TEEA are to identify and summarize the information the Division of Waste Management and Radiation Control (formerly DRC) evaluated in its review of Energy Fuels Resources, Inc. (formally Denison Mines Corp.) (Licensee) White Mesa Mill's February 2007 License Renewal Application (LRA) and supplement information provided by EFRI to the Division in response to interrogatories.

(See https://deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm)

These documents provided the grounds upon which the Division staff concluded whether regulatory requirements were satisfied for the renewal of EFRI's radioactive materials license (RML).

Summary of Comments Received

A 60-day public comment period started on Monday, May 1, 2017, when the public notice was published in the Salt Lake Tribune and the San Juan County Record and posted on the Division webpage. The public comment period would have ended at 5:00 p.m. on Friday, June 30, 2017. However, a written request to extend the comment period was received by the Division. The Director decided to grant the extension request; thereby the public comment period ended on July 31, 2017.

A Hearing was held on Thursday June 8, 2017 in Salt Lake City Utah. The purpose of this Hearing was to meet the requirements of the Atomic Energy Act for Agreement States to allow the opportunity for cross examination found in 42 U.S.C. § 2021(o)(3)(A)(i)(ii). Four organizations participated in this Hearing.

Organization	Representative
GreenAction for Health and Environmental Justice	Bradley Angel
Grand Canyon Trust	Aaron Paul
Ute Mountain Ute Tribe	Scott Clow and Michael Keller
Uranium Watch	Sarah Fields

Five additional people also provided oral comments at the conclusion of the Hearing. A public meeting was held on Wednesday June 15, 2017 in Blanding Utah. Approximately 100 people came to the meeting in Blanding with 34 people providing comment. Three people and the four organizations from the hearing also provided comments in Blanding.

533 people and organizations provided 93 unique comments by email and letter. Of the 93 unique comments, 18 where in favor of the proposed licensing and permitting actions and 75 were against. Below is a table showing the breakdown of the comments received.

Types of Comments Received	Number of People/Organizations
Oral Comments	36

Form Letter #1	37
Form Letter #2	4
Form Email #1	149
Form Email #2	252
Form Email #3	4
Form Email #4	5
Unique Emails	51

Document Format:
Each unique comment will be given a number. The larger comments from the Ute Mountain Ute Tribe, the Grand Canyon Trust and Uranium Watch will have more than one number. The Division will identify the topics identified by the people/organizations that require a response. Each Division Response will be numbered and a list of public comments will assigned to the Division Response.

White Mesa Uranium Mill RML History

The following is a timeline of transfer of controls and license renewal events associated with the White Mesa Uranium Mill:

- February 6, 1978, Energy Fuels Nuclear, Inc. (EFN) applied to the Nuclear Regulatory Commission (NRC) for a source and byproduct material license to construct and operate the White Mesa uranium milling facility located approximately 9.5. kilometers. (6 miles) south of Blanding, Utah. (NRC, 1997)
- August 7, 1979, the NRC Issued Source Material License SUA-1358. (NRC, 1997)
- 1984 Union Carbide Corporation, later Umetco Minerals, became majority owner of White Mesa Uranium Mill (Denison, 2011).
- The NRC SUA-1358 was renewed by the NRC in 1985.
- May 1994, Source Material License SUA-1358 and control and 100% ownership of the White Mesa Mill were transferred from Umetco to EFN. (NRC, 1997)
- May 1997, International Uranium (USA) Corporation (IUC) purchased the Mill from EFN (Denison, 2011).
- The White Mesa Uranium Mill's RML was last renewed by the United States Nuclear Regulatory Commission ("NRC") on March 31, 1997, for 10 years, and was up for timely renewal on March 31, 2007 in accordance with Utah Administrative Code ("UAC") R313-22-36.2
- August 2004, the State of Utah became an agreement State with the NRC for 11e.(2) Licenses
- February 2007, Denison Mines submitted a RML renewal application.
- March 29, 2007, the operator of the Facility became Denison Mines (USA) Corp when Denison Mines Corp. merged with International Uranium Corporation, the parent company of IUC (Denison, 2011).
- October 2011, the DRC went to public comment to renew the RML. The 2011 Safety Evaluation Report with supporting documents can be found online at http://www.deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm
- August 24, 2012, control of the RML was transferred to Energy Fuels (Amendment #5) after it bought the White Mesa Mill from Denison Mines
- May 2017, Division goes back out to public comment to complete the renewal of the RML

Since the original request for public comment in October 2011, three more RML amendments occurred. The explanation for each amendment can be found in the statement of basis or SER for each amendment at http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm. Brief descriptions of each amendment are as follows:

- Amendment #5- Transferred the RML and GWQDP from Denison Mines Corp. to Energy Fuels Inc.
- Amendment #6- Changed the name of the company who holds the surety bond referenced in License Condition 9.5.
- Amendment # 7- Approved a new alternate feed material from Dawn Mining. Found online including supporting documents at https://deq.utah.gov/businesses/E/energyfuels/requests/dawnmining.htm.

References

Denison Mines (USA) Corp (2011), White Mesa Mill Reclamation Plan for the White Mesa Mill and Tailings Management System, Rev. 3.2, Denver, CO.

U.S. Nuclear Regulatory Commission (NRC) (1997), Environmental Assessment for Renewal of Source Material License No. SUA-1358 Energy Fuels Nuclear, Inc. White Mesa Uranium Mill, San Juan County, Utah, Office of Nuclear Material Safety and Safeguards, Division of Waste Management

SECTION 1.0 DIVISION GENERAL RESPONSES

Division General Response #01

The Division received many comments regarding the present, proposed renewal licensing action. These comments are now part of the official administrative record in this matter. The Division would like to thank everyone who provided comments. These comments have assisted the Division in making its final determination about whether granting the renewal permit is warranted based on a more complete administrative record than existed at the time that the renewal license was proposed.

Comments were made both in favor and in opposition to the Division's proposed renewal of the White Mesa Uranium Mill's (Mill) radioactive materials license (RML), together with other related, proposed actions involving the processing of certain byproduct materials. Commenting parties both for and against the RML renewal and other related actions appear to be from a broad demographic of individuals and include individuals from the local Native American population.

In general, individuals in favor of the RML renewal and other related actions are from San Juan County and support the Mill for economic reasons. The individuals cited the jobs that the Mill provides, both directly and indirectly. The individuals also discussed the taxes the Mill pays which help to pay for local public services such as the area's schools. Many of the commenting individuals claimed that they are working, have worked, or have had family that has worked in the area's uranium mines and the Mill. Because of this, the individuals indicated that they are familiar with the potential risks to the health and safety of individuals and to the environment. Knowing the potential risks, these individuals feel that those risks are minimal.

The individuals opposed to the proposed licensing actions were from various locations across the United States. Several of the individuals opposing the licensing actions were from San Juan County and many others were from the remaining areas in the State of Utah and the other states comprising the Four Corners: Colorado, New Mexico and Arizona. In general, the individuals opposing the Mill do so because they are concerned for the health and safety of the local population and the environment. Many also have concerns that:

- The Mill's financial surety may not have enough funding to cover the cost of reclamation;
- The Mill and the Division are not sensitive to the Native American population in the area;
- The Mill endangers the Native American population;
- The Mill threatens archeological sites in the area;

- The tailing cells at the Mill are leaking and are contaminating the groundwater.; and
- The Mill is receiving radioactive materials that it is not allowed to receive and disposes of that radioactive material in the tailing cells.

During the public comment period, this re-licensing action resulted in public media attention, including a June 12, 2017 Salt Lake Tribune Editorial: *Rules for White Mesa uranium mill are not confidence inspiring* (the "Tribune Editorial"). Because many of the comments received re-stated the issues raised in the Tribune Editorial, a general response to the Tribune Editorial is warranted to provide accurate, fact-based information.

First, the Mill has not been operating without a license. Under Utah rules, licenses must be renewed every 10 years. If a timely renewal application is filed, as was done here, the existing license remains in legal effect until the Director is able to make a final determination on the renewal application. *See* Utah Administrative Code R313-22-36(1) (discussing "timely renewal" status). In this matter, the Division (technically, the former Division of Radiation Control or DRC, which was merged in 2015 with the former Division of Solid and Hazardous Waste to form the Division of Waste Management and Radiation Control), proposed to renew the license in 2011. Based on public comments received at that time, the DRC decided to hold off renewal until a number of technical issues raised in the public comments could be addressed. This process took several years to complete. During the entire time, the Mill has been operating under the existing license under "timely renewal" status under Utah (and NRC) regulations. The permit is not "expired" nor is the Mill "unlicensed" as claimed by the Tribune.

Second, there is no reason that the rules applicable to the Mill should not inspire public trust and confidence. The rules were developed by the federal Nuclear Regulatory Commission (NRC). The White Mesa Mill was licensed by the NRC in 1979. The Division took over for the NRC in 2004 but only after the NRC determined that state radiation control laws were equivalent to federal law.

The Division's uranium mill section employs a full-time staff of five environmental scientists and engineers, plus part-time support from others. Because White Mesa is the only operating uranium mill in the state, it is the subject of most of The Division's uranium mill section's time and attention. Staff conducts 18 routine inspections per year of the Mill, plus additional inspections as needed. The Division's staff is onsite at the Mill an average of 40 days per year and is very familiar with the details of Mill operations and conditions.

The NRC provides rigorous oversight of the Division's regulation of the Mill and has never raised any issues. This is not surprising since the Division's regulation of the Mill has been effective. For example, when the Division took over regulation of the Mill, there were only six groundwater monitoring wells that were monitored for only four constituents. Now there are 74 compliance groundwater monitoring wells that are regularly measured for some 38 constituents. Whereas NRC regulators inspected the Mill only once per year, the Division staff is present on site an average of 40 days per year. Whereas the NRC issued two notices of violation at the Mill (between 1979 and 2004) and imposed $0 in civil penalties, between 2004 and 2014, the Division issued some 38 notices of violation to Mill operators and imposed over $176,000 in civil penalties. The Division has not issued any notices of violation since 2014 because no

violations have been found. Finally, the financial assurance (bonding) for Mill closure has increased from approximately $10.5 million in 2004 to approximately $21 million today. The adequacy of the bonding is evaluated every year. The Division's independent review of the adequacy of the bonding supports the Division's conclusion that the current bonding amount is adequate to close the facility were Energy Fuels unable to do so.

Division General Response #02: Transportation

Several individuals were concerned with vehicles hauling ore, alternate feed and in-situ leaching (ISL) waste material to the Mill and vehicles taking yellowcake shipments from the Mill. All radioactive material shipments coming to and leaving the Mill must meet the transportation requirements specified in UAC R313-19-100 which incorporates many of the U.S. Department of Transportation (U.S. DOT) requirements for the transportation of radioactive materials. The transportation requirements that are not incorporated into the Utah Radiation Control Rules are enforced by the U.S. DOT. Shipments to and from the Mill must follow the applicable requirements for shipments of radioactive materials as LSA-1 shipments regardless if the enforcement jurisdiction is the Division's, the NRC's, or the U.S. DOT's.

In the past three years, there have been three incidents reported to the Utah Department of Environmental Quality and the Division by the companies that sent the radioactive materials shipments (shipper) and the Mill. The reported incidents were "leaking" radioactive materials from a shipment of radioactive materials that were to be delivered to the Mill. Until the material is received at the Mill, the shipper is responsible for the materials being sent to the Mill. Since the materials being sent to the Mill in these three cases were sent by companies holding an RML issued by the NRC, the shipper was under the NRC's jurisdiction. The Division's involvement in these incidents was limited to the collection of information and the provision of that information to the NRC. Information regarding the three reported leaking shipments (August 21, 2015, March 29, 2016 and January 12, 2017) was collected by the Division, provided to the NRC, and the NRC took the appropriate enforcement actions against the shipper. Surveys taken of the areas surrounding the "leaking vehicles" involved in these incidents were unable to detect any radiation levels above normal background levels. Due to the very small quantities of radioactive materials that were "leaked," the NRC deemed the amount of material lost as being of no significant health concern because it was less than a reportable quality.

The Utah Department of Environmental Quality's response, dated December 1, 2017, to an allegation letter to the NRC made by Uranium Watch, one of the commenting parties, regarding the foregoing transportation issues is included in the administrative record. In relevant part, it reads as follows:

> *"You also raised concerns to the NRC regarding the impacts of spills of radioactive materials, specifically citing "spills of materials being shipped to the Mill for direct disposal and processing." As you may be aware, the Division does not have regulatory jurisdiction over the transportation of radioactive materials. All radioactive material shipments coming to and leaving the Mill must meet U.S. DOT requirements.*

The spills to which you refer occurred while radioactive material was in transit, not at the White Mesa Facility. These events involve failures by generators and shippers, not Energy Fuels. The three leaking shipments that arrived at the Mill were reported to the Division (August 21, 2015, March 29, 2016 and January 12, 2017) as required. The Division's only involvement was collection of information for the NRC. The NRC took the lead in all three incidents because the companies that sent the leaking shipments are licensed by the NRC.

These incidents were investigated and the appropriate enforcement actions were taken by the NRC. In an enforcement meeting on May 4, 2017 (Docket number 40-08964), the NRC deemed the amount of material lost as being below reportable quantities and of no significant concern for the August 21, 2015 and March 29, 2016 incidents. Regarding the third incident (National Response Center Report #1168447), we are not aware of any additional actions by the NRC.

However, since most of the spill was contained within an enclosed transportation vehicle with a very small amount of material on the undercarriage of the truck, it is likely the NRC would also consider the amount of material to be below reportable quantities and of no significant concerns. The Division also believes that no threats to human health and the environment occurred as a result of these incidents and no further action is warranted. A review of the available radiological surveys of the trucks and transport containers confirms these conclusions."

Division General Response #03: Emergency Response

Some individuals, particularly those residing in the Ute Mountain Ute White Mesa Community have expressed a concern regarding the lack of a requirement to notify the White Mesa Community if an incident occurs at the Mill. In response to an inquiry from Lauren Kaljur regarding this issue, the Division stated the following in a letter dated July, 18, 2017.

"*The Utah Radioactive Materials License issued by the DWMRC does not require Energy Fuels Resources, Inc. (EFRI) to notify residents of the Community of Blanding or the residents of the White Mesa Community in the event of an accidental release of radioactive material or any emergency situation that arises. There are specific requirements contained in the Utah Administrative Code that require EFRI to report radioactive material incidents and releases of radioactive materials that meet certain criteria to the Director of the DWMRC within specified time frames. There are also various requirements in the Utah Administrative Code (UAC) that require EFRI to report events of accidental release of radioactive materials or other emergencies when certain conditions are met. The Utah Administrative Code also does not alleviate the Licensee from complying with reporting requirements to other Federal, State, or local agencies. However, the DWMRC would not have the authority to regulate compliance with the requirements from other agencies.*

The White Mesa Uranium Mill's Radioactive Material License (RML) License Condition 9.2 requires the Mill to notify the Division in accordance with UAC R313-15-1202 and R313-19-50. Due to the kinds and quantities of materials received and processed at the Mill, the typical

incident that may occur would require notification to the Division within 24 hours. EFRI would then be required to file a written report with the Division regarding the incident within 30 days. In the case of transportation incidents, the incident would be required to be reported in accordance with United States Department of Transportation requirements which would mean the shipper is responsible for reporting the incident in compliance with 49 CFR 171.15. The shipper is required to notify the National Response Center as soon as possible but no later than 12 hours after the incident. Please note that the Mill is not the shipper of the materials.

If the incident requires emergency response (i.e. a fire or a chemical spill) then the Mill would follow its Emergency Response Plan and contact local emergency responders (e.g. fire department, sheriff department, etc.)

The Division notes that the radioactive materials received and processed at the Mill are not high level radioactive materials. The final product the Mill produces is yellowcake which must go through conversion and enrichment at other facilities before it becomes concentrated to the point that it can be used as fuel for a nuclear power plant. The Mill is the first step in process and material at the Mill does not have the same level of hazards found at a nuclear power plant. The material at the Mill cannot cause a fission event to occur, so the emergency response requirements for power plants do not apply to the Mill.

It appears that members of the White Mesa Community believe that the lack of notification to White Mesa Community is due to a lack of concern for the population of the community. The commenters insinuated that the City of Blanding is notified but the White Mesa Community is not notified which the commenters believe demonstrates that the citizens of Blanding are more valued than the citizens of the White Mesa Community. The Division understands that there are no specific requirements for the Mill to directly notify the citizens of either community if a significant incident occurs at the Mill. Therefore, the citizens of the City of Blanding are not notified by the Mill when an incident occurs.

As with any other business in the State of Utah, the Mill would contact the local emergency responders if there was a need for a response from the police, the fire department, or for medical assistance. Since the White Mesa Community does not provide emergency services to the Mill, the Mill would not contact the emergency officials in White Mesa since the Mill is outside of the jurisdiction of the White Mesa Community. Since the police, the fire department, or medical assistance would be provided by the City of Blanding or San Juan County in case of an emergency at the Mill, the Mill would contact those emergency officials, not the emergency officials in the White Mesa Community. Although it is very unlikely that an incident requiring the citizens of the City of Blanding or the Community of White Mesa to evacuate due to radiation exposure levels would ever occur, if the citizens in either Blanding or White Mesa need to take specific actions due to an incident at the Mill, emergency personnel are much more efficient at notifying necessary emergency personnel in surrounding jurisdictions and the citizens in those jurisdictions of any necessary actions that need to be taken. Mill personnel will not have time to make multiple phone calls to different jurisdictions since they would either be addressing the emergency issue or evacuating the area themselves. By notifying the local emergency personnel for their facility, the Mill has effectively the opened the emergency network and notification process for the surrounding jurisdictions. If additional jurisdictions would be

involved in the response to an incident, emergency personnel have set protocols and are much more efficient in notifying all of the necessary emergency personnel regarding the need for response.

Take for example a natural gas leak at a business in an unincorporated portion of Salt Lake County that is very near the boundary of West Valley City and perhaps the boundary of the city of West Jordan. The natural gas may cause an explosion so individuals in the areas surrounding the business must be evacuated. This means that citizens in three jurisdictions, Unincorporated Salt Lake County, West Valley City, and the city of West Jordan, would need to be evacuated. The business would contact the emergency services for Unincorporated Salt Lake County to respond to the gas leak. Because the business is not notifying the City of West Jordan and West Valley City, the business is not discriminating against the individuals in either of the cities. Typically, individuals are only aware of the emergency personnel for the area where they live and/or work. Therefore, personnel at the business would only call the emergency personnel that would respond to their business which would be the emergency services for Salt Lake County (the Sheriff's Office & the County Fire Personnel). The business is allowing emergency personnel in all jurisdictions to function as they have been trained. The business would not directly call the emergency personnel for the City of West Jordan and the emergency personnel for West Valley City, dispatch would notify those jurisdictions, as necessary, once a determination as to whether or not evacuation was necessary. If it was found that an evacuation was necessary, the Sheriff's Office would start evacuating individuals close to the business and would keep in contact with the other jurisdictions to have them take the necessary actions in their cities. The Sheriff's Office would not delay evacuating individuals in other jurisdictions if individuals were in immediate danger and the other jurisdictions had not yet responded; but would turn the evacuation notifications over to the other city's emergency personnel when that city's emergency personnel arrived. Although some of the following incident examples would pose more of a hazard than an incident at the Mill might pose, an incident at the Mill would not be handled any differently than an incident at a large manufacturing business involving chemicals, at a refinery, involving a tanker carrying jet fuel, an incident on the highway involving a tanker carrying chlorine gas; at any location involving a natural gas leak, etc. Because of this, the Mill would contact the emergency response personnel that would respond to their site in case of an emergency and rely on the emergency network to function as it is designed for the notification of other jurisdictions.

The incidents that have occurred at the Mill are not incidents that have caused an issue for individuals in either the City of Blanding or the White Mesa Community. Because of the characteristics the levels of radioactive materials located at the Mill cannot result in the catastrophic results that many individuals picture when they think of radiation (mushroom clouds, Fukushima, Chernobyl, etc.). Because of the potential of criticality that may occur at a nuclear power plant and the high radiation levels that can occur and be released if criticality occurs, there are specific emergency procedures that nuclear power plants must adhere to when an event occurs that include nuclear power plants to notify the public and provide specific instructions regarding actions for the public to take. Power plants are required to have periodic drills to ensure that emergency personnel in the surrounding communities are well trained and prepared to deal with the emergencies, to ensure that notification systems are functioning as designed, etc. Since the materials received and processed at the Mill are only the first step in

creating the nuclear fuel used in a nuclear power plant, the radioactive materials do not contain the concentrated high grade uranium that is present at the nuclear power plants and cannot have a criticality accident. In fact much of the material received at the Mill is found in nature and is delivered to the Mill without any modification from its natural state. Due to this fact, the same hazards that exist at a nuclear power plant do not exist at the Mill (nothing on the scale of Chernobyl or Fukushima can occur at the Mill). Because criticality cannot occur at the Mill, the same emergency requirements that are in place for nuclear power plants do not apply to the Mill, so the specific emergency procedures including the drills, notifications to the public, public instruction, etc., required for nuclear power plants do not apply to the Mill. Therefore, the Mill is not required to notify the citizens of either the City of Blanding or the White Mesa Community of incidents or emergences that occur at the Mill's site.

Division General Response #04: Alternate Feed and 11e(2) Disposal

Many commenters have stated that alternate feed material is not “ore." The Division disagrees with these comments for a number of reasons. This legal question is a matter of federal law. The Division uses the definition of ore developed by the NRC for the regulation of alternate feeds and for alternate feed guidance documents. The present definition of "ore" used by the NRC is in response to a court interpretation (Kerr-Mcgee vs NRC) of what ore is in relation to the AEA. Since the NRC is bound by the court's decision, the Division is also bound by the court's decision and must recognize alternate feed as ore.

Other commenters have argued that alternate feed materials, specifically those from Sequoyah Fuels, are “waste” and do not meet the definition of 11e.(2), byproduct material. The Division disagrees. This comment is not supported as a matter of law. The material from Sequoyah Fuels and similar materials are legally classified as “byproduct material” under federal law. This material is a form of ore. As to all such material, the U.S. Department of Energy has statutory stewardship. It is the policy of the U.S. Department of Energy to limit the total number of byproduct material processing sites by consolidating byproduct material generated at certain sites and requiring re-location and consolidation of byproduct materials in approved locations. The White Mesa Uranium Mill is one of the locations the U.S. Department of Energy has approved for receipt of byproduct material. This is so because the Mill has the technology to recover useful radionuclides from byproduct material. The facility is also designed and licensed for the ultimate disposal of spent tailings materials. Thus, the useful portion of byproduct materials is removed and used and the residual solids (tailings) are disposed of, along with other ore-derived tailings, pursuant to the license. The Division does not have jurisdiction to make or interfere with these determinations. These comments would be more appropriately directed to the U.S. Department of Energy and/or the U.S. Nuclear Regulatory Commission.

These legal questions have been settled law for many years. In the late 1990s, the state of Utah submitted objections to the NRC that are similar to those presented here. In the Tonawanda Alternate Feed Case (also known as Ashland 2), the state of Utah objected to the proposed shipment of byproduct material to the White Mesa Mill (then owned by International Uranium (USA) Corporation) based on the theory that the receipt of byproduct material was “sham disposal” of radioactive waste. The Administrative Judge held that the material was byproduct material and rejected the state’s “sham disposal” argument. *See In the matter of International*

Uranium (USA) Corporation (Receipt of Material from Tonawanda, New York), Docket No. 40-8681-MLA-4 (February 9, 1999). The Administrative Law Judge's Decision included the following regarding holding regarding the scope of the definition of 11e.(2) byproduct material: "Congress enacted the 11e.(2) definition, which expressly declared mill tailings to be a form of byproduct material. […] [T]ailings generated during uranium milling operations would 'formally be byproducts rather than waste.'"[2]

The entire five-member Nuclear Regulatory Commission affirmed this decision under the same docket reference, in a decision dated February 10, 2000. The NRC reasoned that so long as more than a minute or negligible recovery of uranium were possible from the material, there was no issue of sham disposal of byproduct material at the White Mesa Mill. *Id.* at 21. The Division is legally bound to follow these federal requirements.

Furthermore, the Division notes that once the tailings settle out, the liquid portion of the plant discharge that is introduced into the tailings management system is recirculated into the plant process to recover additional uranium values and to take advantage of the chemical makeup of the fluid. Therefore, neither the liquid nor the solid portion of the tailings can properly be declared "waste" as a matter of federal or state law. Characterizing the plant operation for which the Division has received a license renewal application as a "waste disposal" operation is not accurate.

The Governor of the State of Utah signed an agreement with the NRC to become an Agreement State. The Division was delegated the regulatory authority over radioactive materials in the State of Utah, including the regulation of uranium recovery facilities. As stated above, the Division uses the definition of ore derived from an interpretation provided by a court of law and adopted by the NRC. Since the definition of ore and alternate feeds has been challenged in the past and the resulting definition and interpretation is now in use by the State of Utah, a new challenge regarding this definition and interpretation would need to be made to the NRC and potentially the courts. Until the NRC revises the presently used interpretation and definition of "ore," the Division will continue to use the current definition and the approved interpretation. A summary of the history for the present definition and interpretation of the term, "ore," is found in the table below.

Summary for the History of the Definition and Interpretation of Alternate Feed

Year	Description
1990	In the Kerr-McGee vs. NRC court decision, which was argued before the United States Court of Appeals, District of Columbia Circuit in 1989, Kerr-Mcgee challenged the NRC's definition of byproduct material. In the Background section the court describes the regulatory framework of this decision and how the AEA and UMTRCA apply to the decision. In the Factual Background section the court describes how Kerr-Mcgee owned a

[2] ML14133A521 p. 10

	Thorium Mill near West Chicago, Illinois. It also discusses that a portion of the material processed for its thorium content was first processed for its rare earth minerals content. At that time, the NRC determined that this material was not considered byproduct material because it had been previously processed before it was reprocessed for its thorium content and it would be classified as source material. The court also discussed that the material that was processed for the rare earth content as well as the thorium content were identical to the material that was processed for its thorium content in physical composition and in potential health hazards. In the Discussion section the court discusses the definition of ore. It states “The word "ore" is also subject to more than one meaning. In fact, there is ample basis within the AEA for applying the term to the stockpiled material remaining after the rare earth had been extracted from the feedstock ore and before that material had been processed for its thorium content. For example, section 101 of the UMTRCA states that "[a] license for the production of any uranium product from residual radioactive materials shall not be treated as a license for production from ores ... if such production is in accordance with section 7918(b) of this title." 42 U.S.C. Sec. 7911(6) (1982) (emphasis added). The clear implication is that if such production is not in accordance with section 7918(b), then production from residual radioactive materials may be treated as production from ores. Moreover, the NRC's designation of the offsite tailings as "source material" implies that they may be properly categorized as "ore" because the NRC defines source material as "ores which contain by weight ... (0.05%) or more of ... thorium." 10 C.F.R. Sec. 40.4(h) (emphasis added); see also 42 U.S.C. Sec. 2014(z) (statutory definition of source material). The NRC cannot have it both ways. If the offsite tailings may be characterized as ore, so must the stockpiled material from which they were derived. The NRC's construction is not saved by the happenstance that the tailings in this case have a sufficiently high thorium content (0.05% or more by weight) to enable the agency to classify the offsite wastes as "source material" and therefore subject to its licensing authority under another part of the AEA. In the first place, statutory definitions are intended to have general applicability. A construction of section 11(e)(2) is not acceptable if it will orphan mill tailings having a source material content of less than the 0.05% threshold, as is usually the case. Second, the NRC's interpretation would exclude the offsite wastes from coverage by the regulations promulgated pursuant to Title II that are designed to protect the public health against the hazards created by mill tailings produced in the course of the nuclear fuel cycle.” In the Conclusion section the court states “The UMTRCA was intended to bring previously unregulated radioactive end products of the source material extraction process within the scope of NRC regulation and to provide a comprehensive remedial program for the safe stabilization and disposal of uranium and thorium mill tailings. The NRC's interpretation of section 11(e)(2), however, places a portion of

	the thorium tailings from Kerr-McGee's West Chicago facility outside of the UMTRCA's regulatory regime even though they are in all relevant ways identical to tailings found by the NRC to be byproduct material and thus subject to the UMTRCA's remedial program. The NRC's construction thus frustrates the purposes of the UMTRCA by rendering it inapplicable to waste material that it was clearly intended to reach and recreating a jurisdictional gap it was intended to close. As we find that interpretation impermissible, and as we have considered the other arguments put forth by Illinois and Kerr-McGee and found them without merit, we grant the petitions for review in Nos. 88-1636 and 88-1726, and deny the petition for review in No. 87-1254." See the full court decision in Attachment 5
1992	In the May 13, 1992 publication of the Federal Register pgs. 20530 -20533 the NRC published its first discussion of alternate feeds being used as "ores" for the extraction of source material such as uranium. This included a discussion the 11e section of the AEA and examples of NRC licensing actions which allowed the processing of alternate feed materials. The NRC recognizes that the AEA and UMTRCA do not have a definition of "ore" and refers to the court decision of Kerr-McGee vs. NRC and its definition of ore as it applies to the AEA and UMTRCA. The NRC also discusses the definition of 11e.(2) byproduct material and the importance of the word "any" in that definition. The NRC then proposed its own definition as "Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill." This definition took in account two major consideration: 1. It is broad enough to include a wide variety of feed materials. 2. The definition continues to be tied into the nuclear fuel cycle. The remainder of the discussion revolves around the issues with RCRA, low-level radioactive waste and alternate feeds. See a copy of the 1992 Federal Register in Attachment 5
1995	On August 15, 1995 the NRC publishes SECY-95-211 titled *FINAL "REVISED GUIDANCE ON DISPOSAL OF NON-ATOMIC ENERGY ACT OF 1954, SECTION 11e.(2) BYPRODUCT MATERIAL IN TAILINGS IMPOUNDMENTS," AND FINAL "POSITION AND GUIDANCE ON THE USE OF URANIUM MILL FEED MATERIALS OTHER THAN NATURAL ORES"*. In the Background section of this document the NRC discusses the history of the development of this guidance document. The document discusses what needs to be reviewed and determined to approve an alternate feed to be used as an "ore" for source material. See a copy of SECY 95-211 in Attachment 5
1995	In the September 22, 1995 publication of the Federal Register pgs. 49296 and 49297, The NRC finalizes the Uranium Mill guidance document for the use of Uranium Mill Feed Material Other than Natural Ores. In the discussion three criteria are identified to assist Staff for determining if an alternate feed can be processed as an

	ore. 1. Determination of whether the feed material is ore. To do this the following definition is to be used “Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill.” 2. Determination of whether the feed material contains hazardous waste. So if the material contains listed waste under subpart D of RCRA, than the material would not be accepted to avoid dual regulation of the material by the NRC/EPA. 3. Determination of whether the ore is being processed primarily for its source material content. This is to be done by the Co-disposal test and the Licensee certification and justification test. See a copy of the 1995 Federal Register in Attachment 5
1998	The State of Utah filed a Request for Hearing and Petition for Leave to Intervene in the Ashland 2 alternate feed license amendment request. The State of Utah argued that the NRC staff improperly granted the license amendment because the Mill was not processing the Ashland 2 material "primarily" to recover its relatively minimal uranium content, but rather to obtain the generous handling and disposal fee. The State of Utah also emphasized that Mill's license amendment application failed to adequately substantiate that the material was to be "processed primarily" for its uranium content. The State of Utah insisted upon "some objective documentation" to show that recovery of the uranium, not payment for disposal, was Mill's primary interest behind the license amendment.
2000	The NRC issues its decision on the State of Utah’s Petition to Intervene in the Ashland 2 alternate feed license amendment request. According to this document the issue in this proceeding is the Atomic Energy Act's definition of 11e.(2) material, defined by the statute as "the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." The NRC’s Presiding Officer explained, "[i]f ... the material were processed primarily to remove some other substances (vanadium, titanium, coal, etc.) and the extraction of uranium was incidental, then the processing would not fall within the statutory test and it would not be byproduct material within the meaning of the Atomic Energy Act. That is, the adverb 'primarily,' applies to what is removed from the material by the process and not to the motivation for undertaking the process." The Presiding Officer went on to conclude that the NRC staff appropriately granted the license amendment because IUSA "is milling ore" to extract uranium and therefore is "not involved in a sham." The Presiding Officer also rejected Utah's claim that the Guidance was intended to prevent material from being categorized as 11e .(2) byproduct material if the Licensee's primary economic motive was to receive a fee for waste disposal instead of to recover the uranium. "The Alternate Feed Guidance," the Presiding Officer stated, "is not supportive of the position, taken by the State of Utah, that material is to be considered byproduct only if the primary economic motivation is to remove uranium rather than to dispose of waste."

	The NRC further described the purposes behind the wording of § 11e.(2)'s definition served: (1) to expand the types of materials that properly could be classified as byproduct material; (2) to make clear that even feedstock containing less than 0.05% source material could qualify as byproduct material; and (3) to assure that the NRC's jurisdiction did not cross over into activities unrelated to the nuclear fuel cycle. The Mill's license amendment was consistent with these statutory intentions, regardless of whether Mill's bigger interest was payment for taking the material or payment for the recovered uranium. Indeed, even accepting the State of Utah's claim that the four million dollar payment the Mill contracted to receive for processing and disposing of the Ashland 2 FUSRAP site material was the primary motivator for this transaction, the tailings generated from the processing can still properly be classified as § 11e.(2) byproduct material. See the NRC Decision in Attachment 5
2004	State of Utah becomes an Agreement State for Uranium Recovery

There were comments regarding the disposal of In-situ Leach (ISL) material from other uranium recovery sites. License Condition 10.5 allows the disposal of byproduct material from other 11e.(2) facilities such as ISL Uranium Recovery facilities (aka In-situ Recovery) in limited quantities at the Mill's tailings cells. Decommissioning byproduct from ISL facilities is considered to be uranium byproduct material as defined by the AEA. By definition in UAC R313-12-3 byproduct material is not considered waste. 11e.(2) disposal is in line with 10 CFR 40 Appendix A Criterion 2 (as incorporated by reference in UAC R313-24-4) which states "To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations must be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations."

Division General Response #05: Sequoyah Fuels Alternate Feed Amendment

Many individuals commented that the Sequoyah Fuels material is a waste; however, the NRC classified this material as 11e(2) byproduct material in 2002. The Division disagrees with the commenters. This question of federal law has long been settled beyond dispute. The NRC discussed its determination in the NRC document, *SECY-02-0095, "Applicability of Section 11e.(2) of the Atomic Energy Act to Material at the Sequoyah Fuels Corporation Uranium Conversion Facility*." Because the Sequoyah Fuel material is 11e(2) byproduct material, the material can be placed directly into the Mill's tailing cells without processing. Since the NRC determined that the Sequoyah Fuel material is 11.e(2) byproduct material and the material meets the definition of ore as determined and interpreted by the courts, the Sequoyah Fuels Material is byproduct material, not waste. The legal determinations on this topic are settled and are not subject to collateral attack.

One individual challenged the Division's determination that the Sequoyah Fuels material is an ore. Based on the interpretation and the definition of "ore" as decided by the courts and the Commission, the materials in question are considered to be an "ore." This comment constitutes an impermissible collateral attack on a settled legal question.

The Governor of the State of Utah signed an agreement with the NRC to become an Agreement State. The Division was delegated the regulatory authority over radioactive materials in the State of Utah, including the regulation of uranium recovery facilities. As stated above, the Division uses the definition of ore derived from an interpretation provided by a court of law and adopted by the NRC. Since the definition of ore and alternate feeds has been challenged in the past and the resulting definition is now in use by the State of Utah, a new challenge regarding this definition would need to be made to the NRC. Until the NRC revises the presently used definition of ore, the Division will continue to use the current definition.

The same individual commented that an environmental analysis was not conducted for the Sequoyah Fuels alternate feed material. The Division disagrees with this comment. There appears to be a misinterpretation of the requirements in 42 USC §2021(o)(3)(C). The commenter has concentrated on the requirements in 42 USC §2021(o)(3)(C), but failed to read the lead-in statements found in §2021(o) and §2021(o)(3), If read in its entirety, 42 USC §2021(o)(3)(C) requires that the Agreement States have procedures for compliance with 42 USC §2021(o)(3)(C). This means that the Division, as the regulatory entity in the State of Utah, must have procedures that ensure the analysis has been conducted, but does not necessarily conduct the analysis. The Division may review an analysis that was written by EFRI or by a consultant to ensure that the requirements in 42 USC §2021(o)(3)(C) were followed. Since that is the case, an environmental analysis was conducted by URS . Specifically, it is the May 2015 Safety Evaluation Report prepared by URS Professional Solutions , LLC. It meets all of the regulatory requirements of R313-24-3 and the AEA [42 USC §2021(o)(3)(C)].

The same commenter asked why the Division did not evaluate why the Sequoyah Fuels material was not shipped to EnergySolutions' Clive facility. The Division disagrees. This issue goes beyond the scope of the Division's jurisdiction. The Division does not dictate how companies make business decisions not related to regulatory compliance. Therefore, it is up to the owner of the material to determine the different long-term disposition options for the Sequoyah fuels material. The determination regarding the final recipient of the material is the responsibility of the individuals cleaning up the Sequoyah Fuels site in Gore, Oklahoma. As part of the owner's determination, the Division was asked to determine whether the material could be used as an alternate feed for uranium recovery. The Division's responsibility was to determine if the material could be sent to the White Mesa Mill as alternate feed material or not.

Another individual asked why Energy Fuels would be allowed to take the Sequoyah Fuels material if EnergySolutions was not allowed to take the Sequoyah Fuels material at the Clive facility because of the high uranium content. There are two parts to this question. For the first part, the EnergySolutions Clive facility is a different facility than the Energy Fuels White Mesa Mill facility and each facility has unique requirements. The RML held by EnergySolutions may not allow it to receive the Sequoyah Fuel material for the simple reason that EnergySolutions

may not have requested approval for that material. However, it is likely that EnergySolutions could have received the Sequoyah Fuels material for disposal had a request been made. Secondly, the alleged high uranium content of the Sequoyah Fuels material supports a determination that this material is an appropriate feedstock for recovery of that uranium rather than wasting the resource through disposal at Clive. The proposal before the Division involves the processing the Sequoyah Fuels material to recover uranium.

Division General Response #06: Tribal Consultation
The Ute Mountain Ute Tribe (Tribe) has raised a concern that the Division has not communicated with the Tribe in matters related to the White Mesa Mill. The Division disagrees with this comment because it is not supported by facts. The Division has engaged in extensive communication and outreach with the Tribe on a regular basis. Attached is a summary of the formal communication and outreach efforts by the Division with the Tribe (see Attachment 5). This summary does not include informal contacts with professional representatives of the tribe nor any formal meetings that were held with individuals who retired from the Division before this document was written.

In the Division's considered view, the issue is not that the Division does not communicate with the Tribe, but that they often have differing opinions. A secondary issue is that it is not always clear to the Division which specific people are representing the Tribe at any given time. To ensure that communication between the Tribe and the Division is occurring as the Tribe leader(s) have requested, it would be helpful if the Tribal leader(s) confirms, in writing, that the Division is to continue to communicate with the Tribe's Environmental Office regarding all matters related to the White Mesa Mill. If the Tribe leader(s) desire(s) that the Division communicate with a different office or individual(s) than previously identified by the Tribe, the Tribal leader(s) need(s) to notify the Director of the Division, in writing, of the desired change. The Division will be happy to make a change regarding the points of contact for the Tribe whenever requested by the Tribal leader(s).

Division General Response #07: Environmental Monitoring
Several individuals had comments regarding the Mill's Environmental Monitoring program and the reporting of the environmental monitoring results. The Mill's Semi-Annual Effluent Monitoring program is based on the NRC Regulatory Guide 4.14, Revision 1, "Radiological Effluent and Environmental Monitoring at Uranium Mills," (Reg Guide 4.14) dated April 1980. This guidance describes programs that are acceptable to the NRC for measuring and reporting releases of radioactive materials to the environment from typical uranium mills. The information on radiation doses and the radionuclides in a mill's effluents and environment both prior to and during operations is needed "[t]o ascertain whether the regulatory requirements of the NRC (including 10 CFR Part 20 dose limits, release limits, and the 'as low as is reasonably achievable' requirement), mill license conditions, and the requirements of 40 CFR Part 190, 'Environmental Radiation Protection Standards for Nuclear Power Operations,' have been met." The Division has comparable requirements in UAC R313. Since the Mill's monitoring program complies with the guidelines that are acceptable to the NRC for gathering the necessary information to report to the Division, no changes to the Mill's environmental program is necessary. The Division will continue to review the Mill's operations and as necessary will require additional monitoring.

An example of the monitoring performed at the Mill is the use of thermoluminescent dosimeters to document gamma results at the Mill's monitoring stations. The gamma results are reported in the Mill's Semi-Annual Effluent Monitoring Reports (SAEMR). The SAEMRs are reviewed by the Division when they are received. Table 3 (below) shows the reported gamma monitoring results from 2015 and 2016. As demonstrated below, the annual gamma exposure from the Mill is below the regulatory limit of 100 mrem/year for a member of the public [R313-15-301(1)(a)] but must still be added to exposures from other pathways to determine actual compliance with the limit. The added pathways are evaluated through the MILDOS-Area software program. The software includes the evaluation through the inhalation and ingestion pathways in addition to the various external means of exposures. The SAEMRs are found on the Division webpage at: https://deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm

Table 3: Gamma Monitoring Results **

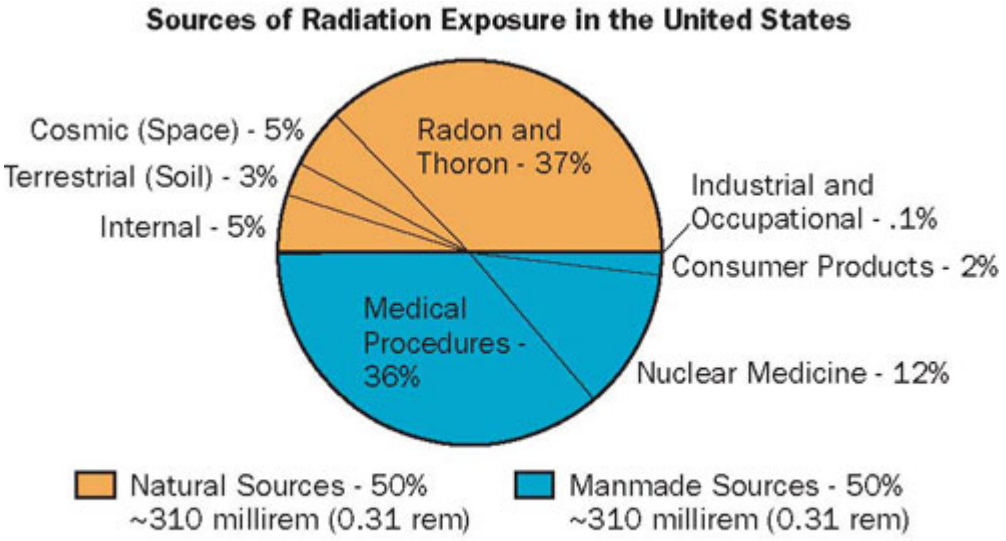
Monitoring Stations	2015				2016			
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
BHV-1	2.3	0.4	12.3	11.4	5.7	3.3	5.0	4.0
BHV-2	2.9	2.0	2.3	4.3	0.0	1.9	1.8	4.8
BHV-3*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BHV-4	0.2	0.0	6.1	3.6	0.0	0.0	0.0	1.2
BHV-5	3.2	3.1	10.1	13.1	3.9	2.4	0	2.1
BHV-6	0.0	4.9	6.1	0.6	1.0	0.0	0	0.4
BHV-7	0.6	0	7.2	3.3	0.0	0	0	4.3
BHV-8	0.0	0	9.5	3.4	0.0	1	0.8	1.8

** Results are reported in mrem/quarter
*Background location

Division General Response #08: Dose to the Public

Many commenters are concerned about the potential health impacts arising from exposure to radiation associated with Mill operations. These comments are understandable and the Division is sensitive to its role in protecting public health and welfare. The NRC and the state have established very conservative public exposure limits that the Licensee must meet at its property boundary in order to protect the general public. Under UAC R313-15-301(a), each holder of an RML in the State of Utah may not emit more than the total effective dose equivalent (TEDE) to any member of the public of 100 mrem (0.1 rem) above background radiation levels per year. UAC R313-15-101(d) also specifies that not more than 10 mrem(0.01 rem) of the 100 mrem TEDE limit can come from air emissions , radon excluded.

To put these public exposure limits into perspective, the 100 mrem TEDE limit is conservative. The average human living in the United States receives far more than 100 mrem per year from background and manmade radiation sources. According to NRC.gov in the Sources of Radiation section (https://www.nrc.gov/about-nrc/radiation/around-us/sources.html), the average person receives 620 mrem per year. Approximately half of that annual dose comes from background radiation and half comes from manmade sources of radiation.



Source: NCRP Report No.160(2009)
Full report is available on the NCRP Web site at www.NCRPpublications.org.

A list of some of the more common manmade sources that the public are exposed to is as follows:

- Medical Sources (by far, the most significant man-made source)
  - Diagnostic x-rays
  - Nuclear medicine procedures (iodine-131, cesium-137, and others)
- Consumer Products
  - Building and road construction materials
  - Combustible fuels, including gas and coal
  - X-ray security systems
  - Televisions
  - Fluorescent lamp starters
  - Smoke detectors (americium)
  - Luminous watches (tritium)
  - Lantern mantles (thorium)
  - Tobacco (polonium-210)
  - Ophthalmic glass used in eyeglasses
  - Some ceramics

Source: https://www.nrc.gov/about-nrc/radiation/around-us/sources/man-made-sources.html#indiv

Applied to the While Mesa Mill, the 100 mrem TEDE public dose limit is a theoretical number. There is a network of six radiation monitoring stations around the White Mesa Mill. The monitoring equipment measures radiation dose on a continuous basis. The total dose is calculated annually because the TEDE standard of 100 mrem is a public dose annual limit. Actual monitoring data from the White Mesa Mill shows that the potential TEDE at the property boundary is far below the NRC's 100 mrem limit. The ten-year average of the monitoring stations at the Mill property boundary is 10.9 mrem. Moreover, there generally exists an expanded buffer around the boundary of the White Mesa Mill property. The closest resident is

about 1 mile to the north. There are no residents to the west. To the south, the Ute Mountain Ute tribal property boundary is about 2.5 miles away from the Mill property boundary. This means that the actual TEDE public dose from the White Mesa Mill is likely even lower than the dose measured at the property boundary.

Compliance to this requirement is measured using the Mill's effluent monitoring program. EFRI submits the results from effluent monitoring twice a year and the Division staff reviews the results. In addition, computer modeling is occasionally used to confirm the Division staff reviews. For uranium milling the computer model that is used is call MILDOS-AREA.

The following monitoring data points are based on actual dose readings at points of compliance at specified locations at the White Mesa Mill property boundary. There are no residents contiguous to the mill property. The closest residents are to the northwest so the actual buffer between the Mill property boundary and human receptors is more remote. Monitoring Station BHV6 is the closest station to the Ute Mountain Ute Tribe property, which is approximately 2.5 miles from the location of BHV6.

Environmental TLD Dosimeter Measurement (Gamma) for 2007						
Monitoring Station	1st Qtr, 2007 Result (mrem)	2nd Qtr, 2007 Result (mrem)	3rd Qtr, 2007 Result (mrem)	4th Qtr, 2007 Result (mrem)	2007 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	0.0	2.0	2.0	3.0	7.0	100
BHV2	0.0	1.0	4.0	0.0	5.0	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.0	1.0	2.0	1.0	4.0	100
BHV5	0.0	4.0	3.0	4.0	11.0	100
Average (not including BHV3)					6.75	

Environmental TLD Dosimeter Measurement (Gamma) for 2008						
Monitoring Station	1st Qtr, 2008 Result (mrem)	2nd Qtr, 2008 Result (mrem)	3rd Qtr, 2008 Result (mrem)	4th Qtr, 2008 Result (mrem)	2008 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	2.73	1.17	1.36	0.40	5.66	100
BHV2	0.0	0.91	0.00	0.00	0.91	100
BHV3	0.0	0.00	0.00	0.00	0.00	100
BHV4	0.0	0.65	0.00	0.00	0.65	100
BHV5	0.0	0.91	0.00	0.00	0.91	100
BHV6	0.0	0.00	0.00	0.00	0.00	100
Average (not including BHV3)					1.63	

Environmental TLD Dosimeter Measurement (Gamma) for 2009						
Monitoring Station	1st Qtr, 2009 Result (mrem)	2nd Qtr, 2009 Result (mrem)	3rd Qtr, 2009 Result (mrem)	4th Qtr, 2009 Result (mrem)	2009 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	9.1	4.9	6.9	8.8	29.7	100
BHV2	2.0	4.5	5.2	4.7	16.4	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.0	0.1	1.3	0.0	1.4	100
BHV5	1.7	2.9	5.3	1.4	11.3	100
BHV6	21.3	1.4	2.4	0.1	25.2	100
Average (not including BHV3)					16.8	
Environmental TLD Dosimeter Measurement (Gamma) for 2010						
Monitoring Station	1st Qtr, 2010 Result (mrem)	2nd Qtr, 2010 Result (mrem)	3rd Qtr, 2010 Result (mrem)	4th Qtr, 2010 Result (mrem)	2010 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	1.9	3.7	7.4	4.4	17.4	100
BHV2	0.0	0.3	3.2	5.6	9.1	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.0	0.4	0.0	3.6	4.0	100
BHV5	0.7	2.7	6.5	5.9	15.8	100
BHV6	0.0	0.0	0.0	0.6	0.6	100
Average (not including BHV3)					9.38	
Environmental OSL Dosimeter Measurement (Gamma) for 2011						
Monitoring Station	1st Qtr, 2011 Result (mrem)	2nd Qtr, 2011 Result (mrem)	3rd Qtr, 2011 Result (mrem)	4th Qtr, 2011 Result (mrem)	2011 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	7.7	3.6	7.7	4.1	23.1	100
BHV2	0.3	1.8	1.8	0.0	3.9	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	4.2	0.0	2.0	0.3	6.5	100
BHV5	8.2	3.2	8.7	2.5	22.6	100
BHV6	0.0	2.4	2.8	2.5	7.7	100
Average (not including BHV3)					12.76	

Environmental OSL Dosimeter Measurement (Gamma) for 2012						
Monitoring Station	1st Qtr, 2012 Result (mrem)	2nd Qtr, 2012 Result (mrem)	3rd Qtr, 2012 Result (mrem)	4th Qtr, 2012 Result (mrem)	2012 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	4.0	7.5	1.7	5.3	18.5	100
BHV2	-0.3	0.5	0.4	2.6	3.2	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	1.4	4.0	0.5	3.8	9.7	100
BHV5	4.2	6.4	3.6	3.9	18.1	100
BHV6	1.1	1.5	1.1	0.7	4.4	100
Average (not including BHV3)					10.78	

Environmental OSL Dosimeter Measurement (Gamma) for 2013						
Monitoring Station	1st Qtr, 2013 Result (mrem)	2nd Qtr, 2013 Result (mrem)	3rd Qtr, 2013 Result (mrem)	4th Qtr, 2013 Result (mrem)	2013 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	4.8	5.0	3.9	7.5	21.2	100
BHV2	0.6	1.2	1.9	1.9	5.6	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.3	3.1	4.9	0.7	9.0	100
BHV5	2.8	3.2	5.0	6.6	17.6	100
BHV6	-1.5	30.3	0.8	2.3	31.9	100
Average (not including BHV3)					17.06	

Environmental OSL Dosimeter Measurement (Gamma) for 2014						
Monitoring Station	1st Qtr, 2014 Result (mrem)	2nd Qtr, 2014 Result (mrem)	3rd Qtr, 2014 Result (mrem)	4th Qtr, 2014 Result (mrem)	2014 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	3.9	4.1	3.5	6.1	17.6	100
BHV2	0.8	0.0	0.0	4.0	4.8	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	3.4	0.0	0.0	1.6	5.0	100
BHV5	4.5	3.6	5.4	7.2	20.7	100
BHV6	5.1	0.0	0.0	0.8	5.9	100
BHV7	NS	NS	0.0	0.8	0.8	100
BHV8	NS	NS	0.0	1.0	1.0	100
Average (not including BHV3, BHV7, & BHV8)					10.8	

Environmental OSL Dosimeter Measurement (Gamma) for 2015						
Monitoring Station	1st Qtr, 2015 Result (mrem)	2nd Qtr, 2015 Result (mrem)	3rd Qtr, 2015 Result (mrem)	4th Qtr, 2015 Result (mrem)	2015 Total (mrem)	R313-15-301(a) Total Body Limit(mrem)
BHV1	2.3	0.4	12.3	11.4	26.4	100
BHV2	2.9	2.0	2.3	4.3	11.5	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.2	0.0	6.1	3.6	9.9	100
BHV5	3.2	3.1	10.1	13.1	29.5	100
BHV6	0.0	4.9	6.1	0.6	11.6	100
BHV7	0.6	0	7.2	3.3	11.1	100
BHV8	0.0	0	9.5	3.4	12.9	100
Average (not including BHV3)					16.3	
Environmental OSL Dosimeter Measurement (Gamma) for 2016						
Monitoring Station	1st Qtr, 2016 Result (mrem)	2nd Qtr, 2016 Result (mrem)	3rd Qtr, 2016 Result (mrem)	4th Qtr, 2016 Result (mrem)	2016 Total (mrem)	R313-15-301(a) Total Body Limit (mrem)
BHV1	5.7	3.3	5.0	4.0	18.0	100
BHV2	0.0	1.9	1.8	4.8	8.5	100
BHV3	0.0	0.0	0.0	0.0	0.0	100
BHV4	0.0	0.0	0.0	1.2	1.2	100
BHV5	3.9	2.4	0.0	2.1	8.4	100
BHV6	1.0	0.0	0.0	0.4	1.4	100
BHV7	0.0	0	0	4.3	4.3	100
BHV8	0.0	1	0.8	1.8	3.6	100
Average (not including BHV3,)					6.49	

The 100 mrem public dose limit mentioned above is also different from the occupational dose limit of 5,000 mrem (5 rem) in R313-15-201(1)(a)(i). The 10-year average occupation dose at the Mill is 100.6 mrem. Below is the occupational dose (TEDE) over the last 10 years.

Year	Average Dose (mrem)	Maximum Dose (mrem)
2007	106	500
2008	101	370

2009	80	270
2010	75	490
2011	111	440
2012	106	350
2013	84	260
2014	90	360
2015	143	330
2016	110	310

Note: The occupational dose is calculated by using data from air sampling (both particulate and radon) and the individual workers OSL badges.

While workers are allowed to receive an occupational exposure dose of 5,000 mrem per year (a level considered safe for workers), the workers at the White Mesa Mill are receiving actual doses far below that standard. The average dose for workers is, coincidentally, close to the 100 mrem annual dose the NRC considers to be safe for the general public.

MILDOS-AREA MODELING

Compliance with the public dose requirement is measured using the White Mesa Mill's effluent monitoring program. EFRI submits the results from effluent monitoring twice a year and the Division staff reviews the results. In addition, computer modeling is typically used at license renewal to confirm the Division staff reviews. For uranium milling, the computer model that is used is call MILDOS-AREA.

The MILDOS-AREA computer model was created and has been revised by Argonne National Laboratory. Modeling can be done by EFRI, the Division or a contractor to either EFRI or the Division to show compliance. A contractor ran a MILDOS-AREA model for EFRI which was submitted as part of the 2007 RML renewal application. The Division did a separate MILDOS-AREA model after the 2011 public comment period. Both models indicate that the Mill is compliant with the 100 mrem public limit. However they did have slightly different results. These differences can be explained because:

1. EFRI's contractor used an older version of MILDOS-AREA then the Division;
2. EFRI' contractor used the assumption of processing native ores (both Colorado plateau and Arizona strip) 24 hours a day/7 days a week for an entire year; and
3. The Division used actual ore processed (native and alternate feed) including the different percentage of uranium of each and the number of days operating (3 months to 9 months) from each year evaluated(2007 to 2014).

Division General Response #09: AEA Environmental Analysis Requirement
One commenter stated that the former DRC did not follow guidelines on being compliant with the AEA in doing an environmental assessment and holding a public meeting. The Division does not agree with this comment. In the renewal application, EFRI submitted Standard Operating Procedures (SOPs) which describe how the Mill is going to operate to maintain regulatory compliance. Division staff reviewed the Mill's SOPs and through the interrogatory process worked with EFRI to resolve any concerns that were identified during the review of the renewal application. Compliance with regulatory limits is determined and documented during site inspections and review of effluent and groundwater monitoring reports by Division staff. The Mill is allowed to make adjustments to its SOPs through the SERP committee and its own ALARA audits. SERP committee reports and ALARA audit reports are reviewed annually by Division staff.

EFRI also submitted an Environmental Report and a MILDOS-AREA modeling analysis. The Division staff reviewed both of these documents and found them adequate to demonstrate compliance with regulatory requirements. The Environmental Report prepared and submitted by EFRI was very thorough and similar to a NEPA review. It discussed the impact of Mill operations on the surrounding areas of the Mill. Long-term impacts of the disposal of uranium mill tailings were considered by the NRC during its review and approval of the original January 30, 1978 Environmental Report for the White Mesa Uranium Project. In addition, impacts from the commercial scale operation of the site were previously evaluated in the Final Environmental Statement (NUREG 0556) (NRC, 1979). The Division believes the term "environmental analysis" is synonymous with such terms as Technical Analysis, Statement of Basis, Safety Evaluation Report, Technical Assessment, or Environmental Assessment. The purpose of the report required by UAC R313-24-3 is to advise the public of the environmental issues of concern.

In a letter (DRC-2017-001282) dated February 22, 2017 to the Division, the State of Utah's Office of the Attorney General wrote a response addressing the issue of compliance with the AEA by the State of Utah regarding an independent environmental analysis. It was concluded "there is also no language in the AEA or any other authority that requires an Agreement State to perform completely independent environmental analysis. It is acceptable for an Agreement State to review and analyze environmental analysis submitted by a Licensee. Thus, the existing Utah rules are fully consistent with federal requirements."

Moreover, one commenter raised the same challenge in an "allegation" to the NRC. The Division has responded to this allegation pursuant to a letter dated December 1, 2017 (Attachment 5). This letter is incorporated here. In relevant part it reads as follows:

"Environmental analysis of this facility is an ongoing process. It began with the review of the initial Environmental Report submitted by Dames and Moore in behalf of the Licensee in 1978. Our review and evaluation of every significant change in plant configuration, operation and equipment, every license amendment and every license or permit renewal since that time has added to the environmental analysis of the facility and to the knowledge base about those subjects. Accordingly, we believe that it is appropriate and prudent to evaluate what has changed since those earlier analyses and add those findings to the existing body of work rather

than prepare a new analysis. This approach combines historical and institutional knowledge and current information to create a comprehensive record."

"Your letter to the NRC identifies the May 2017 Technical Evaluation and Environmental Assessment (TEEA) and what you refer to as a "one paragraph environmental analysis." This paragraph is not the environmental analysis; rather, it is a summary that concludes that the White Mesa Uranium Mill is being operated in compliance with applicable laws and regulations. This summary comment is based on and provides reference to, also in summary format, all of the written environmental analyses that have been done throughout the entire radioactive license renewal process. This process included but was not limited to interrogatories, requests for information, the 2011 Safety Evaluation Report, and additional work presented in attachments to the 2017 TEEA. All of this information is posted on the Division of Waste Management and Radiation Control's website. Links to the review are found under the "Current Activities" section at: "https://deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm." In sum, all of the reviews and evaluations of substantial amounts of detailed technical information, reports and data, past and present, constitute the environmental analysis for this facility."

Environmental analysis of this site by regulatory authorities began with the review of the initial Environmental Report submitted by Dames and Moore in behalf of EFRI in 1978. Every significant change in plant configuration and equipping, every license amendment, and every license or permit renewal since that time has added to the environmental analysis of the site and the facility, and to the knowledge base about those subjects. It is only necessary to ascertain what has changed since the earlier analyses, not to prepare a new analysis from scratch.

The commenter specifically challenged the siting of the Mill when asserting a lack of evaluation of "details regarding the impacts to the environment associated with continuing operation of the Mill." Those impacts are reviewed through on-site inspections, reporting of sampling data of multiple types, and by studies of the effectiveness of all proposed changes to the Mill facilities and operations. For example, as cited in Response 2.1.1 above, the primary difference between the currently approved Reclamation Plan 3.2b and Reclamation Plan 5.1 is the cover system. The new reclamation plan did not change the construction of the tailings and fluid management cells, the plant and equipment, haul routes, or other aspects of the operation. Only an analysis of the new cover system's effectiveness and any other changes made via the plan would require attention. In fact, such did take place, and remaining questions are being explored through a demonstration project, retaining provision to use the currently approved cover system should the demonstration project provide data indicating the new proposal is not as effective as the legacy cover. Other examples of analysis of the facilities, operations, and impacts to the community and the environment exist.

Another example of the types of analyses that have occurred shows that a new environmental analysis of the reclamation plan would be redundant. Reclamation Plan Revision 5.1 cites cleanup standards that must be met to satisfy federal requirements for closure of the site that

pertain to the proposed cover system.[3] Those standards reflect a long and meticulous process of determining what level of cleanup must occur in order to satisfy the environmental criteria against which the site would be evaluated at closure. Those standards are the same against which the plan would have to be analyzed. Meeting the standards at closure insures a site that is at least as safe as would result if an environmental assessment were done instead. Therefore, no specific environmental analysis of the revised reclamation plan is required; instead, the plan was reviewed to see that all relevant cleanup standards were included, and that the design considered these requirements.

The examples given relate to the reclamation plan. Similar rationale extends to changes in standard operating procedures, monitoring schemes, changes in physical plant, implementation of new best practices, and a number of other issues. If an area has been overlooked by regulatory authority during review of the proposed action or any previous action, the specifics of that oversight should be brought to the attention of the Division rather than making a general, unsupported statement that the work was not undertaken. The argument put forward that the review of the license renewal package lacked required rigor is unsupported, and inaccurate. No new analysis will be produced to address this comment.

For further clarification regarding the environmental analysis, the Division itself is not required to "produce" an environmental analysis, but must have procedures in place that require for each license which has a significant impact on the human environment a written analysis of the impact of such license, including the items specified in 42 USC 2021(o)(3)(C)(i) through (iv). The required analysis may be "produced" by the Licensee, a third party contractor, or other entity that is sufficiently knowledgeable about the Licensee's activities to write such analysis. During a review of the requested action, the Division will review the analysis to ensure that the analysis meets the requirements specified above and that there are no environmental issues raised in the analysis. An environmental analysis may not have a title of "Environmental Analysis" and the analysis may be included with other portions of an application. There is no requirement that states the document must be a stand-alone document or that it must be called an "Environmental Analysis." As with other items of the application, if the Licensee is able to show the Division that the subject matter was covered regardless of the information's location within the application, the Division is required to accept the information. Therefore, an environmental analysis may be covered throughout various sections of a Licensee's application; or it may be a separate document that has a title other than environmental analysis, etc.

Because the Division does not have specific requirements that require Licensees to submit information in a specific format if the Licensee is able to show the Division that the subject matter that was required to be submitted was covered in the application or amendment request regardless of the information's location, the Division is required to accept the information. The format of the information provided by the Licensee may be confusing to the commenter, but even if the Division could regulate the format, there is not one format that would be acceptable to all individuals who might review the document. Even though Licensee's must supply

[3] DRC-2017-001026 (Reclamation Plan Revision 5.1) Section 3 (pp. 3-1 through 3-12; e.g., the Radon emission standard of 20 pCi/m^2s appears on p. 3-5)

information required by rule, regulation, or statute to any regulatory agency, the specific format of the information to be provided is usually not specified by the rule, regulation, or statute unless a particular form is required to be completed. Therefore, an environmental analysis may be covered throughout various sections of a Licensee's application or amendment request, it may be a separate document that has a title other than environmental analysis, etc. The Division's evaluation of the Licensee's submission is considered to be an environmental analysis of the items reviewed regardless of the title of the Licensee's submission.

Division General Response #10: Cultural Resources
One commenter expressed concerns over protection of cultural and historical site on and adjacent to the Mill's property. While the Division is sensitive to cultural resource issues, we conclude based on the record that the potential impact to adjacent cultural sites has been adequately addressed in accordance with applicable legal requirements. Impacts to cultural and historical sites within the proposed White Mesa Uranium Project were previously evaluated in Appendix E of the Final Environmental Statement (NUREG 0556) (NRC, 1979).

In the State of Utah, the Division does not have jurisdiction over cultural resource matters. That responsibility falls to SHPO to oversee cultural resource protection. License Condition 9.7 specifies what must be done when a cultural or historical site is encountered. It requires EFRI to work with SHPO to address the cultural resource requirements. EFRI meets its obligations to protect cultural resources by meeting the requirements in License Condition 9.7. If a new construction activities occur at the site (such as a tailings cell), License Condition 9.7 will require EFRI to administer a cultural resource inventory; similar to what was completed for Tailings Cell 4B. The Division will not allow a construction project to proceed until it receives a letter from SHPO stating that EFRI has met its cultural resource protection requirements.

In the Ute Mountain Ute Tribes comments, the Tribe requested some changes to License Condition 9.7. In a letter from the Division to the Tribe dated November 15, 2017, the Division asks the Tribe to discuss and collaborate on changes to License Condition 9.7. This discussion and collaboration will be between the Ute Mountain Ute Tribe, the Division, EFRI and SHPO. Changes to License Condition 9.7 will be addressed in a future RML amendment and will not be included in the renewal amendment.

Division General Response #11: Drinking Water Quality
Several commenters raised concerns regarding drinking water quality. Some expressed concern over potential contamination of down gradient drinking water resources, while others alleged that contamination had already occurred. The Division disagrees with these comments because they have no basis in fact. To date, data available to the Division has not implicated the Mill facilities in contamination of drinking water resources. The extensive groundwater monitoring network has produced data that leads to a fair conclusion that no contaminant plumes have developed from the tailings and fluid management impoundments. Two small plumes of contaminants unrelated to the processing of uranium have been detected in the perched Burro Canyon Aquifer near the Mill facility, long distances away from off-site potential receptors, and both non-radioactive plumes are being managed to prevent spread beyond the Mill property. Both have cleanup initiatives under way. The drinking water aquifer is separated from the perched aquifer See discussion on Groundwater below.

The commenters claim that the Mill has impacted water quality in the White Mesa community. Likewise, this comment has no basis in fact. Based on analysis of data acquired through the monitoring network on the Mill property, the apparent groundwater gradients do not appear to flow in the direction required to impact the White Mesa Community. Therefore, even if a plume were to develop, its influence would not reach the White Mesa Community.

The Division has concern for maintenance of clean drinking water resources. Commenters have not provided facts (data) for the Division to consider in evaluating claims of impacted drinking water supply. They have simply offered their verbal statements without providing factual support. In the event that new data is discovered, it will be taken into account in the future. The current licensing action is limited to the existing administrative record. No contrary fact-based information has been submitted during the public comment period and the record is now closed.

Division General Response #12: Impoundments (Conventional tailings disposal cells and non-conventional fluid management cells)

Uranium milling operations require two types of impoundments to facilitate operation of the Mill. One type of impoundment becomes the final repository for the solids remaining after extraction of the uranium, and is known as a conventional impoundment or tailings cell. The two types of impoundments and their purposes are discussed below.

Several commenters noted the differing ages, construction standards and uses of the impoundments on the Mill property. The Division appreciates these comments but does not agree that this fact means there is any technical or legal problem with the continuing use of the impoundments. As a result, there is no technical or legal basis in this record to support a finding requiring remedial or retrofit efforts with respect to the tailings disposal cells in use at the Mill. All applicable technical and legal requirements are being met with the current facilities. These conclusions are based on the following considerations, among others, that are based on information in this administrative record.

All impoundments were constructed to the required standard for conventional impoundments at the time of construction. From the monitoring data, the impoundments all operate within mandated parameters, and are not manifesting formation of contaminant plumes.

Since the State accepted delegation of authority from the NRC for the uranium recovery program, Cell 4A was relined and Cell 4B was constructed. The Division completed plan reviews prior to commencement of those activities, and had inspectors and engineers involved onsite during construction. The final installations either conformed to the approved plans or had changes approved, as documented in the Division's construction inspection files. One commenter challenged the standards of construction applied to Cell 4B. His allegations either conflict with the field record, or are unsubstantiated.

Furthermore, the following discussion relies on definitions promulgated in the EPA's Radon standards found in 40 CFR Part 61 Subpart W and in Appendix A to 10 CFR Part 40.

Conventional impoundments or tailings cells receive tailings. Discharge to a conventional impoundment includes a slurry of tailings and process fluid. Tailings consist of the solid residue

from the milling process, and are typically discarded. Process fluid contains chemical constituents that may have value to EFRI, and are often recycled through the Mill. The conventional impoundment provides opportunity to settle the solids from the slurry. Clarified fluid is decanted to a non-conventional impoundment for evaporation or recycled through the Mill to reuse chemical values that may be present. Under Subpart W, the Licensee can only have two active conventional impoundments.

In addition to tailings from the processing of ore through the Mill, regulations allow the Licensee to receive and dispose material defined as byproduct material under Section 11e.(2) of the Atomic Energy Act in active conventional impoundments. For economic reasons, the general practice is to fill the impoundment to design capacity with tailings prior to disposing byproduct material, then to emplace byproduct material in the first layer of the cover over the tailings. License conditions 10.4 and 10.5 set additional bounds to EFRI's operation of conventional impoundments.

The Licensee currently has only two active conventional impoundments, Cells 3 and 4A. One other conventional impoundment, Cell 2, is in closure and has a full radon barrier installed on its surface.

Non-conventional impoundments or fluid management impoundments/evaporation ponds receive process fluids and may also receive storm water runoff from the site. Process fluids may enter the impoundments either following decanting from a conventional impoundment or directly from process vessels in the plant. Tailings solids may not enter a non-conventional impoundment. A Licensee may construct a non-conventional impoundment with anticipation of one day converting the use of the impoundment to receipt of tailings, but conversion to a conventional impoundment requires prior regulatory authorization.

The Licensee currently has two active non-conventional impoundments, Cells 1 and 4B. This detail was argued before the United States District Court for the District of Utah. The court affirmed the understanding that the Mill, as operated by EFRI, has only two active conventional impoundments, Cells 3 and 4A, with Cells 1 and 4B currently operated as non-conventional impoundments, and Cell 2 in closure.[4] One other impoundment, Roberts Pond, has been fully remediated and backfilled. The Division concurs with and adopts the court's ruling on these issues.

Several of the comments erroneously attributed four or five active tailings cells to EFRI. Reiterating the relevant point discussed above, EFRI has only two active conventional impoundments or tailings cells, Cells 3 and 4A.

Several commenters cited EPA's Subpart W radon regulations as applicable to Cells 1 and 4B. The Division finds, based on the evidence in this record, that Cells 1 and 4B are non-conventional impoundments. The Subpart W radon regulations govern conventional

[4] Case 2:14-cv-00243-CW Document 93 Filed 09/15/17

impoundments only. Based on the foregoing, the Division concludes that the Subpart W regulations do not apply to Cells 1 and 4B as a matter of law for radon flux sampling.

Division General Response #13: Radon

There were many comments on the potential health effects of Radon coming from the Mill. The Division has carefully reviewed and considered these comments. Based on this review and evaluation of all the evidence in this administrative record, the Division finds that the Licensee's operations are in full compliance with all applicable legal, technical, and industrial standards relating to radon emissions and that, as a result, there is no basis upon which to deny the relicensing application, nor is there any factual basis in the record to support a finding that radon emissions from the Mill pose a public health risk above an actionable level of concern, based on standards established by the NRC and the EPA. These conclusions are generally based on the following factors as well as other matters in the administrative record:

Radon is a naturally occurring radionuclide and a decay product of Uranium. [1-10] Radon is found everywhere in the United States [1,5-7] and is the major source for background radiation.[1,5,8] It is true that radon is known to cause lung cancer [1-3,6-9] However, health effects come from chronic exposure (long term) to Radon [1-2,10] and are stochastic (random) in nature.[2] Based on the technical data, a person must be exposed to Radon for a long period of time before potential health effects arise, and not everyone will develop health problems from Radon exposure. Radon exposure is considered an indoor air quality issue because radon enters buildings through cracks in the floors, construction joints, cracks in walls, gaps in suspended floors, gaps around service pipes, cavities inside walls, and gas appliances [1-2,9] and becomes trapped allowing the concentration to increase. The potential for harmful exposure to outdoor Radon is low, as concentrations range from 5.92 Bq/m^3 (0.16 pCi/L) to 21.1Bq/m^3 (0.57 pCi/L) with a mean of 15.1 Bq/m^3 (0.41 pCi/L). [4] (note 1pCi/L=37 Bq/m^3)

By comparison, presented below are the 2015 Radon monitoring results at the Mill property boundary, as reported in the *White Mesa Uranium Mill, Radioactive Materials License UT1900479, Semi-Annual Effluent Monitoring Report (July through December 2015).*

White Mesa Mill Effluent Rn-222 Monitoring Results (pCi/L)					
Monitoring Station	1/7/2015	4/2/2015	6/29/2015	9/28/2015	2015 Average
BHV1	0.1	0.23	0.2	0.2	0.183
BHV2	0	0	0.2	0.1	0.075
BHV3*	0.2	0.07	0.2	0.3	0.193
BHV4	0.3	0.23	0.4	0.2	0
BHV5	0.6	0.43	0.4	0.6	0.508
BHV6	0.2	0.23	0.3	0.3	0.258
BHV7	0.2	0.33	0.2	0	0.183
BHV8	0.1	0.03	0.2	0.1	0.108
*BHV3 = background location					

These results are from continuous monitoring equipment. As the evidence demonstrates, the average radon concentration at each of the Mill's monitoring stations is within the range of radon concentration found throughout the United States for ambient outdoor air concentrations. There is no basis to conclude that Mill operations are impacting radon levels as measured at the Mill property boundary. Moreover, the Colorado Plateau area is known for higher levels of naturally-occurring radiation, including radon. The levels measured at the Mill property boundary are well within the levels that would be expected at the naturally-occurring background state.

The EPA action level (not an enforceable regulatory limit) for indoor Radon in air is 4 pCi/L. [1;6;9;10] One commenter tried to compare the EPA action level of 4 pCi/L to the EPA NESHAP limit of 20 pCi/m^2-sec. The problem with comparing the EPA action level to the NESHAP limit is the units associated with the number. Units (i.e. pCi/L and 20 pCi/m^2-sec) give the number in front of it context. The unit pCi/L is a unit of volume. The 20 pCi/m^2- sec is a unit of rate. Because of the different context of the units the numbers are not comparable.

Radon References:
(1) Agency for Toxic Substances and Disease Registry (ATSDR) (2010), *Case Studies in Environmental Medicine Radon Toxicity*, Course: CB/WB1585, U.S. Department of Health and Human Services, Washington, D.C.
(2) International Commission on Radiation Protection (ICRP) (1993), *Protection Against Radon-222 at Home and Work*, ICRP Publication 65,Volume 23, ISSN 0146-6453, Pergamon, Tarrytown, New York.
(3) ICRP (2010), *Lung Cancer Risk from Radon and Progeny and Statement on Radon*, ICRP Publication 115,Volume 40, ISSN 0146-6453, Pergamon, Tarrytown, New York.
(4) National Council on Radiation Protection and Measurements (NCRP) (1988), *Measurement of Radon and Radon Daughters in Air*, NCRP Report No. 97, Bethesda, Maryland.
(5) NCRP (2009), *Ionizing Radiation Exposure of the Population of the United States*, NCRP Report No. 160, Bethesda, Maryland.
(6) United States Environmental Protection Agency (EPA) (2009), *Home Buyer's and Seller's Guide to Radon*, Indoor Environments Division, Washington D.C.
(7) United States Geological Survey (1992), *The Geology of Radon*, U.S. Government Printing Office, Washington D.C.
(8) World Health Organization (WHO) (2009), *WHO Handbook on Indoor Radon: A Public Health Perspective*, WHO Press, Geneva, Switzerland.
(9) EPA (2010), *Consumer's Guide to Radon Reduction: How to Fix Your Home*, Indoor Environments Division, Washington D.C.
(10) ATSDR (2012), *Toxicological Profile for Radon*, U.S. Department of Health and Human Services, Washington, D.C.

Division General Response #14: Reclamation Plan Revision 5.1
UAC R313-22 requires the Licensee to establish financial assurance for decommissioning and reclamation activities associated with cessation of operations at the site. The Rule requires that the financial assurance reflect the costs for an independent third-party contractor to complete decommissioning and reclamation activities should the Licensee prove unwilling or unable to fulfill its obligations. The decommissioning and reclamation activities are specified in the reclamation plan for the site. EFRI has provided updates to the reclamation plan that existed

when Utah assumed responsibility for regulating the site. The latest update is Reclamation Plan Revision 5.1. In its reply to comments, EFRI committed to make further changes to the reclamation plan to address commenter concerns over reclamation milestones. The Division has fully considered this comment and does not agree that further changes are warranted.

Within the reclamation plan, one element is the design of a permanent cover system for the tailings disposal cells. The NRC intended the disposal cell cover design to reflect site-specific design considerations rather than adopting a specified design wholesale. Reflecting local conditions in the design should increase the probability of effective performance without excessive, wasted cost.

Cover Design
The Division's role is to ensure that the cover design meets the requirements set forth in 10 CFR 40 Appendix A Criterion 6(1), not to dictate a given design. According to this criterion:

> In disposing of waste byproduct material, Licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design [footnote deleted] which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average [footnote deleted] release rate of 20 picocuries per square meter per second (pCi/m^2s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion.

The NRC originally approved and the Division has previously concluded that the legacy (rock armor) cover meets the applicable requirements.

Many commenters on the reclamation plan called for the rejection of the approved rock armor cover and the immediate implementation of a new and yet unapproved evapotranspirative cover in the Plan. While the Division has considered these comments, the Division has concluded that any decision regarding the use of an evapotransporative cover at the Mill is premature. The question of whether this new cover system will be adequate to meet applicable regulatory standards is the subject of a separate process that will be evaluated on its own merits, outside the scope of the present re-licensing application.

While any decisions regarding an evapotransporative cover are premature, the Division would like to take this opportunity to provide technical and legal responses to comments, with the hope that these responses will better inform the public as to the legal and technical requirements that will guide the process through which the evapotransporative cover will be evaluated in the future. Reclamation Plan Revision 5.1 includes a design for an evapotranspirative cover system to discourage seepage of storm water into the tailings mass below. Other than minor differences primarily in clay content and placement density, the proposed cover is monolithic – the same material for the entire approximately 9.5 feet of its thickness.

The proposed cover design is not proven, and the concept of evapotranspirative covers in arid environments is also not proven (see 10 CFR 40 Appendix A, Criterion 4(d).). Therefore, the Division's approach to reviewing this element includes allowing EFRI to prove the efficacy of the cover through construction and operation of a fully-instrumented primary test section on a portion of Cell 2 to evaluate water balance and plant diversity/density issues; evaluating precipitation run-on and run-off erosion and biointrusion at a second test section located where mmill personnel rarely go (burrowing animals are less likely to be spooked), and installing a weather station to provide site-specific weather data. Parenthetically, one commenter laments the lack of specific weather data for the Mill; this effort will help bridge that gap.

Those commenters who insisted on adoption of an evapotranspirative cover also preferred the cover design installed at the former Monticello Mill site. The consensus among those commenters was that the Division needed to mandate some or all of the Monticello design. The Division would like to make several points in response to these comments:

1. The Monticello cover is, itself, experimental.[5] The funding for that effort came from the Formerly Utilized Sites Remedial Action Program (FUSRAP), and the design intentionally included redundancies not expected to appear in production designs. The idea was to evaluate multiple approaches simultaneously and efficiently at one site rather than try all concepts individually. This includes installing multiple synthetic layers in the cover, whose absolute necessity is not yet demonstrated, and whose effectiveness is part of the experimental design. As an experiment, this installation entailed much more expense than any Licensee would be expected to incur for routine design and installation.

2. The Monticello cover required multiple attempts to get the plant community on its surface to establish satisfactorily, and to this day, in the eighth year of the study, portions still lack the desired forbs and shrubs.[6]

3. The climate at Monticello is cooler and wetter than at White Mesa, so the cover design would need tailoring for the White Mesa location.[7]

---

[5] Richardson and Waugh, *The Design of Final Covers Systems for Arid and Semi-Arid Regions of the West*, 3rd Interrnational Symposium on Environmental Geotechnology, June 10-12, 1996, ¶13. At the cited location, the authors state, "Field-plot and lysimeter tests conducted at other DOE sites [citation omitted] suggest that, with plants present, water accumulation at Monticello will not likely exceed the topsoil storage capacity, even during higher than record precipitation years. *Field and modeling studies are ongoing at Monticello* to test this hypothesis. [emphasis added]

[6] US Department of Energy, 2003 Annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites, p. 1; US Department of Energy, 2005 annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites, p. 1-2;

[7] U.S. Climate Data website, specifically https://www.usclimatedata.com/climate/monticello/utah/united-states/usut0170 and

4. The commenters have not demonstrated that the cover system they propose will work in the specific environment in which they want to place it. Their reliance on the literature is, thus, speculative. The commenters have likewise not demonstrated that this preferred cover system will meet the criteria for reducing maintenance demands on the Legacy Management office of the Department of Energy upon turning the site over to the DOE.[8] The Monticello cover has undergone several reseeding events and has required irrigation to encourage the plant community to thrive.[9] Conversely, EFRI has sought the expertise of the very specialists who wrote the NRC guidance on ET cover systems, and has proposed a design these specialists feel will work. That design, not the commenter's preferred ideal, is before the Division for consideration.

Adoption of the Monticello experimental design wholesale, or elements that have not been found necessary places a burden on EFRI that is not in harmony with regulatory guidance. Quoting from 10 CFR 40 Appendix A:

> All site specific licensing decisions based on the criteria in this Appendix or alternatives proposed by Licensees or applicants will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Commission determines to be appropriate. In implementing this Appendix, the Commission will consider "practicable" and "reasonably achievable" as equivalent terms. Decisions involved these terms will take into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest. (5th paragraph of the introduction; emphasis added)
>
> *Available technology* means technologies and methods for emplacing a final radon barrier on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary measures or techniques that would impose costs that are grossly excessive as measured by practice within the industry (or one that is reasonably analogous), (such as, by way of illustration only, unreasonable overtime, staffing, or transportation requirements, etc., considering normal practice in the industry; laser fusion of soils, etc.), provided there is reasonable progress toward emplacement of the final radon barrier. To determine grossly excessive costs, the relevant baseline against which cost shall be compared is the cost estimate for tailings impoundment closure contained in the Licensee's approved reclamation plan, but costs beyond these estimates shall not automatically be considered grossly excessive. (From the definitions; italics in the original, bolding added)

---

https://www.usclimatedata.com/climate/blanding/utah/united-states/usut0019, accessed November 7, 2015.

[8] 10 CFR 40 Appendix A Criterion 1. "Tailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site."

[9] US Department of Energy, 2005 annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites, p. 1-2

From these passages, it is clear that the NRC did not intend that the latest technology be employed for the sake of newness, but that the latest technology be considered when significant benefits accrue to the project through its use and its costs do not outweigh its benefits. One of the detriments of using new technology is the risk of technology failure. This risk is mitigated by using proven designs and materials. Also evident is less concern for cost if the technologies in question form part of the radon barrier. In the commenter's proposals, the addition of synthetic liners and sophisticated capillary break construction techniques would occur *above* the radon barrier, allowing for more consideration of costs before imposing the requirement. Furthermore, if the demonstration project supports implementation of the proposed cover as proposed by EFRI, the addition of these design features becomes an added expense with little or no demonstrable benefit. The data collected during the study will provide indications of need for alteration of the cover design, including whether to consider adding any of the elements desired by the commenters. Even then, the Division will consider EFRI's proposal rather than dictate a design.

Possible study outcomes exist that would indicate a low likelihood of success in this location with an evapotranspirative cover. For this reason, the Division has required EFRI to retain its approved legacy cover design in the reclamation plan. This ensures that an approved cover appears in the plan regardless of the results of the study. In any event, the approved legacy rock armor cover projects to be more expensive than the evapotranspirative cover as proposed, and the surety (discussed below) uses the legacy cover for setting the surety value.

The Division received comments either demanding that the Division rescind approval of the legacy rock-armor cover system previously approved by the NRC, or requesting reevaluation and amendment of that cover. Having fully considered these comments, the Division disagrees. This determination is based on a number of factors, including the following points:

1. EFRI has a vested right by virtue of previous NRC approval of the legacy rock armor cover system to implement that cover system. The commenter assumes too much authority on the part of the Division to dictate the design. Furthermore, the commenter cites research selectively. If the evapotranspiration (ET) cover system fails to produce sufficient plant diversity and density, the ET cover will be even more prone to infiltration than the legacy system while providing significantly poorer protection against erosion. Even the synthetic membranes demanded by the commenter will not provide long-term protection. Once exposed to sunlight because of loss of cover to erosion, the membrane will lose plasticizer and crack. Thus, both erosion and infiltration will penetrate deeper into the system, ultimately mobilizing the tailings and decommissioning debris. Pollution of the environment is a near certainty under those conditions.

   The NRC approved the legacy cover system under a doctrine of "reasonable assurance" a standard the NRC has defined in its case law. In 48 FR 28204 the NRC stated, "In the Commission's view, the 'reasonable assurance' standard neither implies a lack of conservatism nor creates a standard which is impossible to meet. On the contrary, it parallels language which the Commission has applied in other contexts, such as the licensing of nuclear reactors, for many years. See 10 CFR 50.35(a) and 50.40 (a). The reasonable assurance standard is derived from the finding the Commission is required to

make under the Atomic Energy Act that the licensed activity provide 'adequate protection' to the health and safety of the public; the standard has been approved by the Supreme Court, Power Reactor Development Co. v. Electrical Union, 367 U.S. 396, 407 (1961). This standard, in addition to being commonly used and accepted in the Commission's licensing activities, allows the flexibility necessary for the commission to make judgmental distinctions with respect to quantitative data that may have large uncertainties (in the mathematical sense) associated with it." The narrative in 48 FR 28204 also states, **"The Commission would not issue a license unless it were to conclude, after such assessments, that there is reasonable assurance that the outcome will in fact conform to the relevant standards and criteria."** (emphasis added)

Similarly, the NRC recently adopted the EPA's doctrine of "reasonable expectation," defined in a regulation parallel to that which governs milling operations as follows:[10]

"Reasonable expectation means that the Commission is satisfied that compliance will be achieved based upon the full record before it. Characteristics of reasonable expectation include that it:

(1) Requires less than absolute proof because absolute proof is impossible to attain for disposal due to the uncertainty of projecting long-term performance;

(2) Accounts for the inherently greater uncertainties in making long-term projections of the performance of the Yucca Mountain disposal system;

(3) Does not exclude important parameters from assessments and analyses simply because they are difficult to precisely quantify to a high degree of confidence; and

(4) Focuses performance assessments and analyses on the full range of defensible and reasonable parameter distributions rather than only upon extreme physical situations and parameter values.

The NRC has stated that reasonable expectation and reasonable assurance have the same meaning.[11] Even though the terminology may have changed, the principle still applies.

Since the NRC approved the legacy cover system and would not have done so without "reasonable assurance" or "reasonable expectation" of its ability to perform, the Division has chosen to accept that determination instead of applying a more stringent standard and needing to justify why it is acting contrary to State Code regarding stringency. *See* Utah Code Section 19-3-104 (7) – (8) (prohibiting the Utah Waste Management and Radiation Control Board from adopting rules more stringent than corresponding NRC rules without making specific findings of fact in the rulemaking record).

[10] 10 CFR 60:304
[11] ML071520180

2. In a similar line of reasoning, the NRC stated in 10 CFR 40 Appendix A, "Licensees or applicants may propose alternatives to the specific requirements in this appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Commission may find that the proposed alternatives meet the Commission's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E." Clearly, Appendix A is not mandatory if the demonstration in the preceding quotation can be made.

   Further language in Appendix A states, "Available technology means technologies and methods for emplacing a final radon barrier on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary measures or techniques that would impose costs that are grossly excessive as measured by practice within the industry (or one that is reasonably analogous), (such as, by way of illustration only, unreasonable overtime, staffing, or transportation requirements, etc., considering normal practice in the industry; laser fusion of soils, etc.), provided there is reasonable progress toward emplacement of the final radon barrier. To determine grossly excessive costs, the relevant baseline against which cost shall be compared is the cost estimate for tailings impoundment closure contained in the Licensee's approved reclamation plan, but costs beyond these estimates shall not automatically be considered grossly excessive."

   Based on the foregoing considerations and other matters of record in these proceedings, the Division concludes that the design proposed by the Licensee here was appropriately framed, with respect to Appendix A. The Division has reservations about whether an ET cover is appropriate for the climate at Blanding, and shares the concern stated in appendix A, Criterion 4: "Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover must be employed on slopes of the impoundment system." The default in Criterion A is a rock armor barrier as was included in the legacy cover system that one commenter seeks to bar. A demonstration project of sufficient brevity to keep the work moving ahead, yet sufficiently long to allow a robust analysis of the proposed design is warranted.

If the demonstration project proves the design successful as proposed, the additional barriers proposed by the commenter constitute an unneeded expense with no discernible gain in protection of human health and the environment. If not, the Reclamation Plan reverts to the already approved system. EFRI can always propose a new system, and if it addresses the weaknesses in the approved system or the system under investigation, the Division can consider that alternative at that time.

One commenter voiced a concern of inconsistencies surrounding the projected frost depth in the cover system, and indicated a perceived need to revisit the treatment of frost in the legacy cover

design. The commenter correctly points out that freezing temperatures will penetrate deeper in dry soils than in wet soils. The Division's response to this comment is that the critical issue is not frost depth, but the combination of soil texture, soil moisture and soil temperature.[12] This information is not new, appearing in the technical literature in 1962, well before the legacy design was completed, and was well understood at the time EFRI completed design of the legacy cover system. The Division concludes that the cover design for the legacy cover is appropriate and no changes will be required. Other considerations supporting this conclusion are discussed below.

The cover system has, as two of its primary functions, to control radon emanation and reduce rate of water percolating into the tailings mass. The radon barrier is a clay-rich, dense layer designed to inhibit radon emanation while providing a final check against water seepage into the tailings below, along with water-shedding or transpiring characteristics of the upper layers of the two cover systems in question. Frost depth reaching the radon barrier is a necessary condition for frost-related degradation of the radon barrier to occur, but it is not a sufficient requirement by itself. As indicated above, sufficient water penetration must occur. The relevant danger to the cover system is frost heave, a phenomenon where water expansion upon freezing breaks apart the structure of the soil.

The legacy cover system and the proposed ET cover system have different objectives, so using data from one to attack the integrity of the other, as the commenter has done here, is not necessarily useful. The ET cover design seeks to remove pore water from the cover through plant transpiration, leading to lower moisture content in the underlying soil. This is why the two designs used different model inputs, not that the soil moisture content needed to change for both cases. This takes the analysis back to where this response began. Frost will drive deeper in the ET cover than in the legacy cover. The comparison between the two assumes similarities that are not in evidence.

Understanding frost depth is important to be able to interpret the designs and expected function of the cover systems under discussion. As noted in NUREG/CR-7028, freezing of a densely compacted clay barrier changes the structure of the parts that freeze, introducing flow paths for percolation water to take through the cover.[13] Since frost depth is inversely proportional to pore water content, the expected higher pore water content of the soils above the compacted radon barrier serves to insulate the deeper layer from frost in the legacy rock armor cover. The evapotranspirative cover, in theory, draws pore water out of the cover through plant roots, into the plant community, and transpires the water to the atmosphere, resulting in a drier regime in the upper layers of the evapotranspirative cover system. Thus, the reported moisture content of the cover system and the frost depth will be different in the two designs.

Disposal of Decommissioning Rubble, and Residual Tailings and Process Fluid

[12] Penner, E; Ground Freezing and Frost Heaving; 1962, ¶9, 16; Accessed at http://web.mit.edu/parmstr/Public/NRCan/CanBldgDigests/cbd026_e.html#content on 4 October 2017

[13] NUREG/CR-7028, Volume 1, p. 6-17

Several commenters objected to disposal of decommissioning rubble, and any residual tailings or process fluid in a disposal cell constructed of a portion of Cell 1 along its common boundary with Cell 2. At issue are two elements: (1) EFRI's proposed design using clay lining for this cell without synthetic liners and leak detection; and, (2) potential for inundation by storm water introduced to the "basin" formed from the remainder of Cell 1.

In response to the commenters' objections to the clay liner, EFRI revised the reclamation plan, committing to provide a liner and leak detection element identical with Cell 4B – two synthetic liners with interstitial leak detection. Having reviewed and considered the comments and the EFRI revised plan, the Division concludes that this revision is adequate to address the comments. No further revisions will be required at this time. This conclusion is further supported by the following considerations.

The finished contours of the reclaimed Cell 1 provide for a storm water runoff "basin" with a nearly flat bottom. The bottom slope of 0.1% would produce flow velocity low enough to allow particulate to settle out of the flow. The "basin" has no retaining structure at the discharge end, but maintains the shallow slope throughout, so no water retention can occur; thus, the labeling on the plans of a "basin" is misleading. The author of this response would have chosen to label the storm water runoff feature a "channel" rather than a "basin." Since the feature functions as a channel without retention, the commenters' fears of storm water backing up in the feature and flooding the disposal cell are unfounded. To the contrary, positive drainage will occur at all times. That much can be determined from EFRI's contour map for the final product.

One commenter demanded steeper slopes on the top of the ET cover. The Division does not agree with this comment and will not require any changes based upon it. The relatively flat slopes of the current design allow better erosion resistance (particle suspension increases with fluid velocity, which increases with slope) and encourage percolation of water into the cover (slower velocity during runoff increases residence time on the cover, increasing opportunity to penetrate the cover). An ET cover design requires water to penetrate to the water storage/growth medium layer to support the plant community necessary for the ET cover to resist erosion and transpire water from the cover. Demanding a steeper slope is contrary to how the cover system is designed to work. Increased slope may be required if the ET cover demonstration leads to a conclusion that the ET cover will not perform adequately and cannot be adjusted to rectify the deficiencies. In that case, the currently-approved rock cover design will be implemented. In that event, prevention of percolation becomes more critical and an increased slope may be warranted. The flatter slope will be evaluated at the secondary test section, where both run-on and run-off can be studied as motive forces for suspending and carrying off material from the cover.

Milestones

Several commenters objected to the manner in which EFRI's reclamation plan handled the timing of closure events associated with the Mill and its impoundments. The Division disagrees with these comments. 10 CFR 40 Appendix A defines a milestone as "an action or event that is required to occur by an enforceable date." This definition does not comport with the milestones approved by the NRC in the reclamation plan in place when the Division began regulating the

facility, nor did former the DRC adopt this definition in reviews of Reclamation Plan Revisions 3.0, 3.1, 3.2 or 3.2b. This definition was also not implemented in Reclamation Plan 5.1 as originally proposed, because of the difficulty in predicting how long dewatering and tailings consolidation processes would take. The tailings mass was not behaving as predicted, and studies were under way to gain more understanding of the behavior of the tailings mass prior to setting deadlines conforming to that definition. Nevertheless, setting precedent aside, EFRI has amended Reclamation Plan 5.1, Chapter 6 to include milestones as close as can be crafted to meet the intent of the definition. The milestones set a fixed interval following commencement of closure of a tailings impoundment to complete installation of the final radon barrier and to complete all necessary work preparatory to placing the radon barrier.

Commenters have attempted to extend the use of milestones to force acceleration of other decommissioning-related activities at the site. The Division disagrees. The application of milestones in this manner is not consistent with the intent of the regulations. The definition of *reclamation plan* in 10 CFR 40 Appendix A includes a statement on milestones:

> *Reclamation plan,* for the purposes of Criterion 6A, means the plan detailing activities to accomplish reclamation of the tailings or waste disposal area in accordance with the technical criteria of this appendix. **The reclamation plan must include a schedule for reclamation milestones that are key to the completion of the final radon** barrier including as appropriate, but not limited to, wind-blown tailings retrieval and placement on the pile, interim stabilization. (Italics in the original; bolding added)

10 CFR 40 Appendix A also states the following about milestones:

> Criterion 6A—(1) **For impoundments containing uranium byproduct materials, the final radon barrier must be completed *as expeditiously as practicable considering technological feasibility* after the pile or impoundment ceases operation in accordance with a written, Commission-approved reclamation plan. (The term as expeditiously as practicable considering technological feasibility as specifically defined in the Introduction of this appendix includes factors beyond the control of the Licensee.) Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring).** The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan.
>
> **(2) The Commission may approve a Licensee's request to extend the time for performance of milestones related to emplacement of the final radon barrier** if, after providing an opportunity for public participation, the Commission finds that the Licensee has adequately demonstrated in the manner required in paragraph (2) of Criterion 6 that releases of radon-222 do not exceed an average of 20 pCi/m^2s. If the delay is approved on the basis that the radon releases do not exceed 20 pCi/m^2s, a verification of radon levels, as required by paragraph (2) of Criterion 6, must be made annually during the period of delay. In addition**, once the Commission has established the date in the reclamation plan for the**

> **milestone for completion of the final radon barrier, the Commission may extend that date based on cost if, after providing an opportunity for public participation, the Commission finds that the Licensee is making good faith efforts to emplace the final radon barrier, the delay is consistent with the definition of available technology, and the radon releases caused by the delay will not result in a significant incremental risk to the public health.** (Italics in the original, bolding added)

The term *milestone* appears six times in Appendix A, and all are related to the placement of the final radon barrier. Since none of the other activities associated with the reclamation plan concern the installation of a final radon barrier, the Division will not extend the application of milestones to these other activities.

Sequencing of Work

Two commenters demanded simultaneous closure of all impoundments. The Division disagrees with these comments. The commenters' unsupported assertion that the impoundments must be closed simultaneously rather than sequentially ignores common construction practice and other realities of project management. There is no public health or technical or legal reason to require simultaneous closure. Significant earthmoving and construction projects are normally broken into smaller, manageable pieces and implemented sequentially. This is the approach the Licensee has proposed and the Division has approved. This approach allows for efficient use of the most experienced and capable workers and the most appropriate equipment and prevents conflicts that can occur from overcrowding of the worksite. Furthermore, allowing sequenced closure of the impoundments allows for transfer of fluid from each impoundment as work progresses to the next impoundment for evaporation rather than forcing a more expensive and risky process of transporting the fluids offsite for disposal. In fact, requiring simultaneous closure may result in detrimental environmental and construction consequences, including increased construction worker safety hazards associated with managing multiple projects and associated equipment simultaneously.

Consolidation of Tailings and Dewatering

Commenters demanded immediate work to complete dewatering of Cells 2 and 3, and establishment of dates certain for closure of these cells. The Grand Canyon Trust asserted that modeling techniques could produce sufficiently reliable data to fix calendar dates to milestones. The Division disagrees with these comments. As an initial matter, the Division has found that an appropriately designed and constructed final radon barrier has already been installed over Cell 2. Only the final cover is lacking. The radon barrier functions of the final cover are already being satisfied. As a result, the requirement for establishment of milestones no longer applies to Cell 2. Cell 3 is still active, and even though tailings are currently directed to Cell 4A, other byproduct material is being placed in the cell, as allowed under both the regulations and the license. Therefore, the requirement for timelines has not yet been triggered for Cell 3.

Engineers use models to predict the behavior of physical systems and to generate meaningful input to designs. Models do not include all inputs to the physical system, but make simplifying assumptions. Therefore, any model can only be an approximation. Depending on the

assumptions made in developing the model, the results of modeling may be a close representation of the physical system or a poor one.

The quality of the modeling effort is also a function of how well the model inputs reflect the system being modeled. Often, for lack of site-specific data, literature values are used, which may, or may not well represent the conditions ultimately encountered. EFRI used the best available data when doing initial dewatering and settlement modeling, and regulatory approvals were given based upon the results of those models.

The modeling done during the planning phases of the Mill projected much faster dewatering performance than that encountered in the field. EFRI is in the process of a second round of data gathering during operation (i.e., after the conclusion of the planning phase and commencement of operations) to "calibrate" the model and get a more realistic expectation for dewatering performance.

Due to frustration at the slowness of the dewatering effort, in 2007, the Division amended the Ground Water Discharge Permit to include a provision at Part I.D.3(b)(1) (now I.D.3(b)(3)) to calculate the phreatic surface above the slimes drain evacuation pump, and with that data to calculate the three-year running average of that elevation.[14] The three-year running average would then be plotted along with previous years' calculations. The measurements that facilitate that calculation were taken quarterly, so the plot would present the three-year running averages in temporal sequence. EFRI was required to maintain a downward trajectory with no more than two consecutive calculations failing to show a downward trend.

That formula served to encourage EFRI to do the maximum possible to dewater. During the time EFRI has been required to calculate according to that formula, the Division staff has noticed that the pace of dewatering has decreased and approached a horizontal asymptote. Factors beyond EFRI's control have intervened. However, EFRI has installed piezometers and has collected samples of the tailings to analyze what is happening in the tailings mass. There was the potential that EFRI could be in violation of this provision of the GWDP through no fault of its own, but because the natural system would not cooperate with the regulatory authority.

EFRI has since placed several feet of soil on Cell 2 to complete the primary radon barrier. That material has surcharged the tailings mass, creating excess pore pressure as the fluid is compressed along with the tailings. As a result of the increased pore pressure, the phreatic surface has risen, and the amount of fluid available for pumping has also increased. The Division has exercised discretion in not citing EFRI for missing what amounted to an arbitrary date set by the Division, before it could be known how long the process would actually take based on the conditions of the system. The circumstances were beyond the reasonable control of EFRI. Moreover, the GWDP has been modified to remove the arbitrary date.

The Division is cognizant of the effort to gain additional insights through using piezometers to monitor the phreatic surface in multiple locations at Cell 2 and through analyzing samples of

[14] 2008 GWDP Amendment Statement of Basis

tailings and slimes. The Division has a vital interest in using the product of that effort to construct a meaningful way of assuring that EFRI is doing all it can reasonably do to accelerate the dewatering and related consolidation of the tailings mass.

This discussion points out the impracticability of establishing the milestones for reclamation as demanded by the commenter.

Based on all available information, the Division believes the NRC expected situations to arise where the narrow definition of a milestone with an enforceable date attached to the mandated action would be impractical. That is why the NRC noted exceptions to the practice of fixing firm dates for compliance. The Division believes that, notwithstanding the provision allowing EFRI to seek revision of milestone dates, the current situation supports even more discretion on the part of the Division; the dates would need to rely on some predictive mechanism to be meaningful, and the modeling typically used for this purpose has proven to be highly inaccurate. Repeated processing of requests for extension of time will do nothing to help protect human health and the environment, but will divert resources of both EFRI and the Division from that mission. It seems prudent to allow the Division and EFRI sufficient flexibility to work on resolving this problem rather than blindly adhering to a mandated process.

EFRI has attempted to fix a specified interval from the cessation of placement of byproduct material into a cell to the completion of dewatering. Inasmuch as this time interval may prove unworkable, the commenters should anticipate that the Division will be sympathetic to extending the deadline associated with the dewatering milestone.

Storm Water

One commenter fears release of radioactive contamination to Westwater Creek in storm water routed through the Cell 1 discharge channel. This comment is based on speculation, not facts. The Division finds that this comment has been adequately addressed based on a number of factors. The Reclamation Plan calls for surveys to be performed and reclamation activities to be performed to standards that result in radiation levels indistinguishable from background in the areas contributing storm water to the Cell 1 discharge channel. The license provisions to which the commenter refers will be modified as part of the license termination plan to allow for discharge of water from areas remediated to free release standards (radiation levels indistinguishable from background). This removes the conflict the commenter perceives. Discharges from contaminated areas will not be released to Westwater Creek prior to completion of remediation. Note: “background” is defined in the glossary. Inasmuch as background represents the level of uranium and other radioactive material naturally occurring in the area, no readings can be taken that reliably will represent any level of radioactivity lower than background. Thus, background is the maximum cleanup level achievable, and represents the same risks and characteristics as found in the natural environment.

Characterization Surveys

Prior to cleanup of the site at decommissioning, the site will be assessed to determine where contamination exists. The reclamation plan provides a beginning for the planning of

investigative efforts. The work will also consider any information that may help to divide the site into areas of high, medium, or low likelihood of contamination. Then, a statistical approach to focus sampling and scanning activities will be designed. The details of the methodology appear in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*. In the Division's considered view, the use of the MARSSIM approach provides a highly efficient method of identifying contamination with a high degree of confidence that contamination was not missed.

One commenter challenges the adequacy of characterization surveys detailed in the Reclamation Plan. The Division disagrees with this comment and finds that the characterization surveys are adequate. A careful reading of Attachment A to the Reclamation Plan, pages A-23 through A-53 should inform the reader of the probabilities of effectively identifying areas requiring cleanup based on the scanning patterns detailed in the Plan. The scan design was based upon requiring a 95% probability that the scan would identify all areas requiring remediation and a 10% probability of requiring more remediation than necessary. For a discussion of the methodology employed, the reader should consult NUREG-1575, the manual cited in the previous paragraph. NUREG-1575 presents a protocol design developed jointly by the United States Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE) and the Department of Defense (DOD) for cases like this. 95% confidence in successfully identifying contamination is typical for this kind of work. The lateral and vertical definition sought by the commenter is spelled out in the referenced guidance, which was produced specifically to provide the scientific integrity necessary to successful remediation.

The Division further notes that the commenter failed to analyze why only scanning about 10% of the site was inadequate. The commenter should provide some data to support an assertion that the design is inadequate in "leav[ing] 90% of the facility unscanned at best." Doubling or trebling the coverage results in very little gain in probability of finding all contamination.

The starting point for grid sampling, for example, is determined by selecting coordinates for the start point through the use of a random number generator, which precludes any ability to set the grid in a manner intentionally to miss contamination. That point selection will be made at the time of commencement of the survey, not *a priori*. Likewise, the delineation of survey units will await the commencement of decommissioning so that events that occur between now and the commencement of decommissioning can be considered in selecting boundaries for the various grades of survey areas. This is all in accordance with the cited guidance. If those decisions are made today, either the scientific/statistical basis of the method may be compromised in the future, or the decisions made today will need to be discarded in favor of a new set of boundaries and starting points. The characterization should use the most up-to-date data available rather than being rigidly fixed at an arbitrary date perhaps years in advance of commencement of the physical work.

Division General Response #15: Surety (AKA Financial Assurance)

A number of comments relate to financial assurance. Under applicable federal and state regulations, EFRI must provide adequate financial assurance or surety, to complete all decommissioning and remediation efforts required at the Mill should EFRI prove unable or

unwilling to perform those tasks at the time they are required. Several commenters have made suggestions intended to increase the amount of financial assurance for the project, assuming that insufficient moneys have been set aside for the decommissioning and closure of the site. R313-22-35(1)(a) requires this Licensee to submit a decommissioning funding plan as the basis of the surety. The Division has incorporated at R313-22-35(h) a requirement to follow the recommendations of NUREG-1757, Volume 3 to develop the surety estimate, even though NUREG-1620 was intended for uranium recovery facilities. The Division did this, in part, to achieve uniformity, so all radioactive material Licensees would be treated alike.

Several commenters presuppose that the Division did not consider the risk that the surety estimate may prove to be inadequate. The Division disagrees. The Division reviews in detail every year the adequacy of the EFRI financial assurance, as required by applicable regulations and the license. Some commenters have challenged the Division on more than this one occasion to compare decommissioning costs as estimated by EFRI with the cost of cleanup efforts at other mill sites.[15] Based on the Division's many years of experience evaluating the adequacy of financial assurance, each facility's financial assurance determination is site-specific. Comparison of reclamation costs at various mill sites is often not a useful exercise because of unique, site-specific factors. The following, non-exclusive list of examples is noted as compared to the White Mesa Mill:

- Other decommissioned mill sites were constructed when standards for environmental protection were weaker or nonexistent. For example, their tailings impoundments were not lined, so their process fluids readily leached into groundwater. Treating the White Mesa site in this manner sets at naught preventive measures already in place, thus overestimating the costs involved.

- Previous sites had little or no monitoring networks in place to facilitate early detection and cleanup of releases. At the White Mesa Mill, robust monitoring networks are in place. Those networks have detected chloroform and nitrate releases (which do not relate to the impoundments onsite), which are currently in cleanup or control phases. The monitoring network has also proved successful in confirming the success of liner breach repair efforts at Cell 1.

- Previous sites had no ongoing cleanup effort; the entire expense was borne at the decommissioning phase of the project life cycle. That is not true of the White Mesa site in the case of the chloroform release, which is undergoing cleanup, and surety funds have been set aside for work yet to be done. In the case of the nitrate plume, money has been

[15] One set of comments, a letter from RRD International Corp dated December 1, 2011 to Celene Hawkins, counsel to the Tribe, included as Exhibit H to the Ute Mountain Ute Tribe's comments, is an earlier version of a letter from the same source dated April 18, 2014 which the Division reviewed. Both letters cover the same subject matter. The Division reviewed the 2014 letter and prepared an internal review memorandum dated May 29, 2014. The Division provided the Tribe a copy of that memorandum at that time. That memorandum is referenced here and made a part of this review. (Document # DRC-2014-003643)

set aside in the surety to address the release, and money has already been expended to isolate the release from water so it will not be driven into the groundwater.

- Many of the decommissioned mill sites were poorly sited. For an extreme example, Atlas was located on the bank of the Colorado River near Moab, Utah. The White Mesa property underwent a different siting process, leading to fewer potential impacts offsite and more opportunity to address problems at lower cost. Groundwater is deep (excepting the small perched aquifer under the site). A substantial clay/rock aquiclude prevents rapid migration of water from the surface into the groundwater. This geologic setting provides opportunity to address releases, if they occur, before they impact the groundwater and become much more expensive to handle. Furthermore, with the arid climate and a good cover system, the tailings will not need to be moved, sparing the expense that sites like Atlas experienced.

- The Division has been aggressive in its efforts to make the surety complete and conservative. Again using the Atlas site as an example, the Atlas Licensee successfully avoided securing even 1% of the required surety because of a weak regulatory regime. Such is not the case at the White Mesa Mill.

- The current contingency value of 25% is in line with industry standard, and is higher than that recommended in NUREG-1620 which is the guidance for uranium mill sites. Rule R313-22-35(3)(h) incorporated NUREG-1757 Volume 3 by reference. That volume specifies a contingency value of no less than 25% in several locations.[16] Having noted that the lowest the contingency is 25%, the Division has sought additional evidence to suggest whether to increase the contingency beyond that value. Since the Division feels that the site is well characterized, and the risks are well managed, evidence is lacking to justify a higher value at this time. The Division remains open to credible data to consider in this matter.

The reader should note that the Division required EFRI to include the construction of the legacy rock armor cover in the surety. The rock armor cover is projected to cost more than the proposed evapotranspirative cover. If decommissioning occurs prior to the evapotranspoiritive cover study program concluding or if the study demonstrates that the proposed cover does not function sufficiently well, the legacy cover will be implemented. Since the more expensive cover is included in the surety, the question of sufficiency for this line item is answered in the affirmative.

Specific Comments Related to Cleanup of Contaminant Releases

Several commenters want significant sums of money set aside for cleanup of contaminant plumes they speculate might occur in the future, or that they claim, without evidence, have already occurred. The commenters presented no evidence that these conditions exist. As a result, the Division cannot accept these comments because they are not supported by the administrative

[16] NUREG-1757, vol. 3, p. 4-11, p. A-25, p. A-38.

record here. Moreover, in a legal decision, the hearing officer for the NRC stated: "[T]he NRC seeks to regulate efficiently, imposing the least amount of burdens necessary to carry out our public health and safety mission."[17] The State shares this value. The imposition of financial and regulatory burden the commenters seek would be unreasonable, unfair and likely deemed unlawfully excessive on appeal since no rational justification can be made for the provisions.

The Grand Canyon Trust in its comments cites numerous standards to which modern uranium milling facilities must be built and operated. These standards are intended to serve as preventive barriers to the release of pollutants to the environment. When these standards are followed, the probability of release and the potential severity of releases are drastically reduced compared to mills that were sited or constructed without such standards. The hypothetical cleanup costs cited by Grand Canyon Trust and other commenters are derived from facilities that were sited, designed, and operated using limited or antiquated standards. In these legacy operations, little or no work was done during the course of operations to limit or prevent releases of pollutants to the environment. By contrast, the White Mesa Mill was sited, designed, and is operated in accordance with modern standards and industry practices. The facility was sited in a location with favorable natural conditions and includes large tracts of buffer property. The White Mesa Mill is operated in accordance with modern standards and requirements. All new cells are lined. Cell 2, which was unlined because lining was not required at the time it was designed, has been shut down and a full, complete, final radon barrier installed. Dewatering efforts are underway. The degree of protection of human health and the environment at the White Mesa Mill is further supported by extensive, modern environmental monitoring systems to detect releases should they occur, coupled with timely response to any identified releases, and an inspection program to evaluate EFRI's operations and procedures. The administrative record supports a conclusion that the White Mesa Mill meets the test of reasonable assurance of satisfactory performance based on modern standards and practices. Comparison of the White Mesa Mill to other facilities that were not sited or operated in accordance with modern standards and requirements is not warranted.

The commenters effectively give no credit for the network of 74 monitoring wells EFRI has installed to detect releases, the five piezometers installed for that same purpose and to monitor groundwater elevations and the 18 wells installed to monitor groundwater elevations and movement. Nor do the commenters allow any credit for the seven air monitoring stations used to detect any airborne releases. This network has detected two small groundwater contaminant plumes, unrelated to the impoundments, for which cleanup plans have been posted to the Division's website. This degree of environmental monitoring at a uranium mill facility is unprecedented. The execution of the cleanup plans is ongoing, and money for the portions not completed is in the current surety. The commenters' suggested modification to the surety for remediation is unsupportable by the evidence gained from the monitoring network.

The Grand Canyon Trust asserts probability of significant incidence of contaminant release without justifying the claim with data or uncertainty analysis, citing only the conclusions from other sites that did not have adequate prevention or detection measures or cleanup regimens executed during plant operations. Such a comparison is unwarranted and unsupported by the

[17] ML14133A521 p. 17

administrative record here. In a paper prepared to present the evidentiary requirements the NRC imposes so that Department of Energy licensing efforts could navigate the NRC review process, the author made several notes regarding uncertainty analysis that apply to this matter. These standards are adopted by the Division here:

> *"The NRC's use of reasonable assurance, and the DOE's strategy planning are intrinsically associated with describing and defending predictions and performance claims.*
>
> *A severe problem associated with the development of an acceptable strategy occurs when critical predictions and performance claims are stated without bounds and are based on data without addressing the effects of uncertainties in the data.*
>
> *If, in claiming performance or describing predictions, the reader is provided with assumptions without analyses of the consequences of the assumptions and without analyses of the differences in conclusions that could occur if the assumptions were modified, then evaluations pose major problems. In order to judge the validity of claims and predictions made under these conditions, the reader may be required to be better informed and to do more work than the authors of the claims. The problem has been noted repeatedly, and arguments without uncertainty analyses have been declared as unacceptable in the present regulatory framework.*
>
> *This leads to an obvious requirement for the justification for a finding of reasonable assurance:*
>
> ***If the uncertainties cannot be defined, the data cannot be defended."***[18] *(emphasis in the original)*

Here, the commenter provides no data upon which to base an uncertainty analysis, let alone performing the uncertainty analysis. The Division's mission is not to provide that consulting function to the commenter, but to evaluate the commenter's claims on their merits based on the evidence presented. There is no evidence upon which the Division could conclude that the commenter's claims are valid. By contrast, the evidence in this administrative record compels the opposite conclusion. The Division follows the NRC approach to technical evaluation, to the extent possible.

Another distinguishing factor here is the degree of the Division's ongoing environmental oversight of the White Mesa Mill. The Division performs numerous inspections annually to assess topics including, but not limited to, basic environmental housekeeping, record keeping and performance of the installed systems as compared to design and regulatory expectations; i.e., is the project managed and performing in a manner protective of human health and the

[18] Schweitzer and Sastre, Levels of Evidence for Reasonable Assurance Guides to Prediction, 1987, DOE Radioactive Waste Management Division, Department of Nuclear Energy, Brookhaven National Laboratory Associated Universities, Upton, New York, p. 5. Accessed October 10, 2017 at www.osti.gov/scitech/servlets/purl/5559384.

environment. Division inspectors must meet qualification requirements established by the NRC, and are accompanied at least annually by a supervisor to assure that the inspectors are competent and thorough. Mill personnel also perform inspections, which are reported to the Division. Some Division inspections duplicate EFRI's inspections to assure uniformity and reliability of content and execution of inspections. Since the inspections focus on facility construction and maintenance, execution of operations and monitoring activities, the inspection regimen bolsters confidence in the efficacy of the pollution prevention, detection and remediation efforts already discussed. Analogous efforts did not occur with any regularity, if at all, in the examples cited by the commenters.

During periodic reviews, the NRC assesses the Division's work practices, inspection processes, comprehensiveness of coverage, and results attained. This ensures that the Division is enforcing current standards in a manner consistent with NRC expectation and with current best practices.

One commenter seeks to amend the contingency line item for items of work that can be named and an estimate provided, including environmental remediation. The Division disagrees with this approach because it conflicts with industry standard practice. ASTM E2168 asserts that anything that can be foreseen and estimated should have its own budgetary *allowance*, reserving the *contingency* line item for the unforeseen and unforeseeable. This approach is consistent with the language in NUREG-1757, Vol. 3, which states: "The 25 percent contingency factor provides reasonable assurance for unforeseen circumstances that could increase decommissioning costs…."[19] Using the vocabulary correctly here is critical. Environmental remediation should, and does, appear in the budget. With the extensive monitoring network in place, the remediation estimate can be limited to known releases since releases will not go undetected.

Historically, the NRC has addressed groundwater remediation in its surety reviews. In October of 1988, the NRC released a technical position on financial assurance that read, in part:

> *"A major concern in the termination of a mill license is the restoration of aquifers that have been contaminated by the operation of a tailings impoundment. As this concern is added to the site specific reclamation plans, EFRI should include these costs in its surety until EFRI is released from further groundwater restoration activities."*[20]

Similarly, in its most recent guidance, the NRC stated:

> *"Facilities with fluid processes may have unplanned and uncontrolled leaks or spills. Occasionally leaks or spills will exceed the confinement capability of the facility or occur in an unconfined area and migrate into the environment. Once in the environment, the contaminants may spread through the subsurface, resulting in a potentially large volume of residual radioactivity in the subsurface that will require remediation before license*

[19] NUREG-1757, vol. 3, p. A-25.

[20] NRC, 1988, Technical Position on Financial Assurance for Reclamation, Decommissioning, and Long-term Surveillance and Control of Uranium Recovery Facilities, p. 22. This document was superseded by NUREG-1727, then by the NUREG-1757 series.

termination. When such residual radioactivity is identified, the cost of remediating it must be included in the decommissioning cost estimate."[21]

The Division agrees with, follows, and adopts these NRC standards. These references indicate that known releases to groundwater should be included in surety funding. The NRC has also taken a stand on prevention and early detection. In contrast, one commenter proposes a different method, which is inconsistent with the standard adopted by the NRC. As a result, the Division adopts and follows the NRC method.

Consistent with these standards, the Division points out that two non-radioactive contaminant plumes have been identified within the confines of the Mill property. Both are in the process of being cleaned up, and both are addressed in the surety estimate and funding. Furthermore, neither release was related to the tailings impoundment. One appears to be from a septic system that once existed on the property, and the other may be from a chemical spill some distance upgradient from the fluid impoundments. Even more to the point: if the monitoring network is robust enough to detect these comparatively minor releases (when compared to the expected release from a breached fluid impoundment), it surely would detect a release from the impoundment early enough to commence remediation in time to prevent a massive spread of the pollutants. In summary, the Division concludes that the environmental monitoring measures currently in place are adequate to meet all applicable legal and technical standards and requirements and to protect public and worker health as well as the environment.

Long-Term Care

Some of the financial assurance comments relate to the subject of long-term care. The NRC has not seen fit to change its recommendation regarding minimum funding for long-term care. The Division is following current guidance. At this time, the Division does not find that there are significant needs for which the costs have not already been accounted. Specifically, with respect to the Monticello site, the Department of Energy maintains a field office on the Monticello property to house workers while monitoring the experimental cover system; no such activity is anticipated at White Mesa. Therefore, using Monticello as a benchmark would artificially inflate the estimated cost at the Mill without valid justification. Based on all evidence of record, the Division accepts the original NRC estimate of $250,000 in 1978 dollars as being the most accurate number. That estimate was made by the entity that will be tasked with the long term care, The Department of Energy and the Division have no information indicating site-specific need to exceed the minimum care expectation. Therefore, the default must be given some deference in the absence of evidence to the contrary.

Division General Response #16: Groundwater Discharge Permit

Background Information

[21] NUREG-1757, vol. 3, p. A-26.

The Division received comments from the Ute Mountain Ute Tribe (Tribe) dated July 31, 2017. The Tribe's comments relate to the Division public notice for renewal of the Utah Ground Water Discharge Permit, Permit No. UGW370004 (Permit), for the White Mesa Uranium Mill (Mill) located in sections 28, 29, 32, 33, Township 37, Range 22 East, Salt Lake Baseline and Meridian, San Juan County, Utah. The operator/owner of the Mill is Energy Fuels Resources (USA) Inc. (Permittee) who acquired the facility through a transfer of control, approved by the Division Director on June 27, 2012.

Public notice regarding renewal of the Permit was issued on May 1, 2017 including a copy of the Draft Renewal Permit and Permit Statement of Basis. Comments were accepted through July 31, 2017. A public hearing was held on June 8, 2017 (Salt Lake City, UT) to answer questions regarding the Permit renewal and a public information meeting was held on June 15, 2017 (Blanding, UT) to receive comments. The Tribe provided questions and comments during both of those meetings.

General Discussion

The Mill was constructed during the years 1979 and 1980 and was originally licensed by the United States Nuclear Regulatory Commission (NRC) under Source Material License No. SUA-1358. On August 16, 2004, the NRC delegated the Utah uranium mill regulatory program to the State of Utah by approving Agreement State status. The Division became the primary regulatory authority for the Mill, and subsequently issued a State Radioactive Material License No. UT1900479 (License) and a separate Ground Water Quality Discharge Permit No. UGW370004.

Under the Permit, the Permittee is required to conduct and report on environmental monitoring at the Mill, including groundwater monitoring, tailings wastewater sampling, spring and seeps sampling, groundwater elevation data, chloroform monitoring, and nitrate monitoring. The groundwater monitoring network at the Mill includes 74 monitoring wells for compliance purposes. Wells installed to monitor the tailings cells (MW Wells) are required to be sampled and analyzed for 38 different contaminants. For each such contaminant, the Permit establishes a compliance standard.

Two non-radioactive groundwater contaminant plumes have been identified and characterized in the vicinity of the primary Mill facilities. One plume is chloroform, likely from legacy lab wastes, and a second plume is nitrate/chloride, likely originating from Ammonium Sulfate Crystal tanks at the processing site. Based on all available evidence, neither plume relates to uranium process water or the process water ponds. Both plumes are contained within the boundaries of the Mill and are not likely to extend beyond the property boundaries. Additional details regarding each plume are provided below.

1. *Chloroform Plume*

In May 1999 the Permittee and the Division commenced an annual split sampling program for groundwater monitoring wells at the Facility. This program was comprehensive in that it included all monitoring wells at the facility completed in the shallow aquifer, and a large number

of groundwater contaminants, including heavy metals, nutrients, general chemistry, radiologic, and volatile organic compounds (VOCs).

During the May 1999 split sampling event, excess chloroform concentrations were discovered in Monitoring Well MW-4, located on the eastern margin of the site. Because these concentrations were above the Utah Ground Water Quality Standard (GWQS) (70 µg/L), the Division initiated enforcement action against the Permittee on August 23, 1999 via issuance of a Ground Water Corrective Action Order, which required completion of 1) a contaminant investigation report to define and bound the contaminant plume, and 2) a groundwater corrective action plan to address remediation of the plume to re-establish the GWQS's.

Repeated groundwater sampling events since that time, conducted by both the Permittee and the Division confirmed the presence of chloroform in concentrations that exceed the GWQS along the eastern margin of the site in wells that appear to be upgradient or cross-gradient from the tailings cells. Other VOC contaminants associated with chloroform have also been detected in these samples. After installation of 20 new monitoring wells at the site, and associated groundwater studies geared towards defining the nature and extent of the contamination, the eastern and southern boundaries of the Chloroform Plume were adequately characterized and defined in the Division's reasoned view.

Based on the Division's evaluation of available data and information, it was determined that the source of the chloroform was most likely from long-discontinued Mill laboratory wastewater disposal activities. In the early years of the Mill, laboratory waste was disposed in unlined sewage leach fields which likely created the chloroform contamination. This practice had been discontinued many years prior to the discovery of the Chloroform Plume. There is no evidence of an ongoing release or disposal or housekeeping practice that is contributing to the Chloroform Plume.

The Division's determination that the legacy laboratory wastewater was the most likely source of the Chloroform Plume was based on the following factors, together with additional information as described in the relevant reports:

- The location of the highest levels of chloroform contamination is at or near the location of the former sewage leach fields;
- The Chloroform Plume is upgradient or cross-gradient from the tailings cells;
- Monitoring wells that are downgradient from the tailings cells do not show chloroform contamination; and,
- The remediation program has been effective in reducing chloroform concentrations, indicating that there is no continuous source for the chloroform, as would be the case if the tailings cells were leaking.

There are currently 38 monitoring wells associated with the Chloroform Plume. The Division believes that this monitoring system is adequate to address the risks posed by the Chloroform Plume and to monitor the Permittee's progress in remediating the contamination. The Permittee submitted, and the Division approved, a detailed Corrective Action Plan (GCAP) for the Chloroform Plume. Prior to accepting the GCAP, the Division solicited public comment on the

plan from January 12, 2015 through February 13, 2015. The Division also conducted a formal public hearing on the GCAP in Blanding, Utah on February 11, 2015. After considering all public comments submitted on the document, the Division approved the final GCAP on September 14, 2015. The approved remediation strategy for the Chloroform Plume employs a hydraulic control system (pump and treat) to isolate and capture the chloroform. This hydraulic control system was initiated in April of 2003. Groundwater monitoring results show this initial remediation effort has been effective to remove significant amounts of chloroform as reported in quarterly chloroform monitoring results and to hydraulically capture the contamination. The Division continues to monitor the effectiveness of the remediation program. The projected future costs of the remediation program have also been included in the financial assurance, which is updated and reviewed annually. The footprint of the Chloroform Plume continues to diminish over time and the plume is located within the confines of the Mill property. Based on all available information, the Division has concluded that it is unlikely the Chloroform Plume will extend outside of the boundaries of the Mill property in the future.

2. Nitrate/Chloride Plume

During a review of the Permittee April 30, 2008 New Wells Background Report and other Permittee reports, Nitrate + Nitrite (as N) ("Nitrate") concentrations were observed above the Utah GWQS (10 mg/L) in five monitoring wells in the Mill area, including wells: MW-30, MW-31, TW4-22, TW4-24, and TW4-25.

After the Nitrate Plume was identified and the information was shared with the Permittee, the Director and the Permittee entered into a Stipulation and Consent Agreement dated January 28, 2009, which required, among other things, that the Permittee complete a Contaminant Investigation Report (CIR) to determine the potential sources of the nitrate contamination. An immediate action to install 19 additional nitrate monitoring wells was then initiated to define the nature and extent of the contamination.

The Permittee submitted a CIR to the Director on January 4, 2010, which identified a number of potential sources. After review of the CIR, the Director determined that additional investigation was required. This conclusion was shared with the Permittee in an October 5, 2010 letter. The Permittee responded in a November 15, 2010 letter in which they proposed additional studies to be conducted to further define the nature, extent, and source of the Nitrate Plume. The additional studies were discussed in detail during a November 30, 2010 meeting with the Permittee and Divisions staff.

The Director agreed with the Permittee that conducting the proposed, additional studies would be appropriate. Therefore, the Director and the Permittee entered into a Tolling Agreement on December 20, 2010 to allow the Permittee time to conduct additional studies. The additional characterization work was completed and the results evaluated. The new data ruled out tailings cell leakage as a source of the Nitrate Plume. Rather, the new study generated more than enough data to support a conclusion that the Ammonium Sulfate Crystal tanks at the Facility site is a primary or source of the Nitrate Plume. The factual and technical basis for this determination includes the following factors, as described in more detail in the relevant reports:

- The location of the highest nitrate concentrations of the Nitrate Plume are at or directly downgradient from the Ammonium Sulfate tanks;
- The Nitrate plume is upgradient or cross-gradient from the tailings cells, demonstrating that the tailings cells are not contributing to the contamination; and
- While some of the monitoring wells that are downgradient from the tailings cells do show nitrate, these concentrations are not above standards and do not indicate increasing trends. Moreover, the nitrate in these wells appears to be unrelated to the Nitrate Plume. Nitrate occurs naturally in groundwater, so its presence in concentrations below standards is not considered an indication of a problem or a connection with the Nitrate Plume or a release from the tailings cells. There is no data to support a conclusion that the tailings cells are leaking.

After completion of the studies, the Director and the Permittee subsequently agreed to pursue the development and implementation of a corrective action plan (CAP) to address the Nitrate Plume in the groundwater. The Permittee completed and submitted a draft Nitrate Plume CAP to the Director. The Permittee's chosen remediation plan requires the Permittee to pump the groundwater and treat it by evaporation and/or use it as process water for milling.

In response to the draft Nitrate Plume CAP, the Division prepared a proposed, draft Stipulated Consent Order, Docket No. UGW12-04 ("SCO") and solicited public comments. The public comment period began on July 18, 2012. The Division conducted a public hearing to receive comments on the SCO and CAP August 20, 2012. Based on the comments, the Director prepared and published a detailed public participation summary and response to the comments on December 12, 2012, the effective date of the SCO. The Director's approval of the Nitrate Plume CAP is subject to conditions, stipulated penalties and timelines outlined more fully in the SCO.

The Permittee implemented the CAP and initiated groundwater pumping in January, 2013. The footprint of the Nitrate Plume continues to diminish over time and the plume is located within the confines of the Mill property. Based on all available information, the Division has concluded that it is unlikely that the Nitrate Plume will extend outside of the boundaries of the Mill property in the future.

3. Out of Compliance Parameters

On May 9, 2011 the Director issued the Permittee a Notice of Violation and Compliance Order, Docket Number UGW11-02 (NOV), which required source assessment activities for several monitoring wells/parameters in out-of-compliance (OOC) status (based on the Directors review of the 1st, 2nd, 3rd, and 4th quarters 2010 groundwater monitoring data); and required the Permittee to submit revised statistics for field pH for several of the facility monitoring wells which were in OOC status.

During several meetings and phone conferences between the former DRC Director and the Permittee subsequent to issuance of the NOV, the Permittee (subsequently EFRI) indicated that decreasing pH trends appeared to be a site-wide occurrence (observable in monitoring wells

upgradient, interior and downgradient) in the groundwater in the vicinity of the Facility and that there was likely a regional root cause. The Permittee also suggested that several of the other groundwater parameters in OOC (e.g. certain metals) may be attributed to the decreases in pH and thus attributable to the root cause. Based on these discussions, a plan and time schedule deadline for the pH statistical evaluation was extended by tolling agreement in order for the Permittee to include a plan to evaluate the root cause of the site wide decreasing trends in pH. The Permittee subsequently submitted plan and time schedules for studies to determine root causes of pH and OOC parameter exceedances and also submitted a plan and time schedule to determine if regional dissolution of pyrite in the mineral matrix of the Burro Canyon formation could be causing or contributing to the site wide decreasing trends in pH.

On July 12, 2012 the former DRC Director approved the Permittee's plans and time schedules for the studies through issuance of a Stipulated Consent Order, Docket Number UGW12-03 (SCO). The SCO approved study plans and as a result the following Permittee reports were submitted by the Permittee:

- October 10, 2012, Source Assessment Report White Mesa Uranium Mill, prepared by Intera Geosciences & Engineering (Intera). Provides explanation and source assessment study of OOC exceedances except for pH. Provides statistical analysis of data and includes graphs and tables of analysis.

- November 9, 2012, pH Report White Mesa Uranium Mill, prepared by Intera. Provides source assessment study for monitoring wells in OOC for pH. Proposes modified Groundwater Compliance Limits for pH for all MW series monitoring wells based on field measurements.

- December 7, 2012, Investigation of Pyrite in the Perched Zone White Mesa Uranium Mill Site, prepared by Hydro Geo Chem, Inc. (HGC). Provides findings of a study to support the regional geochemical process explaining decreasing pH trends at monitoring wells. Study analyzes quantities of iron pyrite (from monitoring well cores and cuttings) and models dissolution in the Burro Canyon Formation.

Based on the former DRC Director's review of these reports, a letter was sent to the Permittee, dated April 25, 2013, which agreed that revised GWCLs as provided for OOC parameters, and revised GWCLs for pH for all MW series monitoring wells are appropriate and will be included in a permit modification with some adjustments. The Director also noted that dissolution of pyrite as a root cause for decreasing pH trends appeared to be a possible explanation for apparent site-wide decreases in field pH.

4. University of Utah Report

At the request of the former DRC Division, T. Grant Hurst and D. Kip Solomon of the Department of Geology and Geophysics of the University of Utah performed a comprehensive groundwater study at the Mill in July 2007 to characterize groundwater flow, chemical composition, noble gas composition, and age (Hurst and Solomon, 2008). The objective of the

study was to determine whether or not the increasing and elevated trace metal concentrations in monitoring wells at the Mill, all of which were identified in the Background Reports, may indicate that potential leakage from tailings cells is occurring.

In order to evaluate sources of solute concentrations at the Mill, low-flow groundwater sampling was implemented in 15 monitoring wells. In addition, surface water samples were collected from tailings cells 1, 3, and 4A, and two wildlife ponds. Passive diffusion samplers were also deployed and collected in order to characterize the dissolved gas composition of groundwater at different depths within the wells. Samples were collected and analyzed for the following: tritium, nitrate, sulfate, deuterium and oxygen-18 of water, sulfur-34 and oxygen-18 of sulfate, trace metals (uranium, manganese, and selenium), and chlorofluorocarbons ("CFCs"). The 15 wells sampled included MW-3, MW-3A, MW-5, MW-11, MW-18, MW-27, MW-30, and MW-31.

Based on their evaluation of this and other data, as explained in more detail in their report, Hurst and Solomon concluded generally that the out-of-compliance parameters were unrelated to Mill operations: *"[t]he data show that groundwater at the Mill is largely older than 50 years, based on apparent recharge dates from chlorofluorocarbons and tritium concentrations. Wells exhibiting groundwater that has recharged within the last 50 years appears to be a result of recharge from wildlife ponds near the site. Stable isotope fingerprints do not suggest contamination of groundwater by tailings cell leakage, evidence that is corroborated by trace metal concentrations similar to historically-observed observations."* (Hurst and Solomon, 2008, page iii)

The study also documented that, with respect to CFC age dating, MW-3, MW-5, MW-11, MW-18, and MW-31 were found to exhibit CFC recharge dates of the 1960s and 1970s, indicating that the water in those wells predated construction of the Mill in 1980.

Tritium concentrations in MW-3, MW-3A, MW-5, MW-18, MW-30, and MW-31 were found to be non-detect, indicating that impacts from wide-scale atmospheric injection of tritium during above-ground thermonuclear weapons testing in the 1950s and 1960s, expected to be found in surface waters such as Mill tailings, were not observed in those wells. Concentrations in MW-11 were non-detect on first sampling and very low at 0.16 TU on a repeat sample. MW-27 displayed the highest tritium concentration on-site at 8.67 TU. With respect to this result for MW-27, Hurst and Solomon noted that "[t]he fact that significant and measurable quantities of tritium are present in MW-27, MW-19 and the wildlife ponds, indicates recharge to the aquifer from the wildlife ponds is occurring." (Hurst and Solomon, 2008, page 27)

With respect to dissolved gas composition of groundwater, Hurst and Solomon noted that "some samples near the wildlife ponds have helium isotope values that are consistent with transport of young water being recharged at the ponds [eg., MW-27 (shallow and deep) and MW-30 (shallow)" (Hurst and Solomon, 2008, page 33) and that "[s]amples from MW-11 . . . contain the largest amounts of terrigenic helium and thus contain the largest components of old water." (Hurst and Solomon, 2008, page 37)

With respect to deuterium and oxygen-18 ratios in water, Hurst and Solomon concluded that "MW-11 does not show an evaporated signal suggesting that neither pond water nor leakage from tailing cells is present at this well today" (Hurst and Solomon, 2008, page 44) and "[m]onitoring wells MW-3, MW-3A, . . . MW-18, . . . have more depleted $\delta^{18}O$. These wells have elevated uranium concentrations, but as they do not bear an evaporated stable isotope signal it does not appear that the elevated uranium values are the result of leakage from tailing cells (or wildlife ponds.)." (Hurst and Solomon, 2008, page 44)

With respect to isotope ratios of $^{34}S/^{32}S$ and $^{18}O/^{16}O$ as sulfur-34 and oxygen-18 in the dissolved sulfate molecule, Hurst and Solomon observed that "MW-27 is also similar in isotopic composition to the surface water sites. This suggests groundwater there has been influenced by the wildlife ponds found directly upgradient" (Hurst and Solomon, 2008, page 47), and "[w]ells MW-3 . . . and MW-18 . . . exhibited elevated concentrations of uranium but are isotopically distinct from the surface water sites" (Hurst and Solomon, 2008, page 48), and "MW-27 exhibits an isotopic fingerprint very similar to that of the wildlife ponds, as well as similar sulfate concentrations." (Hurst and Solomon, 2008, page 50)

Hurst and Solomon also observed that "[b]ecause of the consistent similarities in δ^{34} values, $\delta^{18}O$ values, and sulfate concentrations between MW-27 and the wildlife ponds, it is likely that water in MW-27 has its origin in the wildlife ponds" (Hurst and Solomon, 2008, page 53), and "[w]hen compared with isotope fingerprints observed in the tailings cells, fingerprints of monitoring wells exhibit strong differences, with the exception of MW-27. This suggests that elevated concentrations of trace metals seen in wells down-gradient of the facility are not being caused by tailings cell leakage." (Hurst and Solomon, 2008, page 52)

Hurst and Solomon (2008) concluded that:

> *"[i]n general, the data collected in this study do not provide evidence that tailings cell leakage is leading to contamination of groundwater in the area around the White Mesa Mill. Evidence of old water in the majority of wells, and significantly different isotopic fingerprints between wells with the highest concentrations of trace metals and surface water sites, supports this conclusion. The only evidence linking surface waters to recharging groundwater is seen in MW-27 and MW-19. Measurable tritium and CFC concentrations indicate relatively young water, with low concentrations of selenium, manganese, and uranium. Furthermore, stable isotope fingerprints of ðD and $\delta^{18}O$ suggest mixing between wildlife pond recharge and older groundwater in MW-19 and MW-27. $D^{34}S$-SO4 and $\delta^{18}O$-SO4 fingerprints closely relate MW-27 to wildlife pond water, while the exceptionally low concentration of sulfate in MW-27, the only groundwater site to exhibit sulfate levels below 100 mg/L, suggest no leachate from the tailings cells has reached the well."*

The former DRC was directly involved in the Hurst and Solomon investigation and provided significant, direct oversight over the project. Based on its direct involvement, the DRC concurred with and adopted the conclusions and recommendations provided by Hurst and Solomon. As of 2017, the Division is persuaded that the data and conclusions presented in the Hurst and Solomon report remain valid and so finds. No contrary evidence has been submitted

during the present public comment period. As a result, the Division adopts the Hurst and Solomon report and its findings relative to the out-of-compliance parameters. There is no basis to conclude that these are related in any way to the Permittee's operations, including, specifically, leaking tailings cells.

5. Monitoring Wells MW-20 and MW-22

The Ute Mountain Ute Tribe has requested in the past and is again requesting as part of its comments for the Permit Renewal that monitoring well MW-22 be added as a point-of-compliance (POC) well since it is the closest well to a resident of the Tribe. Monitoring wells MW-20 and MW-22 were installed in 1994 and are located at a distance of more than three quarters of a mile and one mile south of the Mill tailings cells, respectively. When the State of Utah began oversight of the Facility in August 2004, there was no monitoring data for these wells. Therefore, the former Director required, in accordance with a March 17, 2008 Permit modification, that the Permittee begin quarterly monitoring in both wells. After eight consecutive quarters of sampling, the Permittee was required to submit a report determining background groundwater quality and a calculation of groundwater velocities in the vicinity of wells MW-20 and MW-22. A determination would then be made by the Director whether or not these wells would be made POC wells for the site.

After reviewing the June 1, 2010 Background Report for wells MW-20 and MW-22, the Director determined the following:

- Monitoring wells MW-20 and MW-22 are far downgradient from the nearest tailings impoundment. MW-20 is about three quarters of a mile away and MW-22 is about a mile away and cross gradient from the downgradient edge of Cell 4A making it unlikely that groundwater quality in samples from these wells today has been influenced by potential tailings cell seepage.

- Two other far-downgradient monitoring wells (MW-3 and MW-3A) already exist between MW-20 and the nearest tailings cell.

Calculated average linear groundwater velocities for MW-20 and MW-22 are 0.33 feet per year (ft/yr) and 0.43 ft/yr, respectively. Therefore, any potential contaminants transport from the tailings cell liner to the groundwater table, and then to the monitoring wells would take an extremely long time (thousands of years). Also contaminants would be subject to dispersion. Additionally, pursuant to a study by the Permittee study of groundwater elevations and pathlines in the southwest area of the Facility it is unlikely that contamination from the tailings cells would be transported to either monitoring well.

Therefore, the DRC Director determined that monitoring wells MW-20 and MW-22 would not be added as a POC well. However, the wells would be General Monitoring Wells where aquifer head and groundwater quality information would be collected for informational purposes. The wells would be sampled on a semi-annual frequency for the constituents listed in the Permit.

When the State of Utah began oversight of the Facility in August 2004, the former DRC Director was concerned that the constituent concentrations (primarily uranium) found in the wells on site could have come from tailings cell leakage. To address the concern, and in additional to other studies completed by the Permittee, the former DRC Director commissioned the University of Utah to investigate as discussed above. Based on the extensive data and evidence produced in connection with that study, the former DRC Director determined that downgradient wells with excess total uranium concentrations (including well MW-22) are likely the product of surface recharge mobilizing natural uranium in the vadose zone, and not from tailings cell leakage. This conclusion was based on a large number of points of evidence, as outlined more fully in the report referenced above. Of the specific evidence, at least four lines of isotopic evidence deserve specific reference here:

a. Tritium Signature - wells MW-3, MW-3A, MW-14, MW-15, and MW-22 had tritium signatures in groundwater at or below the limit of detection (0.3 Tritium Units), University of Utah Report p. 26. These values are more than an order of magnitude below the corresponding surface water results found in either the tailings cells or the wildlife ponds. Consequently, the groundwater in these five downgradient wells is older than water in the tailings cells, and is of a different origin than the tailings wastewater.

b. Stable Isotopes of Deuterium and Oxygen-18 in Water - the Deuterium and Oxygen-18 content of the groundwater matrix and tailings wastewater matrix was tested in all of the water sources studied. University of Utah results showed that wells MW-3, MW-3A, MW-14, MW-15, and MW-22 (all downgradient with the elevated uranium concentrations) had Deuterium / Oxygen-18 signatures that were almost twice as negative as any of the surface water results (University of Utah Report p. 42). Consequently, groundwater in these downgradient wells had a different geochemical origin than the tailings cell wastewater.

c. Stable Isotopes on Dissolved Sulfate - the University Study evaluated two stable isotopes found on sulfate minerals dissolved in the water samples (Oxygen-18, and Sulfur-34). These samples showed that the sulfate solutes in groundwater from downgradient wells MW-3, MW-3A, MW-14, MW-15, and MW-22 had a different isotopic signature than the sulfate minerals dissolved in the tailings wastewater. In the case of Oxygen-18 on sulfate, the downgradient wells showed more negative values than the tailings cells wastewater. For Sulfur-34, the results were inversed, with groundwater showing more positive values than the negative values seen in the tailings wastewater (University of Utah Report p. 46). As a result, the sulfate dissolved in the downgradient wells, with elevated uranium concentrations, has a different origin than the tailings wastewater.

d. Wells with elevated metal concentrations. The University of Utah Study concluded that wells with high concentrations of metals (MW-3, MW-14, MW-15, MW-18, and MW-22) bear very different isotopic fingerprints that those of the surface water sites (e.g. wildlife ponds, and tailings cells) (2008 University Report p. 58). Regarding uranium concentrations in well MW-22, the University Study stated that "…it does not appear that the elevated uranium values are the result of leakage from tailings cells…" (2008 University Report p. 45).

The current Director adopts and concurs with these findings, on the same basis as the former DRC Director. In addition to these findings, the current Director notes that if the tailings cells were leaking the monitoring wells located near the tailings cells would show evidence of the leakage well before MW-22. No such evidence exists. To the contrary, none of the monitoring wells closest to the tailings cells show any signs of process water impacts. Because the monitoring wells closest to the tailings cells show no impacts, it cannot be logically concluded that wells located thousands of yards cross-gradient from the tailings cells would show impacts from the tailing cells. Therefore, MW-22 will remain as general monitoring well rather than a POC well.

Hydraulic Isolation of the Navajo Aquifer from the Perched Burro Canyon Aquifer

The natural conditions present at the Mill property provide additional layers of safety and protection for groundwater. Any potential discharges from the Mill to groundwater would be isolated in a perched aquifer system defined as the Burro Canyon Aquifer. The Burro Canyon Aquifer is classified as "perched" due to the presence of significant, naturally low-permeability formation materials underneath it. The perched Burro Canyon Aquifer is separated from the deep Navajo Aquifer (which is locally used as a primary drinking water source), by approximately 1,100 feet of Morrison and Summerville Formation materials. These formations have unusually low average vertical permeability. For example, the underlying formation includes more than 200 feet of Brushy Basin Member bentonitic clay, a material with extremely low vertical permeability. Located directly below the Burro Canyon Aquifer, the Brushy Basin Member bentonitic clay perches the Burrow Canyon groundwater so well that it forces lateral flow from the perched aquifer to the margins of the mesa. This unique stratigraphy effectively isolates the perched Burro Canyon Aquifer from the Navajo Aquifer, prohibiting the discharge of potential contaminants from the perched aquifer to the deep aquifer. These natural conditions were a significant consideration in the siting of the White Mesa Mill in the 1970s.

To be sure, it is possible that a man-made well could penetrate the confining layers beneath the Burrow Canyon perched groundwater unit, creating a migration pathway or conduit. The Utah State Engineer's Office is aware of the need to maintain the integrity of the confining units beneath the perched Burrow Canyon Aquifer. All well drilling permits in the area are subject to stringent regulations administered by the State Engineer through the Utah Division of Water Rights. These permits require that well be drilled and sealed using methods to eliminate potential groundwater communication between the perched and deep aquifers. Additionally, the Utah Division of Drinking Water requires that the deep Navajo aquifer water wells at the Mill be monitored for contaminants to ensure that all concentrations are below maximum contaminant levels and that there are no detectable concentrations of volatile organic compounds. The Division finds and concludes that these measures are reasonable to protect the integrity of the perched shallow groundwater in the vicinity of the Mill in order to protect the deep drinking water aquifer (Navajo formation).

SECTION 1.1 PUBLIC COMMENTS ASSOCIATED WITH THE GENERAL RESPONSE

General comments received from the public are found in Appendix C. The General Responses described in detail above answer the comments found there. Section 2.0 below includes public comments received that require a specific response by the Division.

SECTION 2.0 PUBLIC COMMENTS WITH SPECIFIC DIVISION RESPONSES

Public Comment #0082

Bradley Angel, Executive Director, GreenAction for Health and Environmental Justice, Oral Comment Received in Blanding, Utah June 15, 2017

"Good afternoon. My name is Bradley Angel and I am the Executive Director of GreenAction for Health and Environmental Justice. I am here today at the request of the residents of the nearest community to the mill, not Blanding Utah, but the White Mesa Ute Community and I have been working with and at the request of White Mesa residents for over 15 years now and I share their concern. Not just about the mill and its pollution of their air, of their land, of groundwater, but the destruction and desecration courtesy of the State of Utah with your knowing approval of desecration for family friendly sites, including burials.

When Americans say the Pledge of Allegiance, we end it by saying, 'With liberty and Justice for all.' But apparently, that doesn't apply to this process. This process is rigged. It is not legitimate and in fact it's predetermined and that is not proper and I don't think it's legal. The so-called public notice says at the top, 'Renewal of the Product License.' It says, 'Renewal of the Groundwater License.' When this hearing was introduced a few minutes ago by the hearing officer, you said, and I quote, 'You are here to take public comments for the renewal.' You do not say for the proposed renewal. You then said, 'We are also renewing the facility's groundwater discharge permits.' You should have said, we are considering renewing it or we are proposing to. But based on your written public notice and the statements you opened tonight's hearing with it is proof that cannot be contradicted that this is rigged, it's predetermined.

A week ago today I joined a lot of tribal members and others at the so-called public hearing in Salt Lake City at the DEQ offices and as tribal members pointed out with frustration, up on the podium was the State agency people and right next to them at the podium as though they were one of the decision makers, which in my opinion, clearly, they are, which is not proper, was the attorney for Energy Fuels. As tribal members pointed out, he should have been in the audience with the rest of us. But that is not how you run things here. You make decisions before the public comment period even starts. Why even bother? Why waste our tax dollars? And by the way I am a tax payer with both San Juan and Grand County.

I also want to address the claim that this is a well-regulated facility. A few years ago, in this very room as I was here with my college from Uranium Watch at that hearing and as we left, there wasn't a lot of people here, and as we left a very interesting thing happened. A man who

identified himself as one of the nighttime managers at Energy Fuels, a really nice guy, wanted to talk and he told us that the nighttime shift at the time at least, according to him, was there was a culture of violation including illegal dumping. I shared that with the State, nobody bothered to follow-up. I hear often that the emissions are within the acceptable and legal standards. Gee, that's funny and I don't think that's true. I remember a couple years ago I was coming down from Moab and Monticello I saw a gigantic plume of black smoke. It went for miles and it wasn't from Blanding. It was from the mill. We brought that to the attention, people at the State of Utah play dumb about it.

A couple of other things, number one, it was pointed out, and in fact at the hearing last week when it was claimed that the… I had asked, 'Which was the closest community?' and it was admitted by the State officials that was White Mesa Ute Community. Why isn't there a hearing at White Mesa? Why isn't White Mesa residents notified if there is an emergency? And the answer from the State officials last Thursday was, 'Well, the local officials are notified, Blanding; San Juan County; the State.' Well, I have news for you. The Ute Mountain Ute Tribe is a local official. They've been here before anybody else. What we have here, and this is not affront to any of the hard-working people, men and women that work there, not at all, but what we have here is a rigged process, a discriminatory process, makes believe facts coming from the State of Utah just to justify issuing the permit as you've already admitted you're going to do. So, no matter what we have to say, apparently it will have no effect. The exclusion of the tribe and tribal members from meaningful participation in this process is racist. The destruction, knowing destruction of the sacred sites, including burials. I don't think you would like a uranium mill on top of where your ancestors are buried. So, time is over for my comments, but also for the violation of the civil rights and human rights of the Ute people of the White Mesa Ute Community. Thank you for your time."

Division Response: The commenter's allegation that the Division's license and permit renewal process is "rigged" and "predetermined" lacks any basis in fact or law. The materials possession license in question has been subject to a renewal process since 2007. The former Division of Radiation Control (which was merged into the current Division in 2015), made the decision in 2011 to hold off renewal of the license in order to afford more time for the DRC to address and answer public comments received during the public notice and comment period at that time. Details relating to these events are outlined in the DWMRC's Technical Evaluation and Environmental Assessment (May 2017) and the DWMRC's response to public comments also published at that time. If the process were "rigged" as the commenter suggests, it would stand to reason that the former DRC would have relicensed the White Mesa Mill in 2011 or perhaps earlier. But the process is not rigged. To the contrary, the public participation process is a critical part of any licensing and re-permitting action. In 2011, the DRC took a number of actions in response to public comments, including having the Division staff undertake and produce a new MILDOS-Area model for the Mill facility together with many other actions. The present PPS shows many examples where the Division accepted public comments and required or otherwise made changes to the License and the Permit. In any event, the Division has expended tremendous time and effort reviewing and responding to each public comment in connection with this matter before making any final decisions. The alleged quotes by Division documents and by Division staff are incomplete and have been taken out of context and misconstrued. There is no truth to the comment that the process is rigged. Most of the critical

decisions about the White Mesa Mill were made by the NRC in connection with the initial siting, design, and licensing of the facility. It was the NRC that made the decision to site the White Mesa Mill in its location near the White Mesa community and Blanding. The state of Utah was only a "stakeholder" in that process and did not obtain agreement state status until August 2004. Moreover, the NRC and U.S. DOE make many other decisions that are binding on the Division, including the legal status of "alternate feed" and 11(e).2 materials. The Division's jurisdiction over these decisions is extremely limited. More information on this topic is available in the Division's General Response #04 and #05. Finally, the Division notes that at the time that the White Mesa Mill was originally sited and permitted by the NRC, both the Ute Mountain Ute Tribe and the Navajo Nation wrote letters to the NRC urging that the White Mesa Mill facility be sited and licensed as proposed. Contrary to the commenter's position, at the time that the facility was originally sited and licensed, the communities he claims now oppose it were in favor of the facility. From the record, there is no evidence that the White Mesa Mill was forced upon these communities. They welcomed it.

In response to the comment that the White Mesa Mill is not well-regulated, this comment is also not supported by the evidence of record. As explained in more detail in the Division's General Response #01, the White Mesa Mill is vigorously regulated by five full-time Division staff that are physically on site more than 40 days per year. The scope of environmental monitoring for wind and surface transport, wind-transport, soils and plants (including sagebrush), shallow and deep groundwater, and so forth at and around the facility has increased significantly since 2004 and continues to expand. Two plumes unrelated to tailings cell leakage have been detected, defined, and are under rigorous corrective action, backed by a third-party bond. The Division has issued 38 notices of violation and has imposed $176,000 in civil penalties, compared to the NRC's two notices of violation and zero penalties. All available evidence continues to support the same conclusions: that the White Mesa Mill is being operated responsibly in conformance with all applicable laws, rules, and regulations. Workers are being protected. Over the past 10 years, the average radiation worker dose is very close to 100 mrem per year. The NRC standard is 5,000 mrem per year radiation worker. The theoretical public dose (at the property boundary points of compliance) is likewise well below the NRC's standard of 100 mrem per year, based on continuous monitoring. The average dose over the past 10 years at the points of compliance is 10.88 mrem per year, based on continuous monitoring. The point of compliance in the direction of the White Mesa community, BHV6, shows a 9-year average dose of 9.31 mrem per year. That monitoring station is 2.5 miles away from the nearest White Mesa community resident, and even farther away from most White Mesa residents so the expected actual public dose from Mill operations is far below the dose measured at BHV6. The average human being receives 630 mrem per year dose just from normal activities and background sources. The NRC sets the standards. According to federal law, the public dose limit is 100 mrem per year. The points of compliance for the White Mesa Mill are well within this limit. Finally, because of the prevailing wind direction, the residents living to the northeast of the Mill are more at risk than those living in and near the White Mesa community. The notion that the Mill was sited upwind of the White Mesa community is not supported by the evidence of record.

Therefore, the Mill is legally entitled to a renewal of its License and Permits, subject to conditions and continued oversight by the Division. This conclusion has been reached only after

full consideration of all the evidence in the administrative record, including public comments, reply comments, and sur-reply comments where these have been requested by the Director.

Public Comment #083

Mark Kerr

Emailed Comment Received June 8, 2017.

UT DEQ,

The operating license and the groundwater discharge permit at the White Mesa Uranium Mill should not be issued, and operations should be suspended until numerous issues are addressed.

These 'poor housekeeping' practices are as much the responsibility of the UT DEQ as they are the mill owner/operator, as neither party can be expected to follow rules, regulations, license requirements, or construction permit technical specifications, as proven by past practice. It is no surprise that plumes of contamination exist, radon emissions exceed limits, and monitor wells contaminates exceed limits set by the regulators.

Following are examples:

Construction bid documents for Cell 4B in Jan 2008 require major changes be reported to the regulators prior to implementation. Reporting of those changes did not occur prior to implementation.

The mill owner/operator indicated, 8-7-09, that blasted rock during cell construction would be removed. The blasted rock was not removed. In lieu of rock removal a directive for a revised compaction methodology, 5-19- 10, was issued. But large areas of the cell floor were left untouched by the new methodology, as directed by the mill owners engineer.

On 6-8-2010 the mill owner's engineer states that over blasting of rock can result in an unstable soil/rock mixture that may settle differentially or significantly.....yet the rock was not removed, and as noted above the compaction methodology was not applied consistently over the cell floor.

On 6-14-2010 the mill owner/engineer was asked if the regulators were aware of the changes. 6-17-2010, the mill owner/engineer advise that the question is inappropriate, and they state, 'please revise or rescind' the question. Back on 3-12-2010 the mill owner/engineer advised of the format to use for questions, so they could respond 'accordingly'.

UT DEQ's consultant, URS, 9-4-09, states that the blasting plan should be included as a critical component of the technical specifications for construction. On 3-4-10 the mill owner/owner's engineer direct changes to the blasting plan without notice to the regulators. Back on 11-6-09 the mill owners engineer states that they are not, and the contractor is, responsible for deviations to the contract documents.

12-14-2011, UT DEQ advises that they allow for discretion on the part of the permittee (the mill owner & mill owner's engineer) types of changes that require notification. UT DEQ states that it appeared that DUSA/Geosyntec determined that changes to compaction methodology did not qualify as being sufficiently significant to notify UT DEQ of such a change.

UT DEQ states than notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

It is well documented that the UT DEQ, the mill owner, and the mill owner's engineer, all considered rock excavation, blasting, and compaction to be sufficiently significant to report changes. All were changed, no notice was given, and questions about reporting were ignored or rejected altogether.

1-13-2012, the UT DEQ states that following their review, the review made now knowing of the changes, that cell construction was acceptable. BUT, how could that be. This means that conflicting Technical Specifications implemented during construction are now OK. The Blasting plan was critical according to UT DEQ, URS, DUSA, and Geosyntec....but the plan was changed in direct conflict with documents from all 4 parties.

The blasted rock would increase fractures & jointing, or rock would become discontinuous,(or as the Exec VP of US Operations for the DUSA puts it.....the blasting would cause caverns to form, which would collapse over time, tearing the cell liners and the cell would leak, releasing contaminates into the ground water), but as stated by the VP, 8-7-09, not to worry, the blasted rock would be removed. The rock was not removed.

Addressing the 'poor housekeeping': The regulators take the position of allowing the owners/engineers to determine what is reportable and what isn't based on the discretion of the owners/engineers. Why would Anything be reported if it might cost the owner time and money. Everyone's off the hook concerning the environment. The owners/engineers are essentially given permission of what to report, and the regulators can't act on what they don't know.

Sure, sometimes there are fines, and some requirements imposed of the owner for some remediation. But, these permits should not be granted, and mill operations should be suspended until regulatory oversight is responsible enough to require emissions compliance, groundwater contaminate plume elimination, clean monitor well samples, a regulatory presence on the mill grounds full time, and Cell 4B is reconstructed in compliance with specifications.

Having some experience in this industry, it is impossible for a facility such as this to go NOV free for nearly 4 years!
Mark Kerr

Division Response: The Division disagrees with the commenter. As an initial matter, the Division refers generally to its General Response #1. Second, there is a legal objection to Mr. Kerr's comments. The licensing action for Tailings Cells 4B was published for public comment in 2010. Mr. Kerr submitted no comments. The final decision was signed by the Director on June 17, 2010. The commenter had opportunity to contest the construction issues, but had to file his appeal during a specific 60-day timeframe under applicable provisions of Utah law. He did not do so. This legal defense is not a technicality. It goes to the heart of the public comment process. It is critical for the Division to be aware of all relevant information relating to a licensing action before making a final decision. But once the final decision is made, they are not subject to collateral attack. This legal defense is set forth in Utah Code Section 19-1-301.5.

Therefore, the licensing action related to Cell 4B is final and is not subject to collateral attack. But regardless of the legal defense, the Division also finds that the comments lack substantive merit. A Division engineer reviewed the plans for Tailings Cell 4B and certified the plans as compliant with applicable regulations and engineering requirements. That same engineer spent considerable time at the site during cell construction to verify that the intent of the plans was met during construction. The Division is comfortable with its independent certifications of the plans, of the construction effort, and of the changes made during construction. Tailings Cell 4B is currently being used as an evaporation pond and has performed as designed (i.e. no leakage). In addition, the Division notes that the commenter has filed a number of legal actions against EFRI or its predecessors. EFRI countersued for nonperformance. In each case, the court determined in favor of EFRI and against the commenter.[22] Given this record, the Division feels no need to reopen this issue on legal merits, but defers to the judgments rendered by the courts. These judicial decisions lend further support to the Division's conclusion that Mr. Kerr's comments lack substantive merit.

[22] See Release of *Lis Pendens* for Case #100700151, Seventh Judicial District Court, San Juan County, Utah; Release of Mechanics Liens dated September 5, 2014; Final Award in Arbitration, dated February 28, 2014; Order Confirming Arbitration Award for Case #100700151, Seventh Judicial District Court, San Juan County, Utah; Utah court of Appeals Opinion #20150049-CA; Interim Award of the Arbitrator dated January 10, 2014.

Public Comment #084
Ephraim Dutchie
Oral Comment after the Hearing Received June 8, 2017

Yes, sir.· My name is Ephraim·Dutchie.· I'm a White Mesa resident. And my question is, you know, you guys are talking about -- there was something that happened at·the mill.· How much time, and what is the safety·perimeter, you know, to be in a safe zone, so to·speak?· What is a safe zone to be when there is a -- when you guys are -- when there's something going onat the mill?· Like a alarm, something happens, you·know, what's the safe perimeter around the whole ·area?· Can you guys answer that for me?

MR. ANDERSON: Anyone want to take that one on?

MR. RANDALL: Well, I think this -- I think this portion of the hearing is just for public comment. So you make your comment. We'll take that under advisement, and we'll issue a formal written response to your question.

MR. DUTCHIE: So you can't, you know, answer it off the top of your head? You guys can't just answer one little --

MR. GOBLE: It would be basically a·case-by-case basis depending on what the incident was. So it's hard for me to speculate what would be safe zone for anything that happens at the mill. What we can do is, like Bret Randall said is this: You know, we will submit a formal response to your comment, and we'll take it into consideration maybe with some different scenarios on what we'll need to do for different scenarios. That I think would be better for actually addressing your concern rather than to speculate. Because it depends on what·the issue is.

MS. GALLOWAY: It does.

MR. DUTCHIE: Well, I mean, with any – with any serious situation, you know, I mean, you're working with some toxic stuff here, you know. I mean, what -- that's what I mean. That's the perimeter, the safety perimeter around the whole area, you know. Is it within White Mesa range or is it out of White Mesa range is what I'm asking?

MR. GOBLE: Yeah, I -- honestly, I can't speculate on what would be -- because I don't know what different incidents could possibly be. Right now, there is quite the buffer property between where the mill building is at versus where the property boundaries begins. For the potential place where you would have the tailings cell leak or if there was an emission, you know, let's say from some of the processes for the mill, I can't speculate. It would have to depend·on the concentrations, the extent, the duration. Perhaps Gwyn can add more to that.

MS. GALLOWAY: There's so many variables involved. You know, the weather could be taken into·account, the material that's involved.

MR. DUTCHIE: Yes, very -- exactly weather.

MS. GALLOWAY: Well, the weather, the materials, the concentration of the materials, the incident itself. You know, there are some things you can pretty much stand right next to it. There's some things you have to be a little further away from. It -- it's so specific to the incident that we would be best to pose some potential scenarios that could happen, perhaps, and -- and then address your issues based on those than try and speculate just a general statement saying X amount. Because for some situations, you know, X would be okay. In some situations it wouldn't.

MR. DUTCHIE: Well, I don't know what, you know, the mill's working with. You know, they're working with all kinds of different, all the uranium level different kind of sorts that they're bringing into the mill. You know, I don't know all of them on top of my head. But, you know, you -- you said weather. You know, 75 percent of the time, the wind comes from the north south -- south. And when all that stuff -- when you guys are moving the piles out there outside of the mill, sometimes it's wind blowing. Sometimes that wind carries that down to White Mesa.

MS. GALLOWAY: But it would probably be best for us to develop a scenario to account for those types of things and answer your -- and address your·question more -- more completely --

MR. DUTCHIE:· Yeah, that's where we're basically going is like a scenario. I mean, like the safe zone, you know, like bring back to my question, you know.

MS. GALLOWAY: Yes, sir. And what Phil --

MR. DUTCHIE: How far would that reach? The whole basically the whole perimeter throughout from the mill outward, you know, how many miles is that? How many miles is a safe zone?

MS. GALLOWAY: What Phil was trying to say was what we can do is propose some scenarios, and for each of those scenarios, then state what an appropriate amount would be for -- to address your question more completely. Because if we try and address it here, we're not going to be able to·address it very well. But we can address it in writing at a later date and address better·scenarios --

MR. DUTCHIE: Please tell me --

MR. ANDERSON:· Sir, your time has run, and it's an open-ended question. And I think that the·proposal to respond and develop some scenarios will probably be the best way to address your comment.

MR. DUTCHIE: All right. All right.

MR. ANDERSON: Thank you.

MR. DUTCHIE: Yep, thank you guys. You·know, you guys all have a good evening. May the Creator bless each and every one of you. And sure hope you guys know, you know, White Mesa we do care about our land and we do care about people, you know. And can you guys please, you know, listen to what, you know, I'm trying to say. You know, I'm here as a White Mesa

resident, you know. Obviously you guys maybe never really seen a Ute Mountain Ute or Ute from White Mesa speak on a community's behalf.

MR. ANDERSON: Well, thank you. We appreciate your time.

MR. DUTCHIE: Thank you guys for opening your doors here and letting me speak and listen to what you guys got going on here. Thank you.

MR. ANDERSON: Thank you.

Oral Comment Received June 15, 2017.

Good evening gentlemen. My name is Ephraim Dutchie. I signed that paper and I didn't get called. But I'm from White Mesa. I can't see how hard it is to go out and get a job. I pay taxes in two states, in Colorado and in Utah. Because I work in Colorado and I live in Utah. I've been going back and forth every day for about 10 years. I'm against this renewal. You know, a lot of folks here was talking about the school. What's going to happen if, you know…I'm a truck driver. I get tired when I'm driving when I'm out there. I get tired, but I got to put my 8 hours in, in order for me to have my shipment in on time. I get tired. What's going to happen if one of these trucks wreck going through the community? The kids on the bus, who are our future generation. How long is it going to take for the response? Who is going to respond to the spill? What of one of these semis wreck in White Mesa or Bluff or on the other reservations? What's going to happen? That person that works at the mill, he's from White Mesa, but he lives in Blanding, where are his parents going to go if that wrecks in White Mesa? We might be quarantined out of there. We don't know what we are going to do. When I went to Salt Lake to the hearing I asked, 'Is White Mesa in that safe zone?' The serious scenario about that mill, certain chemicals going to get mixed up, man, this things going to blow. We need to get out of here. Is White Mesa in that safety zone or is White Mesa in that danger zone? I have seen that fencing around that place. It's only barbwire fence and it's poorly done. The deer can jump over it. It's only four and a half feet high. Come on you guys. Open your eyes, man. Us White Mesa people, Ute Mountain Ute Tribe…all we try to do is fit in with Blanding. Our tribe built this hospital, Blue Mountain Hospital, along with the Navajo Nation. Ute Mountain Tribe built the rec center that all your kids go to, your grandkids go to. We try to fit in. I went to school at San Juan High. Those books were so poorly done. Old names, my uncle's names were written in those books and they say they have new things. The only thing that came up new was when those two individual burnt the high school and the high school rebuilt off of insurance. That's it. Come on you guys, open your eyes. Would the man upstairs forgive you for what you are doing to us people? Not only Natives, it's all of us that are on that road, every day. Every day. So, as a White Mesa resident, who lives downwind…The water cells are south of the mill. The White Mesa water resources is north of White Mesa and it's only 2 miles away from the last cell there. With that, thank you guys for coming down from Salt Lake. You guys listen to all these comments people are making. Blanding is supposed to be the number one place for spiritual and their being greedy. Come on guys, open your eyes. When you guys die you are not going to take this money with you. Come on. Please. Open your eyes people. You all know me. I went to school with some of the workers back there in high school. Some of us, we played football together. That individual that works there at the mill, he's my relation. Shame on him. But I understand. We all need money. We need jobs to support our family. Again, I'm against this mill. It's

Mother Earth and when you guys dig in all this oil and uranium, you are hurting Mother Earth. I am pretty sure no one would want no harm to our Mother. With that, thank you guys."

Division Response: Please see the Division's Response to the Ute Mountain Ute Tribe's Comment No. I-III-Q below.

1. GENERAL COMMENTS

UW Comment #01
Sarah Fields, Uranium Watch, Oral Comment Received June 15, 2017.
"My name is Sarah Fields. I am with Uranium Watch in Moab Utah. I'm glad to see so many people here. I have been to hearings on the White Mesa Mill in this very room and I have been the only one that has come to make comments. I want to just focus on one thing. I believe that the Division of Waste Management and Radiation Control needs to require the monitoring of the radon emissions from the new tailings impoundment cells 4Aand 4B and any subsequent tailing impoundments. They're not required by the EPA and the EPA finalized that in their Subpart W Rulemaking earlier this year. I was surprised that the Utah Division of Waste Management and Radiation Control and the Division of Air Quality were not more forward and did not demand that the EPA require radon emissions for the new tailings impoundments. The EPA does have a requirement that the radon emissions be kept as low as reasonably achievable to protect both the citizens in the community and the workers on site. The State doesn't really know if there are issues with radon emissions and if the radon emissions are going up unless they require yearly monitoring and require the reporting of the results to Division of Air Quality and Division of Waste Management and Radiation Control. You've already made that requirement for Cell 2 and that resulted in additional clean material being put on Cell 2 to maintain the 20 pico curie per square meter per second level. Also, with the reclamation plan, I believe that you really need to do an environmental analysis. The tailings will remain on White Mesa in perpetuity, that means they have to be under government control forever. The State needs to do a better job evaluating the quality of the proposed reclamation plan impacts on the community not just for 200 years, or 1000 years, but 5000 years and as long as there will be citizens in San Juan County. Thank you."

Division Response: The suggestions made by the commenter are beyond the regulatory framework that governs uranium mills and beyond the scope of the present relicensing action. 40 CFR 61, Subpart W does not require tailings cells constructed after December 15, 1989 that are 40 acres in size or smaller to be analyzed for radon emissions. Utah law prohibits the State of Utah from imposing requirements that are more stringent than federal regulations. Therefore, the Division does not have the legal ability to force the Licensee to perform radon flux sampling while tailings cells 4A and 4B are in operation. However, once the tailings cells are no longer in operation and closure activities begin, they will then be subject to 10 CFR 40, Appendix A, Criterion 6. The final cover for tailings cells 4A and 4B must be so that radon emissions are less than 20 pCi/m2-s.

In addition, the federal requirement for tailing cell design found in 10 CFR 40 Appendix A Criterion 6 (as incorporated into State Rule in UAC R313-24-4), requires that the tailing cells be designed for 200 to 1,000 years. For the same reasons discussed above, the Division lacks the

legal authority to require the Licensee to design its tailings cells to last for 5,000 years because that would be more stringent than required by federal law and the Board has not adopted a regulation that is more stringent.

Sarah Fields, Program Director Uranium Watch
Emailed Comment Received July 31, 2017
Dear Mr. Anderson:

Below please find comments on the Energy Fuels Resources (USA) Inc. December 15, 2011, request to receive and process 11e.(2) byproduct material from Sequoyah Fuels Corporation, Gore, Oklahoma, site at the White Mesa Uranium Mill, San Juan County, Utah. The request is to amend Radioactive Materials License No. UT1900479 by adding License Condition 10.8. These comments are submitted by Uranium Watch and on behalf of Living Rivers and the Utah Chapter of the Sierra Club.

UW Comment #02
1.1. The Utah Division of Waste Management and Radiation Control (DWMRC, or Division) should not have included the license amendment request to process Sequoyah Fuels Corporation (SFC) waste at the White Mesa Mill in the License Renewal Process. The renewal of the White Mesa Mill License and the approval of the request to process 11e.(2) byproduct material originating at the Sequoyah Fuels Corporation, Gore, Oklahoma, facility, were two separate proposed licensing actions. The two proposed licensing actions should have not been included in one notice and comment opportunity, one hearing held at Blanding, Utah, and one hearing and opportunity for cross examination held in Salt Lake City. Combining two important but separate licensing actions, along with a third action to approve the White Mesa Mill Reclamation Plan Rev. 5, in one process was onerous for the public and, most likely, for Division staff.

It made it difficult to focus the questions provided to the Division for the June 8, 2017, hearing in Salt Lake City. It made it difficult to present comments at the June 15 hearing in Blanding. Combining 3 licensing actions in one notice and comment process will likely delay the review and final decisions on these licensing actions.

Division Response: The Division disagrees with this comment. In 2011, the former Division of Radiation Control made the decision to defer final resolution of the 2007 relicensing action, pending completion of various tasks that have required significant time. Coincidentally, the Division's final review of the Sequoyah Fuels byproduct matter became ready for final decision at the same time as the 2007 relicensing matter and the Division's final decision on the Reclamation Plan 5.1. In many respects, these matters are related. In any event, there is no legal requirement that prevents the Division from combining licensing activities. To the contrary, the Division determined that doing so was in the public interest and serves the interests of efficiency. The Division has combined licensing matters several times in the past when different licensing actions have been completed around the same time. The Division's experience is that combining these processes has made it more efficient to manage the process and has resulted in greater public participation as compared to previous actions involving fewer issues.

UW Comment #03

1.2. The application to process the waste from the SFC Gore facility was submitted to the Division on December 15, 2011. On December 12, 2012, the Division responded with a request for additional information. These 2 documents are on the Division webpage for the White Mesa Mill, under Sequoyah Fuels Corporation: Alternate Feed Request.1 However, the Division did not post the Licensee's response to the request for additional information and other documents associated with the "Alternate Feed Request" on that webpage. There were additional submittals in August and October 2013 that are references in the Safety Evaluation Report, discussed below. However, the Division failed to post them on the Alternate Feed Request webpage. The SER references, for the most part, do not include links to the documents or information on where to access the various referenced materials, including Sequoyah Fuels Gore Facility licensing documents.

Division Response: The Division makes every reasonable effort to support the interests of transparency with respect to its licensing actions. All documents associated with this License Renewal can be found on the Division's website, can be accessed on a publicly available webpage such as NRC.gov, or can be accessed using by making a Government Records Access and Management Act (GRAMA) request.

UW Comment #04

1.3. The failure to make all of the pertinent application documents readily available for public review is reason enough to deny the Amendment Request.

Division Response: The Division disagrees that relevant documents were not reasonably available. At a minimum, the public always has access through GRAMA. Here, all documents associated with this License Renewal are and were available on the Division's website, are and were accessible on a publicly-available webpage such as NRC.gov, and are now and were then available using GRAMA.

2. SAFETY EVALUATION REPORT (DRC-2017-002764)

The "Safety Evaluation Report, Amendment Request to Process an Alternate Feed Material (the SFC Uranium Material) at White Mesa Mill from Sequoyah Fuels Corporation, Gore, Oklahoma, is "in Consideration of an Amendment to Radioactive Materials License No. UT1900479 to Authorize Receipt and Processing of the SFC Uranium Material as an Alternate Feed Material Primarily for the Recovery of Uranium and Disposal of the Resulting Residuals in the Mill's Uranium Tailings Impoundments as 11e.(2) Byproduct Material." The Safety Evaluation Report (SER) was developed by URS Professional Solutions, LLC, for the Utah Department of Environmental Quality, DWMRC, dated May 1, 2015.

***2.1.** The SER, Section 1.1, states that the SER "has been prepared to evaluate the environmental impacts of the proposal for the White Mesa Uranium Mill to receive and process alternate feed material from the Sequoyah Fuels Corporation, Inc. (SFC) Facility Conversion Plant located near Gore, Oklahoma (the "Gore Facility")." According to the SER, the "Uranium Material consists of dewatered raffinate sludges resulting from purification and conversion of natural uranium concentrates (yellowcake) at the former Gore Facility" and contains "residual amounts of thorium, uranium, certain nonradioactive metals (arsenic, beryllium, and lead), and barium at*

concentrations that are higher than present in typical uranium mill tailings and typical uranium ores processed at the White Mesa Mill.

COMMENT

UW Comment #05

2.1.1. The SFC 11e.(2) byproduct material contains radiological and non-radiological materials that are not found in ore that has been processed at the White Mesa Mill since the Mill commenced operation. The Mill and the tailings impoundments were not designed to dispose of the wastes from the processing of such material. The statutory and regulatory programs that are applicable to the operation of the Mill never contemplated the processing, disposal, and long-term presence of such material at the Mill. For these and other reasons outlined below, Division should deny the proposed amendment to process 11e.(2) byproduct material from the Sequoyah Fuels site at the White Mesa Mill.

Division Response: As discussed in the General Response #4 above, the NRC has already classified this material as 11e.(2) byproduct material; therefore, this material could go directly into the tailings cells. However, in the EFRI application they requested the material processed as alternate feed material. That is the review the Division completed. No change will be made to the license.

UW Comment #06

2.2. *SER, Section 1.2, Classification of the SFC Uranium Material as Alternate Feed Material. The SER, with respect a determination of whether the feed material is an ore (and, therefore, the wastes from the processing of the SFC Uranium Material at the Mill can be defined as 11e.(2) byproduct material), quotes from the Nuclear Regulatory Commission (NRC) Guidance (SECY 95-211, SECY-99-012, and NRC Regulatory Issue Summary 2000-23):*

> *For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." In determining whether the feed material is ore, the following definition of ore will be used:* ***Ore is*** *a natural or native matter that may be mined and treated for the extraction of any of its constituents* ***or any other matter from which source material is extracted in a licensed uranium or thorium mill.*** *[Emphasis added.]*

The SER then states, "The NRC declared this 'front end waste' to be 11e.(2) byproduct material (See SECY-02-0095, July 25, 2002)." The SER then concludes, "Based on the above considerations, the [Utah Division of Radiation Control] UDRC has determined that the SFC Uranium Material meets this criterion."

COMMENT

2.2.1. Apparently, the Division, believes the SFC Uranium Material meets the definition of "ore" because it is "any other matter from which source material is extracted in a licensed uranium or thorium mill" and, therefore, the wastes from the processing of the Uranium Material would

"qualify as 11e.(2) byproduct material." In support of that determination, the SER states states that the NRC made a determination with respect the definition of the Uranium Material. The SER states, "The NRC declared this "front end waste" to be 11e.(2) byproduct material (See SECY-02-0095, July 25, 2002)." In other words, the Uranium Material would be defined as 11e.(2) byproduct material both before and after processing.

These statements and conclusions are confusing and erroneous. If the NRC determined that the Uranium Material is 11e.(2) byproduct material, it does not follow that the waste from the processing of the Uranium Material at the White Mesa Mill is also 11e.(2) byproduct material. The NRC Guidance referenced by the SER states that, for the wastes from the processing of the Uranium Material to be defined as 11e.(2) byproduct material, the material must be defined as "ore." It is hard to see how the Uranium Material can be both 11e.(2) byproduct material and "ore." The SER fails to explain how this 11e.(2) byproduct material somehow reverts back to "ore," so that the wastes from the processing of the Uranium Material can also be defined as 11e.(2) byproduct material. The SER fails to explain this magical transformation, how it takes place, and when (in a specific time and place) the transformation takes place.

Division Response: A detailed response to this comment is found in the General Responses #4 and #5 above.

UW Comment #07

2.2.2. The NRC determination that the SFC Uranium Material is 11e.(2) byproduct material is based on statutory and regulatory definitions. However, the Licensee's determination that the SFC Uranium Material somehow becomes "ore" once it is processed has no basis in the Atomic Energy Act (AEA) or NRC or Environmental Protection Agency (EPA) regulations applicable to uranium mills and the regulation of 11e.(2) byproduct material. Therefore, any determination that the Uranium Material is "ore" and the waste from the processing of that Material is 11e.(2) byproduct material has no basis in any applicable federal statute or regulation. The State of Utah has no authority to amend the AEA or NRC or EPA regulations to create or make use of new definitions in licensing actions. The Division has no authority to redefine 11e.(2) byproduct material, define any material that is not "ore" as "ore," or to define the wastes from the processing of 11e.(2) byproduct material as "11e.(2) byproduct material."

Division Response: Please see General Responses #4 and #5 above. The Division believes these responses are adequate to address all the issues raised in this comment.

2.3. *The SER, Section 3. Determination of whether the feed material contains hazardous waste. In this section, the DWMRC concludes, "The NRC (2002) classified the SFC Uranium Material as 11e.(2) byproduct material. Under 40 CFR 261.4(b)(7), solid wastes from the extraction, beneficiation, and processing of ores and minerals are not hazardous wastes."*

COMMENT

UW Comment #08

2.3.1. Here, the SER claims that the SFC Material is a waste from the processing of ores to address the question of whether the feed material contains hazardous waste under EPA regulation. They conclude that, since the Uranium Material is a solid waste from the extraction, beneficiation, and processing of ores, it is not a hazardous waste. The SER does not mention that 11e.(2) byproduct material is exempted from the definition of a solid waste and, thereby, the definition of a hazardous waste, pursuant to 40 C.F.R. § 261.4(a)(4). Section 261.4(a)(4) states:

> *40 C.F.R. § 261.4 Exclusions.*
> *(a) Materials which are not solid wastes. The following materials are not solid wastes for the purpose of this part:*
> *(4) Source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq.*

The SER does not claim that the SFC Material is exempt from the definition of a solid waste because it is a source material under the AEA. The definition of source material includes "1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof." 2 The SER and the Division do not claim that the SFC Material is either source material (where only the uranium and/or thorium content would be exempt) or that the SFC Material is "ore," and thereby exempt. That is because there would be no legal basis for defining the SFC Material as "ore," within the definition of "source material."

Division Response: See General Responses #4 and #5 above. The Division believes these responses are adequate to address all the issues raised in this comment.

UW Comment #09

2.3.2. The SER makes no mention of or explain how the solid and hazard waste exemptions apply if and when the Uranium Material is defined as "ore." How the Uranium Material is both a "solid wastes from the extraction, beneficiation, and processing of ores," 3 so it can be exempt from the definitions of hazardous waste, and also an "ore" (prior to extraction, beneficiation, and processing) is not explained by the Division.

In sum, the Division is manipulating the definitions to reach a desired outcome, however conflicting those definitions and outcomes are. Clearly, the Uranium Material cannot be both a solid waste from "the extraction, beneficiation, and processing of ores," to suit one outcome, and "ore," to suit another.

Division Response: See General Responses #4 and #5 above. The Division believes these responses are adequate to address all the issues raised in this comment.

UW Comment #10

2.4. *The SER (page 9) provides information about the Environmental Analysis Review Scope. The scope of the review includes the items that are required under the AEA for the scope of an Environmental Analysis of a licensing action.4 The Scope also includes a review of other environmental impacts.*

COMMENT

2.4.1. The Scope of the Review of the Environmental Analysis demonstrates that the Division is aware of the AEA requirements for an Environmental Analysis and that such an analysis need not be limited by, but must include, those aspects required in the AEA.

Division Response: Please see General Response #09. The Division believes this response is adequate to address all the issues raised in this comment.

UW Comment #11

2.4.2. It is apparent that the SER and SER Environmental Analysis are guided by the Division's desire to approve the license amendment request to process the SFC 11e.(2) byproduct material. All of the conclusions serve to minimize any concerns—whether legal, technical, health and safety, or environmental—and demonstrate that there will be no problems or significant impacts, including cumulative impacts, if the SFC 11e.(2) byproduct material is shipped, received, stored, processed, and waste disposed of at the White Mesa Mill. The Division analysis is not an independent, balanced analysis.

Division Response: The May 1, 2015 URS SER of the Sequoyah Fuels Material is the Environmental analysis that is required by the AEA. The Division may use a contractor to perform the independent Environmental analysis. Please see General Response #09 The Division finds that the applicable environmental analysis is fair, balanced, and adequately supported by facts and technical analysis to support the Division's final determinations in this matter. Please see General Response #09 for further response to this comment.

2.5. *SER, Section 4.1.1. Radiological Impacts, Tables 5 and 6 (page 13). Tables 5 and 6 provide data on radiological concentrations of the SFC 11e.(2) product material, based on samples from 2003 and 2005.*

COMMENT

UW Comment #12

2.5.1. There is no information that demonstrates that those samples are representative of all of the SFC 11e.(2) product material that is proposed to be processed at the Mill. Nor is there data on the total volume and weight of the listed radionuclides.

Division Response: The Division disagrees with this comment. As stated above, the NRC has already determined that this material is 11e.(2) byproduct material and can be accepted at the White Mesa Mill. The expected total volume of the material to be received is described in the SER (page 17). While it may be of interest to know "the *total volume and weight of the listed radionuclides,"* the Division concludes that this data point is not necessary to support its final determination in this matter. This calculation has more to do with the relative value of the material and the costs and processes to be used to recover uranium. That the material qualifies as 11e.(2) byproduct material is not subject to dispute, regardless of the total volume and weight of the radionuclides. The material will be processed, and recoverable radionuclides removed and

sold. The precise volume and weight of radionuclides is not relevant to the determinations that fall to the Division to make here.

2.6. *SER, Section 4.1.1. Radiological Impacts, Table 8. Comparison of Radionuclide Activity Concentrations in SFC Uranium Material and Previously Approved Alternate Feed Materials (page 15). Table 8 compares various radionuclide concentrations of the SFC 11e.(2) byproduct material to uranium-bearing waste materials that have already been approved for processing at the White Mesa Mill. These include the materials from W.R. Grace facility and the Maywood, New Jersey, Formerly Utilized Sites Remedial Action Project (FUSRAP) site.*

COMMENT

UW Comment #13

2.6.1. The White Mesa Mill never received and processed materials from the W.R. Grace facility or the Maywood FUSRAP site. The Division has proposed removing the license conditions that authorize the processing of those materials from the White Mesa Mill License. Therefore, any information in the SER that refers to those feed materials should be deleted and not taken into consideration, because it is irrelevant.

Division Response: This question was answered during the Public Hearing conducted on June 8, 2017. There, URS explained how they used the W.R. Grace and Maywood alternate feeds as comparisons because they had been previously approved in the license by the NRC as alternate feeds. The only reason they are being removed from the RML is because those license conditions are no longer needed as the material is not expected to be received. No change to the SER is required based on this comment.

UW Comment #14

2.6.2. The Table should have included a comparison of the total mass of the material received and the mass of the various radiological constituents, not just the concentrations. The comparison of concentrations of radiological constituents is affected by the total amount of material and total amounts of specific radionuclides.

Division Response: The Division disagrees with this comment. The concentration unit used in Table 8 are in pico-Curies per gram. Gram is a unit of mass. Therefore, the unit of pico-Curies per gram accounts for the mass of the material. No change will be made to the table.

2.7. *SER, Section 4.1.1.1 Gamma and Radon Emissions (page 16). Section 4.1.1.1 discusses the radon emissions from the uranium and thorium decay chains and states: "Ra-226 concentrations in the SFC Uranium Material are in disequilibrium and much lower than typical low-grade Colorado Plateau-derived uranium ores." And, "Given the lower average Ra-226 concentrations in the SFC Uranium Material than in uranium ores typically processed at the mill (Table 7), Rn-222 emissions (from the uranium decay series) in the SFC Uranium Material are expected to be lower than those for the uranium ores processed at the mill."*

COMMENT

UW Comment #15

2.7.1 It is quite possible that the measurements of radium-226 in the SFC 11e.(2) product material is not accurate or is not representative of all of the material. Unless the Division can demonstrate that the measurements of R-226 are accurate and representative of all of the material, the Division cannot assume that the radon-222 emissions from SFC 11e.(2) product material will be less than those from Colorado Plateau and Arizona Strip ores over the life of the Mill and thousands of years into the future. The data on the thorium-228 concentration may also be questionable. Eventually all of the thorium-232 in the material will decay to thorium-228 and thorium-228 progeny.

Division Response: The Division disagrees with this comment because it is not supported by any evidence and is based on speculation. The commenter provided no evidence in connection with the comment. In the Division's reasoned, technical judgment, the Licensee fully accounts for Radon from both the Uranium decay series and the Thorium decay series in its occupational and environmental monitoring. Therefore, this data is and will be included in the overall environmental analysis of uranium milling.

2.8. *The SER, Section 4.1.1.1. Gamma and Radon Emissions (page 16). Section 4.1.1.1 also states, "The lower gamma field emanating from the U-nat chain decay in the SFC Uranium Material will be offset to a degree by higher gamma fields derived from the Th-232 chain decay associated with the SFC Uranium Material."*

COMMENT

UW Comment #16

2.8.1. The SER fails to mention that, since the processing wastes will be disposed of in tailings Cell 4A (and possibly 4B) there is no requirement to measure and report the radon emissions annually, pursuant to 40 C.F.R. Part 61 Subpart W. Therefore, there is currently way to know what the radon-222 emissions will be during and after the disposal of the wastes from the processing of the 11e.(2) byproduct material from Sequoyah Fuels. There will be no way of knowing if the radon-222 emissions are above the generally established standard of 20 pico Curies per square meter per second (20 pCi/m2-sec) and if mitigative measures should be taken to reduce the emissions (usually by placement of clean soil on the tailings).

Division Response: 40 CFR 61, Subpart W doesn't require tailings cells constructed after December 15, 1989 that are 40 acres in size or smaller to be analyzed for radon emissions. Utah law prohibits the State of Utah from being more restrictive than the Federal Government; therefore, the Licensee will not be required to perform radon flux sampling while tailings cells 4A and 4B are in operation. However, once the tailings cells are no longer in operation and closure activities begin, they will then be subject to 10 CFR 40, Appendix A, Criterion 6. The final cover for tailings cells 4A and 4B must be so that radon emissions are less than 20 pCi/m2-s.

UW Comment #17

2.8.2. Therefore, the Division must amend the White Mesa Mill License to include a requirement to monitor and report the radon emissions from Cells 4A and 4B solid tailings at least annually, but preferably twice annually, as is currently required for Cell 2, which is under closure and no longer subject to the Subpart W numerical radon emission standard for older ("existing") tailings impoundments. The Division has the authority to include this important requirement as a license condition. This proposed action is needed regardless of any approval or denial of the Energy Fuels license amendment. Radon monitoring from Cells 4A and 4B must include measurements of radon-220 emissions.

Division Response: The Division refers to its Response to UW Comment #01 and #16, above. Imposing the commenter's requested action would result in a state standard that is more stringent than its federal counterpart. In any event, in the Division's reasoned technical judgment, there is no basis to implement this change.

UW Comment #18

2.8.3. It is apparent from the data provided in the SER, that there are significant amounts of thorium-232 and thorium-232 progeny in the SFC 11e.(2) byproduct material. The SER fails to mention that the radon-220 (from the decay of thorium-232) and the other thorium-232 progeny have not been included in the MILDOS-AREA Model. The White Mesa Uranium Mill license and groundwater permit renewal, "Technical Evaluation and Environmental Assessment" (TEEA) and MILDOS-AREA Model do not provide any information about the doses or impacts from the radioactive particulates and radon-220 emissions from the materials that contain thorium-232 and progeny that have been disposed of at the Mill, may be disposed of in future, based on current License conditions, and are being proposed for disposal.

Division Response: The Division does not agree with this comment. This comment directly relates to the commenter's concern regarding the approval of certain alternate feed materials (AF materials) containing levels of Th-232 not present in natural ore. The Th-232 AF materials that are of concern to the commenter were approved a number of years prior to the submission of the license renewal application in 2007. As explained in response to a previous comment, some of the approved Th-232 AF materials were never received by the Licensee at the White Mesa Mill for either disposal or for processing. In fact, for the radioactive material license renewal, a number of the license conditions approving various AF material approvals are being removed from the Licensee's radioactive materials license because the campaign has been completed or the AF materials were not and will not be received by the Licensee for processing or disposal. The Licensee last received and processed any of the AF material in question in 2003. Therefore, except for the wastes from the previously processed Th-232 AF materials that is contained in the tailings cells, the Th-232 AF materials were not evaluated as part of the processing materials for the actions presently under review.

Since the last AF materials containing the Th-232 that the commenter is concerned about were received and processed in 2003, the waste from the Th-232 AF materials have been in the tailings cells and have been covered by wastes from materials processed since 2003 and any interim radon cover that has been placed on the tailings cells. Therefore, the only potential

emissions from the Th-232 AF materials are from the radon-220 (Rn-220) that would be emitted from the tailings cells. Radon-220 decays a little more than 1,000 times faster than Rn-222 since Rn-220 has a half-life of 55 seconds and Rn-222 has a half-life of 3.8 days (about 5,970 seconds).

Given the relatively small quantities of Th-232 AF materials that were received by the Mill, the fact that the waste from these materials have been covered by other wastes emitting Rn-222 and interim radon cover, and the short half-life of the Rn-220, the Division considered the emissions from Rn-220 in a more conservative manner. As stated in response to other comments and in Attachment A to the TEEA, the Division overestimated the emissions of Rn-222 from the tailings cells. Instead of using the data reported by the Licensee for the radon emissions from Cell 2 and Cell 3 which were well below the EPA's limit of 20 pci/(m^2sec) for calendar years 2007 through 2011, the Division ran the MILDOS evaluations using the limit of 20 pci/(m^2sec) as the amount that was released by the tailings cells. In 2012, the Licensee reported a level of radon emissions that exceeded the EPA's limit for Cell 2. The Division used the reported level that was above the EPA's limit for the emissions from both tailings Cell 2 and tailings Cell 3 even though the emissions from Cell 3 were actually below the EPAs limit. For calendar years 2013 and 2014, the Division used values that exceeded the EPA limits for Cells 2 and 3 by 25 percent. In addition to overestimating the releases of Rn-222 from the tailings cells by using the EPA limits instead of the reported values, the Division also included the emissions from Cell 2 more than once for each calendar year evaluated. This means that essentially, the Division considered the emissions from Cell 2 to be at least twice the EPA limit for 2007 through 2011 and for 2012 through 2014 emissions equal to two and one half times the EPA limit. In doing so, the Division is confident that any potential impacts from emissions related to Rn-220 have already been fully taken into account. Therefore, the Division finds that the conclusions reached in the (TEEA) and MILDOS-AREA Model are well supported.

UW Comment #19

2.8.4. The SER fails to provide information regarding the radium content of the liquid effluents in Cells 1, 4A, and 4B that will be impacted by the placement of the processing effluents or tailings after the processing of the SFC 11e.(2) byproduct material. The EPA and Energy Fuels have determined that the radon emissions from liquid effluents at conventional uranium mills are not ZERO. The Division must require the periodic testing (at least monthly) of the liquid effluents in Cells 1, 4A, and 4B and determine the radon emissions from those effluents, based upon an agreed upon formula. The testing and the formula must include the radium from both the uranium and thorium-232 decay chains.

Division Response: The Division disagrees with the commenter. The EPA has made it clear to the Division, for many years, that in its view and experience, radon emissions from liquid uranium impoundments are essentially zero. In 2015, EPA spokesman Richard Mylott confirmed EPA's position, that based on current regulations, the radon flux emission from the White Mesa tailing ponds "are considered negligible, with no impacts to the environment." There is no federal or state regulation requiring the Licensee to sample its liquid uranium impoundments for radium. In the Division's reasoned technical judgment, there is no technical or scientific reason to do so. Moreover, Utah law prohibits the Division from enforcing more stringent regulations than required under federal law (where counterpart regulations exist), unless

the Board makes a specific finding supporting its imposition of more stringent standards. Here, the Board has not done so. Based on the foregoing, EFRI will not be required to perform radium sampling in its tailings cells and no change will be made to the License or Permit.

2.9. *SER, Section 4.1.1.3 Packaging, Transportation, and Handling Procedures (page 20 -21). Section 4.1.1.3 discusses the transportation of the SFC 11e.(2) byproduct material.*

COMMENT

UW Comment #20

2.9.1. The Section 4.1.1.3. discussion of transportation of the SFC 11e.(2) byproduct material describes the route that the trucks carrying the Sequoyah Fuels waste will travel. However, the exact route from Interstate 40 in New Mexico to the Mill is not delineated. The SER mentions the use of Utah State Highway (SH) 262 to SH 191, leading to the Mill. The distance from I-40 to the Mill is approximately 186 miles. The distance on SH 262 and SH 191 to the Mill is about 30 miles, so there are over 150 miles between I-40 and Utah SH 262. The roads between Gallup on I-40 and Montezuma Creek, where SH 292 begins, crosses through the Navajo Nation and the Ute Mt. Ute Nation lands. Yet, there is no mentions of that fact in the SER.

Division Response: In the Division's reasoned view, the detailed Transportation analysis set forth in the URS SER is sufficient and the requested additional information will not change any conclusions. The Sequoyah Fuels materials will be transported on State and Federal Highways in accordance with all applicable Department of Transportation requirements. The same precautions and procedures will be followed over the entire route. No change will be required to the SER relating to this comment.

UW Comment #21

2.9.2. The SER must provide a full description of the route from the Sequoyah Fuels facility in Gore, Oklahoma, to the Mill.

Division Response: The Division disagrees with this comment and refers the commenter back to its response to UW Comment #20, above. The Division believes this response is adequate to address all the issues raised in this comment.

UW Comment #22

2.9.3. The SER must discuss the fact that the route to the Mill from New Mexico crosses tribal lands belonging to the Navajo Nation and Ute Mt. Ute Nation. The SER must assess the impacts to the tribal communities and discuss how Energy Fuels will inform the tribal governments of the transport routes and individual truck shipments. The SER must discuss how the transport company and Energy Fuels will work with the tribal governments in the event of an accident or other possible exposure scenario. The Division and Energy Fuels cannot ignore the fact that the transportation route crosses tribal lands and requires timely notification, emergency planning, and involvement of tribal government officials and staff.

Division Response: The Division disagrees with this comment and refers the commenter back to its response to UW Comment #20, above. The Division believes this response is adequate to address all the issues raised in this comment.

2.10. *The SER, Section 4.1.2 Non-Radiological Impacts (page 25). Section 4.1.2. states with respect RCRA-Listed Materials Analysis: "As stated in Section 1.3, the SFC Uranium Material is considered to be the result of natural ore processing, therefore no listed RCRA material is presented because it is exempt under 40 CFR 261.4(b)(7)."*

COMMENT

UW Comment #23

2.10.1. As discussed above at Section 2.3, the SER claims to exempt the SFC 11e.(2) byproduct material from any RCRA-Listed Materials Analysis because the Material is "solid wastes from the extraction, beneficiation, and processing of ores" and not because the SFC Material is "ore." This leaves one wondering if the Division is manipulating statutory definitions to allow the material to be processed at the Mill. One the one hand, the material is exempt from any RCRA-Listed Materials Analysis, because the material to be processed is "solid wastes from the extraction, beneficiation, and processing of ores;" on the other hand, the SFC material is "ore," so the wastes from the processing of the SFC 11e.(2) byproduct material will be defined as 11e.(2) byproduct material. And, the NRC has determined that the SFC Material is 11.(2) byproduct material (which means it is not even a "solid waste," so that the Material can be directly disposed of in a licensed 11e.(2) byproduct material impoundment. Certainly, there are unacknowledged and unexplained discrepancies.

Division Response: Please see General Responses #4 and #5 above. The Division believes these responses are adequate to address all the issues raised in this comment.

UW Comment #24

2.10.2. How, exactly, can the SFC Material be both "11e.(2) byproduct material" (as defined under the AEA and NRC and EPA regulation) and "ore" (which has no AEA or NRC and EPA regulatory definition—just hundreds of years of traditional use of that term? Does this SFC 11e.(2) byproduct material get transformed back into "ore"? These magical processes must be explained by the Division.

Division Response: Please see General Responses #4 and #5 above. The Division believes these responses are adequate to address all the issues raised in this comment.

2.11. *The SER, Table 11. Projected Changes in Tailings Inventories and Concentrations From SFC Uranium Material and Comparison to Other Alternate Feed Materials (page 28). Table 11 provides the estimated concentration and mass of various constituents in the SFC 11e.(2) byproduct material and compares that informaiton with the concentrations and mass of those constituents in the White Mesa Mill tailings (before and after the processing of the SFC 11e.(2) byproduct material) and other data. Based on the footnotes to Table 11, it appears that the assumption is that the waste from the processing of the SFC 11e.(2) byproduct material will be disposed of in Cell 3. The footnotes to Table 11 indicate that the data for the current tailings and tailings after the processing of the Sequoyah Fuels waste all refer to Cell 3, though Cell 2 may also be included in some of the data (the Table is not clear in this respect). The data on the concentration range in the Mill Tailings before Processing the SFC Material (column C) is based on 2004 data. That data is over 12 years old. Table 1 does not include data regarding the*

wastes in Cells 4A or 4B. According to the SER, the waste from the processing of the SFC 11e.(2) byproduct material will be disposed of in Cell 4A and possibly 4B or future impoundment.

COMMENT

UW Comment #25

2.11.1. The information in Table 11 is of minimal relevance to the disposal of the wastes from the processing of the SFC 11e.(2) byproduct material, because Table 11 relies on old, incomplete data, and does not include data on the existing tailings impoundment(s) that will receive the waste: Cell 4A and possibly 4B.

Division Response: The Division disagrees with this comment. In its reasoned technical judgment, the Division finds that the Data reported in Table 11 is valid and appropriate. This data is based on appropriate analysis performed by qualified scientists using valid assumptions and approved methods. The fact that some of the data is over 12 years old is irrelevant. Data does not have an expiration date.

2.12. *The SER, Section 4. Alternatives (page 45). The Section 4 discussion of alternatives to the processing of the SFR 11e.(2) byproduct material states that "alternate sites and engineering methods be considered in the analysis of the license amendment request." The only alternate site mentioned is the Cotter Mill, which is no longer operational.*

COMMENT

UW Comment #26

2.12.1. The SER should have considered 2 other alternatives: 1) the direct disposal of the SFC 11e.(2) byproduct material at the White Mesa Mill and 2) the direct disposal at the Energy Solutions, Clive, Utah, 11e.(2) byproduct material impoundment. The Clive Disposal Facility is licensed to receive and disposal of 11e.(2) byproduct material by the DWMRC. The White Mesa Mill is also licensed to directly dispose of 11e.(2) byproduct material. These are alternatives that should reasonably have been considered in the SER. Of concern with both alternatives is the fact that the SFC 11e.(2) byproduct material has numerous constituents that are not found in, or are not found in similar concentrations, as 11e.(2) byproduct material produced from the processing of ore (that is, as natural material after removal from its place in nature) at the White Mesa Mill and other uranium mills.

Division Response: The Division disagrees with this comment because it is not legally justified. The Sequoyah Fuels Alternate Feed application was for processing the Sequoyah Fuel material for its uranium content. Direct disposal into the tailings cells could have been evaluated if the Licensee had requested that option. However, that was not the requested by EFRI. Disposal at another facility was out of scope for the Division because the determination to send the material to the White Mesa Mill was in the sole discretion of the owner of the material, Sequoyah Fuels Inc. The Division cannot force the owner of that material to send it to another facility for disposal. The only legal issue before the Division in the present matter is whether the Sequoyah Fuel material can be processed as an alternate feed. The Division has answered this question in

the affirmative. The alternatives raised by this comment are not relevant to the Division's inquiry.

3. DENIAL OF LICENSE AMENDMENT REQUEST

COMMENT

UW Comment #27
The Division should deny the license amendment request to process 11e.(2) byproduct material from the Sequoyah Fuels Corporation, Gore, Oklahoma, facility at the White Mesa Mill for the following reasons:

3.1. The NRC has determined that the SFC material is 11e.(2) byproduct material, under the definition of in the AEA and NRC and EPA regulation. The SER and the Division have not explained, and cannot explain, how the SFC 11e.(2) byproduct material can be transformed back into a material that can be defined as "ore," based on statutory and regulatory provisions in the AEA and NRC and EPA regulations.

Division Response: Please see General Responses #4 and #5 above. The Division believes that these responses are adequate to address all the issues raised in this comment.

UW Comment #28
3.2. The wastes from the processing of the SFC 11e.(2) byproduct material at the White Mesa Mill would not meet the definition of 11e.(2) byproduct material. That is because the SFC material is not "ore," as that term has been in common use for hundreds of years[6] and how that term is used in the AEA definition of 11e.(2) byproduct material.[7] AEA, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA),[8] does not sanction the processing of feed materials other than natural ores and the disposal of wastes from such processing at licensed uranium and thorium processing facilities. The AEA does not include a definition, or any indication of such definition, of "ore" that states that "ore" is any "matter from which source material is extracted in a licensed uranium or thorium mill."

---

[6] *The word, or term, "ore," as defined in several sources:*

• Ore—a naturally occurring solid material from which metal or other valuable minerals may be extracted. [Illustrated Oxford Dictionary, DK Pub. 1998.]

• Ore—A native mineral containing a precious or useful metal in such quantity and in such chemical combination as to make its extraction profitable. Also applied to minerals mined for their content of non-metals. [The Compact Oxford English Dictionary, Second Edition, Oxford University Press, 2000, p. 1224:915-916.]

• Ore—a. A natural mineral compound of the elements of which one at least is a metal. Applied more loosely to all metaliferous rock, though it contains the metal in a free state, and occasionally to the compounds of nonmetallic substances, as sulfur ore. . . . Fay b. A mineral of sufficient value as to quality and quantity that may be mined for profit. Fay. [A Dictionary of

Mining, Mineral, and Related Terms, compiled and edited by Paul W. Thrush and Staff of the Bureau ofMines, U.S. Dept. of Interior, 1968.]

• The Oxford English Dictionary points out that the current usage of the word "ore" goes back several hundred years. A Dictionary of Mining, Mineral, and Related Terms lists over 65 compound words using the word "ore," such as ore bin, ore body, ore deposit, ore district, ore geology, ore grader, ore mineral, ore reserve, ore zone.

All of these terms incorporate the word "ore" as it relates to the mining of a native mineral. The term "ore," without explanation, has for many years been used in thousands, if not millions, of instances in thousands of mining, milling, geological, mineralogical, radiochemical, engineering, environmental, and regulatory publications. "Ore" like the word "water," is a word of common and extensive usage with a clear and accepted meaning.

[7] 42 U.S.C. Sec. 2014 (e). "The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content."
[8] The Uranium Mill Tailings Radiation Control Act of 1978 ("UMTRCA") (Public Law 95-604, 92 Stat. 3033 et seq.), amending the Atomic Energy Act of 1954 (Public Law 83-703, 68 Stat. 919 et.seq.).

The AEA does not give the Utah Department of Environmental Quality (DEQ), or other state or federal entity, the broad authority to authorize the processing of feed materials other than natural ores or the disposal of wastes from such processing at licensed uranium and thorium processing facilities as "11e.(2) byproduct material." The term "ore" has an accepted and historical definition as that term is used in the AEA and regulations promulgated responsive to that Act. Neither the NRC, nor the DEQ have the authority to use "guidance" or other means to change the substantive meaning of a word and, thereby, the regulatory program associated with that word and associated definitions. The DEQ does not have the authority to amend the AEA.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address all the issues raised in this comment.

UW Comment #29
3.3. The statutory history of UMTRCA, found in the two Congressional reports, provides information with respect "uranium mill tailings" and "ore." The Congressional Reports clearly state what was contemplated by Congress (i.e., the intent of Congress) when Congress established a program for the control of "uranium mill tailings" from the processing of "uranium ore" at inactive (Title I of UMTRCA) and active (Title II of UMTRCA) uranium and thorium processing facilities. See House Report (Interior and Insular Affairs Committee) No. 95-1480 (I), August 11, 1978, and House Report (Interstate and Foreign Commerce Committee) No. 95-1480 (II), September 30, 1978. Under "Background and Need," HR No. 95-1480 (I) states:

> *Uranium mill tailings are the sandy waste produced by the uranium ore*

milling process. Because only 1 to 5 pounds of useable uranium is extracted from each 2,000 pounds of ore, tremendous quantities of waste are produced as a result of milling operations. These tailings contain many naturally-occurring hazardous substances, both radioactive and nonradioactive. . . . As a result of being for all practical purposes, a perpetual hazard, uranium mill tailings present the major threat of the nuclear fuel cycle.

In its early years, the uranium milling industry was under the dominant control of the Federal Government. At that time, uranium was being produced under Federal Contracts for the Government's Manhattan Engineering District and Atomic Energy Commission program. . . .

The Atomic Energy Commission and its successor, the Nuclear Regulatory Commission, have retained authority for licensing uranium mills under the Atomic Energy Act since 1954. [HR No. 95-1480 (1) at 11.]

The second House Report, under "Need for a Remedial Action Program" states:

Uranium mills are a part of the nuclear fuel cycle. They extract uranium from ore for eventual use in nuclear weapons and power-plants, leaving radioactive sand-like waste—commonly called uranium mill tailings—in generally unattended piles. [HR No. 95-1480 (2) at 25.]

The statutory history of UMTRCA does not provide any basis for a definition of "ore" as being any "matter from which source material is extracted in a licensed uranium or thorium mill."

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address all the issues raised in this comment.

UW Comment #30

3.4. Atomic Energy Commission (AEC) and the AEA of 1946 also demonstrate the intent of Congress and the agency that preceded the NRC with resect ore and the processing of ore. The domestic uranium mining and milling industry was established at the behest of the Manhattan Engineer District and the AEC. The AEC regulated uranium mines and uranium processing facilities, established ore buying stations, and bought ore. Mining and milling of uranium ore was done under contract to the AEC. AEC purchased uranium ore under the Domestic Uranium Program. Regulations related to the AEC's uranium procurement program were set forth in 10 C.F.R. Part 60. Part 60 was deleted from 10 C.F.R. on March 3, 1975, after the establishment of the NRC. The AEC published a number of circulars related to their Domestic Uranium Program.

The Domestic Uranium Program—Circular No. 3—Guaranteed Three Year Minimum Price—Uranium-Bearing Carnotite-Type or Roscoelite-Type Ores of the Colorado Plateau Area" (April 9, 1948), an amendment to 10 C.F.R. Part 60, states:

§ 60.3 Guaranteed three years minimum price for uranium-bearing

carnotite-type or roscoelite-type ores of the Colorado Plateau—(a) Guarantee. To stimulate domestic production of uranium-bearing ores of the Colorado Plateau area, commonly known as carnotite-type or roscoelite-type ores, and in the interest of the common defense and security the United States Atomic Energy Commission hereby establishes the guaranteed minimum prices specified in Schedule 1 of this section, for the delivery of such ores to the Commission, at Monticello, Utah, and Durango, Colorado, in accordance with the terms of this section during the three calendar years following its effective date.

Note: In §§ 60.1 and 60.2 (Domestic Uranium Program, Circulars No. 1 and 2), the Commission has established guaranteed prices for other domestic uranium-bearing ores, and mechanical concentrates, and refined uranium products.

Note: The term "domestic" in this section, referring to uranium, uranium-bearing ores and mechanical concentrates, means such uranium, ores, and concentrates produced from deposits within the United States, its territories, possessions and the Canal Zone.

10 C.F.R. Part 60—Domestic Uranium Program at § 60.5(c) states:

Definitions. As used in this section and in § 60.5(a), the term "buyer' refers to the U.S. Atomic Energy Commission, or its authorized purchasing agent. ***The term "ore" does not include mill tailings or other mill products****. . . . [Emphasis added.]*
[Circular 5, 14 Fed. Reg. 731 (February 18, 1949).]

It is clear that the AEC was the primary mover in the domestic uranium mining and milling program. It is clear that under the AEAs of 1946 and 1954, the AEC regulated uranium mining and milling and established a uranium ore-buying program. It is clear that from the 1940's to 1975, the regulations in 10 C.F.R. Part 60 clearly stated that "ore" does not include mill tailings or other mill products. It is clear that "ore," under the AEA and AEC regulation did not mean any "matter from which source material is extracted in a licensed uranium or thorium mill." Such a new definition contradicts the AEA.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address all the issues raised in this comment.

UW Comment #31
3.5. The Statutory Definition of Source Material also is relevant to the use of the term "ore" under that AEA and NRC regulation. The AEA of 1946, under "Control of Materials," Sec. 5 (b), "Source Materials," (1), "Definition," provides the definition of "source material." Section 5(b)(1) states:

Definition. — As used in this Act, the term "source material" means

uranium, thorium, or any other material which is determined by the Commission, with the approval of the President, to be peculiarly essential to the production of fissionable materials; but includes ores only if they contain one or more of the foregoing materials in such concentration as the Commission may by regulation determine from time to time.

The AEA of 1954, Chapter 2, Section 11, "Definitions," sets forth the current statutory definition of "source material" at Sec. 11(s):

The term "source material" means (1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of section 61 to be source material; or (2) ores containing one or more of the foregoing materials, in such concentrations as the Commission may by regulation determine from time to time. [42 U.S.C. Sec. 2014(z).]

Responsive to this statutory definition, in 1961 the AEC established the following regulatory definition at 10 C.F.R. § 40.4:

Source Material means: (1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material. [26 Fed. Reg. 284 (Jan. 14, 1961)]

Therefore, the AEC made a determination, in accordance with the mandate of the AEA of1954, that ores containing 0.05% thorium and/or uranium would meet the statutory definition of source material. At the same time that they made that determination, the AEC had a regulation that clearly stated that "ore" does not include mill tailings or other mill products. Surely, the AEC, as the administrator of a uranium ore procurement program and the developer of the uranium mining and milling industry knew what they were talking about when they used the term "ore."

Additionally, the AEC set forth certain exemptions to the regulations in 10 C.F.R. Part 40. The proposed rule that was later finalized in January 1961 states, in pertinent part:

The following proposed amendment to Part 40 constitutes an over-all revision of 10 CFR Part 40, "Control of Source Material."

With certain specified exceptions, the proposed amendment requires a license for the receipt of title to, and the receipt, possession, use, transfer, import, or export of source material. . . .

Under the proposed amendment, the definition of the term "source material": is revised to bring it into closer conformance with that contained in the Atomic Energy Act of 1954. "Source Material" is defined as (1) uranium or thorium, or any combination thereof, in any physical or

chemical form, but does not include special nuclear material, or (2) ores which contain by weight one-twentieth of one percent (0.05 percent) or more of (a) uranium, (b) thorium or (c) any combination thereof. The amendment would exempt from the licensing requirements chemical mixtures, compounds, solutions or alloys containing less than 0.05 percent source material by weight. As a result of this exemption, the change in the definition of source material is not expected to have any effect on the licensing program. . . .

Section 62 of the Act prohibits the conduct of certain activities relating to source material "after removal from its place of deposit in nature" unless such activities are authorized by license issued by the Atomic Energy Commission. The Act does not, however, require a license for the mining of source material, and the proposed regulations, as in the case of the current regulations, do not require a license for the conduct of mining activities. Under the present regulation, miners are required to have a license to transfer the source material after it is mined. Under the proposed regulation below, the possession and transfer of unrefined and unprocessed ores containing source material would be exempted. [47 Fed. Reg. 8619 (September 7, 1960).]

Therefore, the AEC established, via a rulemaking, exemptions for source material as defined in Sec. 2014(z)(1) related to mixtures, compounds, solutions, or alloys containing uranium and/or thorium:

(a) Any person is exempt from the regulations in this part and from the requirements for a license set forth in section 62 of the Act to the extent that such person receives, possesses, uses, transfers or delivers source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution or alloy. The exemption contained in this paragraph does not include byproduct material as defined in this part. [10 C.F.R. § 40.13(a), 26 Fed. Reg. 284 (Jan. 14, 1961).]

The AEC also established, via a rulemaking, exemptions for source material as defined in Sec. 2014(z)(2) related to "ore":

b) Any person is exempt from the regulations in this part and from the requirements for a license set forth in section 62 of the act to the extent that such person receives, possesses, uses, or transfers unrefined and unprocessed ore containing source material; provided, that, except as authorized in a specific license, such person shall not refine or process such ore. [10 C.F.R. 40.13(b), 26 Fed. Reg. 284 (Jan. 14, 1961).]

The definition of "source material" and the exemptions that are related to those definitions stand today, over fifty-five years later. These regulatory definitions and exemptions did not change when the NRC was established in 1975 and took on the regulatory responsibility for "source material." These regulatory definitions and exemptions did not change when the AEA was amended by UMTRCA in 1978.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address all the issues raised in this comment.

UW Comment #32

3.5. Definition of 11e.(2) byproduct material. UMTRCA, among other things, amended the AEA of 1954 by adding a new definition, the definition of 11e.(2) byproduct material:

> *Sec. 201. Section 11e. of the Atomic Energy Act of 1954, is amended to read as follows:*
> *"e. The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." [42 U.S.C. Sec. 2014 (e).]*

There is no evidence in the regulatory history of UMTRCA that Congress, in defining "11e.(2) byproduct material" intended to also amend the statutory definition of "source material." There is no evidence in the regulatory history of UMTRCA that the term "any ore" does not mean "any type of uranium ore" (e.g., ore containing ***less than*** *.05% uranium and/or thorium and the numerous types of natural uranium-bearing minerals that are mined at uranium mines and milled at uranium mills). There is no evidence in the regulatory history of UMTRCA that Congress intended the term "any ore" to mean anything that the NRC, DWRC, or Energy Fuels wants it to mean. There is no evidence in the regulatory history of UMTRCA that "ore" is "any other matter from which source material is extracted in a licensed uranium or thorium mill."*

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #33

3.6. In response to UMTRCA, both the EPA and the NRC established a regulatory program for uranium milling and the processing of ores. In establishing those regulations, neither the EPA nor the NRC contemplated the processing of materials that were not "ore" (as that term has been used under the AEA and the common meaning of the term). Neither the EPA nor the NRC considered wastes from other mineral processing operations in their concept of "ore." They did not address in any manner the processing wastes or any matter other than natural ore when promulgating their regulatory regimes for active uranium processing facilities. Further, during the various rulemaking proceedings, the public was never informed that wastes from other mineral processing operations or materials other natural ore, no matter how they were defined, would be processed at licensed uranium or thorium mills. Therefore, the public was given no

reasonable opportunity to comment on such processing activities at uranium mills in the rulemaking processes.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #34

3.7. NRC Regulatory Program, 10 C.F.R. Part 40. Responsive to UMTRCA, the NRC incorporated the UMTRCA definition of 11e.(2) byproduct material (with clarification) into their regulations at 10 C.F.R. § 40.4:

> *"Byproduct Material" means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "byproduct material" within this definition.*
> *[44 Fed. Reg. 50012-50014 (August 24, 1979).]*

The NRC also explained the need for the new definition:

> *Section 40.4 of 10 CFR Part 40 is amended to include a new definition of "byproduct material." This amendment, which included uranium and thorium mill tailings as byproduct material licensable by the Commission, is required by the recently enacted Uranium Mill Tailings Radiation Control Act. [44 Fed. Reg. 50012-50014 (August 24, 1979).]*

The NRC promulgated further regulations amending Part 40, in 1980, 45 Fed. Reg. 65521-65538 (October 3, 1980). In the summary, the NRC states:

> *The U.S. Nuclear Regulatory Commission is amending its regulations to specify licensing requirements for uranium and thorium milling activities, including tailings and wastes generated from these activities. The amendments to parts 40 and 150 take into account the conclusions reached in a final generic environmental impact statement on uranium milling and the requirements mandated in the Uranium Mill Tailings Radiation Control Act of 1978, as amended, public comments received on a draft generic environmental impact statement on uranium milling, and public comments received on proposed rules published in the Federal Register. [Footnotes omitted.]*

There is no statement in any of the NRC regulations in 10 C.F.R. Part 40 or in any of rulemaking proceedings promulgating those regulations that wastes from other mineral processing operations, 11e.(2) byproduct material, or any other matter processed in a licensed uranium mill could be defined as "ore," under any circumstances. The NRC regulations did not contemplate that, under any circumstances, wastes and other materials would be processed at licensed uranium or thorium mills and the tailings, or that the wastes from such processing would be

disposed of as 11e.(2) byproduct material in the mill tailings impoundments. The regulations promulgated by the NRC did not contemplate this kind of activity.

The National Environmental Policy Act ("NEPA") document in support of the promulgation of the NRC regulatory program for uranium mills did not contemplate this kind of activity. In the rulemaking proceedings and NEPA proceeding, the public did not have an opportunity to contemplate and comment on this kind of uranium or thorium mill processing activity. The information provided in the SER and other documents demonstrate that materials other than natural ore contain radiological and non-radiological constituents that are significantly different than those in natural ore. Therefore the impacts from the processing and disposal of the wastes from those materials would be different from those of "ore."

Furthermore, 10 C.F.R. Part 40, Appendix A, Criterion 8, states in part:

> *Uranium and thorium byproduct materials must be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983.*

There is no indication that this NRC regulation and the regulation in 40 C.F.R. Part 440 (and the enabling statute) have in any manner been amended or altered by subsequent NRC policy guidance. Therefore, any shift in the usage of the word "ore" would conflict with statutory and regulatory authorities with respect 10 C.F.R. Part 40 and 40 C.F.R. Part 440.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #35

3.8. The Final Generic Environmental Impact Statement on Uranium Milling (GEIS).[9] The GEIS makes a clear statement regarding the scope of the GEIS and its understanding of what uranium milling entails:

> *As stated in the NRC Federal Register Notice (42 FR 13874) on the proposed scope and outline for this study, conventional uranium milling operations in both Agreement and Non-Agreement States, are evaluated up to the year 2000. Conventional uranium milling as used herein refers to the milling of ore mined primarily for the recovery of uranium. It involves the processes of crushing, grinding, and leaching of the ore, followed by chemical separation and concentration of uranium. Nonconventional recovery processes include in situ extraction or ore bodies, leaching of uranium-rich tailings piles, and extraction of uranium from mine water and wet-process phosphoric acid. These processes are described to a limited extent, for completeness. [GEIS, Volume I, at 3.]*

The GEIS is very clear about what it considers "ore" to be and gives no indication whatsoever that materials other than ore (a natural material after its removal from its place in nature), such as the tailings or waste from mineral processing operations, are considered to be "ore" if the material is processed at a licensed uranium mill.

The GEIS includes a discussion of "Past Production Methods." That discussion makes reference to "ore," "ore exploration," "pitchblende ore," "crude ore milling processes," "lower-grade ores," "uranium-bearing gold ores," "high-grade ores," "ore-buying and "ore reserves." GEIS, Volume I, Chapter 2, at 2-1 to 2-2.

In Chapter 6, "Environmental Impacts," there is a discussion of "Exposure to Uranium Ore Dust," which states, in part:

> *Uranium ore dust in crushing and grinding areas of mills contains natural uranium (U-238, U-235, thorium-230, radium-226, lead-210, and polonium-210) as the important radionuclides. GEIS, Volume I, at 6-41.*

There is also a table giving the "Average Occupational Internal Dose due to Inhalation of Ore Dust," (GEIS at 6-41, Table 6.16). Further, the GEIS discusses "Shipment of Ore to the Mill" (GEIS at 7-11); "Sprinkling or Wetting of Ore Stockpile" (GEIS at 8-2); "Ore Storage" and "Ore Crushing and Grinding" (GEIS at 8-6); "Ore Pad and Grinding" (GEIS, Vol. 3, at G-2); "Ore Warehouse (GEIS, Vol. 3, at K-3); and "Alternatives to Control Dust from Ore Handling, Crushing, and Grinding Operations (GEIS, Vol. III, at K-3 to K-3). In the NRC responses to comments there are discussions of "Average Ore Grade, Uranium Recovery" (GEIS, Vol. II, at A-12 to A-13).

---

[9] *Final Generic Environmental Impact Statement on Uranium Milling, Nuclear Regulatory Commission, NUREG-0706, September 1980.*

The GEIS did not consider the processing of wastes from mineral processing operations at uranium or thorium mills. The GEIS gives no indication whatsoever that such wastes are "ore," even if they were processed at a uranium or thorium recovery facility for their "source material content." Clearly, the GEIS did not consider that the wastes from the processing of such wastes (such as material already defined as 11e.(2) byproduct material) would meet the definition of 11e.(2) byproduct material.

Therefore, the GEIS did not evaluate, and the public did not have an opportunity to comment upon, any of the possible health, safety, and environmental impacts of the processing of other mineral processing wastes at uranium or thorium processing facilities. There was no evaluation of the transportation issues related to the transport of such wastes, nor were reasonable alternatives to the transportation, receipt, processing, and disposal of such wastes at uranium or thorium mills ever evaluated.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #36

3.9. EPA Regulatory Standards. UMTRCA directed the EPA to establish standards for uranium mill tailings and directed the NRC to implement those standards. That statute, as codified in 42 U.S.C. 2022, states in pertinent part:

> *Sec. 2022. Health and environmental standards for uranium mill tailings*
> *(b) Promulgation and revision of rules for protection from hazards at processing or disposal site.*
>
> *(1) As soon as practicable, but not later than October 31, 1982, the Administrator shall, by rule, propose, and within 11 months thereafter promulgate in final form, standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal of byproduct material, as defined in section 2014(e)(2) of this title, **at sites at which ores are processed primarily for their source material content** or which are used for the disposal of such byproduct material. . . . [Emphasis added.]*
>
> *Requirements established by the Commission under this chapter with respect to byproduct material as defined in section 2014(e)(2) of this title shall conform to such standards. Any requirements adopted by the Commission respecting such byproduct material before promulgation by the Commission of such standards shall be amended as the Commission deems necessary to conform to such standards in the same manner as provided in subsection (f)(3) of this section. Nothing in this subsection shall be construed to prohibit or suspend the implementation or enforcement by the Commission of any requirement of the Commission respecting byproduct material as defined in section 2014(e)(2) of this title pending promulgation by the Commission of any such standard of general application. In establishing such standards, the Administrator shall consider the risk to the public health, safety, and the environment, the environmental and economic costs of applying such standards, and such other factors as the Administrator determines to be appropriate.*
> ** * **
> *(d) Federal and State implementation and enforcement of the standards promulgated pursuant to subsection (b) of this section shall be the responsibility of the Commission in the conduct of its licensing activities under this chapter. States exercising authority pursuant to section 2021(b)(2) of this title shall implement and enforce such standards in accordance with subsection (o) of such section. [42 U.S.C. 2022(b) and (d).]*

Congress directed the EPA only to establish standards for "sites at which ores are processed primarily for their source material." The EPA, as mandated by UMTRCA, finalized the "Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites" in 1983.[10] 48 Fed. Reg. 45925-45947, October 7, 1983. In the "Summary of

Background Information" the EPA provides a discussion of "The Uranium Industry" (i.e., the industry that the regulations apply to):

> *The major deposits of high-grade uranium ores in the United States are located in the Colorado Plateau, the Wyoming Basins, and the Gulf Coast Plain of Texas. Most ore is mined by either underground or open-pit methods. At the mill the ore is first crushed, blended, and ground to proper size for the leaching process which extracts uranium. . . . After uranium is leached from the ore it is concentrated . . . . The depleted ore, in the form of tailings, is pumped to a tailings pile as a slurry mixed with water.*
>
> *Since the uranium content of ore averages only about 0.15 percent, essentially all the bulk or ore mined and processed is contained in the tailings. [48 Fed. Reg. 45925, 45927, October 7,1983.]*

Clearly, when the EPA developed its standards for uranium and thorium mills they stated, with specificity and particularity, what uranium "ore" was, what uranium milling consisted of, and what uranium mill tailings consisted of. The EPA clearly stated that the standards applied to the processing of uranium and thorium ores at uranium and thorium mills. There is no reasonable evidence that would indicate that the standards promulgated by the EPA applied to the processing of wastes from other mineral processing operations at uranium and thorium mills or that ore could be defined as "any other matter from which source material is extracted in a licensed uranium or thorium mill."

---

[10] *https://www.epa.gov/radiation/health-and-environmental-protection-standards-uranium-andthorium-mill-tailings-40-cfr*

Additionally, the EPA incorporated UMTRCA's definition of 11e.(2) byproduct material, as clarified by the NRC in 10 C.F.R. 40.4, into their standards at 40 C.F.R. Subpart D, § 192.31(b). Since that time the EPA has not amended their definition of 11e.(2) byproduct material in a rulemaking proceeding, nor have they amended their definition via policy guidance. The EPA has not, in any manner, widened the use of the words "any ore" to include "any other matter from which source material is extracted in a licensed uranium or thorium mill." EPA did not sanction the NRC's policy guidance with respect new definitions of "ore" and 11e.(2) byproduct material.

Clearly, the EPA, as directed by Congress, has not in any manner contemplated the processing of wastes from other mineral extraction operations at uranium or thorium mills when establishing the "Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites." The EPA did not contemplate, nor was the public informed of the EPA intention to consider, the processing of "any other matter from which source material is extracted in a licensed uranium or thorium mill."

In the various rulemaking proceedings that have taken place in the establishment of EPA standards, the public was given no opportunity to consider or comment on the possibility that the EPA standards would also apply to the processing of wastes from other mineral processing operations or "any other matter from which source material is extracted in a licensed uranium or thorium mill." The processing of wastes (such as the material from the Sequoyah Fuels Corp. Gore facility) from material other than natural ore at uranium and thorium mills was beyond the scope of the regulatory program established by the NRC and the EPA in response to UMTRCA for operating uranium mills.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #37

3.10. The AEA, as amended in 1978 by UMTRCA, included provisions applicable to Agreement States. One of those provisions requires NRC Agreements States (such as Utah) to "require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include," among other things, "consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 2014 (e)(2) of this title." [11] So, again, the AEA imposes requirements associated with the definition of and management of 11e.(2) byproduct material, as that term is defined under the AEA and NRC and EPA regulations promulgated responsive to that Act. The State of Utah has not been given the authority to amend this section of the AEA.

[11] *42 U.S.C. § 2021(o)(3)(C)*

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #38

3.11. Regulatory History of NRC's Alternate Feed Guidance. The SER relies on NRC Guidance (SECY 95-211, SECY-99- 012, and NRC Regulatory Issue Summary 2000-23). In the late 1980's the NRC was faced with a few requests to process material other than ore. At that time, and today, there are two statutes or regulations (implementing those statues) that are pertinent. First is the statutory definition of "source material" established in 1954 by the AEA, found at 42 U.S.C. Sec. 2014(z), and in the NRC regulatory definition of "source material" (established in 1961 pursuant Sec. 2014(z)), found at 10 C.F.R. 40.4:

> *Source Material means: (1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material.*

The second is the definition of "byproduct material" in Section 11(e)(2) of the Atomic Energy Act of 1954, as amended, (42 U.S. C Sec. 2014(e)(2)) and the regulatory definition of "byproduct material" found in 10 C.F.R. 40.4:

> *Byproduct Material means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "byproduct material" within this definition.*

The NRC had several options, including the denial of the amendment requests to process feed material that was not "ore." One option would have been to go to Congress and request that Congress change the definition of 11e.(2) byproduct material to read "the tailings or wastes produced by the extraction or concentration of any ore ***or any other matter from which source material is extracted in a licensed uranium or thorium mill****." Emphasis added. NRC Staff made a determination that they would not go to Congress to seek an amendment to the AEA of 1954. If the AEA was amended to include a new definitions, the NRC would have also had to commence a rulemaking to amend 10 C.F.R. Part 40, and the EPA would have had also commence a rulemaking to amend 40 C.F.R. Part 192, 40 C.F.R. Part 61 Subpart W, and other regulations.*

What the NRC did was to manipulate the use of the word "ore" as it is used in the definition of 11e.(2) byproduct material. NRC proposed in a notice and comment opportunity, that a policy guidance be established for the purpose of interpreting the term "ore," as it is used in the definition of 11e.(2) byproduct material. 57 Fed. Reg. 20525 (May 13, 1992). The NRC did not institute a rulemaking proceeding to amend 10 C.F.R. Part 40, though they indicated that that was their intent.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #39

> *3.12. The NRC Final Position and Guidance gave a new definition of ore:*
>
> *Ore is a natural or native matter that may be mined and treated for the extraction or any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill. [60 Fed Reg. 49296 (September 22, 1995).]*

Based on the new use of the term "ore" as put forth in the NRC Guidance, not only would the definition of 11e.(2) byproduct material apply to "any ore processed primarily for its source material content" in a licensed uranium or thorium mill, but the definition of 11e.(2) byproduct material would also apply to ***any matter*** *processed primarily for its source material content in a licensed uranium or thorium mill. In other words, NRC altered the accepted meaning of the word "ore" as that word was used in the NRC regulatory definition of 11e.(2) byproduct material.*

It is plain from the AEA of 1946 and the legislative history of the AEA of 1954 and the Uranium Mill Tailings Radiation Control Act of 1978 and the regulatory history of the AEC, EPA, and NRC rules promulgated responsive to those laws, that the Policy Guidance's new use of the term "ore" goes far beyond the accepted meaning of that term and the clear intent of Congress.

The applicability of various environmental regulations to a great degree depends upon definitions. Congress, in their legislative function, often specifically defines words or phrases related to the application of a statute to a particular material or circumstances—when there is a need for explanation. However, when using words or terms with a common and long accepted meaning, such as groundwater, mill, tailings, or "ore," no explanation or definition is necessary.

The NRC and the State of Utah have not authorized to shift these accepted definitions at will as an expression of their "regulatory flexibility." This is especially so when such shifts result in direct conflicts with NRC's own enabling statutes and regulations, as is the case with the use of the newly defined term "ore." Additionally, NRC is not authorized to shift definitions at will when such shifts directly conflict with the statutory authority and regulations of another federal agency; in this case, the EPA.

The NRC issued the 1995 Final Position and Guidance and the 2000 Interim Position and Guidance without conducting an assessment of any of the health, safety, or environmental effects of establishing a substantively new and different regulatory program that resulted from the issuance of the Final Position and Guidance.

At the White Mesa Mill, this new recovery program—a program that started with the processing of a few small batches of wastes from other mineral processing operations to supplement the processing of uranium ore—grew to be a major uranium recovery program that entailed the receipt and processing of thousands of tons of wastes from other mineral processing operations from across the country and even Canada.

The adverse environmental effects—including cumulative effects—of this new program have not been adequately identified and evaluated under the statutory framework established by the AEA. Further, no NEPA document has ever considered the reasonable alternatives to the processing of wastes from other mineral processing operations at uranium and thorium recovery facilities.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #40

3.13. UMTRCA, as it amends the AEA, clearly specified what constitutes "any ore." What constitutes "any ore" is "any ore." The plain language of the Act and the history of the implementation of the AEA of 1946, as amended by the AEA of 1954 and UMTRCA is all that is needed to determine what "ore" or "any ore" is. Clearly the legislative and regulatory history of the AEA and Title 10 of the Code of Federal Regulations make plan the meaning of the term "ore" and the term "any ore."

The DWMRC's use of the word "ore" for waste materials from mineral processing operations (in this case materials already defined as 11e.(2) byproduct material) is unreasonable and not permitted under the plain language of the AEA. No state or federal agency can use a licensing action or a policy guidance to expand upon and substantively alter the will of Congress when that will is explicitly set forth in statute.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

UW Comment #41

3.14. The standards promulgated by the EPA in 40 C.F.R. Part 192 Subpart D and 40 C.F.R. Part 61 Subpart W no not apply to the processing of materials other than natural ore at a licensed uranium mill, the construction of tailings impoundments that will receive wastes from the processing of materials other than natural ore, the disposal of wastes from the processing of materials other than natural ore, or any other operations or health and safety or environmental impacts from the processing of materials other than natural ore at a licensed uranium mill. The State of Utah has not been given the authority to amend EPA regulations through use of NRC guidance or by any other means. Therefore, the DWMRC cannot approve the proposed license amendment request to process 11e.(2) byproduct material at the White Mesa Mill and the License Amendment Request must be denied.

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address the issues raised in this comment.

Thank you for providing the opportunity to comment.

Sarah Fields
Program Director
sarah@uraniumwatch.org

and

John Weisheit
Conservation Director
Living Rivers
PO Box 466
Moab, Utah 84532

and

Marc Thomas, Chair
Sierra Club - Utah Chapter
423 West 800 South, Suite A103
Salt Lake City, Utah 84101

Dear Mr. Anderson:

Below please find comments on the licensing package associated with the operation of the White Mesa Uranium Mill, San Juan County, Utah. The Mill is owned and operated by Energy Fuels Resources (USA) Inc. (Energy Fuels, or Licensee) under Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004. The comments are submitted to the Utah Division of Waste Management and Radiation Control (DWMRC, or Division). Any older reference to the Division of Radiation Control (DRC) means the DWMRC.

Comments are submitted by Uranium Watch, Living Rivers, and the Utah Chapter of the Sierra Club. These comments incorporate by reference comments submitted by the Ute Mountain Ute Tribe and the December 21, 2011, comments submitted by Uranium Watch et al.

The comments below will address 1) the Utah Division of Waste Management and Radiation Control (DWMRC) Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004, "Technical Evaluation and Environmental Assessment" (DRC-2017-002761) 2) MILDOS-AREA Model (DRC-2017-002763), and 3) the Draft Renewal of Radioactive Materials License Number UT1900479, Amendment 8 DRC-2017-002764).

1. GENERAL COMMENTS

UW Comment #42

1.1. The Division should not have included the Reclamation Plan Rev. 5 and the License Amendment request to process Sequoyah Fuels Corporation waste at the White Mesa Mill in the License Renewal Process. These were 3 separate proposed licensing actions that should not have been included in one notice and comment opportunity, one hearing held at Blanding, Utah, and one hearing and opportunity for cross examination that was held in Salt Lake City. Combining 3 important but separate licensing actions in one process was onerous for the public and, most likely, for Division staff. It made it difficult to focus the questions provided to the Division for the June 8, 2017, hearing in Salt Lake City. It will likely delay the review and final decisions on these licensing actions.

Division Response: The Division disagrees with this comment. There is no regulatory requirement that prevents the Division from combining licensing activities. To the contrary, the Division is, in part, taxpayer funded and thus owes taxpayers the duty to operate efficiently. For efficiency, it is common practice for the Division to combine multiple requests, where possible, into one action, especially where the actions are related. If the requests for a license renewal and a modification to the license have been submitted to the Division and the processing times overlap, the Division will typically address the actions simultaneously. Therefore, it is not unusual for the Division to address the Licensee's renewal request and an amendment to approve the Sequoyah Fuels Corporation alternate feed materials at the same time. By doing so, the Division eliminates duplicating work and uses taxpayer's monies more efficiently.

The reclamation plan of a uranium mill facility is typically reviewed as part of a renewal application. If a new version of the Licensee's reclamation plan is not submitted than the existing reclamation plan is reviewed to make sure it reflects current facility conditions and

regulatory requirements. If a new version of the Licensee's reclamation plan is submitted, it is reviewed to make sure that changes to the reclamation plan meets regulatory requirements. The Licensee's, "Reclamation Plan, Revision 5.1," was submitted and reviewed as part of the Licensee's renewal application. The application would have been deemed incomplete without a reclamation plan. Given that the reclamation plan is a required element of the license renewal, the Division opted to review the application as a whole rather than as separate items. As stated above, it is more efficient and uses taxpayer money more efficiently. In addition, by processing all the actions under review together, it is easier for Division staff to ensure that any proposed activities are compatible with existing activities and that the activities conducted under the radioactive materials license as a whole will comply with current requirements. Reviewing the actions as a whole also helps determine if there are any concerns not addressed by rule, regulation, or law that need to be addressed through a condition of the radioactive materials license.

UW Comment #43

1.2. The TEEA includes a list of references at the end. However, the list does not identify each record individually and does not provide links to all of the specific records.

Division Response: For the majority of the documents listed in the TEEA, each individual document was listed and a separate link was provided. For those documents accessible through the Division's website, a link was provided to an index page containing the multiple documents that had been identified in the reference list that were available from the same index page link instead of providing a link to each separate document. This meant that the individual would have to look in the index for a specific document and click on the link to the document to pull it up instead of going directly to the document. The Division had determined that providing the link in this manner was a reasonable way to address documents that are found at the same website instead of repeating the link over and over, changing only the file name at the end. If an individual was unable to locate the document in the index, the individual could have contacted Division staff for clarification or assistance.

In any event, all documents were also available through a GRAMA request. Therefore, the individual can obtain access to the documents through the GRAMA process if, for some reason, the individual is unable to locate the document in the index and chooses not to contact Division staff for clarification.

UW Comment #44

1.3. Prior to the development of the TEEA, the Division should have conducted a scoping period to receive comments from the public on the scope of the environmental analysis of the White Mesa License Renewal and Groundwater Discharge Permit Renewal. The Division should also have provided an opportunity for the public to comment on the scope of the environmental analysis of the White Mesa Mill Reclamation Plan. Since the Division has not produced an environmental analysis on either the License Renewal, Groundwater Discharge Permit Renewal, or the Reclamation Plan, commenters request that the Division commence a scoping period for those analyses.

Division Response: Scoping periods are conducted at the Director's discretion when the Director determines that additional information is needed before beginning major licensing actions. It is not something the Division is required to do. For example, a Scoping Period was completed for the Shootaring Canyon Uranium Mill as the new Licensee at the time, Anfield Resources, wanted to bring the Mill back into operation after it had been on Standby since 1982. The Division went out for scoping to determine what the stakeholders in the area thought about the Mill being put back into operation.

The White Mesa Mill Renewal Application was submitted in February of 2007 and the Division determined that a scoping period was not warranted at this point in the review. The Public comment period which went from May 1 to July 31, 2017 for this licensing action is in effect asking for the public comment on the TEEA and other associated documents, not a scoping period.

Regarding the performance of an environmental analysis, the Division refers to its General Response #09 above.

UW Comment #45

1.4. The draft renewed license references several documents that have been submitted by the Licensee over the years. Yet, those documents are not readily available on the Division's webpage for the White Mesa Mill, nor are they available on the Department of Environmental Quality (DEQ) Electronic Document Management System (EDMS, or E-Z Records). Therefore, the commenters did not have an opportunity to review these documents as part of the comment period.

Division Response: The commenter argues that because these documents were not readily available over the internet, that individuals commenting on the license renewal action did not have an opportunity to review these documents as part of the comment. This comment is not accurate because the documents were available, as discussed more fully above. Many of the documents at issue were previously referenced in the license when it was noticed for public comment in 2011 and have been referenced in the license since the Division signed an agreement with the NRC to allow Utah regulatory jurisdiction for uranium recovery facilities (August 2004).

White the commenter does not specify which documents were not made available, the Division notes for the record that it received no requests for access to documents from the commenting party, through the GRAMA process or through direct contact with Division staff, during the public comment period. Had the commenting party contacted the Division about access to documents, staff would have provided the document. In any event, under Utah law, public documents that are not on the Division's webpage or in DEQ's E-Z Records are still available to the public through a GRAMA request. Given the large volumes of documents handled by the Division and the fact that an electronic means of tracking and making documents available was not available until relatively recently, the responsibility for finding specific documents rests with the commenting party. The Division made reasonable efforts to make all relevant documents publicly available at no charge. The burden is on the commenting parties to make specific record requests during the public comment period. The commenter made no such request.

UW Comment #46
1.5. The draft renewed License uses various formats for license condition subsections that are referenced in other sections: for example, LC 11.3A, LC 11.3.A., LC 11.3.A, and 11.3(A). The License should have a single format for license condition subsections that are referenced in other sections of the License.

Division Response: The Division appreciates this comment and agrees that a consistent format should be used. The Division will look at the RML formatting prior to finalizing the RML and make the necessary format changes.

UW Comment #47
1.6. The License Renewal package included the Public Participation Summary for Comments Received between October and December 21, 2011. However, the Division did not make available the attached written and oral comments. Some, but not all, of the oral comments are available in the E-Z Records documents.

Division Response: As always, the transcript of the oral and written comments would have been made available had the commenter submitted a timely request, either directly to Division staff or through the GRAMA process.

UW Comment #48
1.7. The last renewal of the White Mesa Mill License was in 1997. That License was for a 10-year period, not a 20-plus year period. It will be over 10 years since the expiration of the license before the License is renewed. There is no excuse for the extensive delay in renewing the License.

Division Response: The Division refers to its General Response #01. In addition, the Division notes that EFRI submitted a renewal application for the License on February 7, 2008. After reviewing the renewal application, the Division requested public comment on its proposed renewal license in the fall of 2011. A significant number of comments were received during this public comment period, including comments submitted by the commenter here, urging that the renewal license not be granted. In response to these comments, the former DRC did not issue a final license renewal at that time. Instead, former DRC management decided that the DRC staff should perform new, independent MILDOS-AREA modeling in response to these comments (including those submitted by the commenter). Having been involved in the 2011 comment process, the commenter should not be surprised by this series of events. The delay was the result, in part, of comments on technical issues raised by the commenter in 2011. It was understood at the time that creating a new MILDOS-AREA model would require significant time and resources and included significant additional data relating to the time period between 2007 through 2014. In addition to the independent MILDOS-AREA modeling, DRC staff also undertook the following matters relating to the White Mesa Mill:

- Completed three license amendments;

- Implemented various modifications and improvements to the Mill's Reclamation and Decommissioning Plan;
- Completed review and approval of the Corrective Action Plans for the nitrate and chloroform plumes; and
- Worked with EFRI on changes to the Mill's Environmental Monitoring Program. Changes to the Decommissioning and Reclamation Plan and the Environmental Monitoring Program include but not limited to:
- A new tailings cover design;
- A test period for the new cover in which the cover has been built on tailings Cell #2;
- Two new air monitoring stations (BHV-7 and BHV-8); and
- Forty-six new soil sampling locations.

All the foregoing matters related to the pending license renewal, including significant new data. Therefore, the commenter is correct as the license renewal process itself has been significantly delayed. However, the delay is entirely consistent with the public participation process required by Utah law. Through the 2011 comments, several valid technical issues were raised that required extensive evaluation and consideration, including the gathering and evaluation of significant new data. The Division apologizes for the length of time it took to complete the license renewal. However, it is the Division's responsibility to do a complete review and sometimes it takes longer than expected. At this time, the Division's final decision to renew the license is supported by a robust administrative record.

2. TECHNICAL AND ENVIRONMENTAL ASSESSMENT

2.1. *The Utah Division of Waste Management and Radiation Control (DWMRC) Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004, "Technical Evaluation and Environmental Assessment," White Mesa Uranium Mill; Energy Fuels Resources; May 2017, is 22 pages. Regarding the Purpose of the document, the Technical Evaluation and Environmental Assessment (TEEA) states:*

> *The purpose of this Technical Evaluation and Environmental Assessment (TEEA) is to supplement the Safety Evaluation Report (SER) that the former Utah Division of Radiation Control (DRC) released in October of 2011. The SER and the TEEA are to identify and summarize the information the Division of Waste Management and Radiation Control (formerly the DRC) evaluated in its review of Energy Fuels Resources, Inc. (formerly Denison Mines Corp.) (Licensee) White Mesa Mill's February 2007 License Renewal Application (LRA) and the grounds upon which the Division of Waste Management and Radiation Control (DWMRC) staff concluded whether regulatory requirements are satisfied for the renewal of the Licensee's radioactive materials license (RML).*

The TEEA references applicable regulations in the Utah Code Annotated and refers to federal regulations and Nuclear Regulatory Commission (NRC) Regulatory Guides. There is no mention of any provisions of the Atomic Energy Act (AEA) that are applicable to the proposed License Renewal and other licensing actions. The 22-page TEEA includes 1) a White Mesa

Uranium Mill RML History, 2) TEEA Outline, 3) MILDOS Write-up and Analysis, 4) discussion of the Reclamation and Decommissioning Plan Rev. 5.1, 5) discussion of Sequoyah Fuels Alternate Feed Request (URS Review and Write-up), 6) Summary and Explanation of License Changes, 7) discussion of Groundwater Quality Discharge Permit (GWQDP) Renewal, 8) Environmental Analysis of the Proposed Licensing/Permitting Action, 9) Technical Evaluation of the Proposed Licensing/Permitting Action, 10) Conclusion, 11) list of references, and 12) list of attachments.

The "Environmental Analysis" for the License Renewal is one paragraph:

> *The DWMRC Staff conducted a review of the Licensee's 2007 renewal application and the Licensee's MILDOS-Area assessment of the estimated annual dose to an individual from the Mill operations at specific locations surrounding the property boundary of the Mill. The DWMRC also performed an independent MILDOS-AREA assessment for Mill operations. The MILDOS-AREA modeling includes the environmental sampling results. Environmental sampling results are reviewed semiannually by Staff and are determined to be representative of Mill operations. The DWMRC has determined that the Licensee complies with all of the State of Utah and Federal regulatory requirements including dose limits to individuals from Mill operations. Therefore, the DWMRC staff has concluded that the Mill operates within acceptable environmental parameters.*

COMMENT

UW Comment #49

2.1.1. The TEEA discussion of the Reclamation and Decommissioning Plan Rev. 5.1 (pages 8 - 9) does not include an Environmental Analysis of the proposed Reclamation Plan Rev. 5.1.

Division Response: The Division believes that its General Response #09, above is adequate to address all the issues raised in this comment.

UW Comment #50

2.1.2. The TEEA discussion of the Sequoyah Fuels Alternate Feed Request (URS Review and Write-up) does not include an Environmental Analysis of the proposed license amendment. However, the full URS Professional Solutions, LLC (URS) Review Sequoyah Fuels Alternate Feed Request is included in the License Renewal package and includes an analysis of the environmental impacts of the proposed license amendment.

Division Response: The Division believes that its General Response #09 is adequate to address the issues raised in this comment. In short, the SER that URS wrote and all interrogatories in the review of the alternate feed request is the Environmental analysis. The commenter states that the request for the SFC materials amendment includes an environmental analysis that was completed by URS. The commenter clearly recognizes that an environmental analysis was performed for

the request to allow the Mill to receive and process SFC materials. The commenter is stating fact and does not propose that an action be taken by the Division.

UW Comment #51

2.1.3. In sum, the Environmental Analysis for the Renewal of the White Mesa Mill License is one paragraph, with no details regarding the impacts to the environment associated with the continued operation of the Mill. The TEEA does not contain any environmental analysis of the Reclamation and Decommissioning of the Mill.

Division Response: The Division believes that its General Response #09 is adequate to address the issues raised in this comment.

2.2. *The 2017 License Renewal documents included the "Public Participation Summary For Comments Received Between October 14 and December 21, 2011." The Public Participation Summary responded to comments regarding the AEA and Environmental Analysis Requirements (Comment Topic #08, pages 14-15). Comment Topic #08 quotes from a February 22, 2017, letter to the DWMRC from the State of Utah's Office of the Attorney General regarding compliance with AEA by the State of Utah when conducting an independent environmental analysis ((DRC-2017-001282). That opinion was sent to Sarah Lopas, Office Allegation Coordinator Office of State and Tribal Programs, NRC, on March 2, 2017, by Scott Anderson, Director, DWMRC, in response to Uranium Watch's January 26, 2017, letter, "Allegations Regarding Utah Agreement State Program and Division of Waste Management and Radiation Control Actions." Uranium Watch responded to Mr. Anderson's letter and the legal opinion on March 14, 2017. The Public Participation Summary quote from the legal opinion states that "there is also no language in the AEA or any other authority that requires an Agreement State to perform completely independent environmental analysis," and that, "it is acceptable for an Agreement State to review and analyze environmental analysis submitted by a Licensee."*

The Public Participation Summary (Comment Topic # 10: Environmental Assessment) pages 15-16) also states:

> *The DWMRC is not required to create a stand-alone analysis of the environmental report. The DWMRC is well aware of the environmental analysis/report requirements of UAC R313-24-3 and the need to require compliance with these requirements. Here, EFRI provided an Environmental Report in Volume 4 of its 2007 License Renewal Application. The DWMRC provided its review of the Environmental Report in the October 2011 SER. This is all that is required by the AEA. The DWMRC has the ability to title its environmental analysis as they deem appropriate. Such titles may include but are not limited to: Technical Analysis, Statement of Basis, Safety Evaluation Report, Technical Assessment, or Environmental Assessment. The purpose of the report required by UAC R313-24-3 is to advise the public of the environmental issues of concern.*

The referenced UAC R313-24-3(3) requires that "The Director shall provide a written analysis of the environmental report which shall be available for public notice and comment pursuant to R313-17-2." Rule R313-24-3(3) does not require a written environmental analysis, contrary to the requirements set out in Section 2021(o)(3)(C) of the AEA.
COMMENT

UW Comment #52
2.2.1. The TEEA relies on the Utah Division of Radiation Control, October 2011, "Safety Evaluation Report For The Denison Mines White Mesa Mill 2007 License Renewal Application" (2011 SER). The October 2011 SER provides a limited review of the 2007 White Mesa Licensee's Environmental Report. The 2011 SER did not claim to be an analysis of the environmental impacts of the proposed licensing action, pursuant to the requirements of the AEA or Utah Regulations implementing those AEA requirements. As stated in the 2011 SER, its purpose was to identify and summarize the information the DWMRC evaluated in its review of February 2007 License Renewal Application and the grounds upon which the DRC staff concluded whether regulatory requirements are satisfied.

Division Response: The Division believes that its General Response #09 is adequate to address the issues raised in this comment. At the risk of creating redundancy in the record, the Division also notes that "environmental analysis" of this site by regulatory authorities began with the review of the initial Environmental Report submitted by Dames and Moore in behalf of EFRI in 1978.[23] Every significant change in plant configuration and equipping, every license amendment, and every license or permit renewal since that time has added to the environmental analysis of the site and the facility, and to the knowledge base about those subjects. It is only necessary to ascertain what has changed since the earlier analyses and to assess those changes, not to prepare a new analysis from scratch.

The commenter specifically refers to the 2011 SER, which was a specific response to a specific licensing application for an operating facility, not a request to site a new facility. Therefore, the Division relied on the earlier work, and only addressed what had changed in the 2007 application and supplemental documents submitted prior to authoring the 2011 SER. Likewise, the Division did not discard the 2011 work in preparing the additional analyses made available for the 2017 comment period.

The commenter challenges the Division's effort as insufficient to meet the requirements of the AEA or associated Utah regulations. Such a challenge disregards all work done since, and including, the initial siting studies and review of the 1978 Environmental Report. Such a challenge also fails to acknowledge the ongoing inspection regimen, and operating history of the Mill. Not availing oneself of work already accomplished would be an unfortunate, inefficient and expensive oversight. Not acknowledging the ongoing operation of the Mill would be unfair.

[23] DRC-1978-001001 (1978 Environmental Report) and NUREG-0556 (A Final Environmental Statement Related to Operation of White Mesa Uranium Project)

The review that occurred at the commencement of the project met the AEA requirements, and every review since that time has added to the environmental analysis of the site. The commenter has not provided any specific deficiencies for the Division to address. Therefore, no new analysis will be produced to address this comment.

UW Comment #53

2.2.2. The October 2011 SER and the 2007 Licensee Environmental Report are out of date. There is new information regarding the operation of the Mill and the impacts to the environment from the Mill operation. The TEEA does not provide an update on the environmental impacts of the White Mesa Mill operation over the past decade. For example, there are no analyzes of the impacts from spills of material being to shipped to the Mill for direct disposal or processing. Such spills have occurred recently. There is no analysis of the impacts from the disposal of wastes from the processing of wastes from other mineral processing operations since 2007 and other changes in the Mill operation.

Division Response: The Division believes that its General Response #09 is adequate to address most of the issues raised in this comment. At the risk of creating redundancy in the record, the Division also responds specifically to the assertion that the environmental assessment is out of date because it did not include "analyzes of the impacts from spills of material being to shipped to [sic] the Mill for direct disposal or processing."

In its reasoned technical judgment, the Division has concluded that because spills of radioactive materials being shipped to the Mill for processing are not regulated under EFRI's radioactive materials license, no additional "environmental assessment" of these events is required beyond the detailed investigations already performed by the NRC and the U.S. DOT. As with all shipments of radioactive materials, the radioactive materials are the sole responsibility of the shipper until the materials are received by the Licensee at the final destination stated on the "Bill of Lading" or equivalent document. Therefore, the impacts to be analyzed for the White Mesa Mill's activities do not include shipments of radioactive materials from other Licensees until the radioactive materials are received at the White Mesa Mill. Once the radioactive materials are received at the White Mesa Mill, the impact of those materials, along with all of the other radioactive materials received for processing or disposal are considered. The impacts of each individual shipment are not analyzed separately, but the overall impacts of the Mill's activities are analyzed. Therefore, the review of the impacts of various materials, natural ores, AF materials, or ISR materials may not be specifically stated. For example, the estimated doses reported for the Mill's operations include the receipt, processing, and disposal of natural ores, AF materials, and ISR materials, and the potential emissions related to these materials. The commenter also states, "There is no analysis of the impacts from the disposal of wastes from the processing of wastes from other mineral processing operations since 2007 and other changes in the Mill operation." This statement is misleading, as the NRC was specific that the alternate feeds to which the commenter refers were not to be classified or referred to as wastes, but are to be classified or referred to as ore, byproduct material or alternate feedstock.[24] As stated above, the impacts of all materials received, processed and disposed under EFRI's radioactive materials

[24] ML14133A521 at p. 4 and p. 10

license were considered in the analysis of the impacts from the Mill. The impact of each separate feed material or radioactive material received for direct disposal is not necessarily analyzed separately, but the impacts from the Mill's activities as a whole are considered. Therefore, there is no separate discussion of the impacts of each separate fee material, but the discussion of the dose resulting from the receipt, processing, or disposal of radioactive materials includes radiological impacts from the Mill's activities. The commenter's statement fails to account for the review that occurs prior to every change in the Mill facilities and equipment (e.g., construction of Cells 4A and 4B) or the authorization to receive alternate feeds or 11e.(2) decommissioning debris from other Licensees. The commenter failed to cite any instance of omission, preferring instead to make a general accusatory comment without supporting evidence. To the contrary, the commenter cited in UW Comment #52, below, an analysis for the Sequoyah Fuels Alternate Feed request, an example of the existence of the work the commenter claimed was not produced. No additional analysis is required or will be performed to address this comment.

UW Comment #54

2.2.3. The TEEA references the 2017 SER, developed by a DWMRC contractor, which assesses the environmental impacts associated with the Amendment Request to process 11e.(2) byproduct material from Sequoyah Fuels Corporation. That SER contradicts the DWMRC's claim that the Director only needs to provide a written analysis of the Licensee's environmental report in order to fulfill the requirements for an environmental analysis at 42 U.S.C. § 2021(o)(3)(C).

The SER for the License Amendment for the processing of the Sequoyah Fuels material states:

> *In accordance with UAC R313-22-38 and R313-24-3, this SER has been prepared to:*
>
> *1. Assess the radiological and non-radiological impacts to the public health.*
> *2. Assess any impact on waterways and groundwater.*
> *3. Consider alternatives, including alternative sites and engineering methods.*
> *4. Consider long-term impacts including decommissioning, decontamination, and reclamation impacts.*
> *5. Present information and analysis for supporting UDRC findings and conclusions with respect to approval of the proposed license amendment.*

As discussed in the January 26, 2017, Uranium Watch Allegation, the provisions in R313-24-3 do not meet the AEA requirements for Agreement State statutory and/or regulatory requirements for an Agreement State environmental analysis of a proposed licensing action.

Division Response: The Division has not contradicted its position regarding the assessment of the environmental impacts of changes made to the license through a license action. The Division believes that its General Response #09 is adequate to address the issues raised in this comment.

The Division would like to restate that the requirements of 42 USC 2021(o)(3)(C) have been met here. This provision reads, in relevant part, as follows:

(o) "In the licensing and regulation of byproduct material, as defined in section 11e. (2) of this Act, or of any activity which results in the production of byproduct material as so defined under an agreement entered into pursuant to subsection b., a State shall require–"

(3) **procedures which**[emphasis added] ---

***

(C) require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include–

(i) an assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license;

(ii an assessment of any impact on any waterway and groundwater resulting from such activities;

(iii consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to such license; and (iv) consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 11e.(2); ***

Therefore, the analysis is not required to be conducted by the Division, but can be conducted by the Licensee, a third-party contractor (whether hired by the Licensee or the Division) or the Division, if warranted. If the Division does not conduct the environmental analysis, the Division may review the information provided by the Licensee or contractor to comply with the requirements regarding the environmental assessments required in 42 USC Section 2021(o)(3)(C). However, this is part of an ongoing allegation made to the NRC by one commenter, Uranium Watch, and the Division responded to this allegation pursuant to a letter dated December 1, 2017 (Attachment 5). To date, the Division has not received any indication from the NRC that it has a problem with the degree of the Division's environmental analysis. In fact, the NRC's most recent evaluation of Division performance occurred in December of 2017. During that review, the NRC did not raise any issues with the degree of the Division's environmental assessments, including its compliance with 42 USC Section 2021(o)(3)(C), notwithstanding the allegation letter submitted by Uranium Watch.

UW Comment #55

2.2.4. The Division claims that the Environmental Analysis required under the AEA can have other titles, as developed by the Division. However, that is confusing. It is confusing to combine the environmental analysis with a technical analysis or to call an Environmental Analysis a "Technical Analysis" or other name. The Environmental Analysis falls under specific federal statutory requirements and should be identified as the document that fulfills those requirements. The Environmental Analysis must also include all of the required analyses and additional pertinent analyses of the impacts of the proposed licensing action.

Division Response: The Division believes that its General Response #09 is adequate to address the issues raised in this comment. At the risk of creating redundancy in this record, the Division would also like to explain that since state and federal agencies have differing approaches to conducting business, there are multiple ways that requirements may be addressed. Providing

information to the Division is no different. Each Licensee may have a different format that they use to provide required information to the Division. The Division is not able to dictate the format of, the wording in, or the titles of documents submitted by Licensees. Every individual may not agree with the manner that a Licensee provides the required information, but if the information is provided, the Division must accept it no regardless of the format or the title of the document. Rather, the Division cares about, and focuses, on the substance of the submissions. In this case, the substance of all submissions is a form of environmental analysis, however it may be characterized. This comment would exalt form over substance.

As stated previously, because the Division does not have specific requirements that require Licensees to submit information in a specific format if the Licensee is able to show the Division that the subject matter that was required to be submitted was covered in the application or amendment request regardless of the information's location, the Division is required to accept the information. The format of the information provided by the Licensee may be confusing to the commenter, but even if the Division could regulate the format, there is not one format that would be acceptable to all individuals who might review the document. Even though Licensee's must supply information required by rule, regulation, or statute to any regulatory agency, the specific format of the information to be provided is usually not specified by the rule, regulation, or statute unless a particular form is required to be completed. Therefore, an environmental analysis may be covered throughout various sections of a Licensee's application or amendment request, it may be a separate document that has a title other than environmental analysis, etc. The Division's evaluation of the Licensee's submission is considered to be an environmental analysis of the items reviewed regardless of the title of the Licensee's submission.

UW Comment #56

2.3. *Atomic Energy Act Requirements*

2.3.1. The relevant section in the AEA that applies to NRC Agreement States, as codified in statute at 42 U.S.C. § 2021(o)(3), states:

> *(o) State compliance requirements: compliance with section 2113(b) of this title and health and environmental protection standards; procedures for licenses, rulemaking, and license impact analysis; amendment of agreements for transfer of State collected funds; proceedings duplication restriction; alternative requirements*
> ***
> *(3) procedures which—*
> *(A) in the case of licenses, provide procedures under State law which include—*
> > *(i) an opportunity, after public notice, for written comments and a public hearing, with a transcript,*
> > *(ii) an opportunity for cross examination, and*
> > *(iii) a written determination which is based upon findings included in such determination and upon the evidence presented during the public comment period and which is subject to judicial review;*
> ***

(C) require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include—
(i) an assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license;
(ii) an assessment of any impact on any waterway and groundwater resulting from such activities;
(iii) consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to such license; and
(iv) consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 2014 (e)(2) of this title; and
(D) prohibit any major construction activity with respect to such material prior to complying with the provisions of subparagraph (C).
[Emphasis added.]

Division Response: The Division believes that the issues raised in this comment have been fully addressed above and in its General Response #09.

2.4. *The TEEA and the requirements of 42 U.S.C. § 2021(o)(3)(C).*

COMMENT

UW Comment #57
2.4.1. The TEEA does not fulfill the requirements of the 42 U.S.C. § 2021(o)(3)(C) for an environmental analysis of the Renewal of the White Mesa Mill Materials License.

The TEEA did not 1) assess all of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license; 2) assess the impacts on any surface water and groundwater resulting from such activities; 3) consider alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to such license; or 4) consider the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 2014(e) (2) of the AEA.

Division Response: The Division believes that the issues raised in this comment have been fully addressed above and in its General Response #09.

UW Comment #58

2.4.2. The TEEA, including the MILDOS-AREA evaluation, does not provide a full "assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license." There is no analysis of how the Mill will "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA), as required by Utah Rule R313-15-101(4) and 10 C.F.R. § 20.1101.

Division Response: The Division disagrees with this comment. The Division refers to its General Response #09 in partial response to this comment. In addition, the Division has determined that the administrative record is complete and no additional analysis as requested is necessary. The MILDOS-Area evaluation was conducted in full compliance with all applicable standards and requirements. The TEEA presents information in the form of an overview of the environmental analysis for all the actions presently under review and was not intended to act as a full environmental assessment. The environmental review for this licensing action includes but not limited to interrogatories and RFI's, Safety Evaluation Reports (SER), and dose modeling. All these documents were made available and the TEEA is a summary of all the work done. With regards to the requirement stated in UAC R313-15-101(4), compliance with the requirement was evaluated during the Division's review of the actions presently under review and was included in the MILDOS-Area review. A Licensee is required to provide information regarding its facilities, the equipment and procedures that will be used when conducting the activities authorized under the radioactive materials license in the application for the license renewal. The submitted information is reviewed to determine that the proposed activities will meet the requirements of the Utah Radiation Control Rules and the conditions of the radioactive materials license. Although the information was reviewed, a separate written analysis stating how each and every procedure and engineering control is based on sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as reasonably achievable is not required. Therefore, the additional written analysis that the commenter infers should be provided was provided albeit not in the precise format desired by the commenter.

UW Comment #59

2.4.3. The TEEA does not provide an assessment of impacts on surface water or groundwater resulting from the operation of the Mill or consideration of alternatives. The TEER, even though the License Renewal Packet included the Reclamation Plan for the Mill, fails to consider "the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material." Nor does the TEEA provide an assessment of other environmental impacts. The AEA Section 2021(o) (C)(3) requirements for an environmental analysis were not meant to limit that analysis to the requirements in Section 2021(o)(C)(3)(i) - (iv).

Division Response: The Division disagrees with this comment. The Division believes its General Response #09 and its Response to UW Comment #58, above, are adequate to address the issues raised in this comment.

UW Comment #60

2.4.4. The TEEA references the information in the 2011 SER. The 2011 SER was developed about 5 years after the 2007 License Renewal Application was submitted to the Division. Not only was the 2011 SER not an analysis of the environmental impacts of the License Renewal, but it relied on an outdated application, data, and information.

Division Response: The Division disagrees with this comment. The Division believes its General Response #09 and its Response to UW Comment #58, above, are adequate to address the issues raised in this comment.

UW Comment #61

2.4.5. The TEEA's 1-paragraph Environmental Analysis of the License Renewal and other TEEA sections and the 2011 SER do not meet the AEA requirements for an environmental analysis of the License Renewal.

Division Response: The Division disagrees with this comment. The Division believes its General Response #09 and its Response to UW Comment #56, above, are adequate to address the issues raised in this comment.

UW Comment #62

2.4.6. The DWMRC did not develop an environmental analysis for the 2017 White Mesa Mill Reclamation Plan Rev. 5.1, as required by 42 U.S.C. Section 2021(o)(C)(3). The DWMRC Staff concluded that the Mill met all technical requirements with respect the Reclamation Plan. However, the TEEA does not provide 1) an assessment of the radiological and nonradiological impacts to the public health associated with the Reclamation Plan, 2) an assessment of impact to the groundwater as a result of decommissioning and reclamation, 3) consideration of decommissioning and reclamation engineering alternatives; and 4) consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts. Nor does it provide an assessment of other environmental impacts associated with the reclamation and long-term presence of uranium mill tailings at White Mesa. The AEA Section 2021(o)(C)(3) requirements for an environmental analysis were not meant to limit that analysis to the requirements in Section 2021(o)(C)(3)(i) - (iv).

Division Response: The Division disagrees with this comment. The Division believes its General Response #09 and its Response to UW Comment #58, above, are adequate to address the issues raised in this comment.

***2.5.** TEEA - MILDOS Write-up*

The TEEA contains a discussion of the MILDOS-AREA Model Report calculations and compliance with federal radiological emission standards.

COMMENT

UW Comment #63

2.5.1. The TEEA (page 3) states, "In estimating doses from uranium recovery facilities, MILDOS Report calculates doses from the radionuclides of the uranium-238 (U-238) decay chain." However, there is no mention of the dose from the thorium-232 decay chain. The Mill has

received, stored, processed, and disposed of material containing thorium-232 and thorium-232 progeny. The mill owner proposes to receive, store, and process additional materials containing thorium-232 and thorium-232 progeny. Yet, there is no mention of how the radiological emissions from thorium-232 and thorium-232 progeny have been calculated and incorporated in the estimates of exposure to nearest receptors. Therefore, any calculation of the estimated radiation releases from the Mill must include an estimate of the radionuclide releases from thorium-232 and thorium-232 progeny, and technical justification for those estimates.

Division Response: The Division disagrees with this comment. The Division believes its General Response #09 and its Response to UW Comment #58, above, are adequate to address many of the issues raised in this comment concerning the TEAA and the related environmental analyses. In addition, the Division would like to add the following response: This comment directly relates to the commenter's concern regarding the approval of certain alternate feed materials (AF materials) containing levels of Th-232 not present in natural ore. The Th-232 AF materials that are of concern to the commenter were approved a number of years prior to the submission of the license renewal application in 2007. As explained in response to a previous comment, some of the approved Th-232 AF materials were never received by the Licensee at the Mill for either disposal or for processing. In fact, for the radioactive material license renewal, a number of the license conditions approving various AF material approvals are being removed from the Licensee's radioactive materials license because the campaign has been completed or the AF materials were not and will not be received by the Licensee for processing or disposal. The Licensee last received and processed any of the AF material in question in 2003. Therefore, except for the wastes from the previously processed Th-232 AF materials that is contained in the tailings cells, the Th-232 AF materials were not evaluated as part of the processing materials for the actions presently under review.

Since the last AF materials containing the Th-232 that the commenter is concerned about were received and processed in 2003, the waste from the Th-232 AF materials have been in the tailings cells and have been covered by wastes from materials processed since 2003 and any interim radon cover that has been placed on the tailings cells. Therefore, the only potential emissions from the Th-232 AF materials are from the radon-220 (Rn-220) that would be emitted from the tailings cells. Radon-220 decays a little more than 1000 times faster than Rn-222 since Rn-220 has a half-life of 55 seconds and Rn-222 has a half-life of 3.8 days (about 5970 seconds).

Given the relatively small quantities of Th-232 AF materials that were received by the Mill, the fact that the waste from these materials have been covered by other wastes emitting Rn-222 and interim radon cover, and the short half-life of the Rn-220, the Division considered the emissions from Rn-220 in a more conservative manner. As stated in response to other comments and in Attachment A to the TEEA, the Division overestimated the emissions of Rn-222 from the tailings cells. Instead of using the data reported by the Licensee for the radon emissions from Cell 2 and Cell 3 which were well below the EPA's limit of 20 pci/(m^2sec) for calendar years 2007 through 2011, the Division ran the MILDOS evaluations using the limit of 20 pci/(m^2sec) as the amount that was released by the tailings cells. In 2012, the Licensee reported a level of radon emissions that exceeded the EPA's limit for Cell 2. The Division used the reported level that was above the EPA's limit for the emissions from both tailings Cell 2 and tailings Cell 3 even though the emissions from Cell 3 were actually below the EPAs limit. For calendar years

2013 and 2014, the Division used values that exceeded the EPA limits for Cells 2 and 3 by 25 percent. In addition to overestimating the releases of Rn-222 from the tailings cells by using the EPA limits instead of the reported values, the Division also included the emissions from Cell 2 more than once for each calendar year evaluated. This means that essentially, the Division considered the emissions from Cell 2 to be at least twice the EPA limit for 2007 through 2011 and for 2012 through 2014 emissions equal to two and one half times the EPA limit. In doing so, the Division is confident that any potential impacts from emissions related to Rn-220 have been taken into account.

UW Comment #64

2.5.2. The discussion of the MILDOS-AREA Model does not provide any information regarding the assessment of the radionuclide emissions from liquid effluents at the Mill—Cells 1, 3, 4A, and 4B. Both the Environmental Protection Agency (EPA)[1] and Energy Fuels have determined that the radon releases from liquid effluents at the Mill are not zero. Therefore, any calculation of the estimated radiation releases from the Mill must include an estimate of the radionuclide release from liquid effluents, and technical justification for those estimates.

Division Response: The Division disagrees with this comment. The Division believes its General Responses #09, #12, and #13, and its Response to UW Comment #56, above, are adequate to address many of the issues raised in this comment concerning the TEAA and the related environmental analyses, including the MILDOS-Area model. In addition, the Division would like to add the following response: Both the NRC and the EPA consider the radon release from the liquids in tailings cells to be either "zero or negligible." The 2016 update to the EPA's National Emission Standards for operating Mill tailings (Subpart W) states that for GACT (generally available control technology) for Non-Conventional Impoundments, "The 2016 rule requires control of radon emissions by keeping the solid uranium byproduct material or tailings in the ponds saturated with liquid at all times. "No solid material may be visible above the liquid level." Additionally, the fact sheet states that the EPA requirements for Conventional Impoundments were not changed which means that the liquid portion of the tailings cells are not required to be monitored for radon effluents.

Both the EPA and the NRC recognize the shielding properties of liquid. A good example of the capabilities of liquid to shield the emission of radon is Cell 2 at the Mill. After the Cell was closed and covered with an interim radon cover, while the tailings within Cell 2 contained large quantities of liquid, the radon emissions were well below the standards set by the EPA in Subpart W. As the Licensee began dewatering Cell 2 and the dewatering accelerated, the radon emissions in Cell 2 began increasing. Therefore, based on information from both the EPA and the NRC, and in the Division's reasoned technical judgment, the Division understands and finds the release of radon from the liquid contained in the tailing cells is negligible. This is the only finding that is based on evidence in this record. The commenter's position is not supported by facts or law in this record.

UW Comment #65

2.5.3. It is unclear if the MILDOS-AREA Model includes radionuclide releases from in situ leach (ISL) facility waste that is disposed of in Cell 3. That information should be provided by the DWMRC.

Division Response: This comment misrepresents the record. As explained elsewhere, all materials received, processed, and/or disposed by the Licensee at the Mill, including ISL materials, were considered in the MILDOS evaluations conducted by the Division. All radionuclide releases from Cell 3 were included in the MILDOS evaluations. Since all the materials are placed in the cell and become mixed, a separate evaluation for each feed material or radioactive material disposed in the cell is not conducted. The impacts are evaluated from the Cell 3 in its entirety as opposed to attempting to fractionate the emissions and then sum the fractions. Therefore, any ISR materials contained in Cell 3 were included in the emission calculation rate.

UW Comment #66

2.5.4. There is little information regarding the total amount of "Alternate Feed" that has been received and processed from each specific source of feed. The Division should provide information on how they calculated the total amount of material received and the radiological content of the wastes from those materials after processing. A gross estimate of the "Alternate Feed" does not provide sufficient information regarding each particular feed source.

Division Response: The Division refers to its General Response #4 and #5 in response to this comment. The Division has the ability to review records of receipt, transfer and disposal of licensed radioactive materials for all radioactive materials Licensees in the State of Utah. EFRI is no different than other radioactive materials Licensees in the State, so the Division is able to review their records of receipt, transfer and disposal for licensed radioactive materials. In connection with the present action, the Division obtained information from the Licensee's records regarding the amounts of licensed materials and the grades or radionuclide concentrations of the materials. The total amounts of AF materials received were summed in the same manner as the natural ores from the Colorado Plateau and the Arizona Strip. The tons of materials received from mines located on the Colorado Plateau were summed together. The Division also notes that although the natural ores are referred to as Arizona Strip or Colorado Plateau Ores, these ores originated from multiple mines in each of those areas with each mine having different grades or concentrations of radionuclides. This is very similar to the fact that AF materials come from different sources and may have different radionuclide concentrations or grades just as the different mines do. As explained in the TEEA and Attachment A, any calculations involving the radioactivity of the materials used in the MILDOS evaluations were based on actual data or on calculations using the weighted average grades or radionuclide concentrations of the materials.

As far as the radiological content the waste from each separate AF material's waste, the Division performed calculations in the same manner as used for the Arizona Strip and Colorado Plateau Ores. AF Materials are not processed separately so the waste for processing any AF material may include wastes from other AF materials, Colorado Plateau Ores, Arizona Strip Ores or any combination thereof. Although waste concentrations were calculated, the Licensee took actual samples of the wastes in Cell 2 and Cell 3. The Division took the average of the sample results for each radionuclide concentration in Cell 2 and Cell 3. Since Cell 4 was just starting to be used toward the end of the evaluation period, the Division used the sample averages in, assuming that Cell 2 and Cell 3 wastes were representative of the wastes that would be received by the tailings

cells during normal operations. (Note: the samples taken from Cell 3 would include the ISR materials that were disposed directly into Cell 3).

UW Comment #67

2.5.5. The TEEA (pages 5 and 6) states: "The first of these requirements is in R313-15-101(4) of the Rules. This requirement states that there is a constraint on air emissions of radioactive material to the environment, excluding radon and its decay products, such that an individual member of the public will not be expected to receive a TEDE in excess of 100 mrem in a calendar year from the Licensee's operations." The requirements in R313-15-101(4) are found in 10 C.F.R. Part 20, § 20.1101, which states, at (d): "Excluding Radon-222 and its daughters, the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of ***10 mrem*** *(0.1 mSv) per year from these emissions." (Emphasis added.) Therefore, the total effective dose equivalent limit (excluding radon) is 10 mrem per year, not 100 mrem. This should be corrected.*

Division Response: The commenter correctly describes the requirement in R313-15-101(4) that limits an individual member of the public from receiving a TEDE in excess of 10 mrem per year, excluding Radon and its daughters. There is a typographical error in the TEEA. The Division will change the stated 100 mrem found on page 5 of the TEEA to 10 mrem as it should read. This was only a typographical error in the TEEA. The Division has been and will be enforcing the correct standard.

UW Comment #68

2.5.6. The MILDOS-AREA discussion should address other regulatory stipulations, including 10 C.F.R. § 20.1101(b) and (c):

> *Section 20.1101 Radiation protection programs*
> *****
> *(b) "The Licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)."*
> *(c) "The Licensee shall periodically (at least annually) review the radiation protection program content and implementation."*

The TEEA should describe and evaluate how, exactly, the Licensee is complying with the requirement to "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." The TEEA should also discuss the Licensee's annual reviews of the radiation protection program content and implementation since 2007.

Division Response: The Division disagrees with this comment. The Division believes its General Responses #09, #12, and #13, and its Response to UW Comment #58, above, are adequate to address the issues raised in this comment concerning the TEEA and the related environmental analyses, including the MILDOS-Area model. In addition, the Division states that the commenter's desire that the TEEA "describe and evaluate how, exactly, the Licensee is complying with" the requirements of R313-15-101 is misplaced because that information is available elsewhere in this administrative record. The TEEA is simply a summary of the review

that was conducted of the actions presently under review and was never meant to provide a step by step evaluation of the Licensee's compliance with each license condition and Utah requirement related to their facility. That information is available throughout this administrative record. Although the Licensee's facilities, equipment, and procedures are reviewed regularly during the initial license application process and over the course of operations to ensure that these are adequate to minimize danger to public health and safety or the environment. During the relicensing process, the Licensee again submits information regarding its facilities, equipment, procedures, and training as required in a license renewal application. In addition to this information, the Licensee submitted periodic reports regarding the environmental monitoring that is completed to demonstrate compliance with Utah requirements and the conditions of the radioactive materials license. The Division has reviewed all this information as well as the Licensee's compliance history during the review of the renewal application. In the Licensee's application, the Licensee provided detailed information regarding what the equipment and facility design is meant to accomplish with regard to protecting the public health and safety or the environment. The effectiveness of the Licensee's facilities, equipment, and procedures to protect the public health and safety is best reviewed during the inspections of the Licensee's facilities during regular operations, as the division does constantly, as described more fully in its General Response #01. This is the purpose of the inspection program for radioactive materials Licensees and regular inspections are conducted by Division staff. The Licensee's annual review of their radiation protection program ***should*** verify that the program is up to date with any regulation or requirement changes, or any changes to the Licensee's procedures, ***should*** identify any weaknesses or ***should*** identify any improvements that should be made. The Licensee ***must*** make a record of their review of the radiation protection program. Please note that although an annual review of the radiation protection program ***must*** be conducted, there is no requirement regarding what the review must look at or how it must be documented. Therefore, in form and substance, all the information requested by commenter is provided and reviewed by the Division on a regular basis, in addition to the present relicensing action.

UW Comment #69

2.5.7. The MILDOS Model calculations are from 2007 to 2014. That means that data from 2014 to 2017 have not been included. The TEEA should explain how the data from 2014 to 2017 affects the offsite doses to the public.

Division Response: The Division disagrees that data from 2014 through 2017 must be included in the MILDOS-Area model before the Division can take final action in this matter. The MILDOS-Area software (MILDOS) is only one means of demonstrating compliance with the dose limits specified in regulations. Licensees may use calculations, actual measurements, a combination of those methods, or any other acceptable method to demonstrate compliance. The Division may review the Licensee's submissions (data, calculations, etc.) to verify the Licensee's compliance with the requirements and is not required to conduct an independent analysis performed by Division staff. A separate MILDOS evaluation for each year of operation or for each separate feed material, whether different AF materials, ores from different mines, or ISR materials received at the Mill by the Licensee is not required as long as the evaluation includes all of the stated materials. Also, if a new radioactive material is received, processed, or disposed at the Mill and is sufficiently similar to radioactive materials previously reviewed and evaluated for receipt, processing, or disposal, a new analysis would not necessarily be required as long as

other conditions at the Mill were not modified. Even though it is not required, the Division decided to conduct an independent MILDOS evaluation including the receipt, disposal and/or processing of all materials received by the Licensee for calendar years 2007 through 2014. The commenter indicated that calendar years that the TEEA should explain how the data from 2014 to 2017 affects the offsite doses to the public. Data from calendar year 2014 was, in fact, included in the Division's MILDOS evaluations and was discussed in the TEEA. It is also obvious that calendar year 2017 could not be included in the evaluation since the calendar year was not concluded in May 2017 when the public comment period began. In any event, in its reasoned technical judgment, the Division has concluded that the data set relied upon is sufficient to support the Division's final decisions in this matter. The MILDOS evaluations conducted by the Division covered eight years of the Mill's operations, including the receipt, processing and/or disposal of natural ores, AF materials, and/or ISR materials in both low and high production years. The Division believes that the MILDOS evaluations conducted for the eight years are representative of the Mill's present normal operations.

UW Comment #70

2.5.8. The TEEA should have, but did not, provide data and information on the actual radiological and non-radiological emissions from each source at the Mill, based on data and information provided to the Division since 1997. The TEEA should provide information on each possible source of emissions, whether or not those emissions are monitored or measured during Mill operation.

Division Response: As explained in more detail above, the TEAA is simply a summary of certain information. The form of the summary is in the technical discretion of the Division. The fact that the commenter would have preferred that the TEAA summary present information in a different form is not relevant. All the data the commenter desires is otherwise available in this administrative record. The fact that the Division did not include such details in its TEAA summary is immaterial to the Division's final decision in this matter.

Moreover, the commenter is stating a preference that in the TEEA, the Division should have provided data and information on the actual radiological and non-radiological emissions from each source at the Mill based on data and information provided to the Division since 1997, including information on each possible source of emissions and whether or not those emissions are monitored or measured during Mill operations. There is no requirement for the Division to provide this depth of information for a license review. The Division did not obtain authority over the Mill's regulation until an agreement under Section 274(b) of the Atomic Energy Act was signed between the Governor of the State of Utah and the U.S. Nuclear Regulatory Commission (NRC) in August 2004. Until the Division was given the authority for the regulatory oversight of the White Mesa Mill, all data and information was submitted to the NRC, not the Division. Therefore, the Licensee did not submit data and information on the actual radiological and non-radiological emissions from each source at the Mill to the Division from 1997 through the end of 2004 as alluded to by the commenter.

Although not contained in the TEEA because the TEEA is an overview or summary of the information reviewed by the Division during the evaluation of the Licensee's renewal application and other requests currently under review, information describing all potential sources of

emissions were submitted in the Licensee's renewal application and other documents pertaining to the actions under review. Additionally, information regarding the Licensee's environmental monitoring programs which state what is monitored and measured was also submitted in support of the license renewal application. Because of this, the Division believes that the requested information was provided for the appropriate time frame, but was not included for the lifetime of the facility or in the TEEA as preferred by the commenter.

The Division places the semi-annual effluent reports and the groundwater monitoring reports on the Division webpage. These reports have all the data that has been collected at the Mill. They are reviewed when they are submitted and the Mill is compliant with all radiological regulatory requirements and is working toward compliance on the groundwater issues.

UW Comment #71
2.5.9. The TEEA should have included, but did not, an assessment of the "radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license," as required under the AEA.

Division Response: The Division's response to UW Comment #69, above, is adequate to address this comment.

2.6. *Reclamation and Decommissioning Plan Rev. 5. The TEEA includes less than a single page discussion of the Reclamation and Decommissioning Plan Rev. 5.*

COMMENT

UW Comment #72
2.6.1. As discussed above, the TEEA does not provide an analysis of the environmental impacts of the Reclamation Plan Rev. 5 or other aspects of the Reclamation Plan. There is no description of, or technical analysis of, the Plan, except for the mention of a test sections on the radon cover for Cell 2 and a February 23, 2017 Stipulation and Consent Agreement for implementation of the Plan.

Division Response: The Division believes that its Response to UW Comment 53 and the other comments above relating to the scope of the TEEA (UW Comment #69) are adequate to address the issues raised in this comment.

UW Comment #73
2.6.2. The TEEA fails to mention of the requirement for the establishment of milestones for completion of the final radon barrier, a portion of the radon barrier, and other actions that lead to the reclamation, such as, completion of groundwater corrective actions, clean up of windblown tailings, dewatering of tailings cells, completion of interim covers or related cover plans. Enforceable reclamation milestones are required under NRC and EPA regulations and should be considered in the TEEA.

Division Response: As to the adequacy of the TEEA, the Division refers to its Response to UW Comment #68. The Division also points out that the Licensee is dealing with natural forces

beyond its control. 10 CFR 40 Appendix A Criterion 6(1) requires the Licensee to "place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m^2s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion."

The design provided in approved Reclamation Plan Revision 3.2b and in Reclamation Revision Plan 5.1 calls for emplacement of a cover that has the longevity properties specified in subsection (i) of the quoted passage. The design requires settlement/consolidation of the tailings mass to a point that additional settlement will not compromise the Radon barrier. Settlement monitoring is ongoing at the site, and is reported annually on covered portions of Cell 2 annually.[25] To accelerate settlement, EFRI performs a dewatering operation, and reports the results of that effort quarterly.[26] Settlement velocity is sufficient that placing all layers of the final cover at this time would result in an unacceptable risk of differential settlement causing fissures to form in the cover, which would provide channels for escape of Radon. The reader is directed to the definition of factors beyond the control of the Licensee that may hamper the Licensee's efforts to meet a time schedule for placement of final cover as contemplated in Criterion 6(1).

Recognizing the difficulty of setting, let alone meeting a schedule given the low settling velocity, EFRI has undertaken to place the Secondary and Primary Radon Barriers (the lower two layers of the cover system) to try to reduce Radon emanation. Data due to be published late this year indicate that the effort was successful in reducing Radon emissions from Cell 2 to well below 20 picocuries per square meter per second (pCi/m^2s) while leaving the cover accessible for repair should settlement-related fissures appear. An added benefit of placing the approximately six feet of Radon barrier is that the added weight of the cover is squeezing more fluid from the tailings mass, accelerating dewatering and consolidation of the tailings. This information was not available at the time of publication of the TEEA, and so was not shared at that time. The Radon flux data will appear in the next Annual Technical Evaluation Report late in 2017.

The Stipulation and Consent Agreement contains milestones and a timeline for completing evaluation of the final cover design. Unfortunately, these things take time, and the data will not be available for seven years.[27]

2.7. *Environmental Analysis of the Proposed Licensing/Permitting Action.*

[25] For example, see DRC-2016-011362 (Annual Technical Evaluation for November 2015 through October 2016)

[26] See DRC-2017-006111 (DMT Performance Standards Monitoring Report and Cell 4A BAT Performance Standards Monitoring Report for the 2nd Quarter of 2017)

[27] DRC-2017-001268 (Stipulation and Consent Agreement regarding Cell 2 Cover)

COMMENT

UW Comment #74
2.7.1. Environmental Analysis of the Proposed Licensing/Permitting Action is one short paragraph that references the Division's MILDOS-AREA analysis. The Environmental Analysis states that "The DWMRC has determined that the Licensee complies with all of the State of Utah and Federal regulatory requirements including dose limits to individuals from Mill operations;" and that, "therefore, the DWMRC staff has concluded that the Mill operates within acceptable environmental parameters." The brief paragraph and referenced MILDOS-AREA analysis do not fulfill the AEA requirements for an Environmental Analysis of the License Renewal, Ground Water Discharge Permit Renewal, and Reclamation Plan Rev. 5. Those requirements are set forth in Section 2.3, above.

Division Response: The Division disagrees that its environmental analysis is only one short paragraph. On this topic, the Division believes its General Response #09 above is adequate to respond to the issues and claims raised in this comment.

UW Comment #75
2.7.2. The Environmental Analysis fails to define the scope of the analysis.

Division Response: The Division disagrees that its environmental analysis fails to define the scope. On this topic, the Division believes its General Response #09 above is adequate to respond to the issues and claims raised in this comment.

UW Comment #76
2.7.3. The Division must provide a scoping period for the public to comment on the scope of the environmental analyses for the License Renewal and Reclamation Plan that are required under the AEA.

Division Response: The Division disagrees that it is required to provide a public scoping period. On this topic, the Division believes its General Response #09 above is adequate to respond to the issues and claims raised in this comment. Moreover, the Division also points out that a scoping period is conducted at the Director's discretion when the Director feels additional information is needed before beginning major licensing actions. It is not something the Division is required to do. For example, a Scoping Period was completed for the Shootaring Canyon Uranium Mill as the new Licensee at the time, Anfield Resources, wanted to bring the Mill back into operation after it had been on Standby since 1982. The Division went out for scoping to determine what the stakeholders in the area thought about the Mill being put back into operation.

The White Mesa Mill Renewal Application was submitted in February of 2007 and scoping period would not be justified at this point in the review. The Public comment period which went from May 1 to July 31, 2017 for this licensing action is in effect asking for the public comment on the TEEA and other associated documents, not a scoping period.

Regarding the performance of an environmental analysis please see General Response #09 above.

3. MILDOS-AREA MODEL (DRC-2017-002763)

COMMENT

UW Comment #77
3.1. A title page is not included in the MILDOS-AREA Model document (Attachment A) provided by the Division. The MILDOS Model document should have a title page, including the authors of the documents.

Division Response: The Division disagrees with this comment. The question of whether the MILDOS-Area model has a cover page is in the Division's discretion. This document is a public document written by public employees in the context of their job duties. The document is the Division's document and is not considered to be authored by specific individuals as it is a team effort. Nor is there a requirement for the Division to list the authors of its work product. No change will be made to the MILDOS-AREA title page as requested.

UW Comment #78
3.2. The MILDOS Model document should have included data through 2016, rather than stopping at 2014.

Division Response: The Division incorporates its Response to UW Comment # 69, above.

UW Comment #79
3.3. The MILDOS Model fails to mention the receipt and disposal of waste from in situ leach (ISL) processing facilities. The receipt and disposal of the wastes contribute to the radionuclide emissions at the Mill. Recently, there have been spills of this material at the Mill and near the Mill.

Division Response: The Division disagrees with this comment because it is not based on fact. The MILDOS evaluation includes the evaluation of emissions from all sources of the Mill's operations, including the ISL material. Although not specifically stated, the MILDOS evaluation does state that the emissions from Tailings Cell 3 were evaluated, including particulate and radon emissions. ISR (also known as ISL) materials are taken directly to Cell 3 for disposal upon receipt of the material at the Mill. Therefore, the ISR materials are not processed through the Mill's circuits or stored on the ore storage pad for any period of time. The ISR materials are disposed directly into Tailings Cell 3, and the particulate and radon emissions from Cell 3 were evaluated; therefore, the emissions from ISR materials were included with the evaluation of the emissions from Tailings Cell 3.

UW Comment #80
3.4. It is helpful to the public for the Division and contractors to the Division to use regular numbers, rather than notation, to express various levels of radioactivity and other technical parameters. The Division should try to make tables of information more accessible to the public understanding. In the future, the Division should use common numbers, not the "E" notation, when expressing pico Curies (pCi), wind speed, release rates, amounts of radionuclides or other

chemical constituents, or any other type of measurement. The tables should be easy to read and understand.

Division Response: The Division disagrees with the comment because presenting data as requested would be more confusing than using scientific notation. The commenter is stating a preference to have numbers written as "common numbers" and for the Division to refrain from using "E" notation (scientific notation). The commenter believes the tables should be easy to read and understand. The use of scientific notation in reporting very large or very small numbers is an industry standard and is required for publications in scientific or technical journals. Since many of the numbers involved in expressing various levels of radioactivity and other technical parameters can be quite small or quite large, the Division uses the industry standard to write numbers. The industry standard is to use scientific notation which includes the "E" notation as stated by the commenter. It would be possible to change the units for each number used in a table so that all of the numbers could be written as "common numbers," but this would make the document more confusing and would make it easier for errors to be introduced into the document. The commenter mentioned expressing "pico Curies [sic] (pCi)" quantities of materials in "common numbers." In scientific notation a pCi of activity would be expressed as 1.00E-12. Written as a "common number," a pCi would be written as 0.000000000001. If attempting to read a table of activities reported in pCi, it would be difficult to keep track of all of the zeros required to write the numbers in "common numbers," tables would be more difficult to read because the numbers would be much longer which would necessitate using a much smaller font in the table, compacting the table columns together, or possibly changing the unit for each number in the table to a unit which would make the common number easy to read but would cause other difficulties. Using scientific notation, makes it easier to perform necessary mathematic operations, makes numbers easier to read, and allows the reviewer to see numbers that are substantially larger or smaller than other numbers in the table at a glance without having to fight through all of the zeros. Since scientific notation is the standard format for writing numbers when discussing scientific or technical issues in all scientific and technical publications, the Division believes that the use of scientific notation is the best format to use. The Division will continue to use the industry standard in writing numbers.

UW Comment #81

3.5. The MILDOS Model does not include emissions and doses from the thorium-232 decay chain. The Mill has stored and processed and disposed of material containing thorium-232 and thorium-232 progeny. The mill owner proposes to receive, store, and process additional materials containing thorium-232 and thorium-232 progeny. Yet, there is no mention of how the radiological emissions from thorium-232 and thorium-232 progeny have been calculated and incorporated in the estimates of exposure to nearest receptors. Therefore, any calculation of the estimated radiation releases from the Mill must include an estimate of the radionuclide releases from thorium-232 and thorium-232 progeny, and technical justification for those estimates.

Division Response: The Division incorporates its Response to UW Comment#18, above.

UW Comment #82

3.6. The MILDOS Model does not provide a reference to, or link to, the documents that provided the data for this report. Citations and links to the data and information that was used in the MILDOS Model should have been included.

Division Response: The MILDOS Model included references to nearly all the underlying data and sources. In some cases, as the commenter notes, links to all the underlying documents were not included. However, the documents were referenced in the text of the TEEA and Attachment A to the TEEA. As explained above, all underlying data was reasonably made available to the public in connection with this matter. If the commenter had requested Division staff to provide specific documents, that would have been completed. In any event, the commenter could have filed a request under GRAMA. The burden to do so was on the commenter.

As stated in the text of Appendix A, measured data was used where possible. This information came from the various environmental monitoring reports for the time period. Some of the information was calculated and some example calculations were provided in Appendix A. Some regulatory limits were used as stated in the TEEA and Attachment A. In addition, there was some proprietary information provided by the Licensee, which could not be disclosed under GRAMA..

UW Comment #83

3.7. The MILDOS Model does not include radionuclide releases from ISL waste that is disposed of in Cell 3. That data should have been included in the Model.

Division Response: This comment is redundant of Comment 3.3 (UW Comment #79), though it is stated a little differently. As previously explained, the wastes from each separate feed stock are not addressed separately. Natural ores from various mines, various AF materials, and various ISR materials are mixed either while processing or while in the tailings cells. As provided in response to the previous comment, the particulate and radon emissions from Tailings Cell 3 were evaluated when the MILDOS evaluations were conducted. Since the ISR materials are deposited directly into Cell 3 for disposal, the emissions from the ISR materials were evaluated with all of the particulate and radon emissions from Cell 3. Each specific waste and the wastes from each separate AF material, ISR material, or the wastes from each natural ore from each separate mine sent to Tailings Cell 3 are not analyzed separately. The emissions from Tailings Cell 3 are evaluated as a whole since the waste materials contained in the Cell are mixed and there is no means to separate the wastes placed in the Cell 3 from the different sources of materials; therefore, the emissions from ISR materials were included with the evaluation of the emissions from Tailings Cell 3.

UW Comment #84

3.8. The MILDOS Model does not include a discussion of the emissions from contaminated soils, broken sacks of "Alternate Feed," windblown dust, and other visible and not-so-visible emissions. That data should have been included in the Model.

Division Response: The Division disagrees with this comment because it is not accurate. As stated in response to previous comments, the Division's MILDOS evaluations include the

emissions from all materials received, processed, and disposed at the Licensee's facilities. Although not referred to using the exact terms stated by the commenter, the MILDOS evaluation discusses the emissions from materials received and unloaded from trucks and materials stored on the ore storage pad. The emissions include particulate releases from the materials stored on the ore storage pad (including all windblown materials regardless of the source). Attachment A to the TEEA clearly states that "MILDOS considers but does not limit consideration of transport mechanisms to mechanisms such as deposition of radionuclides from stack plumes, resuspension of the deposited radionuclides, radioactive decay, ingrowth of daughter products, and deposition of radionuclides from wind erosion of tailings or stored ores and resuspension of the radionuclides. Multiple pathways are also considered in the MILDOS code. MILDOS considers the following pathways: inhalation; ingestion of vegetables, milk, and meat; external exposure from cloud immersion in airborne releases or resuspension of radionuclides that had been deposited on the ground; and external exposure from ground shine (from deposited radionuclides)." As stated in the information provided in Attachment to the TEEA, the evaluation includes emissions from wind-blown materials (regardless of the source), emissions from radionuclides deposited in soils (contaminated soils), including resuspension of the contaminated soils (again wind-blown emissions), and all other emissions whether visible or as the commenter states, "not-so-visible."

UW Comment #85

3.9. The discussion in the MILDOS Model should, but does not, include data and information about the emissions of radon from the tailings cells, as measured and reported to the EPA and the Utah Division of Air Quality, pursuant to 40 C.F.R. Part 61 Subpart W. The Model should include all data on all of the emissions from all sources that are measured over time.

Division Response: The Division disagrees with this comment because it is not accurate. This information was considered and included. Attachment A to the TEEA provided information regarding the radon emissions from the tailings cells and why the data as reported to the Division of Air Quality was not used. As stated in the Attachment, the EPA's radon limits contained in 40 CFR Part 61 Subpart W were used in the MILDOS evaluations instead of the numbers provided in the Licensee's reports to the Utah Division of Air Quality for the years 2007 through 2011. Additionally, since in 2012, Tailings Cell 2 exceeded the radon limit specified in 40 CFR Part 61 Subpart W, the maximum value for the radon emissions (rounded to the higher whole number) was used in the MILDOS evaluations for the cover of Cells 2 and Cell 3 for 2012. For the years 2013 through 2014, the values used for the MILDOS evaluations were values that exceeded the radon limit specified in 40 CFR Part 61 Subpart W instead of the values reported to the Utah Division of Air Quality. Although the commenter takes exception of the use of the higher values, the Division used these values to overestimate the radon emissions coming from the Tailings Cells. The Division could use the actual numbers reported to the Utah Division of Air Quality for the radon emissions from each of the tailings cells, but doing so would lower the estimated dose to a member of the public. Although the Division does not believe that it would lower the dose by a substantial amount, the estimated dose would be lowered regardless. The Division does not believe that reworking the MILDOS evaluations to use the reported radon emission values as opposed to the maximum limit or even values above the maximum limit would be a beneficial exercise since the use of the radon emission limits has resulted in a more

conservative estimate of the dose from the Mill's operations. Please refer to Attachment A to the TEEA for a more detailed discussion of the radon emissions from the tailings cells.

UW Comment #86

3.10. The MILDOS Model does not include any information regarding the assessment of the radionuclide emissions from liquid effluents at the Mill—Cells 1, 3, 4A, and 4B. As discussed above at Section 2.5.2, the radon releases from liquid effluents at the Mill are not zero. Therefore, any calculation of the estimated radiation releases from the Mill must include an estimate of the radionuclide release from liquid effluents, and technical justification for those estimates.

Division Response: The Division believes its Response to the UW Comment #64, above, is adequate to address all the issues raised in this comment. It is incorporated here by this reference.

4. DRAFT RADIOACTIVE MATERIALS LICENSE — RENEWAL

4.1. *The Proposed License Condition 9.4.B. states:*

> *The Licensee shall file an application for an amendment to the license, unless the following conditions are satisfied.*
> ***
> *(3) The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in the Nuclear Regulatory Commission (NRC) Environmental Assessment dated February 1997.*

COMMENT

UW Comment #87

4.1.1. This condition references conclusions of actions analyzed and selected in the 1997 Environmental Assessment (EA)—20-year old assessment of the environmental impacts of the operation of the White Mesa Mill. The 1997 EA is 110 pages of information that is incomplete and out-of-date. This document should have been updated by the Division in an environmental analysis, pursuant to the requirements of the AEA (42 U.S.C. § 2021(o)(3)(C)).

Division Response: The commenter has raised a valid point in the sense that the 1997 Environmental Assessment referenced in License Condition 9.4.B does not capture the extensive, cumulative environmental assessments the Division has undertaken since assuming its role as an agreement state. As a result of the foregoing, the Division has decided to amend Paragraph 9.4 B(3) of the License to read as follows: "The change, test, or experiment is consistent with the conclusions of actions analyzed in the most recent Environmental Assessment conducted by the Division from the last license renewal and/or major license amendment."

UW Comment #88

4.1.2. The License Condition that states the License must submit a license amendment, unless (among other things) the change, test, or experiment is "consistent with the conclusions of actions analyzed and selected" by the NRC in the 1997 EA is vague. The term "consistent with" is not defined. The "conclusions of actions analyzed and selected" by the NRC in the 1997 EA have not been fully identified. The 1997 EA contains a section entitled "Conclusion Including Environmental License Conditions." Some of these conditions are part of the current and proposed License. The renewed License should not rely on a 20-year-old assessment and conclusions. The Division should completely update the 1997 EA, provide an opportunity to comment on the scope of the new environmental analysis of the renewed operation of the Mill (including cumulative impacts), and provide an opportunity for public comment on that document and the development of new "conclusions" and new license conditions, if warranted.

Division Response: The Division finds that its Response to UW Comment #87 adequately addresses all the issues raised in this comment. The same response applies here. Therefore, it is incorporated.

UW Comment #89

4.1.3. The References provided in the 1997 EA are out of date. The White Mesa Mill documents have been updated and the NRC Regulatory Guides have been revised:

- *"Design, Construction and Inspection of Embankment Retention Systems for Uranium Mills," NRC Regulatory Guide 3.11, December 1977, was revised in 2008.2*
- *"Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mill Tailings," NRC Regulatory Guide 3.11.1, October 1980, was withdrawn, and any revisions incorporated into the 2008 Regulatory Guide 3.11.*
- *"Radiological Effluent and Environmental Monitoring at Uranium Mills, Regulatory Guide 4.14, April 1980, was last revised in 2014.3*
- *"Quality Assurance for Radiological Monitoring Programs (Normal Operations) Effluent Streams and the Environment," NRC Regulatory Guide 4.15, February 1979, was revised in 2007.4*
- *"Bioassays at Uranium Mills," NRC Regulatory Guide 8.22, Rev. 1, August 1988, was revised in 2014.5*

The Division should not reference a 20-year old NRC EA that references and was based on even older NRC Regulatory Guidances, which have been revised and updated within the last 10 years.

Division Response: The Division finds that its Response to UW Comment #87 adequately addresses all the issues raised in this comment. The same response applies here. Therefore, it is incorporated.

UW Comment #90

4.1.4. The 1997 EA contains information that is incomplete and outdated; for example: 1) the processing of feed material other than "ore;" 2) the disposal of waste from in-situ leach uranium recovery operations; 3) spills of material shipped to and from the Mill; 4) changes in the mill operation since 1997; 5) groundwater impacts; 6) issues and concerns that have arisen

since 1997; 7) new tailings Cells 4A and 4B; 8) cultural resource impacts since 1997; 9) cumulative air quality impacts; 10) compliance with NRC, Division of Waste Management and Radiation Control, Mine Safety and Health Administration, EPA, and Utah Division of Air Quality regulations; 11) off-site dispersal of contaminants; 12) quality of construction of Cells 1, 2, and 3; 12) impacts from the dewatering of Cell 2; 13) closure and partial reclamation of Cell 2; 14) impacts to seeps and springs; 15) effluent monitoring data; 16) Groundwater Discharge Permit requirements and data; 17) sources and use of water; 18) worker and community impacts; 19) impacts of fluctuations in Mill workers, pay, benefits, hours of work, etc.; 19) impacts to local minority and low income residents; 20) long-term impacts; and 21) other impacts (including historical and cumulative impacts) of the Mill. These environmental impact and other information should have been updated and included in a new Environmental Analysis for the Mill.

Division Response: The Division finds that its Response to UW Comment #87 adequately addresses all the issues raised in this comment. The same response applies here. Therefore, it is incorporated.

4.2. *License Condition 9.4.D. License Condition 9.4.D. states: The Licensee's SERP shall function in accordance with the most version of the standard operating procedures submitted by letter to the Director NRC dated February 27, 2007.*

COMMENT

UW Comment #91

4.2.1. The words "in accordance with the most version of the standard operating procedures" needs a word to indicate which version the License Condition is referred to. It probably should read: "in accordance with the most recent version of the standard operating procedures."

Division Response: The Division acknowledges a typographical error in the License, namely, the omission of the word "current" in the sentence cited above. This language will be corrected to read "the most current version of the standard operating procedures."

4.3. *License Condition 9.7. License Condition 9.7 states: "As per the Memorandum of Agreement (MOA) negotiated by the Utah State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), the NRC and Energy Fuels Nuclear Inc. (EFN) and ratified on August 20, 1979 and as amended on May 3, 1983 and substantially as implemented in NRC License SUA-1358.:"*

COMMENT

UW Comment #92

4.3.1. The referenced MOA is not readily available on the Division website for White Mesa Mill, or in the White Mesa Licensing documents accessioned to the DEQ EDMS. It is important for the public and the Division staff to have documents that are referenced in the Mill's License are readily available, since they are part of the License. Any document referenced in the License should be posted on the webpage for the White Mesa Mill.

Division Response: Issues relating to the availability of records are addressed in several comments, above. With respect to this particular document, the Division acknowledges that this document is not available on the DEQ electronic document system. When the DEQ began using electronic document system around 2008, the Director of the DRC at the time made the decision to scan all documents from that point forward. This document was not scanned into the electronic databased based on the foregoing policy. However, the MOA is available under GRAMA and would have been made available to the commenter had she contacted staff about this issue during the course of the public comment period.

UW Comment #93
4.3.2. The 1979 MO, as amended on May 3, 1983, is out of date and should be revised and updated.

Division Response: The Division's General Response #10 provides a detailed answer to this question. The Division is not a party to the MOU. The Division has contacted the Ute Mountain Ute Tribe offering to assist in a process to address and update cultural resource issues. Until that happens, License Condition 9.7 will remain in effect.

***4.4**. License Condition 9.7 (continued). License Condition 9.7 also states:*

> *The Licensee shall avoid by project design, where feasible, the archaeological sites designated "contributing" in the report submitted by letter to the NRC dated July 28, 1988. When it is not feasible to avoid a site designated "contributing" in the report, the Licensee shall institute a data recovery program for that site based on the research design submitted by letter from C. E. Baker of Energy Fuels Nuclear to Mr. Melvin T. Smith, Utah State Historic Preservation Officer (SHPO), dated April 13, 1981.*

COMMENT

UW Comment #94
4.4.1. The list of archaeological sites dated July 28, 1988, is incomplete, inaccurate, and outdated. None of the sites on the Bureau of Land Management (BLM) land transferred to Energy Fuels Nuclear (EFN, the original Licensee) are listed. Several sites that have not been excavated are listed as "excavated," and a site that was excavated is listed as a site "to be excavated." There is conflicting information regarding which sites are "contributing" and which are "undetermined." The April 13, research design is also outdated. These documents should be reviewed by Energy Fuels and the Division and updated. The Licensee should be required to submit a new research design for any White Mesa Mill activities associated with the destruction of archaeological sites and cultural resources on and adjacent to the Mill site.

Division Response: The Division appreciates this comment but is not the agency responsible for archeological issues relating to the Mill. The Division's General Response #10 provides a detailed answer to this question. These comments will be taken into account as described there.

4.5. *License Condition 10.1. License Condition 10.1, at subsections A and B, states:*

> *A. The Licensee may not dispose of any material on site that is not "byproduct material," as that term is defined in 42 U.S.C. Section 2014(e)(2) (Atomic Energy Act of 1954, Section 11(e)(2) as amended).*
>
> *B. The Licensee may not receive or process any alternate feed material without first applying for and obtaining approval of a license amendment. For any such proposal, the Licensee shall demonstrate that it will comply with Condition 10.1(B). Any such demonstration shall include:*

COMMENT

UW Comment #95

4.5.1. Subsection A should read: "The Licensee may not dispose of any material on site that is not "byproduct material," as that term is defined in 42 U.S.C. Section 2014e(e)(2) (Atomic Energy Act of 1954, Section 11e.(2), as amended)."

Division Response: The Division has concluded that the existing language is in accordance with applicable law. As a result, the Division will not make the requested amendment to the License because it is unnecessary and may create ambiguity.

UW Comment #96

4.5.2. Subsection B contradicts requirements in Subsection A, and should be deleted from the License, based on the information provided herein in Exhibit A.

Division Response: The Division disagrees that Subsection B contradicts the requirements in Subsection A. Apparently, the commenter is relying on legal arguments regarding the definition of byproduct material and waste. The Division declines to make any change to the License in response to this comment and refers to its General Responses 4 and 5.

4.6. *License Condition 10.8. The proposed License Condition 10.6 would authorize the receipt and processing of 11e.(2) byproduct material from the Sequoyah Fuels Corporation Facility, Gore, Oklahoma.*

COMMENT

UW Comment #97

4.6.1. For reasons outlined in Exhibit A, hereto, and comments on the proposed License Amendment to process the SFC 11e.(2) byproduct material submitted in a separate comment submittal, the Division should not authorize the processing of the SFC Material.

Division Response: For the reasons outlined in the Division's General Responses 4, 5, and in response to comments made by others on this topic, the Division disagrees with this comment. Please refer to NRC Document SECY-02-95 in the Attachments..

4.7. *License Condition 10.19. License Condition 10.19 authorizes the receipt and processing of materials from the FMRI Muskogee Facility, Muskogee, Oklahoma.*

COMMENT

UW Comment #98

4.7.1. The FMRI material is shipped to the Mill in large sacks. There have been problems with the sacks breaking due to exposure to sunlight and other impacts during extended periods of storage at the Mill. License Conditions 10.8 (proposed) authorizes the receipt of materials that arrive at the Mill in large sacks, sometimes referred to as "Super-Saks." The proposed License Condition 10.8 provides specific provisions that apply to off-loading and on-site storage of the sacks to prevent damage, control any damage, and provide shielding from radioactive emissions. The Division should amend License Condition 10.19 to require similar handling of the FMRI sacks and protection from radioactive emissions and particulate dispersion during handling and storage.

Division Response: The FMRI alternate feed material arrives at the Mill in Supersaks but the Division disagrees that there is an uncontrolled problem with sacks breaking. Currently all the FMRI material on-site is covered with a temporary soil cover in accordance with the Mill's SOP. Once any Supersaks arrives onsite and in storage, the Mill is required to inspect each sack weekly per the Mill's SOP. If a leaking sack is found, the Mill is required to follow its SOP to mitigate the leak or spill. The SOP includes the FMRI material. The Division finds that the current License conditions are technically and legally adequate and appropriate and will not make the requested change to the License.

4.8. *License Condition 11.2. License Condition 11.2 requires the implementation of an effluent and environmental monitoring program.*

COMMENT

UW Comment #99

4.8.1. The effluent monitoring program should include the measurement of the radium content of the liquid effluents in Cells 1, 3, 4A, and 4B in order to determine the radon emissions from the radium-bearing liquid effluents. The EPA has determined that the radon emissions from liquid effluents at conventional mills are not zero, as previously claimed. The EPA developed a formula for determining the radon emissions, based on the radium content and local meteorological conditions.[6] Energy Fuels did not agree with the EPA formula and conclusions based on the formula or data submitted to the Division on the gross alpha content of the effluents as a means to determine radium content of the liquid effluents. However, Energy Fuels found that the radon emissions from the effluents were not zero, based on single radium sampling events and an adjusted formula. Since the radium content fluctuates during the year, the Licensee and Division should develop a monitoring plan to obtain base-line information on the radium content of the liquid effluents over a few years (during various operational and meteorological conditions) and

agree on a formula for determining the radon emissions over time. The Licensee should be required to determine the radon emissions from the liquid effluents throughout the year, and report the findings to the Division.

Division Response: The Division disagrees with this comment because it is contrary to applicable legal requirements, as explained in detail above. The Division believes its Response to UW Comment #19, above, provides a complete and adequate response to this comment, so it is incorporated by this reference.

UW Comment #100

4.8.2. By letter of July 23, 2014, regarding Request to Cease Monthly Radon Flux Sampling Tailings Cell 2, Radioactive Material License Number UT 1900479, the Division ordered Energy Fuels to monitor the radon emissions from Cell 2 and report the results twice a year in the Semi-Annual Effluent Report (DRC-2014-004489). It is Uranium Watch's understanding that the monitoring will continue until the final radon barrier is placed on Cell 2. The requirements to monitor and report the Cell 2 radon flux and take corrective actions is the radon emissions are over 20 pCi/m2-sec should be included in the License.

Division Response:

As noted, radon flux sampling is currently performed on Tailings Cell 2 on a semi-annual basis and will continue on that schedule until the Licensee can demonstrate to the Director's satisfaction that the cover construction of Cell 2 is successful in meeting the radon flux standard. However, this requirement does not need to be added to the License as the requirement is already found in Rule in 10 CFR 40 Appendix A Criterion 6 as referenced in UAC R313-24-4. Therefore, no change needs to be made to the License in response to this comment.

UW Comment #101

4.8.3. The Division should also require the Licensee to monitor and report the radon flux from the surface of solid tailings on Cells 4A, 4B, and any other "new" tailings impoundments at the Mill. The EPA regulations applicable to the radon emissions from operating uranium mills (40 C.F.R. Part 61 Subpart W) do not require the monitoring and reporting of the radon emissions from Cells 4A and 4B and any other tailings impoundments constructed after December 15, 1989.[7] The EPA relies, instead on a design and work practice standard, rather than a numerical emission standard, to control the emissions from "new" impoundments. Subpart W limits the size of the impoundments to 40 acres. However, the radon emissions from the dry tailings will remain unknown, and there will be no requirement to take mitigative measures if the emissions exceed 20 pCi/m2-sec, as they have in the past at the White Mesa Mill.

The EPA did not take into consideration 1) the cumulative impacts of radon emissions from several tailings impoundments at an operating mill; 2) the emission of radon from the decay of the radium isotopes from the decay of thorium-232, which is present in the Mill tailings; 3) the presence of tailings from the processing of materials other than natural ore that contain higher levels of radium from both uranium and thorium-232 decay; and 4) the disposal of 11e.(2) byproduct from in-situ leach operations and other sources. As was demonstrated by the history of Cell 2, the monitoring of the radon is necessary to keep the radon emissions as low as reasonably achievable. The monitoring alerts the Licensee and the Division that the radon

emissions have increased; for example, due to the he dewatering of the tailings or uneven placement of tailings with higher levels of radium. If the radon emissions increase, clean material that is placed on the impoundment reduces the radon emissions. Monitoring of various sections of the tailings provides information regarding which areas of the tailings cell needs clean material, the effectiveness of the placement of clean material, and any major changes in the Mill operation. Cells 4A and 4B are the only "new" tailings impoundments in the United States that are subject to the 40 C.F.R. § 261.252(a)(2) standard.[8] Therefore, neither the EPA, the Utah Division of Air Quality (which administers and enforces that standard in Utah, nor the DWMRC know if the design and work practice standard for "new" impoundments will significantly reduce the radon emissions, as compared to the emissions from earlier impoundments (Cells 2 and 3 at the Mill). Therefore, the monitoring of Cells 4A and 4B, pursuant to the requirements of 40 C.F.R. § 61.252.(a)(1) and 61.253, would provide important data on the effectiveness of the standard for "new" impoundments.

_____

[7] *40 C.F.R. Part 61 Subpart W. https://www.ecfr.gov/cgi-bin/text-idx?node=sp40.9.61.w*

[8] *(a) Each owner or operator of a conventional impoundment shall comply with the following requirements:*

•••

(2) After December 15, 1989, no new conventional impoundment may be built unless it is designed, constructed and operated to meet one of the two following management practices:
(i) Phased disposal in lined impoundments that are no more than 40 acres in area and comply with the requirements of 40 CFR 192.32(a)(1). The owner or operator shall have no more than two conventional impoundments, including existing conventional impoundments, in operation at any one time.
(ii) Continuous disposal such that uranium byproduct material or tailings are dewatered and immediately disposed with no more than 10 acres uncovered at any time and shall comply with the requirements of 40 CFR 192.32(a)(1).

Requiring the monitoring, reporting of the radon emissions from the "new" impoundments and mitigative measures is an important measure to be taken to protect the health of the public and the workers at the Mill and assure that the radon emissions from "new" tailings impoundments are kept as low as reasonably achievable, as required by NRC and Utah regulation.

Division Response: The Division's position on this topic is addressed in detail, above. In addition, the Division's General Response #12 and #13 address this issue. The Division believes these responses are adequate to address the issues raised in this comment.

4.9. *License Condition 11.4. License Condition 11.4. applies to the annual collection of data for air emissions from the Mill.*

COMMENT

UW Comment #102

4.9.1. The air sampling is only required annually. There is no indication that annual sampling will provide data that is representative of the Mill emissions and operation over the sample year. The sampling should occur more frequently. Continuous air sampling should be required.

Division Response: The Division does not agree with this comment because it is not accurate. License Condition 11.4 relates to collecting air samples to determine occupational dose to workers from potential airborne radioactive material. In the Mill's Radiation Protection Manual Section1.1.1, EFRI states that this sampling is performed on a monthly or quarterly basis, depending working conditions. Environmental air monitoring sampling occurs continuously with filters collected weekly and analyzed quarterly and reported to the Division annually. In the Division's view, this level of sampling is in accordance with all applicable legal requirements.

UW Comment #103

4.9.2. License Condition 11.4. only requires that the Licensee analyze the mill feed or production product for U-nat, Th-230, Ra-226, and Pb-210 and use the analysis results to assess the fundamental constituent composition of air sample particulates. However, the feed material also contains thorium-232, thorium-228, radium-228, and radium-224. Therefore, the Licensee should also be required to analyze the Mill feed and production product for these elements and use the analysis results to assess the fundamental constituent composition of air sample particulates.

Division Response: The Division does not agree with this comment because it misstates the facts. The air sampling described in License Condition 11.4 is occupational air monitoring that is used in calculating the derived air calculations (DAC). When alternate feeds materials that contain Thorium are employed, the Licensee is require to undertake additional air monitoring pursuant to the SOP for that alternate feed material, which monitoring is required for specific DAC values for that feed material. No changes to the License are necessary in response to this comment. It already is in compliance with all applicable legal and industry requirements.

4.10. *License Condition 13.1.AA and Reclamation Plan Revision 5.1. License Condition 13.1 lists various Licensee submittals that the Licensee must comply with: "Except as specifically provided otherwise by this license, the Licensee shall conduct operations in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below." License Condition 13.1.AA lists: "White Mesa Uranium Mill Reclamation and Decommissioning Plan Rev 5.1, from Energy Fuels dated August 10, 2016 and February 23, 2017 to UDWMRC."*

COMMENT

UW Comment #104

4.10.1. The Renewed License should have a specific Section and License Condition for the Reclamation Plans, not just a reference at the end of a list of other Licensee submittals. If the

Division approves Reclamation Plan Rev. 5.1. there should be a separate License Condition that reflects that submittal and any other submittals (such as the 2017 "Stipulated Consent Agreement")that should be referenced in a License Condition set aside for Reclamation Plans incorporated into the License.

Division Response: Based on this comment, the Director has added License Condition 9.13 which specifically references and requires conformance to Reclamation Plan Revision 5.1. The Stipulation and Consent Agreement is a separate enforceable legal agreement compelling certain activities with respect to Reclamation Plan Revision 5.1, and is referenced in Section 5.2 (p. 5-1) of Reclamation Plan Revision 5.1. Thus, it is not necessary to mention the Stipulation and Consent Agreement in a license condition.

UW Comment #105

4.10.2. The draft License does not include any reclamation milestones associated with the reclamation Plan, specifically milestones for the closure of Cell 2. Enforceable reclamation milestones are required under EPA[9] and NRC[10] regulations applicable to operational uranium mills. Milestones include dates for the placement of the interim cover, dewatering, cleanup of windblown tailings and other on-site and off-site contamination, and placement of the final radon barrier. The Licensee is in the process of dewatering Cell 2, placing an interim radon barrier, and other closure activities. Yet, the draft License and TEEA makes no mention of the need for the establishment of reclamation milestones.

Division Response: The Division has provided extensive responses to comments regarding reclamation plan milestones elsewhere in this PPS, including its General Response #14. These responses are adequate to address this comment, except that the Division would like to note that EFRI is dealing with natural forces beyond its reasonable control. 10 CFR 40 Appendix A Criterion 6(1) requires the Licensee to "place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m^2s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion."

The design provided in approved Reclamation Plan Revision 3.2b and in Reclamation Revision Plan 5.1 calls for emplacement of a cover that has the longevity properties specified in subsection (i) of the quoted passage. The design requires settlement/consolidation of the tailings mass to a point that additional settlement will not compromise the Radon barrier. Settlement monitoring is ongoing at the site, and is reported annually on covered portions of Cell 2 annually.[28] To accelerate settlement, EFRI performs a dewatering operation, and reports the

[28] For example, see DRC-2016-011362 (Annual Technical Evaluation for November 2015 through October 2016)

results of that effort quarterly.[29] Settlement velocity is sufficient that placing all layers of the final cover at this time would result in an unacceptable risk of differential settlement causing fissures to form in the cover, which would provide channels for escape of Radon. The reader is directed to the definition of factors beyond the control of the Licensee that may hamper the Licensee's efforts to meet a time schedule for placement of final cover as contemplated in Criterion 6(1).

Recognizing the difficulty of setting, let alone meeting a schedule given the low settling velocity, EFRI has undertaken to place the Secondary and Primary Radon Barriers (the lower two layers of the cover system) to try to reduce Radon emanation. Data due to be published late this year indicate that the effort was successful in reducing Radon emissions from Cell 2 to well below 20 picocuries per square meter per second (pCi/m^2s) while leaving the cover accessible for repair should settlement-related fissures appear. An added benefit of placing the approximately six feet of Radon barrier is that the added weight of the cover is squeezing more fluid from the tailings mass, accelerating dewatering and consolidation of the tailings. This information was not available at the time of publication of the TEEA, and so was not shared at that time. The Radon flux data will appear in the next Annual Technical Evaluation Report late in 2017.

The commenter cites 40 CFR Part 120, Section 192.32(a)(3), subpart (i) of which reads, "(i) Uranium mill tailings piles or impoundments that are nonoperational and subject to a license by the Nuclear Regulatory Commission or an Agreement State shall limit releases of radon-222 by emplacing a permanent radon barrier. This permanent radon barrier shall be constructed as expeditiously as practicable considering technological feasibility (including factors beyond the control of the Licensee) after the pile or impoundment ceases to be operational. Such control shall be carried out in accordance with a written tailings closure plan (radon) to be incorporated by the Nuclear Regulatory Commission or Agreement State into individual site licenses." This is entirely in agreement with the analysis already given in this Response.

The milestones which the commenter desires can only be established after settlement and dewatering of the tailings mass are sufficiently complete that the milestones become meaningful; otherwise, the milestones will be changed repeatedly to avoid unfairly citing EFRI for conditions that EFRI cannot control. The Division has been compelling EFRI to take all reasonable measures to accelerate dewatering and tailings mass consolidation.

UW Comment #106

4.10.3. Reclamation Plan Rev. 5.1, regarding the establishment of reclamation milestones for the reclamation of Cell 2—the only Mill tailings impoundment undergoing closure—at Section 6.22 Deadlines and Interim Milestones for Closure of Cell 2 (page 6-3), states:

> *The deadlines and interim milestones for closure of Cell 2 will be set out in the SCA. The requirements set out in the SCA, when finalized, will be incorporated by reference into this Plan as if set out in this Plan.*

[29] See DRC-2017-006111 (DMT Performance Standards Monitoring Report and Cell 4A BAT Performance Standards Monitoring Report for the 2nd Quarter of 2017)

The signed "Stipulated Consent Agreement" (SCA) was submitted to the DWMRC by Energy Fuels on February 20, 2017. The SCA includes a proposed reclamation milestones for Cell 2 under Phase 1 Cover Construction in the "Agreement," page 3:

> *Cell 2 Phase 1 cover placement commenced in April 2016, and will be completed on or before August 31, 2017, or such later date as may be approved by the Director.*

Other pertinent reclamation milestones are indicated, but without any dates certain. The milestone for the completion of the Cell 2 Phase 1 cover should be incorporated into the License as a license condition. If the August 31, 2017, date is not feasible, then it is the responsibility of the Licensee to notify the DWMRC and request an extension of the milestone. It is however, unclear if the SCA is a License Amendment request, or the Licensee must submit a separate request for the establishment of the milestones for Cell 2 outlined in the SCA.

Division Response: Cell 2 Phase 1 cover construction was completed prior to the August 31, 2017 milestone presented in the SCA. Therefore, no license condition is needed.

UW Comment #107

4.10.4. The License must submit license amendment requests for the establishment of any reclamation milestone and any extensions on established reclamation milestones. The Division cannot establish or amend a reclamation milestone, only approve a proposed milestone. Further, the Division is required by the EPA to publish a notice and request public comment on any Licensee request for, or amendment to, a reclamation milestone and publish a notice and request public comment on the Divisions proposed approval of a reclamation milestone or amendment to established milestone. [11] In this instance, the Division did not notice the Licensee's proposed milestone for completion of Cell 2 Phase 1 cover. The Licensee should have submitted a separate amendment request for approval of a the milestone for completion of Cell 2 Phase I Cover. Division should have issued a separate notice and opportunity to comment on the establishment of the milestone, rather than hiding the proposed milestone within Reclamation Plan Rev. 5.1 and the SCA.

Division Response: The commenter's assumption that the milestone for completion of the Cell 2 Phase 1 cover was somehow hidden from the public. This misrepresents the record and the facts. The commenter's allegation is in response to the properly published solicitation for public comment on Reclamation Plan Revision 5.1, which was submitted as part of the License Renewal packet, and to which the Stipulation and Consent Agreement applies in which appears the subject milestone. The SCA was a means of resolving disagreements between the Division and EFRI over the Reclamation Plan prior to going through the lengthy public comment process. Since the Reclamation Plan proposed a cover to which system that the Division had serious, unresolved questions, exposing it to public comment prior to identifying a means to answer those questions would have been inappropriate. Independent of the negotiations over the unresolved questions, EFRI had undertaken to place radon barrier material on Cell 2 in a good-faith effort to protect workers and the public, and to allay fears of uncontrolled radon emissions. EFRI undertook this action even though consolidation of the tailings had not stabilized sufficiently to

assure that the installed radon barrier would not require repair for the appearance in the future of differential settlement-related fissures. The installation of the radon barrier was completed on April 20, 2017. Thus, until February 23, 2017, no proposed milestone existed to which the public could be invited to comment. Following correct procedure, EFRI proposed a milestone, the Division reviewed the proposal, and then invited the public to comment..

UW Comment #108

4.10.5. The Division should incorporate time frames for other submittals indicated in the SCA within another Reclamation Plan license conditions, but not as reclamation milestones until a date certain has been proposed by the Licensee and approved by the Division.

Division Response: The Division disagrees with this comment. All required submittals under the SCA have timeframes attached relative to completion of the work. The work elements also have time frames attached. The SCA is both enforceable, and a part of the Reclamation Plan, which is referenced in License Condition 9.13. In the Division's reasoned technical judgment, this is adequate to comply with all applicable legal and technical requirements and standards. No further adjustments to the License are necessary.

***4.11**. License Condition 4. Expiration Date. License Condition 4 sets an expiration date (to be adjusted) that would be 10 years from the date of the final approval of the Renewed License.*

COMMENT

UW Comment #109

4.11.1. The proposed License Expiration Date means, given past history, that the renewed license would be good for approximately another 20 years, not 10. Therefore, the Division must consider 1) limiting the License extension to 5 to 7 years or 2) requiring that the License submit the License Renewal application at least 1 year before the License expires. It is very troubling that it should take over 10 years for a License Renewal application to be approved by the DWMRC.

Division Response: As a matter of law, the expiration date will be ten years from the date that the Director signs the renewal. However, contrary to the representation made in this comment, the Division regularly reviews the RML and requires changes through amendments to the RML. This review process is not limited by the permit effective date. For example, the RML was amended several times during the renewal review period to address the different needs that arose. This included but not limited an alternate feed approval and changes to the Mill's Environmental Protection Manual.

***4.12.** Other*

COMMENT

UW Comment #110

4.12.1. The Division should make all of the documents referenced in the License available on the White Mesa Mill webpage and on the EDMS. The documents should be posted separately, rather

than being included in another document. The referenced documents are part of the License and should be readily available to Division Staff and the public. The documents include:

A. Drainage Report, January 10, 1990. License Condition 10.3.A.

B. Licensee's submittals to the NRC dated December 12, 1994 and May 23, 1995. License Condition 10.4.

C. Licensee's submittal to the NRC dated May 20, 1993. License Condition 10.5.

D. Amendment request to the NRC dated June 15, 1993. License Condition 10.6.

E. Amendment request to the NRC dated September 20, 1996, and amended by letters to the NRC dated October 30, 1996 and November 11, 1996. License Condition 10.7.

F. License submittals dated August 30, 2013, and October 21, 2013. License Condition 10.8 (proposed).

G. Amendment request to the NRC dated April 3, 1997, as amended by submittals to the NRC dated May 19, 1997 and August 6, 1997. License Condition 10.9.

H. Amendment request to the NRC dated June 4, 1998, and by the submittals to the NRC dated September 14, 1998, September 16, 1998, September 25, 1998, October 7, 1998, and October 8, 1998. License Condition 10.11.

I. Amendment request to the NRC dated December 19, 2000, and supplemental information in letters dated January 29, 2001, February 2, 2001, March 20, 2001, August 15, 2001, October 17, 2001, and November 16, 2001. License Condition 10.17.

J. Amendment requests and submittals to the Director dated March 7, 2005, June 22, 2005, and April 28, 2006. License Condition 10.19.

K. Submittal to the NRC dated March 15, 1986. License Condition 11.2.E.

L. Licensee's letter to the NRC dated August 23, 1991 (including the license renewal application). License Condition 13.1.B.

M. Licensee's revision submitted to the NRC January 13, 1992. License Condition 13.1.C.

N. Licensee's revision submitted to the NRC April 7, 1992. License Condition 13.1.D.

O. Licensee's revision submitted to the NRC November 22, 1994. License

Condition 13.1.E.

P. Licensee's revision submitted to the NRC July 27, 1995. License Condition 13.1.F.

Q. Licensee's revision submitted to the NRC December 13, 1996. License Condition 13.1.G.

R. Licensee's revision submitted to the NRC December 31, 1996. License Condition 13.1.H.

S. Licensee's revision submitted to the NRC January 30, 1997. License Condition 13.1.I.

T. Licensee's Current Standby Trust Agreement. License Condition 13.1.A.

Division Response: All documents listed were made available during the public comment period on the Division's web page, the DEQ EZ search, or through a GRAMA request, as discussed in more detail above. The same holds true of the present time. These documents are available to the public, subject to certain limitations imposed by state law (GRAMA). For example, the standby trust agreement is a protected document and cannot be provided. It does include the standard language used in the standby trust agreement can be found in NUREG-1757 Volume 3..

Thank you for providing the opportunity to comment.

Sarah Fields
Program Director
sarah@uraniumwatch.org

and

John Weisheit
Conservation Director
Living Rivers
P.O. Box 466
Moab, Utah 84532

and

Marc Thomas, Chair
Sierra Club - Utah Chapter
423 West 800 South, Suite A103
Salt Lake City, Utah 84101

Dear Mr. Anderson:

Below please find comments on the proposed approval of Reclamation Plan Revision 5.1 (Rev. 5.1) for the White Mesa Uranium Mill, San Juan County, Utah. The Mill is owned and operated by Energy Fuels Resources (USA) Inc. (Energy Fuels, or Licensee) under Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004. The comments are submitted to the Utah Division of Waste Management and Radiation Control (DWMRC, or Division). Any older reference to the Division of Radiation Control (DRC) means the DWMRC. Reclamation Plan Revision 5.1. was submitted to the Division on August 10, 2016, and supplemented by the Signed Stipulation and Consent Agreement (SCA), White Mesa Mill, submitted by Energy Fuels on February 17, 2017.

Comments are submitted by Uranium Watch, Living Rivers, and the Utah Chapter of the Sierra Club. These comments incorporate by reference comments submitted by the Ute Mountain Ute Tribe and the December 21, 2011, comments submitted by Uranium Watch et al.

1. GENERAL COMMENTS

UW Comment #111

1.1. Revision 5.1 of the Reclamation Plan and the SCA were not placed on the list of License Renewal documents on the White Mesa webpage[1] where other License Renewal and Reclamation Plan documents were posted .[2] The Reclamation Plan 5.1 documents were later placed on a specific page, under "Project Information" [3] The Public Notice provided a link to these records. It was confusing to have the newest Reclamation Plan in another section, rather than where the other Reclamation Plan and License Renewal documents were posted.

[1] *https://deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm*
[2] *https://deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm*
[3] *https://deq.utah.gov/businesses/E/energyfuels/projects/reclamation-plan.htm*

Division Response: The Division apologizes for any confusion the Public Notice may have caused the commenter.

UW Comment #112

1.2. The DWMRC "Technical Evaluation and Environmental Assessment" (TEEA) for the Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004 was supposed to provide a technical analysis of the Reclamation Plan and an analysis of the environmental impacts associated with the Reclamation Plan Rev. 5.1 and the reclamation of Cell 2. The TEEA fails to provide a technical analysis and demonstrate why the Rev. 5.1 and the SCA meet the regulatory requirements for the reclamation of the Mill and Cell 2. The TEEA fails to include an environmental analysis of the Reclamation Plan, as required by the Atomic Energy Act (42 U.S.C. § 2021(o)(3)(C)). The pertinent AEA requirement for Agreement States reads:

> *(o) State compliance requirements: compliance with section 2113(b) of this title and health and environmental protection standards; procedures for licenses, rulemaking, and license impact analysis; amendment of agreements for transfer of State collected funds; proceedings duplication restriction; alternative requirements*
> ***
> *(3) procedures which—*
> *(A) in the case of licenses, provide procedures under State law which include—*
> *(i) an opportunity, after public notice, for written comments and a public hearing, with a transcript,*
> *(ii) an opportunity for cross examination, and*
> *(iii) a written determination which is based upon findings included in such determination and upon the evidence presented during the public comment period and which is subject to judicial review;*
> ***
> *(C) require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include—*
> *(i) an assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license;*
> *(ii) an assessment of any impact on any waterway and groundwater resulting from such activities;*
> *(iii) consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to such license; and*
> *(iv) consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 2014 (e)(2) of this title; and*
> *(D) prohibit any major construction activity with respect to such material prior to complying with the provisions of subparagraph (C).*

The Division has not produced a written analysis of the Reclamation Plan and SCA that accessed the 1) radiological impacts to the public health; 2) the impacts to surface water and groundwater; 3) alternatives, including alternative engineering methods; 4) or long-term impacts, which include impacts of decommissioning, decontamination, and reclamation. Such an environmental analysis was not available prior to the June 8, 2017, hearing in Salt Lake City, as required by 42 U.S.C. § 2021(o)(3)(A). Further, the Division has permitted the Licensee to conduct construction activity on Cell 2 prior to compliance with the provisions of subparagraph (C).

Division Response:
The question of environmental analysis is addressed in detail above and in the Division's General Response #09. As applied to reclamation planning, proper environmental analysis focuses on changes since earlier analyses. It is not necessary to create a new environmental analysis from "scratch" each time a revision is made. For example, the primary difference between the currently approved Reclamation Plan 3.2b and Reclamation Plan 5.1 is the cover system. Detailed environmental analysis of the many other elements of the Reclamation Plan 3.2b that remain unchanged is unnecessary and would be redundant. For example, Reclamation Plan 5.1 did not change the construction of the tailings and fluid management cells, the plant and equipment, or other aspects of the operation. Only an analysis of the new cover system's effectiveness and any other changes made via the plan would require attention. For example, analyzing the siting of the mill to answer the appropriateness of a more up-to-date cover design seems excessive. Notwithstanding that fact, Section 1 of Reclamation Plan Revision 5.1 restates and updates the site characterization first presented in the 1978 Environmental Report.[30] Subsequent sections of the Reclamation Plan set forth answers to questions relevant to the reclamation activities, with emphasis on the cover system. In fact, an environmental review of the reclamation plan did take place, and remaining questions are being explored through a demonstration project,[31] retaining provision to use the currently approved cover system 9the legacy rock armor barrier cover) should the demonstration project provide data indicating the new proposal is not as effective as the legacy cover.[32] Other examples of analysis of the reclamation plan exist. No new analysis will be produced to address this comment.

UW Comment #113
1.3. Section 2021(o)(3) demands that the Division produce a written environmental analysis of the Reclamation Plan Rev. 5.1, as supplemented by the SCA; hold a hearing, after public notice, on the Reclamation Plan after the environmental analysis is complete and made publicly available; and not authorize reclamation and decommissioning of Cell 2 until such a process is complete. The Division must also produce a technical evaluation of the Reclamation Plan Rev. 5.1 and SCA.

Division Response: The Division's Response to UW Comment #112 is adequate to address all the issues raised in this comment. Therefore, it is incorporated here.

[30] DRC-2017-001026 (Reclamation Plan Revision 5.1) Section 1 (pp. 1-1 through 1-110)
[31] DRC-2017-001268 (Stipulation and Consent Agreement regarding Cell 2 Cover)
[32] DRC-2017-001026 (Reclamation Plan Revision 5.1) Section 5 (pp. 5-1 through 5-3)

2. RECLAMATION PLAN REVISION 5.1

2.1. *Referenced Documents. The Reclamation Plan Rev. 5.1 (pages 1-2, 3-7, and R-1 to R-10) includes references to a number of documents previously submitted by the Licensee and documents produced by the Nuclear Regulatory Commission (NRC), the Division, or other entity.*

COMMENT

UW Comment #114

2.1.1. Any document that the Licensee relies on as part of the Rev. 5.1 and the Division is reviewing an relying on should acknowledged by the Division and placed on the DWMRC webpage for the White Mesa Mill Reclamation Plan or a link to the document should be provided.

Division Response: All documents associated with Reclamation 5.1 can be found on the Division's website, can be accessed on a publicly available webpage such as NRC.gov, or can be accessed using GRAMA. No change will be made to the license.

2.2. *Archaeological Resources. Section 1.3 of Rev. 5.1 discusses Archaeological Sites and the Current Status of Excavation. Section 1.3 briefly discusses and lists the archaeological sites at the Mill and their status.*

COMMENT

UW Comment #115

2.2.1. The Reclamation Plan does not provide any discussion of the short-term and long-term impacts to Archaeological Sites during decommissioning and reclamation activities and after site reclamation is complete. There is no mention of possible impacts to archaeological sites and other cultural resources when borrow material is obtained. There is no discussion of whether sites that may have been covered by excavated soils will be rehabilitated after final closure. Further, there is no discussion of other cultural resources in the vicinity of Mill that will be impacted; for example, traditional uses of the land for hunting and gathering. Revision 5.1 makes no mention of the responsibility of the Bureau of Land Management (BLM) to protect the archaeological sites on land that was transferred from the BLM to the Licensee in the 1980s.

Division Response: The Division believes its General Response #10, above, regarding cultural resources is adequate to address most of the issues raised in this comment. In addition, License conditions regarding cultural resources will remain in effect until decommissioning is complete. Please see the Division's Response to UW Comment #112, above.

2.3. *Fauna. Section 1.7.1.2 of Rev. 5.1 discusses the fauna.*

COMMENT

UW Comment #116
2.3.1. The discussion of "fauna" makes no mention of domestic livestock in the vicinity of the Mill. Livestock grazes on Mill land and nearby areas. Livestock has been known to be present on the berms of tailings impoundments. Rev. 5.1 should have discussed domestic livestock in addition to wildlife.

Division Response: Please see the Division's Response to UW Comment #112, above.

UW Comment #117
2.3.2. The discussion of fauna makes no mention of the wildlife ponds, efforts to keep wildlife from using or being impacted by the Mill operation, including the adverse impacts to bird life.

Division Response: Please see the Division's Response to UW Comment #112, above.

2.4. *Mill Site Background. Section 1.7.4 of Rev. 5.1 discusses Mill Site Background and quotes from Section 2.10 of the Final Environmental Statement (FES), White Mesa Uranium Project, Energy Fuels Resources, Nuclear Regulatory Commission, NUREG-0556, May 1979 (DRC-2009-008036). Rev. 5.1 and the 1979 FES state:*

> *The concentration of radon in the area is estimated to be in the range of 500 to 1,000 pCi/m3, based on the concentration of radium-226 in the local soil. Exposure to this concentration on a continuous basis would result in a dose of up to 625 millirems per year to the bronchial epithelium. As ventilation decreases, the dose increases; for example, in unventilated enclosures, the comparable dose might reach 1,200 millirems per year.*

The FES provides 2 footnotes for this information: a 1974 report and a 1975 report. These reports are not available online, as far as I am able to determine, and have not been included in any submittals to the DWMRC.

COMMENT

UW Comment #118
2.4.1. It is impossible to determine the basis for, and accuracy of, the information from the 1979 FES. The concentration of radium-226 in the local soils is not provided. There is no information regarding the results of soil sampling for radium-226 in the vicinity of the Mill prior to the construction of the Mill, or after Mill construction and commencement of operation, or currently. The range of 500 to 1,000 pico Curies-per square meter (pCi/m3) does not indicate a time frame, so one does not know if they are emissions per second, per minute, per day, per week, per month, per year. The Licensee cannot rely on decades-old information where there is no actual data available to support the assertions.

Division Response: The commenter has presented no evidence that the information used from the 1979 EIS is not valid. Additionally, please see the Division's Response to UW Comment #112, above.
.

UW Comment #119

2.4.2. The Licensee and the Division cannot rely on and cite any data in the 1979 FES, unless it is backed up by documents that are readily available to the public and have undergone a current assessment. This is why the Division is obligated to conduct a current environmental analysis of the Reclamation Plan and the License Renewal.

Division Response: The commenter has presented no evidence that the information used from the 1979 EIS is not valid. Additionally, please see the Division's Response to UW Comment #112, above. In response to the portions of the comment regarding the performance of an environmental analysis, the Division incorporates its General Response #09, above.

2.5. *Reclamation Cell 1. Section 3.2.2.2 of Rev. 5.1 discusses the reclamation of Cell 1. After the removal of the current Cell 1 liner and contents, the Plan discusses the construction of a Cell 1 Disposal Area to dispose of contaminated materials and debris from the Mill site decommissioning and windblown tailings cleanup. This area would have a clay liner, not a synthetic liner with a clay base.*

COMMENT

UW Comment #120

2.5.1. The Division must demonstrate that the proposed Cell 1 Disposal Area meets current federal requirements for the disposal of 11e.(2) byproduct material, pursuant to 40 C.F.R. Part 61 Subpart W.[4] Section 61.252(a)(2)(i) references the requirements of 40 C.F.R. 192.32(a)(1),[5] which references the provisions of 40 C.F.R. § 264.221 Design and operating requirements.[6] The Licensee did not discuss how the Cell 1 Disposal Area would meet these requirements. The Division must demonstrate that the Cell 1 Disposal Area will meet the EPA requirements for 11e.(2) byproduct material disposal cells.

Division Response: The Division believes that its General Response #14 above is adequate to address the issues raised in this comment.

2.6. *Milestones for Reclamation. Section 6 of Rev. 5.1 discusses Milestones for Reclamation. Section 6 references and quotes from Utah Administrative Code R313-24-4, incorporating by reference 10 CFR Part 40 Appendix A Criterion 6A(1): provides that:*

> *For impoundments containing uranium byproduct materials, the final radon barrier must be completed as expeditiously as practicable considering technological feasibility after the pile or impoundment ceases operation in accordance with a written, Commission-approved reclamation plan. (The term as expeditiously as practicable considering technological feasibility as specifically defined in the Introduction of this appendix includes factors beyond the control of the Licensee.) Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids*

and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan.

---

[4] *40 C.F.R. § 61.252(a)(2)(i): "(2) After December 15, 1989, no new conventional impoundment may be built unless it is designed, constructed and operated to meet one of the two following management practices: (i) Phased disposal in lined impoundments that are no more than 40 acres in area and comply with the requirements of 40 CFR 192.32(a)(1). . . ."*
[5] *https://www.law.cornell.edu/cfr/text/40/192.32*
[6] *https://www.law.cornell.edu/cfr/text/40/264.221*

Section 6 also states:

> *Under Section 5.3.1 of the Company's Reclamation Plan Revision 3.2, placement of cover materials will be based on a schedule determined by analysis of settlement data, piezometer data and equipment mobility considerations. This gives the regulator authority to set deadlines and milestones as conditions allow, through the future approval of the schedule. The deadlines and milestones in the approved schedule would then serve as the deadlines and milestones for reclamation of the Mill, as contemplated by 10 CFR Part 40 Appendix A, Criterion 6A(1).*

COMMENT

UW Comment #121
2.6.1. Rev. 1 references Reclamation Plan Revision 3.2. It is unclear if Revision 3.2 is incorporated into the White Mesa Mill License. It is not mentioned in any License Condition. Any previous NRC or DWMRC approved Reclamation Plans that are being referenced by and included in Rev. 5.1 must also be incorporated into the License.

Division Response: The approved Reclamation Plan 5.1 supersedes the previous approved versions. The revised design drawings included with Revision 3.2B is still included in Revision 5.1. No change will be made to the license.

UW Comment #122
2.6.2. The Rev. 5.1 states that the regulator (that is, DWMRC) has authority to set deadlines and milestones as conditions allow, through the future approval of the schedule. The DWMRC has the authority to approve reclamation milestones and changes to the milestones, upon receipt of a license amendment request by the Licensee. The DWMRC does not have the authority to independently establish milestones and other reclamation schedules. Therefore, it appears that the proposed milestones in the SCA should be included in an amendment request by the Licensee to the DWMRC. Upon receipt of the amendment request, the Division is required to provide an opportunity for public comment. The Division is also required to provide an opportunity for public comment on the intent to approve the proposed milestone(s).[7]

Division Response: The Division believes that its General Response #14 above is adequate to address the issues raised in this comment.

[7] *"EPA expects the NRC and Agreement States to act consistently with their commitment in the MOU and provide for public notice and comment on proposals or requests to (1) incorporate radon tailings closure plans or other schedules for effecting emplacement of a permanent radon barrier into licenses and (2) amend the radon tailings closure schedules as necessary or appropriate for reasons of technological feasibility (including factors beyond the control of the Licensees). Under the terms of the MOU, NRC should do so with notice timely published in the Federal Register. In addition, consistent with the MOU, members of the public may request NRC action on these matters pursuant to 10 CFR 2.206. EPA also expects the Agreement States to provide comparable opportunities for public participation pursuant to their existing authorities and procedures." 59 Fed. Reg. 36280, 36285, column 3. https://www.epa.gov/sites/production/files/2015-08/documents/subpartt1994.pdf*

2.7. *Milestones: Existing Tailings Management System at the Mill. Section 6.2.1c) discusses the existing tailings cells at the Mill: Cells 1, 2, 3, 4A, and 4B.*

COMMENT

UW Comment #123

2.7.1. The License and the DWMRC should acknowledge that Cell 3, an operational tailings impoundment, must enter closure before the Licensee can use Cell 4B for tailings sands. EPA regulation (revised in 2017) at 40 C.F.R. § 61.252(a)(2)(i) states:

"The owner or operator shall have no more than two conventional impoundments, including existing conventional impoundments, in operation at any one time." A conventional impoundment is defined as "a permanent structure located at any uranium recovery facility which contains mostly solid uranium byproduct material or tailings from the extraction of uranium from uranium ore."

Division Response: The Division and Licensee are fully aware of the requirement referenced in this comment. However, the National Emission Standards for Hazardous Air Pollutants (NESHAPs) program is a program under the Clean Air Act and in Utah is delegated to the Division of Air Quality (DAQ). The implementing federal regulations for regulation of radon at operating uranium mills is at 40 CFR 61, Subpart W (40 CFR §§ 61.250 through 61.256). State rules incorporate those federal regulations by reference at UAC R307-214-1. In order to reflect the separate jurisdiction of the DAQ, the referenced requirement is part of the Mill's Air Approval Order, not in the License. No change will be made to the License based on this comment because it is not required.

2.8. *Leaving a Portion of an Impoundment Open for Disposal of On-site Generated Trash or 11e.(2) Byproduct Material from ISR Operations. Section 6.2.3d) of Rev. 5.1 states:*

> *The License authorizes a portion of a specified impoundment to accept uranium byproduct material or such materials that are similar in physical,*

chemical, and radiological characteristics to the uranium mill tailings and associated wastes already in the pile or impoundment, from other sources, during the closure process, and on-site generated trash.

COMMENT

UW Comment #124

2.8.1. License Condition 10.1.B states: "The Licensee may not dispose of any material on site that is not "byproduct material," as that term is defined in 42 U.S.C. Section 2014(e)(2) (Atomic Energy Act of 1954, Section 11(e)(2) as amended)."

Therefore, the License cannot dispose of "materials that are similar in physical, chemical, and radiological characteristics to the uranium mill tailings and associated wastes already in the pile or impoundment, from other sources, during the closure process or prior to closure. These "other materials" cannot be disposed of if they do not meet the definition of 11e.(2) byproduct material in the AEA and NRC and EPA regulation. The definition of "11e.(2) byproduct material" in the AEA and NRC and EPA regulations is discussed in Exhibit A to the comments on the White Mesa Mill License Renewal.

Division Response: The Division believes its General Responses #4 and #5 above are adequate to address the issues raised in this comment. Therefore, these responses are incorporated here.

2.9. *Windblown Tailings Retrieval. Section 6.2.4a) of Rev. 5.1 discusses Mill Demolition and Windblown Tailings Retrieval and Placement in a Tailings Impoundment. The retrieval of windblown tailings takes place during final closure of the Mill takes place.*

COMMENT

UW Comment #125

2.9.1. The Licensee should be required to retrieve off-site windblown tailings and contaminated soils and other materials from the Mill operation at least annually. The Licensee should be required to retrieve on-site windblown tailings and on-site contaminated soils above the Mill cleanup standard at least annually. Spills of radioactive materials from materials shipped to or from the Mill should be cleaned up immediately. There is no justification to wait decades to retrieve windblown tailings and remediate contaminated areas at the Mill and areas outside the Mill boundaries. Retrieval and cleanup of these materials should be part of an ongoing remedial action program.

Division Response: Some evidence of potential wind-blown radioactive materials has been found northeast of the Mill. However, the levels detected are only slightly above background and are well below EPA's screening levels for residential use. There are no residential uses anywhere in the vicinity of the impacted area but if there were such uses, EPA standards would not require remediation. In the event that off-site contamination were discovered above an applicable cleanup standard, further action would be required. As part of decommissioning, NRC and Division rules will require that the soils in the vicinity of the Mill be remediated to a level at or below natural background. Therefore, areas outside of the Mill property that may

currently be showing levels slightly higher than background but below cleanup levels will be remediated as part of decommissioning. In the Division's reasoned judgment based on all available evidence, there are no current threats to human or ecological health or the environment posed by the minor off-site contamination northeast of the Mill property because the levels are only slightly higher than natural background and well below even the most conservative remediation levels used by the EPA.

***2.10**. Reclamation Schedules*

COMMENT

UW Comment #126

2.10.1. Commenters support the establishment of general schedules for decommissioning and reclamation as set out in the Reclamation Plan and SCA. This provides the Licensee, DWMRC, the White Mesa Community, and other members of the public and interested agencies and persons a basis for moving forward when a tailings impoundment is undergoing closure and reclamation and for final Mill closure.

Division Response: Thank you for your comment.

***2.11.** Radon Attenuation During Closure*

COMMENT

UW Comment #127

2.11.1. The Reclamation Plan fails to mention radon attenuation during closure, particularly during the period of dewatering when radon emissions increase, as was demonstrated during the dewatering of Cell 2. The monitoring and annual reporting of the Cell 2 radon emissions, pursuant to 40 C.F.R. Part 6 Subpart W requirements for "existing" tailings impoundments (constructed prior to December 15, 1989), showed that radon emissions can be expected to increase during the closure period and, particularly, when active dewatering takes place. The radon monitoring results meant that the Licensee was required to measure the radon emissions monthly and take mitigative measures. If the monitoring had not taken place, there would have been no data to show that the emissions were increasing significantly, that mitigative measures were needed, and the locations where the placement of clean soils would be most effective in reducing the radon emissions. Subsequently, the DWMRC determined that Cell 2 was in "closure," and the Subpart W monitoring and reporting requirement were no longer applicable. However, the Division, under its regulatory authority, on July 23, 2014, ordered the Licensee to continue to monitor the radon emissions from Cell 2, reporting twice yearly, and taking any necessary steps to reduce the emissions if they were above the 20 pico Curie-per square meter-per second (20 pCi/m2-sec) Subpart W emission standard (DRC-2014-004489).

2.11.2. Therefore, Commenters request that, during closure, the Licensee measure the radon emissions from Cells 3, 4A, and 4B at least twice a year according to EPA Method 115, report the results to the Division in a timely manner, and take measures to reduce the emissions if they exceed 20 pCi/m2-sec (or less, as established by the Division). The continued monitoring during

closure, when the reduction of water in the tailings cells—through natural evaporation or active dewatering—results in an increase in radon emissions, is necessary to assure that the radioactive emissions are kept as low as reasonably achievable during the closure period. This is one of the most important measures that the DWMRC can take to protect public health and safety during operation and closure of the White Mesa Mill.

Division Response: The requirements for radon monitoring under Subpart W are addressed at length in this PPS. The Division incorporates its responses on this topic here. In short, the Division disagrees with this comment. When the tailings cells are no longer in operation and closure activities begin, they will then be subject to 10 CFR 40, Appendix A, Criterion 6. The final cover for tailings cells 3, 4A, and 4B must be so that radon emissions are less than 20 pCi/m2-s. No change will be made to the License based on this comment.

Thank you for providing the opportunity to comment.

Sarah Fields
Program Director
sarah@uraniumwatch.org

and

John Weisheit
Conservation Director
Living Rivers
P.O. Box 466
Moab, Utah 84532

and

Marc Thomas, Chair
Sierra Club - Utah Chapter
423 West 800 South, Suite A103
Salt Lake City, Utah 84101

EXHIBIT A
WHITE MESA MILL LICENSE RENEWAL — LICENSE NO. UT1900479
URANIUM WATCH ET AL. COMMENTS

UW Comment #128

1. The proposed License for the Renewal of UT for the White Mesa Mill, San Juan County, Utah, contains on license Condition that states: "The Licensee may not dispose of any material on site that is not "byproduct material," as that term is defined in 42 U.S.C. Section 2014(e)(2) (Atomic Energy Act of 1954, Section 11e.(2), as amended)."[1]

2. Then, the License contains conditions that allow for the processing of feed material other than natural ore, and refers to "alternate feed materials or other ores."[2]

3. However, "alternate feed" materials are not "ore," as that term has been in common use for hundreds of years[3] *and how that term is used in the Atomic Energy Acts of 1946 and 1954, as amended; Atomic Energy Commission, Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA) regulations promulgated pursuant to the 1946 and 1954 AEAs; and other EPA regulations.*

---

[1] *License Condition 10.1.B. (as corrected).*
[2] *License Condition 10.1.C., D., and E.*
[3] *The word, or term, "ore," as defined in several sources:*

• Ore—a naturally occurring solid material from which metal or other valuable minerals may be extracted. [Illustrated Oxford Dictionary, DK Pub. 1998.]

• Ore—A native mineral containing a precious or useful metal in such quantity and in such chemical combination as to make its extraction profitable. Also applied to minerals mined for their content of non-metals. [The Compact Oxford English Dictionary, Second Edition, Oxford University Press, 2000, p. 1224:915-916.]

• Ore—a. A natural mineral compound of the elements of which one at least is a metal. Applied more loosely to all metaliferous rock, though it contains the metal in a free state, and occasionally to the compounds of nonmetallic substances, as sulfur ore. . . . Fay b. A mineral of sufficient value as to quality and quantity that may be mined for profit. Fay. [A Dictionary of Mining, Mineral, and Related Terms, compiled and edited by Paul W. Thrush and Staff of the Bureau of Mines, U.S. Dept. of Interior, 1968.]

• The Oxford English Dictionary points out that the current usage of the word "ore" goes back several hundred years. A Dictionary of Mining, Mineral, and Related Terms lists over 65 compound words using the word "ore," such as ore bin, ore body, ore deposit, ore district, ore geology, ore grader, ore mineral, ore reserve, ore zone.

All of these terms incorporate the word "ore" as it relates to the mining of a native mineral. The term "ore," without explanation, has for many years been used in thousands, if not millions, of instances in thousands of mining, milling, geological, mineralogical, radiochemical,

engineering, environmental, and regulatory publications. "Ore" like the word "water," is a word of common and extensive usage with a clear and accepted meaning.

4. License Condition 10.1.B. relies on, but does not quote from, NRC Regulatory Summary 2000-23 Recent Changes to Uranium Recovery Policy, November 30, 2000. That Regulatory Summary is not a regulation does not have legal force and effect. It cannot be used as a basis for amending the Atomic Energy Act of 1954 (AEA), as amended, nor NRC and EPA regulations promulgated responsive to that Act. The Summary includes a new definition of 11e.(2) byproduct material by creating a new definition of the word "ore":

> *For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." In determining whether the feed material is ore, the following definition of ore will be used:* ***Ore is*** *a natural or native matter that may be mined and treated for the extraction of any of its constituents* ***or any other matter from which source material is extracted in a licensed uranium or thorium mill.*** *[Emphasis added.]*

5. The AEA definition of 11e.(2) byproduct material[4] and the NRC and EPA definitions of 11e.(2) byproduct material do not, and cannot, mean wastes from the processing of any matter from which uranium and/or thorium is recovered at a licensed uranium mill.

6. The AEA, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA),[5] does not sanction the processing of feed materials other than natural ores and the disposal of wastes from such processing at licensed uranium and thorium processing facilities. The AEA does not include a definition, or any indication of such definition, of "ore" that states that "ore" is any "matter from which source material is extracted in a licensed uranium or thorium mill." The AEA does not give the Utah Department of Environmental Quality (DEQ), or other state or federal entity, the broad authority to authorize the processing of feed materials other than natural ores or the disposal of wastes from such processing at licensed uranium and thorium processing facilities as "11e.(2) byproduct material." The term "ore" has an accepted and historical definition as that term is used in the AEA and regulations promulgated responsive to that

---

[4] 42 U.S.C. Sec. 2014 (e). "The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content."

[5] The Uranium Mill Tailings Radiation Control Act of 1978 ("UMTRCA") (Public Law 95-604, 92 Stat. 3033 et seq.), amending the Atomic Energy Act of 1954 (Public Law 83-703, 68 Stat. 919 et.seq.).

Act. Neither the NRC, nor the DEQ have the authority to use "guidance" or other means to change the substantive meaning of a word and, thereby, the regulatory program associated with that word and related definitions. The DEQ does not have the authority to amend the AEA.

7. The statutory history of UMTRCA, found in the two Congressional reports, provides information with respect "uranium mill tailings" and "ore." The Congressional Reports clearly state what was contemplated by Congress (i.e., the intent of Congress) when Congress established a program for the control of "uranium mill tailings" from the processing of "uranium ore" at inactive (Title I of UMTRCA) and active (Title II of UMTRCA) uranium and thorium processing facilities. See House Report (Interior and Insular Affairs Committee) No. 95-1480 (I), August 11, 1978, and House Report (Interstate and Foreign Commerce Committee) No. 95-1480 (II), September 30, 1978. Under "Background and Need," HR No. 95-1480 (I) states:

> *Uranium mill tailings are the sandy waste produced by the uranium ore milling process. Because only 1 to 5 pounds of useable uranium is extracted from each 2,000 pounds of ore, tremendous quantities of waste are produced as a result of milling operations. These tailings contain many naturally-occurring hazardous substances, both radioactive and nonradioactive. . . . As a result of being for all practical purposes, a perpetual hazard, uranium mill tailings present the major threat of the nuclear fuel cycle.*
>
> *In its early years, the uranium milling industry was under the dominant control of the Federal Government. At that time, uranium was being produced under Federal Contracts for the Government's Manhattan Engineering District and Atomic Energy Commission program. . . .*
>
> *The Atomic Energy Commission and its successor, the Nuclear Regulatory Commission, have retained authority for licensing uranium mills under the Atomic Energy Act since 1954. [HR No. 95-1480 (1) at 11.]*

The second House Report, under "Need for a Remedial Action Program" states:

> *Uranium mills are a part of the nuclear fuel cycle. They extract uranium from ore for eventual use in nuclear weapons and power-plants, leaving radioactive sand-like waste—commonly called uranium mill tailings—in generally unattended piles. [HR No. 95-1480 (2) at 25.]*

The statutory history of UMTRCA does not provide any basis for a definition of "ore" as being "any other matter from which source material is extracted in a licensed uranium or thorium mill."

8. Atomic Energy Commission (AEC) and the AEA of 1946 also demonstrate the intent of Congress and the agency that preceded the NRC with resect ore and the processing of ore. The domestic uranium mining and milling industry was established at the behest of the Manhattan Engineer District and the AEC. The AEC regulated uranium mines and uranium processing

facilities, established ore buying stations, and bought ore. Mining and milling of uranium ore was done under contract to the AEC. AEC purchased uranium ore under the Domestic Uranium Program. Regulations related to the AEC's uranium procurement program were set forth in 10 C.F.R. Part 60. Part 60 was deleted from 10 C.F.R. on March 3, 1975, after the establishment of the NRC.

9. The AEC published a number of circulars related to their Domestic Uranium Program. The Domestic Uranium Program—Circular No. 3—Guaranteed Three Year Minimum Price—Uranium-Bearing Carnotite-Type or Roscoelite-Type Ores of the Colorado Plateau Area" (April 9, 1948), an amendment to 10 C.F.R. Part 60, states:

> *§ 60.3 Guaranteed three years minimum price for uranium-bearing carnotite-type or roscoelite-type ores of the Colorado Plateau—(a) Guarantee. To stimulate domestic production of uranium-bearing ores of the Colorado Plateau area, commonly known as carnotite-type or roscoelite-type ores, and in the interest of the common defense and security the United States Atomic Energy Commission hereby establishes the guaranteed minimum prices specified in Schedule 1 of this section, for the delivery of such ores to the Commission, at Monticello, Utah, and Durango, Colorado, in accordance with the terms of this section during the three calendar years following its effective date.*
>
> *Note: In §§ 60.1 and 60.2 (Domestic Uranium Program, Circulars No. 1 and 2), the Commission has established guaranteed prices for other domestic uranium-bearing ores, and mechanical concentrates, and refined uranium products.*
>
> *Note: The term "domestic" in this section, referring to uranium, uranium-bearing ores and mechanical concentrates, means such uranium, ores, and concentrates produced from deposits within the United States, its territories, possessions and the Canal Zone.*

10. 10 C.F.R. Part 60—Domestic Uranium Program at § 60.5(c) states:

> *Definitions. As used in this section and in § 60.5(a), the term "buyer' refers to the U.S. Atomic Energy Commission, or its authorized purchasing agent.* ***The term "ore" does not include mill tailings or other mill products****. . . . [Emphasis added.]*
> *[Circular 5, 14 Fed. Reg. 731 (February 18, 1949).]*

It is clear that the AEC was the primary mover in the domestic uranium mining and milling program. It is clear that under the AEAs of 1946 and 1954, the AEC regulated uranium mining and milling and established a uranium ore-buying program. It is clear that from the 1940's to 1975, the regulations in 10 C.F.R. Part 60 clearly stated that "ore" does not include mill tailings or other mill products. It is clear that "ore," under the AEA and AEC regulation did not mean

any "matter from which source material is extracted in a licensed uranium or thorium mill." Such a new definition contradicts the AEA.
11. The Statutory Definition of Source Material also is relevant to the use of the term "ore" under that AEA and NRC regulation. The AEA of 1946, under "Control of Materials," Sec. 5 (b), "Source Materials," (1), "Definition," provides the definition of "source material." Section 5(b)(1) states:

> *Definition. — As used in this Act, the term "source material" means uranium, thorium, or any other material which is determined by the Commission, with the approval of the President, to be peculiarly essential to the production of fissionable materials; but includes ores only if they contain one or more of the foregoing materials in such concentration as the Commission may by regulation determine from time to time.*

The AEA of 1954, Chapter 2, Section 11, "Definitions," sets forth the current statutory definition of "source material" at Sec. 11(s):

> *The term "source material" means (1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of section 61 to be source material; or (2) ores containing one or more of the foregoing materials, in such concentrations as the Commission may by regulation determine from time to time. [42 U.S.C. Sec. 2014(z).]*

Responsive to this statutory definition, in 1961 the AEC established the following regulatory definition at 10 C.F.R. § 40.4:

> *Source Material means: (1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material. [26 Fed. Reg. 284 (Jan. 14, 1961)]*

Therefore, the AEC made a determination, in accordance with the mandate of the AEA of 1954, that ores containing 0.05% thorium and/or uranium would meet the statutory definition of source material. At the same time that they made that determination, the AEC had a regulation that clearly stated that "ore" does not include mill tailings or other mill products. Surely, the AEC, as the administrator of a uranium ore procurement program and the developer of the uranium mining and milling industry knew what they were talking about when they used the term "ore."

12. Additionally, the AEC set forth certain exemptions to the regulations in 10 C.F.R. Part 40. The proposed rule that was later finalized in January 1961 states, in pertinent part:

> *The following proposed amendment to Part 40 constitutes an over-all revision of 10 CFR Part 40, "Control of Source Material."*

With certain specified exceptions, the proposed amendment requires a license for the receipt of title to, and the receipt, possession, use, transfer, import, or export of source material. . . .

Under the proposed amendment, the definition of the term "source material": is revised to bring it into closer conformance with that contained in the Atomic Energy Act of 1954. "Source Material" is defined as (1) uranium or thorium, or any combination thereof, in any physical or chemical form, but does not include special nuclear material, or (2) ores which contain by weight one-twentieth of one percent (0.05 percent) or more of (a) uranium, (b) thorium or (c) any combination thereof. The amendment would exempt from the licensing requirements chemical mixtures, compounds, solutions or alloys containing less than 0.05 percent source material by weight. As a result of this exemption, the change in the definition of source material is not expected to have any effect on the licensing program. . . .

Section 62 of the Act prohibits the conduct of certain activities relating to source material "after removal from its place of deposit in nature" unless such activities are authorized by license issued by the Atomic Energy Commission. The Act does not, however, require a license for the mining of source material, and the proposed regulations, as in the case of the current regulations, do not require a license for the conduct of mining activities. Under the present regulation, miners are required to have a license to transfer the source material after it is mined. Under the proposed regulation below, the possession and transfer of unrefined and unprocessed ores containing source material would be exempted. [47 Fed. Reg. 8619 (September 7, 1960).]

13. Therefore, the AEC established, via a rulemaking, exemptions for source material as defined in Sec. 2014(z)(1) related to mixtures, compounds, solutions, or alloys containing uranium and/or thorium:

(a) Any person is exempt from the regulations in this part and from the requirements for a license set forth in section 62 of the Act to the extent that such person receives, possesses, uses, transfers or delivers source material in any chemical mixture, compound, solution, or alloy in which the source material is by weight less than one-twentieth of 1 percent (0.05 percent) of the mixture, compound, solution or alloy. The exemption contained in this paragraph does not include byproduct material as defined in this part. [10 C.F.R. § 40.13(a), 26 Fed. Reg. 284 (Jan. 14, 1961).]

14. The AEC also established, via a rulemaking, exemptions for source material as defined in Sec. 2014(z)(2) related to "ore":

b) Any person is exempt from the regulations in this part and from

> *the requirements for a license set forth in section 62 of the act to the extent that such person receives, possesses, uses, or transfers unrefined and unprocessed ore containing source material; provided, that, except as authorized in a specific license, such person shall not refine or process such ore. [10 C.F.R. 40.13(b), 26 Fed. Reg. 284 (Jan. 14, 1961).]*

The definition of "source material" and the exemptions that are related to those definitions stand today, over fifty-five years later. These regulatory definitions and exemptions did not change when the NRC was established in 1975 and took on the regulatory responsibility for "source material." These regulatory definitions and exemptions did not change when the AEA was amended by UMTRCA in 1978.

15. Definition of 11e.(2) byproduct material. UMTRCA, among other things, amended the AEA of 1954 by adding a new definition, the definition of 11e.(2) byproduct material:

> *Sec. 201. Section 11e. of the Atomic Energy Act of 1954, is amended to read as follows:*
> *"e. The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." [42 U.S.C. Sec. 2014 (e).]*

There is no evidence in the regulatory history of UMTRCA that Congress, in defining "11e.(2) byproduct material" intended to also amend the statutory definition of "source material." There is no evidence in the regulatory history of UMTRCA that the term "any ore" does not mean "any type of uranium ore" (e.g., ore containing less than .05% uranium and/or thorium and the numerous types of natural uranium-bearing minerals that are mined at uranium mines and milled at uranium mills). There is no evidence in the regulatory history of UMTRCA that Congress intended the term "any ore" to mean anything that the NRC, DWRC, or Energy Fuels wants it to mean. There is no evidence in the regulatory history of UMTRCA that "ore" is "any other matter from which source material is extracted in a licensed uranium or thorium mill."

16. In response to UMTRCA, both the EPA and the NRC established a regulatory program for uranium milling and the processing of ores. In establishing those regulations, neither the EPA nor the NRC contemplated the processing of materials that were not "ore" (as that term has been used under the AEA and the common meaning of the term). Neither the EPA nor the NRC considered wastes from other mineral processing operations in their concept of "ore." They did not address in any manner the processing wastes or any matter other than natural ore when promulgating their regulatory regimes for active uranium processing facilities. Further, during the various rulemaking proceedings, the public was never informed that wastes from other mineral processing operations or materials other natural ore, no matter how they were defined, would be processed at licensed uranium or thorium mills. Therefore, the public was given no

reasonable opportunity to comment on such processing activities at uranium mills in the rulemaking processes.

17. NRC Regulatory Program, 10 C.F.R. Part 40. Responsive to UMTRCA, the NRC incorporated the UMTRCA definition of 11e.(2) byproduct material (with clarification) into their regulations at 10 C.F.R. § 40.4:

> *"Byproduct Material" means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "byproduct material" within this definition.*
> *[44 Fed. Reg. 50012-50014 (August 24, 1979).]*

The NRC also explained the need for the new definition:

> *Section 40.4 of 10 CFR Part 40 is amended to include a new definition of "byproduct material." This amendment, which included uranium and thorium mill tailings as byproduct material licensable by the Commission, is required by the recently enacted Uranium Mill Tailings Radiation Control Act. [44 Fed. Reg. 50012-50014 (August 24, 1979).]*

18. The NRC promulgated further regulations amending Part 40, in 1980, 45 Fed. Reg. 65521-65538 (October 3, 1980). In the summary, the NRC states:

> *The U.S. Nuclear Regulatory Commission is amending its regulations to specify licensing requirements for uranium and thorium milling activities, including tailings and wastes generated from these activities. The amendments to parts 40 and 150 take into account the conclusions reached in a final generic environmental impact statement on uranium milling and the requirements mandated in the Uranium Mill Tailings Radiation Control Act of 1978, as amended, public comments received on a draft generic environmental impact statement on uranium milling, and public comments received on proposed rules published in the Federal Register. [Footnotes omitted.]*

There is no statement in any of the NRC regulations in 10 C.F.R. Part 40 or in any of rulemaking proceedings promulgating those regulations that wastes from other mineral processing operations, 11e.(2) byproduct material, or any matter processed in a licensed uranium mill could be defined as "ore," under any circumstances. The NRC regulations did not contemplate that, under any circumstances, wastes and other materials would be processed at licensed uranium or thorium mills and the tailings, or that the wastes from such processing would be disposed of as 11e.(2) byproduct material in the mill tailings impoundments. The regulations promulgated by the NRC and did not contemplate this kind of activity. The National Environmental Policy Act ("NEPA") document in support of the promulgation of the NRC regulatory program for uranium

mills did not contemplate this kind of activity. In the rulemaking proceedings and NEPA proceeding, the public did not have an opportunity to contemplate and comment on this kind of uranium or thorium mill processing activity. The information provided by the Division and the Licensee demonstrate that materials other than natural ore contain radiological and non-radiological constituents that are significantly different than those in natural ore. Therefore the impacts from the processing and disposal of the wastes from those materials would be different from those of "ore."

19. Furthermore, 10 C.F.R. Part 40, Appendix A, Criterion 8, states in part:

> *Uranium and thorium byproduct materials must be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983.*

There is no indication that this NRC regulation and the regulation in 40 C.F.R. Part 440 (and the enabling statute) have in any manner been amended or altered by subsequent NRC policy guidance. Therefore, any shift in the usage of the word "ore" would conflict with statutory and regulatory authorities with respect 10 C.F.R. Part 40 and 40 C.F.R. Part 440.

20. The Final Generic Environmental Impact Statement on Uranium Milling (GEIS).[6] The GEIS makes a clear statement regarding the scope of the GEIS and its understanding of what uranium milling entails:

> *As stated in the NRC Federal Register Notice (42 FR 13874) on the proposed scope and outline for this study, conventional uranium milling operations in both Agreement and Non-Agreement States, are evaluated up to the year 2000. Conventional uranium milling as used herein refers to the milling of ore mined primarily for the recovery of uranium. It involves the processes of crushing, grinding, and leaching of the ore, followed by chemical separation and concentration of uranium. Nonconventional recovery processes include in situ extraction or ore bodies, leaching of uranium-rich tailings piles, and extraction of uranium from mine water and wet-process phosphoric acid. These processes are described to a limited extent, for completeness. [GEIS, Volume I, at 3.]*

---

[6] *Final Generic Environmental Impact Statement on Uranium Milling, Nuclear Regulatory Commission, NUREG-0706, September 1980.*

The GEIS is very clear about what it considers "ore" to be and gives no indication whatsoever that materials other than ore (a natural material after its removal from its place in nature), such as the tailings or waste from mineral processing operations, are considered to be "ore" if the material is processed at a licensed uranium mill.

21. The GEIS includes a discussion of "Past Production Methods." That discussion makes reference to "ore," "ore exploration," "pitchblende ore," "crude ore milling processes," "lower-grade ores," "uranium-bearing gold ores," "high-grade ores," "ore-buying and "ore reserves." GEIS, Volume I, Chapter 2, at 2-1 to 2-2.

In Chapter 6, "Environmental Impacts," there is a discussion of "Exposure to Uranium Ore Dust," which states, in part:

> *Uranium ore dust in crushing and grinding areas of mills contains natural uranium (U-238, U-235, thorium-230, radium-226, lead-210, and polonium-210) as the important radionuclides. GEIS, Volume I, at 6-41.*

There is also a table giving the "Average Occupational Internal Dose due to Inhalation of Ore Dust," (GEIS at 6-41, Table 6.16). Further, the GEIS discusses "Shipment of Ore to the Mill" (GEIS at 7-11); "Sprinkling or Wetting of Ore Stockpile" (GEIS at 8-2); "Ore Storage" and "Ore Crushing and Grinding" (GEIS at 8-6); "Ore Pad and Grinding" (GEIS, Vol. 3, at G-2); "Ore Warehouse (GEIS, Vol. 3, at K-3); and "Alternatives to Control Dust from Ore Handling, Crushing, and Grinding Operations (GEIS, Vol. III, at K-3 to K-3). In the NRC responses to comments there are discussions of "Average Ore Grade, Uranium Recovery" (GEIS, Vol. II, at A-12 to A-13).

The GEIS did not consider the processing of wastes from mineral processing operations at uranium or thorium mills. The GEIS gives no indication whatsoever that such wastes are "ore," even if they were processed at a uranium or thorium recovery facility for their "source material content." Clearly, the GEIS did not consider that the wastes from the processing of such wastes (such as material already defined as 11e.(2) byproduct material) would meet the definition of 11e.(2) byproduct material.

Therefore, the GEIS did not evaluate, and the public did not have an opportunity to comment upon, any of the possible health, safety, and environmental impacts of the processing of other mineral processing wastes at uranium or thorium processing facilities. There was no evaluation of the transportation issues related to the transport of such wastes, nor were reasonable alternatives to the transportation, receipt, processing, and disposal of such wastes at uranium or thorium mills ever evaluated.

22. EPA Regulatory Standards. UMTRCA directed the EPA to establish standards for uranium mill tailings and directed the NRC to implement those standards. That statute, as codified in 42 U.S.C. 2022, states in pertinent part:

> *Sec. 2022. Health and environmental standards for uranium mill tailings*

(b) Promulgation and revision of rules for protection from hazards at processing or disposal site.
(1) As soon as practicable, but not later than October 31, 1982, the Administrator shall, by rule, propose, and within 11 months thereafter promulgate in final form, standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal of byproduct material, as defined in section 2014(e)(2) of this title, ***at sites at which ores are processed primarily for their source material content*** *or which are used for the disposal of such byproduct material. . . . [Emphasis added.]*

Requirements established by the Commission under this chapter with respect to byproduct material as defined in section 2014(e)(2) of this title shall conform to such standards. Any requirements adopted by the Commission respecting such byproduct material before promulgation by the Commission of such standards shall be amended as the Commission deems necessary to conform to such standards in the same manner as provided in subsection (f)(3) of this section. Nothing in this subsection shall be construed to prohibit or suspend the implementation or enforcement by the Commission of any requirement of the Commission respecting byproduct material as defined in section 2014(e)(2) of this title pending promulgation by the Commission of any such standard of general application. In establishing such standards, the Administrator shall consider the risk to the public health, safety, and the environment, the environmental and economic costs of applying such standards, and such other factors as the Administrator determines to be appropriate.
* * *
(d) Federal and State implementation and enforcement of the standards promulgated pursuant to subsection (b) of this section shall be the responsibility of the Commission in the conduct of its licensing activities under this chapter. States exercising authority pursuant to section 2021(b)(2) of this title shall implement and enforce such standards in accordance with subsection (o) of such section. [42 U.S.C. 2022(b) and (d).]

Congress directed the EPA only to establish standards for "sites at which ores are processed primarily for their source material." The EPA, as mandated by UMTRCA, finalized the "Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites" in 1983.7 48 Fed. Reg. 45925-4594[7], October 7, 1983.

---

7 https://www.epa.gov/radiation/health-and-environmental-protection-standards-uranium-andthorium-mill-tailings-40-cfr

23. In the "Summary of Background Information" the EPA provides a discussion of "The Uranium Industry" (i.e., the industry that the regulations apply to):

> *The major deposits of high-grade uranium ores in the United States are located in the Colorado Plateau, the Wyoming Basins, and the Gulf Coast Plain of Texas. Most ore is mined by either underground or open-pit methods. At the mill the ore is first crushed, blended, and ground to proper size for the leaching process which extracts uranium. . . . After uranium is leached from the ore it is concentrated . . . . The depleted ore, in the form of tailings, is pumped to a tailings pile as a slurry mixed with water.*
>
> *Since the uranium content of ore averages only about 0.15 percent, essentially all the bulk or ore mined and processed is contained in the tailings. [48 Fed. Reg. 45925, 45927, October 7,1983.]*

Clearly, when the EPA developed its standards for uranium and thorium mills they stated, with specificity and particularity, what uranium "ore" was, what uranium milling consisted of, and what uranium mill tailings consisted of. EPA clearly stated that the standards applied to the processing of uranium and thorium ores at uranium and thorium mills. There is no reasonable evidence that would indicate that the standards promulgated by the EPA applied to the processing of wastes from other mineral processing operations at uranium and thorium mills or that ore could be defined as "any other matter from which source material is extracted in a licensed uranium or thorium mill."

24. Additionally, the EPA incorporated UMTRCA's definition of 11e.(2) byproduct material, as clarified by the NRC in 10 C.F.R. 40.4, into their standards at 40 C.F.R. Subpart D, § 192.31(b). Since that time the EPA has not amended their definition of 11e.(2) byproduct material in a rulemaking proceeding, nor have they amended their definition via policy guidance. The EPA has not, in any manner, widened the use of the words "any ore" to include "any other matter from which source material is extracted in a licensed uranium or thorium mill." EPA did not sanction the NRC's policy guidance with respect new definitions of "ore" and 11e.(2) byproduct material.

Clearly, the EPA, as directed by Congress, has not in any manner contemplated the processing of wastes from other mineral extraction operations at uranium or thorium mills when establishing the "Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites." The EPA did not contemplate, nor was the public informed of the EPA intention to consider, the processing of "any other matter from which source material is extracted in a licensed uranium or thorium mill."

In the various rulemaking proceedings that have taken place in the establishment of the EPA standards, the public was given no opportunity to consider or comment on the possibility that the EPA standards would also apply to the processing of wastes from other mineral processing operations or "any other matter from which source material is extracted in a licensed uranium or thorium mill." The processing of materials other than natural ore at uranium and thorium

mills was beyond the scope of the regulatory program established by the NRC and the EPA in response to UMTRCA for operating uranium mills.

25. The AEA, as amended in 1978 by UMTRCA, included provisions applicable to Agreement States. One of those provisions requires NRC Agreements States (such as Utah) to "require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include," among other things, "consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 2014 (e)(2) of this title."[8]

So, again, the AEA imposes requirements associated with the definition of and management of 11e.(2) byproduct material, as that term is defined under the AEA and NRC and EPA regulations promulgated responsive to that Act. The State of Utah has not been given the authority to amend this section of the AEA.

26. Regulatory History of NRC's Alternate Feed Guidance. The SER relies on NRC Guidance (SECY 95-211, SECY-99- 012, and NRC Regulatory Issue Summary 2000-23). In the late 1980's the NRC was faced with a few requests to process material other than ore. At that time, and today, there are two statutes or regulations (implementing those statues) that are pertinent. First is the statutory definition of "source material" established in 1954 by the AEA, found at 42 U.S.C. Sec. 2014(z), and in the NRC regulatory definition of "source material" (established in 1961 pursuant Sec. 2014(z)), found at 10

C.F.R. 40.4:

> *Source Material means: (1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material.*

The second is the definition of "byproduct material" in Section 11(e)(2) of the Atomic Energy Act of 1954, as amended, (42 U.S. C Sec. 2014(e)(2)) and the regulatory definition of "byproduct material" found in 10 C.F.R. 40.4:

> *Byproduct Material means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "byproduct material" within this definition.*

---

[8] *42 U.S.C. § 2021(o)(3)(C).*

27. The NRC had several options, including the denial of the amendment requests to process feed material that was not "ore." One option would have been to go to Congress and request that Congress change the definition of 11e.(2) byproduct material to read "the tailings or wastes produced by the extraction or concentration of any ore or any other matter from which source material is extracted in a licensed uranium or thorium mill." NRC Staff made a determination that they would not go to Congress to seek an amendment to the AEA of 1954. If the AEA was amended to include a new definitions, the NRC would have also had to commence a rulemaking to amend 10 C.F.R. Part 40, and the EPA would have had also commence a rulemaking to amend 40 C.F.R. Part 192, 40 C.F.R. Part 61 Subpart W, and other regulations.

What the NRC did was to manipulate the use of the word "ore" as it is used in the definition of 11e.(2) byproduct material. NRC proposed in a notice and comment opportunity, that a policy guidance be established for the purpose of interpreting the term "ore," as it is used in the definition of 11e.(2) byproduct material. 57 Fed. Reg. 20525 (May 13, 1992). The NRC did not institute a rulemaking proceeding to amend 10 C.F.R. Part 40, though they indicated that that was their intent.

28. The NRC Final Position and Guidance gave a new definition of ore:

> *Ore is a natural or native matter that may be mined and treated for the extraction or any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill. [60 Fed Reg. 49296 (September 22, 1995).]*

Based on the new use of the term "ore" as put forth in the NRC Guidance, not only would the definition of 11e.(2) byproduct material apply to "any ore processed primarily for its source material content" in a licensed uranium or thorium mill, but the definition of 11e.(2) byproduct material would also apply to ***any matter*** *processed primarily for its source material content in a licensed uranium or thorium mill. In other words, NRC altered the accepted meaning of the word "ore," as that word was used in the NRC regulatory definition of 11e.(2) byproduct material.*

29. It is plain from the AEA of 1946 and the legislative history of the AEA of 1954 and the Uranium Mill Tailings Radiation Control Act of 1978 and the regulatory history of the AEC, EPA, and NRC rules promulgated responsive to those laws, that the Policy Guidance's new use of the term "ore" goes far beyond the accepted meaning of that term and the clear intent of Congress.

30. The applicability of various environmental regulations to a great degree depends upon definitions. Congress, in their legislative function, often specifically defines words or phrases related to the application of a statute to a particular material or circumstances —when there is a need for explanation. However, when using words or terms with a common and long accepted meaning, such as groundwater, mill, tailings, or "ore," no explanation or definition is necessary.

The NRC and the State of Utah have not authorized to shift these accepted definitions at will as an expression of their "regulatory flexibility." This is especially so when such shifts result in direct conflicts with NRC's own enabling statutes and regulations, as is the case with the use of

the newly defined term "ore." Additionally, NRC and State of Utah are not authorized to shift definitions at will when such shifts directly conflict with the statutory authority and regulations of another federal agency; in this case, the EPA.

31. The NRC issued the 1995 Final Position and Guidance and the 2000 Interim Position and Guidance without conducting an assessment of any of the health, safety, or environmental effects of establishing a substantively new and different regulatory program that resulted from the issuance of the Final Position and Guidance.

At the White Mesa Mill, this new recovery program—a program that started with the processing of a few small batches of wastes from other mineral processing operations to supplement the processing of uranium ore—has grown to be a major uranium recovery program and entails the receipt and processing of thousands of tons of wastes from other mineral processing operations from across the country and even Canada.

The adverse environmental effects—including cumulative effects—of this new program have not been adequately identified and evaluated under the statutory framework established by the AEA. Further, no NEPA document has ever considered the reasonable alternatives to the processing of wastes from other mineral processing operations at uranium and thorium recovery facilities.

32. The NRC, after adopting a new definition of 11e.(2) byproduct material outside of the legislative and rulemaking processes, did not change any other guidance documents that apply to uranium milling. Therefore, there is no indication that any of those guidance documents apply to the processing of feed material other than natural ore and the disposal of the wastes at a licensed uranium or thorium mill. For example, Reg. Guide 8.31, Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities Will be As Low as Reasonably Achievable, and Reg. Guide 8.22, Bioassay at Uranium Mills.

33. UMTRCA, as it amends the AEA, clearly specified what constitutes "any ore." What constitutes "any ore" is "any ore." The plain language of the Act and the history of the implementation of the AEA of 1946, as amended by the AEA of 1954 and UMTRCA, is all that is needed to determine what "ore" or "any ore" is. Clearly the legislative and regulatory history of the AEA and Title 10 of the Code of Federal Regulations make plan the meaning of the term "ore" and the term "any ore."

34. The DWMRC's use of the word "ore" for waste materials from mineral processing operations (in this case materials already defined as 11e.(2) byproduct material) is unreasonable and not permitted under the plain language of the AEA. No state or federal agency can use license conditions, licensing actions, or a policy guidance to expand upon and substantively alter the will of Congress when that will is explicitly set forth in statute.

35. The standards promulgated by the EPA in 40 C.F.R. Part 192 Subpart D and 40 C.F.R. Part 61 Subpart W no not apply to the processing of materials other than natural ore at a licensed uranium mill, the construction of tailings impoundments that will receive wastes from the processing of materials other than natural ore, the emission of radon from wastes from the

processing of matter other than natural ore, the disposal of wastes from the processing of materials other than natural ore, or any other operations or health and safety or environmental impacts from the processing of materials other than natural ore at a licensed uranium mill.

The State of Utah has not been given the authority to amend the AEA, NRC regulations, or EPA regulations through use of NRC guidance or individual licensing actions, or by any other means. Therefore, the DWMRC must delete the provisions in the License that authorize the processing of feed materials other than natural ore, referred to as "alternate feed."

Sarah Fields
Uranium Watch
PO Box 344
Moab, Utah 84532
435-260-8384
July 31, 2017

Division Response: The Division believes that its General Responses #4 and #5 above are adequate to address all the arguments and comments presented in the July 31, 2017 Exhibit A..

UW Comment #129
Emailed Supplement Comment Received August 11, 2017

Dear Mr. Anderson:

The letter is a supplement to Uranium Watch, Living Rivers, and Utah Chapter of the Sierra Club comments on the Renewal of the White Mesa Uranium Mill License, Materials License No. UT1900479. I received the attached letter from Jeff Trembly, RG, Special Projects Coordinator, Adjudications Program Director, Arizona Department of Water Resources (ADWR), on August 2, 2017, after the close of the comment period. This information should be included in comments on the Mill's License Renewal.

The enclosed letter is from Kenneth Slowinski, Chief Counsel, ADWR, to Lee Decker, Gallagher & Kennedy, who, apparently, represents Energy Fuels Resources (USA) Inc. (Energy Fuels) in the matter of the Transportation of Water from Arizona to Utah by Energy Fuels, Inc. The ADWR found that Energy Fuels did not comply with Arizona statute (A.R.S. § 45-292) when it transported water from the Canyon Uranium Mine, Coconino County, Arizona, to the White Mesa Mill for use without prior approval of the ADWR Director. According to Arizona statute, water may not be transported out of state unless 1) the water is put to reasonable and beneficial use in another state and 2) the Director grants prior approval.

Although no fine was imposed, if Energy Fuels intends to transport water from Arizona to Utah in the future, they must comply with all ADWR application and approval requirements.

Mr. Decker argued that the mine water was not transported to the Mill "for reasonable and beneficial use," but "for proper management and ultimate disposal in another state" and that the material was "waste" that included water. The ADWR determined that the water had been

put to use and that, in fact, Arizona law requires exported water be put to reasonable and beneficial use.

Further, on the Utah side, it does not appear that Energy Fuels can transport mine water for "disposal" at the Mill without requesting authorization from the Division of Waste Management and Radiation Control to do so. It is unclear under what regulatory authority the direct disposal of mine water as "waste" could be approved, but there is currently no statute, regulation, or White Mesa Mill license condition that authorizes the receipt and direct disposal of mine water—as waste—at the White Mesa Mill.

It is clear that what happened to the water from the Canyon Mine at the Mill is an important legal and regulatory issue for both the ADWR and the DWMRC. If, in the future, Energy Fuels plans to again transport water from the Canyon Mine to the White Mesa Mill, the DWMRC should make sure that Energy Fuels complies with all ADWR requirements and Energy Fuels should notify the DWMRC of the intent to use the mine water and verify that the transport of water from Arizona has been authorized by the ADWR Director.

Regulatory compliance is a significant environmental and health and safety issue. Energy Fuels compliance with all local, state, and federal regulations related to the operation of the Mill is factor that should be addressed in the License Renewal process and in the Environmental Analysis required under the Atomic Energy Act.1

The Environmental Analysis for the License Renewal should include an accounting of all materials that the are received at the White Mesa Mill for processing or direct disposal, including mine water. These materials would include yellowcake from the Honeywell Inc., Metropolis, Illinois, uranium conversion facility and any other materials that arrive at the Mill for direct disposal or processing.

Sincerely,
Sarah Fields
Program Director

DOUGLAS A. DUCEY
Governor

THOMAS BUSCHATZKE
Director

ARIZONA DEPARTMENT of WATER RESOURCES
1110 West Washington Street, Suite 310
Phoenix, Arizona 85007
602.771.8500
azwater.gov

July 27, 2017

Lee Decker
Gallagher & Kennedy
2575 E. Camelback Road, Suite 1100
Phoenix, Arizona 85016-9225

RE: Transportation of Water from Arizona to Utah by Energy Fuels, Inc.

Dear Lee:

On June 19, 2017, representatives of the Arizona Department of Water Resources (Department) and Energy Fuels Resources, Inc. (Energy Fuels) met to discuss Energy Fuels' past transportation of water across state lines from its Canyon Mine in Arizona to its White Mesa Mill (Mill) in Blanding, Utah. This meeting was followed by your email to me on June 26, 2017.

Energy Fuels' transportation of water across state lines was first brought to the Department's attention by the U.S. Forest Service, which had been contacted by a group known as Uranium Watch. On May 15, 2017, the Department received a formal complaint from Uranium Watch alleging that over 100 tanker trucks of water from the Canyon Mine had been transported to Utah from late 2016 to 2017 without approval of the Director of the Department, in violation of A.R.S. § 45-292.

The Department understands from Energy Fuels that the water Energy Fuels transported was a combination of clean groundwater from a perched aquifer and mine waste water pumped from a sump at the bottom of a mine shaft that is offset from the uranium ore body. According to the Arizona Department of Environmental Quality (ADEQ), the mine waste water was a combination of groundwater from the area (not including the water from the perched aquifer) and water used in the drilling and shaft sinking process.

It is the Department's understanding that Energy Fuels places the mine waste water in a lined impoundment for disposal by evaporation as required by an Aquifer Protection Permit issued by ADEQ. Energy Fuels informed the Department at the meeting on June 19, 2017, that although its preferred practice is to not place the clean groundwater from the perched aquifer in the lined impoundment with the mine waste water, it began doing so when a hoist in the mine shaft broke. Therefore, at the time Energy Fuels was transporting water from the impoundment across state lines, the water included both mine waste water and groundwater from the perched aquifer.

Energy Fuels does not deny that it transported the mine wastewater and clean groundwater from the perched aquifer from Arizona to Utah. However, in your email and in past communications, you maintain that prior approval of the Director was not required under A.R.S. § 45-292 for two reasons. As explained below, the Department disagrees with both reasons.

First, in your email, you maintain that the Director's prior approval was not required because the water "was not transported from the state for a reasonable and beneficial use in another state." You point to language in A.R.S. § 45-292 that states: "A person may withdraw, or divert, and transport water from this state for a reasonable and beneficial use in another state if approved by the director pursuant to this article." You state in your email that this language requires approval by the Director only if the water is transported for a reasonable and beneficial use in another state. You argue that approval was not necessary in this case because Energy Fuels transported the water "for proper environmental management and ultimate disposal in another state," and not for a reasonable and beneficial use in another state.

The Department disagrees with this argument. It is undisputed that the water transported by Energy Fuels across state lines was put to a reasonable and beneficial use at the Mill. Thus, approval by the Director was required by the plain language of the statute. Moreover, even if the Department were to accept your argument that approval of the Director was not required because the water was not transported for a reasonable and beneficial use, the transportation would not have been allowed under Arizona law because, as the Department representatives stated at the June 19, 2017 meeting, A.R.S. § 45-292 allows a person to transport water across state lines *only* if the water will be put to reasonable and beneficial use in the other state and if all other requirements of A.R.S. § 45-292 have been satisfied.

Second, you argue in your email that prior approval of the director was not required under A.R.S. § 45-292 because "Energy Fuels did not ship 'water' as contemplated under the statute. What was shipped was in effect a waste material that contained water, for proper environmental management and ultimate disposal." The Department disagrees with this argument. There is no exception in A.R.S. § 45-292 for the transportation of mine waste water from this state to another state. It is the position of the Department that the mine waste water is water, and that the water may not be transported across state lines unless the water is put to a reasonable and beneficial use in the other state and prior approval of the Director is obtained pursuant to A.R.S. § 45-292. Additionally, the water from the perched aquifer was not mine waste water. The transportation of that water across state lines is therefore clearly subject to A.R.S. 45-292.

Regarding the past shipments of water by Energy Fuels from the Canyon Mine in Arizona to Utah, Energy Fuels represented that the transportation was undertaken to avoid overtopping at the lined impoundment near the mine. At the June 19, 2017 meeting, Energy Fuels represented that transportation across state lines ceased approximately three to four weeks prior to the meeting, and that it is implementing measures to eliminate the risk of overtopping at the impoundment in the future. These measures include greater reduction of water levels or depletion of water from the impoundment prior to high-precipitation winter months each year, the installation and use of electric boilers to enhance

evaporation rates, continued use of land sharks, segregation of the clean groundwater aquifer from the mine waste water, and possible on-site treatment of contaminated water.

Because shipments of water across state lines have ceased and because Energy Fuels is implementing measures to eliminate the need to transport water out of Arizona from the Canyon Mine, the Department will not take any action against Energy Fuels for the past transportation of water from the mine to Utah. However, Energy Fuels must comply with A.R.S. § 45-292 for any future transportation of water from the Canyon Mine out of state by filing an export application with the Department and obtaining the prior approval of the Director. Before the Director decides whether to grant the application, an administrative hearing must be held in the county from which the water would be transported. At this hearing, "any interested person, including the Department, may appear and give oral or written testimony on all issues involved." A.R.S. § 45-292(E). The processing of an export application, including time for an administrative hearing, could require over a year.

The Department appreciates the willingness of Energy Fuels to meet with the Department to discuss this matter and Energy Fuels' future compliance with state law.

Sincerely,

Kenneth Slowinski
Chief Counsel

Division Response:
This letter and attachment were received after closure of the comment period, on August 11, 2017. The comment is therefore not timely and should be rejected on that basis. In the alternative and without waiving the Division's objection on the lack of timeliness, the Division responds to this comment by concluding that all the information submitted here is outside the scope of the Division's legal jurisdiction and, in any event, is far outside the scope of the matters before the Division in the present relicensing action. Therefore, this comment and the attached letters will be added to the administrative record but will not be responded to by the Division.

Public Comment #085
Aaron Paul, Staff Attorney, Grand Canyon Trust
Emailed Comment Received July 31, 2017

Dear Mr. Anderson:

Thank you for the opportunity to comment on the Division of Waste Management and Radiation Control's proposal to renew Energy Fuels Resources (USA), Inc.'s radioactive materials license and groundwater discharge permit for the White Mesa Mill. We appreciate the effort the Division has made over the last decade to review Energy Fuels' license and permit applications, to prepare the proposed license and permit, and to solicit public comments. Ours are enclosed.

If the Division has any questions about our comments, we'd be glad to answer them.
Sincerely,
Aaron M. Paul
Enclosure

Comments on the Proposed Renewal of Energy Fuels Resources (USA), Inc.'s Radioactive Materials License and Groundwater Discharge Permit for the White Mesa Mill
July 31, 2017

TABLE OF CONTENTS

EXHIBIT LIST

Exhibit 9	*Letter from H. Roberts, Executive Vice President, International Uranium (USA)Corporation, to M. Leavitt, Governor, State of Utah (June 18, 1997).*
Exhibit 10	*Energy Fuels, "Our History," 3 (July 11, 2017) available at http://www.energyfuels.com/corporate/history/.*
Exhibit 11	*Memorandum and Order, In re International Uranium (USA) Corp., CLI-00-01, Docket No. 40-8681-MLA-4 (Feb. 10, 2000).*
Exhibit 12	*Letter from M. Rehmann, Environmental Manager, International Uranium (USA) Corporation, to M. Leach, Director, Fuel Cycle Licensing Branch, U.S. Nuclear Regulatory Commission (Oct. 17, 2001).*
Exhibit 13	*Energy Fuels Nuclear, Inc., Request to Amend Source Material License SUA-1358 White Mesa Mill, Docket No. 40-8681 (Sep. 20, 1996).*
Exhibit 14	*International Uranium (USA) Corporation, Request to Amend Source Material License SUA-1358, White mesa Mill, Docket No 40-8681 (Mar. 16, 2000).*
Exhibit 15	*White Mesa Mill, Aerial Photograph (Aug. 23, 1983).*
Exhibit 16	*MWH, Energy Fuels Resources (USA) Inc., White Mesa Mill: Updated Tailings Cover Design Report (Aug. 2016), Appendix A to Energy Fuels Resources (USA) Inc., Reclamation Plan: White Mesa Mill, Blanding, Utah – Radioactive Materials License No. UT1900479, Revision 5.1 (Aug. 2016).*
Exhibit 17	*Letter from S. Anderson, Director, Division of Waste Management and Radiation Control, to B. Tharakan, U.S. Nuclear Regulatory Commission (Apr. 26, 2016).*
Exhibit 18	*Letter from D. Turk, Manager, Environmental Health and Safety, Energy Fuels Resources (USA) Inc., to R. Lundberg, Director, Division of Radiation Control (Nov. 8, 2013).*
Exhibit 19	*Energy Fuels Resources (USA) Inc., Cost Estimates for Reclamation of White Mesa Facility in Blanding, Utah (June 2016), Attachment C to Energy Fuels Resources (USA) Inc., Reclamation Plan: White Mesa Mill, Blanding, Utah – Radioactive Materials License No. UT1900479, Revision 5.1 (Aug. 2016).*
Exhibit 20	*Letter from J. Tischler, Director of Compliance & Permitting, Energy Fuels, to R. Lundberg, Director, Division of Radiation Control, and Reclamation Plan Revision 3.2B attached thereto (Jan. 14, 2011).*
Exhibit 21	*Stipulation and Consent Agreement, In re Energy Fuels Resources (USA) Inc. (Feb. 25, 2017).*
Exhibit 22	*Letter from J. Tischler, Director of Compliance & Permitting, Energy Fuels, to D. Finefrock, Executive Secretary, Utah Radiation Control Board, and Revised Infiltration and Contaminant Transport Modeling Report attached there (Mar. 31, 2010).*
Exhibit 23	*Division, Radioactive Material License No. UT 1900479 and Utah Ground Water Discharge Permit No. UGW370004, Technical Evaluation and Environmental Assessment: White Mesa Uranium Mill, Energy Fuels Resources (May 2017)*
Exhibit 24	*U.S. Department of Energy, Remediation of the Moab Uranium Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement: Summary (July 2005).*
Exhibit 25	*U.S. Environmental Protection Agency, Detailed Comments by the U.S. Environmental Protection Agency on the Draft Environmental Impact Statement for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah.*

Exhibit 26 *Utah Division of Radiation Control, Radioactive Materials License UT 1900479 Am. 7 (July 10, 2014).*

Exhibit 27 *Utah Division of Radiation Control, Radioactive Materials License UT 1900479 Am. 8 (2017).*

Exhibit 28 *Energy Fuels' Motion for Summary Judgment and Memorandum in Support, Case No. 2:14-cv-00243, U.S. District Court for the District of Utah (Apr. 27, 2016).*

Exhibit 29 *Geosyntec Consultants, Analysis of Slimes Drain, Denison Mines: White Mesa Mill (May 2007).*

Exhibit 30 *Titan Environmental, Tailings Cover Design: White Mesa Mill (Sep. 1996), Attachment E to Reclamation Plan Revision 5.1 (Aug. 2016).*

Exhibit 31 *Daved E. Mathes, Lessons Learned from the 20-Year Uranium Mill Tailings Remedial Action Surface Project, U.S. Department of Energy, Office of Environmental Management (Mar. 4, 1999).*

Exhibit 32 *John C. Lommler et al., DOE UMTRA Project Disposal Cell Design Summary (Mar. 4, 1999).*

Exhibit 33 *W. J. Waugh, DOE Experience with Cover Degradation Processes, Design Improvements, and Cover Renovation for Uranium Mill Tailings Disposal Cells (Aug. 2010).*

Exhibit 34 *W.J. Waugh et al., Sustainable Covers for Uranium Mill Tailings, USA: Alternative Design, Performance, and Renovation (Oct. 11, 2009).*

Exhibit 35 *W. J. Waugh, Design, Performance, and Sustainability of Engineered Covers for Uranium Mill Tailings, Proceedings of the Workshop on Long-Term Performance Monitoring of Metals and Radionuclides in the Subsurface: Strategies, Tools, and Case Studies. U.S. Geological Survey (Apr. 21, 2004).*

Exhibit 36 *Craigh H. Benson et al., Design and Installation of a Disposal Cell Cover Field Test (Feb. 27, 2011).*

Exhibit 37 *Mark E. Smith, An Evaluation of Engineered Cover Systems for Mine Waste Rock and Tailings (Apr. 2013).*

Exhibit 38 *Energy Fuels Resources (USA) Inc., Responses to Review of August 15, 2012 (and May 31, 2012) Energy Fuels Resources (USA) Inc. Responses to Round 1 Interrogatories on Revision 5 Reclamation Plan Review, White Mesa Mill Site, Blanding, Utah, Report Dated September 2011 (Aug. 31, 2015).*

Exhibit 39 *Utah Division of Radiation Control, "Groundwater Discharge Permit No. UGW370004" (Aug. 24, 2012).*

Exhibit 40 *Utah Division of Radiation Control, "Groundwater Discharge Permit No. UGW370004" (2017).*

Exhibit 41 *R. Rager et al., Abstract: Effect of Freezing and Thawing on UMTRA Covers, Remedial Action Programs Annual Meeting (Oct. 18, 1988).*

Exhibit 42 *Utah Division of Radiation Control, Denison Mines (USA) Corp's Revised Infiltration and Contaminant Transport Modeling Report: Interrogatories – Round 1 (Mar. 2012).*

Exhibit 43 *Lawrence J. Bruskin & Steve Tarlton, State of Colorado Experience with Waste Repository Covers and Caps, Proceedings of the Workshop on Engineered Barrier Performance Related to Low-Level Radioactive Waste, Decommissioning, and Uranium Mill Tailings Facilities (Aug. 3, 2010).*

Exhibit 44 *U.S. Environmental Protection Agency, Fact Sheet on Evapotranspiration Cover Systems for Waste Containment (Feb. 2011).*

Exhibit 45 *Technical Memorandum from J. Luellen and R. Baird, URS Professional Solutions, to J. Hultquist, Utah Division of Radiation Control, Review of August 15, 2012 (and May 31, 2012) Energy Fuels Resources (USA) Inc. Responses to Round 1 Interrogatories on Revision 5 Reclamation Plan Review, White Mesa Mill Site, Blanding, Utah, report dated September 2011 (Feb. 13, 2013).*

Exhibit 46 *William H. Albright & Craig H. Benson, Alternative Cover Assessment Program Report to Office of Research and Development, National Risk Management Research Lab, Land Remediation and Pollution Control Division (2005).*

Exhibit 47 *U.S. Environmental Protection Agency, (Draft) Technical Guidance for RCRA/CERCLA Final Covers (Apr. 2004).*

Exhibit 48 *MWH, Energy Fuels Resources (USA) Inc., White Mesa Mill: Preliminary Mill Decommissioning Plan (Aug. 2016), Appendix B to Energy Fuels Resources (USA) Inc., Reclamation Plan: White Mesa Mill, Blanding, Utah – Radioactive Materials License No. UT1900479, Revision 5.1 (Aug. 2016).*

Exhibit 49 *National Research Council, Best Practices for Risk-Informed Decision Making Regarding Contaminated Sites (2014).*

Exhibit 50 *Craig H. Benson, et al., Engineered Covers for Waste Containment: Changes in Engineering Properties and Implications for Long-Term Performance Assessment, NUREG/CR-7028 (Dec. 2011).*

Exhibit 51 *U.S. Government Accountability Office, Uranium Mill Tailings: Cleanup Continues, but Future Costs Are Uncertain (Dec. 1995).*

Exhibit 52 *U.S. Energy Information Administration, Remediation of UMTRCA Title I Uranium Mill Sites Under the UMTRA Project, Summary Table: Uranium Ore Processed, Disposal Cell Material, and Cost for Remediation as of December 31, 1999 (Dec. 31, 1999).*

Exhibit 53 *U.S. Department of Energy, Office of Legacy Management, UMTRCA Title I Site Fact Sheets (Nov. 2016).*

Exhibit 54 *U.S. Department of Energy, Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project, Vol. I (Oct. 1996).*

Exhibit 55 *Golder Associates Inc., Alternatives Analysis of Contaminated Groundwater Treatment Technologies, Tuba City, Arizona, Disposal Site (Feb. 20150.*

Exhibit 56 *U.S. Energy Information Administration, U.S. Department of Energy, Decommissioning of U.S. Uranium Production Facilities (Feb. 1995).*

57 *U.S. Environmental Protection Agency, Cleanup of historic Uravan uranium mill completed (Sep. 29, 2008).*

Exhibit 58 *Letter from S. Tarlton, Manager, Radiation Program, Colorado Department of Public Health and Environment, to J. Hamrick, Cotter Corporation (Arp. 22, 2010).*

Exhibit 59 *Letter from J. Hamrick, Vice President, Mill Operations, Cotter Corporation, to S. Tarlton, Manager, Radiation Program, Colorado Department of Public Health and Environment (Nov. 6, 2012).*

Exhibit 60 *U.S. Environmental Protection Agency, Region 6, United Nuclear Corporation (McKinley County) New Mexico: Current Status (July 2015).*

Exhibit 61 *U.S. Environmental Protection Agency, Site Activities Update: Homestake Mining Company and Grants Mining District (Aug. 2015).*

Exhibit 62 *Letter from J. Surmeier, Chief Uranium Recover and Low-Level Waste Branch, Nuclear Regulatory Commssion, to L. Corte, Manager, Western Nuclear, Inc. (Nov. 1, 1999).*

Exhibit 63 *U.S. Nuclear Regulatory Commission, Western Nuclear–Split Rock Uranium Recovery Facility (undated).*

Exhibit 64 *U.S. Nuclear Regulatory Commission, Environmental Assessment for Amendment to Source Materials License SUA-56 Ground Water Alternate Concentration Limits: Western Nuclear, Inc., Split Rock Uranium Mill Tailings Site, Jeffrey City, Freemont County, Wyoming (Aug. 2006).*

Exhibit 65 *Lee Shenton, Grand County UMTRA Liaison, Moab UMTRA: Uranium Mill Tailings Remedial Action (May 2017).*

Exhibit 66 *U.S. Department of Energy, Inspector General, Audit Report: Restoration of the Monticello Mill Site at Monticello, Utah (Oct. 2004).*

Exhibit 67 *Division of Waste Management and Radiation Control, Public Participation Summary for Comments Received Between October 14 and December 21, 2011: License Renewal for Radioactive Material License No. UT1900479, Energy Fuels Resources (USA) Inc. (EFRI), White Mesa Uranium Mill, San Juan County, Utah (Mar. 2017).*

Exhibit 68 *U.S. Nuclear Regulatory Commission, Consolidated Decommissioning Guidance: Financial Assurance, Recordkeeping, and Timeliness (Feb. 2012).*

Exhibit 69 *Division of Low-Level Waste Management and Decommissioning, U.S. Nuclear Regulatory Commission, Technical Position on Financial Assurances for Reclamation, Decommissioning, and Long-Term Surveillance and Control of Uranium Recovery Facilities (Oct. 1988).*

Exhibit 70 *U.S. Department of Energy, Office of Inspector General, Office of Audits and Inspections, Audit Report: Management of Long-Term Surveillance and Maintenance of Uranium Mill Tailings Radiation Control Act of 1978 Title II Sites, OAS-L-15-02 (Oct. 2014).*

Exhibit 71 *Office of the Inspector General, U.S. Nuclear Regulatory Commission, Audit of NRC's Oversight of Decommissioned Uranium Recovery Sites and Sites Undergoing Decommissioning, OIG-12-A-06 (Dec. 13, 2011).*

Exhibit 72 *U.S. Department of Energy, A Report to Congress Detailing DOE's Existing and Anticipated Long-Term Stewardship Obligations (Jan. 2001).*

Exhibit 73 *Oklahoma v. Sequoyah Fuels Corp., Plaintiffs Application for a Temporary Restraining Order, Motion for Temporary Injunction and Brief in Support, CV-2017-00023 (D.Ct. Sequoyah County, Feb. 9, 2017).*

Exhibit 74 *URS Professional Solutions, LLC, Safety Evaluation Report for Amendment Request to Process an Alternate Feed Material (the SFC Uranium Material) at White Mesa Mill from Sequoyah Fuels Corporation, Gore, Oklahoma (May 1, 2015).*

Exhibit 75 *Letter from John Ellis, President, Sequoyah Fuels Corp. to Clayton Eubanks, Oklahoma Attorney General's Office, and Sara Hill, Cherokee Nation Office of the Attorney General (July 24, 2015).*

Exhibit 76 *Utah Department of Environmental Quality, Divisions of Radiation Control and Water Quality, Elements of a Utah Agreement State Program for Uranium Mills Regulation (Aug. 26, 2000).*

Exhibit 77 *Amendment to Agreement Between the United States Nuclear Regulatory Commission and the State of Utah for Discontinuance of Certain Commission Regulatory Authority and Responsibility within the State Pursuant to Section 274 of the Atomic Energy Act of 1954, as Amended (Aug. 16, 2004).*

Exhibit 78 *Letter from J. Tischler, Director, Compliance and Permitting, Energy Fuels, to R. Lundberg, Director, Utah Department of Environmental Quality (Dec. 15, 2011).*

The Division's General Responses, above, are intended to address the vast majority of the comments raised by the Grand Canyon Trust. These general responses are incorporated generally here. But in the interest of creating a more robust record of the Director's final determinations in this matter, a more detailed and specific response to all the comments submitted by the Grand Canyon Trust has been created, here. One of the purposes of doing so is to create a more clear administrative record in the event that review of the Director's final determinations is required by others.

The following should also be noted. At the invitation of the Director, EFRI submitted Responses to Selected Public Comments on October 23, 2017 (the "Reply Comments"). The Director also solicited Sur-Reply comments from the Grand Canyon Trust regarding this matter. These were received by the Division on November 17, 2017.

The Director has considered and has relied upon the Reply Comments and the Sur-Reply Comments in reaching a final decision on the merits of all the issues pending in this administrative record. More specifically, the Director has reviewed and has relied upon the detailed factual information and technical and legal analysis provided by EFRI in its Reply Comments pages 19-51 as relating to the comments raised by the Grand Canyon Trust. The Reply Comments and Sur-Reply Comments are designated as part of the Administrative Record in this matter. However, the Director has not created a separate response to the Reply Comments or the Sur-Reply Comments but has relied on the same in rendering a final decision in this matter.

Following is the Director's response to the specific comments raised by the Grand Canyon Trust. These comments have been re-numbered in order to facilitate presentation of the comments and responses.

GCT Comment #01
I. Introduction and Executive Summary

The Utah Division of Waste Management and Radiation Control is proposing to renew the radioactive materials license and groundwater discharge permit that authorize Energy Fuels Resources (USA) Inc., to run the White Mesa uranium mill in southeast Utah and permanently bury radioactive wastes there.

Division Response: The Division concludes that there is no legal support for the statement that the material being consolidated and disposed of at the White Mesa mill is "waste." The Division General Response #04: Alternate Feed and 11e(2) Disposal, and the Division General Response #05: Sequoyah Fuels Alternate Feed Amendment, above, are incorporated herein by this reference.

GCT Comment #02

The Division has no doubt made many improvements to the license and permit since they were first issued to Energy Fuels over a decade ago. We applaud those improvements, but our comments are directed at remaining shortcomings in these documents. Nearly all our comments are about the plan for reclaiming the mill and the surety bond that guarantees funding for doing so. That plan has several major flaws, particularly in the way that it handles reclamation deadlines. The surety doesn't guarantee enough funding for the possibility that reclaiming the mill won't go as planned. We also implore the Division to reject Energy Fuels' request to process and discard radioactive sludge from Sequoyah Fuels' defunct uranium-conversion plant in Oklahoma.

A point that deserves emphasis at the outset is that we are skeptical that a seven-year performance test of the proposed evapotranspirative cover needs to be completed before Energy Fuels reclaims impoundments at the mill. If the cover were to be improved to a state-of-the-art design, we doubt a performance test would yield especially useful information, given the risks posed by delay in reclaiming the mill's impoundments. This is particularly true because there is performance data available for the tailings repository built not far away in Monticello, Utah that can be considered in reclaiming the wastes at the White Mesa mill. Though we recognize that designing a tailings-impoundment cover is an exceedingly complex task that is fraught with uncertainty, we ask the Division to reconsider whether to require the company to make improvements to the evapotranspirative cover so that it reflects a state-of-the-art design and build the cover on Cell 2 at the mill promptly, without completing the performance test. Information and data gathered from the cover's performance on Cell 2 could be used to adjust the cover design for the remaining cells.

Division Response: The comment suggesting that the Division should compel the construction of final cover on Cell 2 is without merit. Doing so prematurely would have negative impacts and require the expenditure of unwarranted costs. A final cover will be installed on Cell 2 as soon as the cell is dewatered and stabilized. Moreover, the proposed evapotranspirative (ET) cover is not yet been proven to meet applicable engineering and performance standards. As a result, the Division has determined to grant Energy Fuel's request to test the performance of its proposed design for a new ET cover during the time that Cell 2 continues to be dewatered and as it becomes more stable. If the proposed ET cover system proves to meet the applicable standards, Energy Fuels will be authorized to use it. If not, the approved rock armor design will be installed. It will require several years for ET cover testing and Cell 2 stabilization and dewatering to be completed. Until that time, it would not be legally or technically warranted for the Division to require the installation of a final cover immediately. A more detailed response as to the applicable technical criteria that the ET cover must meet follows, below.

Applicable standards set forth in 10 CFR 40 Appendix A Criterion 6(1) require: "In disposing of waste byproduct material, Licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m2s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion." Criterion 6A(1) further requires: "For impoundments containing uranium byproduct materials, the final radon barrier must be completed as expeditiously *as practicable considering technological feasibility* after the pile or impoundment ceases operation in accordance with a written, Commission-approved reclamation plan. (The term *as expeditiously as practicable considering technological feasibility* as specifically defined in the Introduction of this appendix includes factors beyond the control of the Licensee.)." [Emphasis in the original].

The purpose of the cover is to reduce radiological hazards over the design life of the cover system. The cover system approved in Reclamation Plan 3.2b has those design features. The proposed ET cover *may* provide superior performance, or may erode away faster than the approved rock armor cover. 10 CFR 40 Appendix A criterion 4(d) states: "A full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels. Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover must be employed on slopes of the impoundment system." The Division has concerns that the vegetative cover system will not be self-sustaining in the arid climate of Blanding, Utah. It seemed inappropriate to require immediate installation of a cover system that may prove ineffective, only to require remedial action at a later date. Requiring the Licensee to prove the capability of its cover design seemed wiser. Furthermore, final cover cannot be placed until sufficient settlement and dewatering of the tailings mass has occurred to reduce the likelihood of differential settlement compromising the performance of the Radon barrier. Given that some unknown period of consolidation must occur prior to placing final cover anyway, the prudence of using this time to evaluate the Licensee's design becomes more apparent.

10 CFR 40 Appendix A Criterion 6A(1) further requires: "Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan." Reclamation Plan Revision 5.1 discusses these issues in Section 3, treating dewatering and consolidation of the tailings on p. 3-11. The narrative indicates that Phase 1 cover installation would surcharge the tailings sufficiently to induce the bulk of the expected consolidation. Phase 1 cover construction was completed on Cell 2 as of April 27, 2017.

The Division has determined that this Phase 1 cover is adequate to protect human health and safety, as well as the environment, until such time as Cell 2 reaches a more stable state of equilibrium (homeostasis). At that time, the final cover will be installed. Dewatering and stabilization is likely to take several additional years. As a result, the milestones referenced here cannot be set with a date certain. These must be set with triggering conditions until settlement is sufficiently complete that the recontouring will not need to be done. Settlement is monitored and reported annually in the Annual Technical Evaluation Report, which the reader can find on the Division's web page.

GCT Comment #03

For ease of review, the other principal requests we make in these comments are listed below. This list isn't exhaustive and isn't meant to diminish the importance of other requests or critiques made elsewhere in these comments. We ask the Division to:

- *Thoroughly and independently analyze the reclamation-cost estimates Energy Fuels has made and the probabilities that those estimates may prove inaccurate given the cost of closing other uranium mills throughout the country, and require a surety amount (including a contingency) that conservatively guards against the risk that reclamation costs greatly exceed the company's forecasts.*

Division Response: This comment is addressed in large part through the Division's General Responses, particularly numbers 12 and 15. Moreover, this comment incorrectly assumes that the Division failed to consider the risk that the surety estimate may prove to be inadequate. This is not the case. The Division is confident that the amount of surety established for the White Mesa Mill is adequate to protect Utah taxpayers from the risk of incurring public costs were the Mill to close prematurely. The adequacy of the surety is reviewed every year. The value is set at the cost that would be required for the state to hire third-party contractors to close the Mill in its current condition. With respect to comparisons to the costs incurred in reclamation of other mill sites, there are a variety of problems in making direct comparisons. The costs to reclaim any given mill site is highly dependent on its unique facts, its location, costs of equipment and labor in the relevant market, the original construction of the Mill, and other factors, such as the following (offered by way of illustration):

- Other decommissioned mill sites were constructed when standards for environmental protection were weaker or nonexistent. For example, their tailings impoundments were not lined, so their process fluids readily leached into ground water. Because the conditions at the White Mesa site are distinguishable, a direct comparison is not warranted and would give no credit for the preventive measures already in place at the White Mesa Mill, thus overestimating the costs involved.

- Previous sites had little or no monitoring networks in place to facilitate early detection and cleanup of releases. At the White Mesa Mill, robust monitoring networks are in place. And they are working. For example, the environmental monitoring system at the White Mesa Mill detected chloroform and nitrate releases, which are currently in cleanup and control phases. The monitoring network has also proved successful in confirming the success of liner breach repair efforts at Cell 1.

- Previous sites had no ongoing cleanup effort while they were operational. Thus, the entire remediation and reclamation expense was deferred to the decommissioning phase of the project life cycle. That is not true of the White Mesa Mill. As new tailings cells are brought online, old facilities as closed and covered. In the case of Cell 2, a functioning, final radon barrier has been installed. The only element lacking is the final cover, as discussed above. In the case of the chloroform and nitrate releases to groundwater, these have been identified, all ongoing releases controlled, the nature and extent defined, and remediation is underway. On top of that, adequate surety money has been set aside to cover these groundwater releases in the unlikely event that the current operator were to become defunct.

- Many of the decommissioned mill sites were poorly sited. For an extreme example, Atlas was sited on the bank of the Colorado River near Moab, Utah. The extremely high remediation costs for the former Atlas Mill relate directly to the poor siting of the original mill facility. The White Mesa site selection process was superior as compared to Atlas and many other mill sites, including Green River. Moreover, the White Mesa Mill developers purchased thousands of acres of vacant property to serve as a buffer. Drinking groundwater for the region is found in the deep Navajo Aquifer. Any theoretical releases from the White Mesa Mill would be confined to the perched aquifer and would not likely impact the deep drinking water aquifer. A substantial bentonitic clay/rock aquiclude prevents migration of water from the perched aquifer into the deep groundwater. *See* Division General Response #16 (Hydraulic Isolation of the Navajo Aquifer from the Perched Burro Canyon Aquifer). This unique geologic setting provides opportunity to address releases, if they occur, before they impact the ground water and become much more expensive to handle.

- The Division has been aggressive in its efforts to make the surety complete and conservative. Again using the Atlas site as an example, the Licensee successfully avoided securing even 1% of the required surety because of a weak regulatory regime. Such is not the case here.

- The current contingency value of 25% is in line with industry standard, and is higher than that recommended in NUREG-1620 which is the guidance for uranium mill sites.

Based on these considerations and many others, it is not appropriate to compare the reclamation and remediation costs at other mill sites with the White Mesa Mill. The Division is well aware of all of the uranium mill projects throughout the state and other part of the Country and takes this data into account when reviewing the adequacy of the White Mesa Mill surety every year.

GCT Comment #04

- *Require Energy Fuels to forecast the cost of building the evapotranspirative cover proposed in Reclamation Plan Revision 5.1, in addition to the 1996 conventional cover design described in Reclamation Plan Revision 3.2, and base its surety on the more expensive plan.*

Division Response: This comment is moot. Both cover systems have been forecast. The currently-approved cover, rock armor, is also the more expensive system. The surety is based on the more expensive rock armor cover. If the ET cover system is approved, the amount of the surety will need to be re-evaluated at that time.

GCT Comment #05

- *Complete a site-specific analysis of probable long-term costs at the White Mesa mill after reclamation, and establish a fund amount to be guaranteed in Energy Fuels' surety that is sufficient to cover long-term costs at an interest rate of one percent.*

Division Response: A long-term care fund is part of the surety, and will be turned over to the Department of Energy, Office of Legacy Management along with the site following decommissioning. Under federal law, the DOE is required to take over long-term care and stewardship of the White Mesa Mill. The Division finds that there is adequate provision for the long-term care and maintenance of the facility following its ultimate decommissioning. The ultimate responsibility for the property will fall to the Federal government.

GCT Comment #06

- *Deny Energy Fuels' request to process the Sequoyah Fuels sludge.*

Division Response: The Division's Response to Comment No. 1 is incorporated by this reference. It is undisputed in this record that the NRC has determined that the Sequoyah Fuels material qualifies as 11e.(2) byproduct material. This determination was made by the NRC, not the Division. This comment would be more appropriately directed to the NRC. In any event, because of the NRC's designation, RCRA and TSCA do not apply. Environmental analysis of the potential impacts this material may contribute if processed to recover its uranium values has been performed and review of that work did not reveal new concerns to current operations at the Mill. The material meets the definition of alternate feed presented in the 1992 and 1995 Federal Register and NRC guidance documents on alternate feed. Based on the administrative record, there is no legal or technical basis upon which the Division could deny the Licensee's request to process this material.

GCT Comment #07

- *Require Energy Fuels to analyze alternatives for transporting the mill's radioactive wastes off site for permanent disposal.*

Division Response: Based on the administrative record, there is no legal, technical, or other basis upon which the Division could require the relocation wastes from the White Mesa Mill to any off-site location. The Mill was sited and permitted as a permanent repository for byproduct material. Wastes are being properly managed. All applicable performance standards are being met. The facility is bonded as a permanent repository for such materials. It is beyond all reason to require the relocation of these wastes. The commenter's demand was settled in 1978 with the initial siting study for the Mill, adopted and approved by the NRC at that time.

GCT Comment #08

Revise the definition of "operation" that appears in Section 6.2.1 of Energy Fuels' Reclamation Plan Revision 5.1[1] to match the definition of "operation" in Appendix A to the Nuclear Regulatory Commission's uranium-mill-licensing rules.[2]

Division Response: The definition in Section 6.2.1 is warranted based on the administrative record. Moreover, the Division's definition is consistent with a recent ruling by the U.S. District Court for the District of Utah, *Grand Canyon Trust v. Energy Fuels Resources (U.S.A.), Inc.*, Case No. 2:14-cv-243. In that matter, Judge Waddoups recently entered a Memorandum Decision and Order (September 9, 2017), dismissing, with prejudice and on the merits, claims brought by the commenter based on the same argument presented in this comment. This issue having now been decided by a federal court, the Division adopts this ruling. The comment is rejected.

GCT Comment #09

- *Add the definition of "byproduct material" used in the Nuclear Regulatory Commission's regulations (that has been incorporated by reference under State law) to Plan Revision 5.1."[3]*

Division Response: In the Reclamation Plan Revision 5.1, the Licensee adopts and uses the definition of "byproduct material" set forth in the Memorandum and Decision filed February 10, 2000, NRC Docket #40-8681-MLA-4, NRC Document #ML14133A521. This comment is more appropriately directed to the NRC, not the Division. No change to the Plan Revision 5.1 is warranted based on this comment.

GCT Comment #10

- *Clarify in Revision 5.1 that Appendix A's impoundment-closure requirements apply to all the cells at the mill, including Cells 1 and 4B, and will apply to any ce*lls built in the future into which "byproduct material" is placed.[4]

Division Response: The provisions of Reclamation Plan Revision 5.1 meet the intent of 10 CFR 40 Appendix A criteria for decommissioning. No change is required.

GCT Comment #11

- *Include milestones in Revision 5.1 for closing all the mill's impoundments, including Cells 1 and 4B, as well as any other so-called "evaporation ponds" built in the future.[5]*

Division Response: Milestones have already been clarified in the Reclamation Plan for impoundments that will receive tailings. The requirements for fluid management impoundments have no similar requirements and can be closed as already outlined in the reclamation plan. No change is required.

GCT Comment #12

- *Change Revision 5.1's definition of "final closure" to match the definition in the U.S. Environmental Protection Agency's emissions standards for radon emitted from uranium-mill wastes, commonly called Subpart W.[6]*

Division Response: The issue raised in this comment was also addressed by the court in the Memorandum Decision and Order in *Grand Canyon Trust v. Energy Fuels Resources (U.DS.A.) Inc.,* referred to in the Division's Response to Comment No. 8, above. The Division adopts the same position as the U.S. District Court on this issue. As a result, this comment is without merit and is rejected.

---

[1] *Ex. 1 at 6-1.*
[2] *10 C.F.R. Part 40, App. A.*
[3] *10 C.F.R § 40.4; Utah Admin. Code R313-24-4.*
[4] *Ex. 1 at 6-2.*
[5] *See Ex. 1 at 3-5 to 3-6 (discussing the planned closure steps for Cell 1).*
[6] *40 C.F.R. Part 61, Subpart W*

GCT Comment #13

- *Establish an absolute deadline in Revision 5.1 for removing freestanding liquids from cells that are no longer in operation, such as 180 days after final closure begins.*
- *Require Energy Fuels to stop adding liquids to impoundments as soon as final closure begins (rather than to "minimize" the addition of liquids) and to pump freestanding liquids into other operating cells, regardless of whether doing so will force the company to curtail mill operations.*

Division Response: This comment is not warranted and is not supported by any information in the administrative record. The Division's Responses to Comment No. 2, above, and Comment No. 14, below, are incorporated by this reference. It is impossible to determine in advance how many months or years will be required to de-water and stabilize an impoundment before the installation of final cover should be required. This is highly dependent on a variety of technical and engineering issues relating to the bearing capacity of the soils and materials, saturation levels, percolation rates, and similar issues.

Moreover, in the Division's experience, technical models have proven to be inaccurate in predicting dewatering performance. Several factors could contribute to the inaccuracies, and discussion of the fine details are beyond the scope and purpose of this document. Suffice it to say that precipitation of crystals within the slimes may be impeding flow if fluid to the dewatering features. This and other competing theories are being explored. The recently installed piezometers in Cell 2 form part of the data gathering effort as the Licensee and the Division seek to solve this problem and find a way to accelerate dewatering. Until a solution can be found, the Division has two options from which to choose: (1) set date-certain milestones and be constantly reviewing and approving changes to those milestones because factors beyond the control of the Licensee make meeting the deadlines impossible to do safely, or cooperate in the study effort by applying a little flexibility in the enforcement of milestones. If the endpoint of protecting public health and the environment is the objective here rather than rigid adherence to arbitrary deadlines, the flexibility offered in option 2 is mandated. The closure must be done in a manner that is safe long term. Failing to address dewatering and consolidation of tailings in a scientifically responsible way runs an unacceptable risk to workers when working on an unstable tailings beach, and to the public when the cover system fails under differential settlement. Clearly, the NRC's inclusion of language recognizing natural factors beyond the Licensee's

control anticipates regulatory flexibility to respond thereto, as the Division is doing here. The suggested deadlines would be arbitrary and capricious. This comment is without merit and is rejected.

GCT Comment #14

- *Eliminate the proviso in the impoundment-recontouring milestone that allows for more than 180 days to finish recontouring "as may be required if instability of the tailings sands restricts or hampers such activities."*[7]
- *Establish an absolute deadline for completing dewatering that is based on current modelling of how long it will take to meet the settlement-performance standard in the plan (e.g., for Cells 4A and 4B, 5.5 years after dewatering is commenced).*
- *Delete statements in Revision 5.1 that assert that deadlines cannot be established.*[8]

Division Response: The Division has considered but disagrees with this comment. The Division incorporates its Responses to Comments Nos. 2 and 13. In addition, the Division provides the following information: The applicable technical requirements are adequate to address this comment, specifically Criterion 6A(1) and the definition of as expeditiously as practical considering technological feasibility. Criterion 6A(1) reads: "For impoundments containing uranium byproduct materials, the final radon barrier must be completed as expeditiously as practicable considering technological feasibility after the pile or impoundment ceases operation in accordance with a written, Commission-approved reclamation plan. (The term as expeditiously as practicable considering technological feasibility as specifically defined in the Introduction of this appendix includes factors beyond the control of the Licensee.) Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan." A pertinent definition from Appendix A follow: "As expeditiously as practicable considering technological feasibility, for the purposes of Criterion 6A, means as quickly as possible considering: the physical characteristics of the tailings and the site; the limits of available technology; the need for consistency with mandatory requirements of other regulatory programs; and factors beyond the control of the Licensee. The phrase permits consideration of the cost of compliance only to the extent specifically provided for by use of the term available technology." With these factors in mind, consider Criterion 2: "To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations must be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations." This demand from the commenter and some of the other demands received concurrently appear to be part of an effort to force closure of the Mill or to restrict its activities to less than the NRC intended when writing the regulations (cessation of receipt of 11e.(2) byproduct either as

alternate feed or as decommissioning debris from in-situ recovery facilities) without providing a science-based or demonstrably based in improving human or environmental health.

GCT Comment #15

- *Establish reclamation deadlines as a condition of the radioactive materials license.*

Division Response: Deadlines are arbitrary. However, the Division is working with the Licensee to catalog in a more obvious manner the events that constitute the action portion of the milestones and the triggering conditions that need to be identified. This is being done with intent to eventually establish the dates certain when such makes sense.

GCT Comment #16

- *Revise the Stipulation and Consent Agreement executed in February 2017 to eliminate the provision in Section D.7.b.iii that automatically requires Energy Fuels to build the 1996 conventional cover if an impasse is reached on alternative evapotranspirative cover designs.*

Division Response: The Division disagrees with this comment. The approved, conventional cover has been proven to be effective in arid environments. The demonstration project is necessary to prove that the ET cover design will work well enough to meet all applicable requirements.

GCT Comment #17

- *Either rule out the possibility of building the 1996 conventional cover or update that design immediately to avoid future delay if the ET cover fails the performance test.*

Division Response: The Division disagrees with this comment. The proposed "hybrid" cover that would be used on Cell 2 if the rock armor is installed is more robust than the legacy cover design that was approved decades ago. The Division is not aware of any reasonable need to divert its resources from its statutory mission of protecting public health and the environment to revisit an issue that has been settled.

GCT Comment #18

- *Add a capillary break to the evapotranspirative cover design to minimize leachate that could contaminate groundwater unless the Division concludes that a capillary break would degrade the cover's performance.*

Division Response: If the cover design performance test shows the cover to be effective, the capillary break will be unnecessary. The capillary break assumes a downward hydraulic flux. ET design is based on plant transpiration taking up that water, preventing the hydraulic front from forming in the first place.

GCT Comment #19

- *Add a composite barrier of compacted clay and a geomembrane beneath the evapotranspirative cover proposed in Revision 5.1 unless there is compelling evidence that including a composite barrier would diminish the cover's effectiveness.*

Division Response: The Division disagrees with this comment. Its previous responses are incorporated herein. The actions sought by the commenter would place undue financial burden on the Licensee for no gain in protection should the cover function as designed.

GCT Comment #20

- *Require Energy Fuels to increase the top-slope inclination of the evapotranspirative cover design unless doing so would diminish the cover's performance.*

Division Response: The Division disagrees with this comment. The proposed, gentle slopes will perform better than a steep slope. A gentle slope improves resistance to erosion. A steeper slope runs the risk of diminishing the cover performance. The commenter clearly prefers an ET cover, but now seeks a modification to the cover that would increase runoff velocity and, with it, the potential to suspend and transport the soil particles of which the cover is constructed.

GCT Comment #21

- *Add a biointrusion layer to the evapotranspirative cover that is specifically designed to deter burrowing unless Energy Fuels can demonstrate that including that layer would degrade the cover's overall performance.*

Division Response: The Division disagrees with this comment because the heavily-compacted primary radon barrier layer serves this function. Industry specialists have recommended this approach as they collaborated in the design. No additional barrier is warranted.

GCT Comment #22

- *Require Energy Fuels to design the liner for the so-called "Cell 1 Disposal Area" to meet EPA's design standards for hazardous-waste impoundments, which appear at 40 C.F.R. § 264.221.*

Division Response: The Division disagrees with this comment. The 11e.(2) material to be placed in this disposal area is not captured by 40 CFR 264. It is not classified as hazardous waste, but as byproduct material. The Division has no desire to subject this site to dual regulation in contravention of the agreement between the NRC and the EPA.

GCT Comment #23

- *Require Energy Fuels to develop and carry out a functional monitoring plan to measure percolation rates through whatever final cover is built and monitor other cover properties that would help diagnose infiltration problems.*

Division Response: The Division disagrees with this comment. This demand seeks a design feature which is not part of the NRC regulatory reference, and thus would force the Division to be more stringent than the NRC. The Division cannot do so without violating state law. Parts of the ground water monitoring network which is already in place will remain in place for that purpose.

---

7 Ex. 1 at 6-4.
8 Ex. 1 at 6-1.

II. Background

A. The Grand Canyon Trust

The Grand Canyon Trust is a membership-based, non-profit advocacy organization founded in 1985 that has over 3,000 members. It's headquartered in Flagstaff, Arizona, and has offices in Castle Valley, Utah, and Durango and Denver, Colorado. The mission of the Trust is to protect and restore the Colorado Plateau – its spectacular landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude.

The Plateau is a physiographic region that stretches south-to-north from roughly the Mogollon Rim in northern Arizona to the Uinta Mountains in northern Utah and east-to-west from the Great Basin in Utah to the western side of the Rocky Mountains in Colorado and northwestern New Mexico. The White Mesa Mill sits near the heart of the Plateau.

One of the Trust's goals is to ensure that the Plateau is a region characterized by vast open spaces and healthy ecosystems with which human communities maintain a sustainable relationship. In service of that goal, the Trust has worked for years to oppose irresponsible uranium mining and milling on the Plateau, and to see that the contamination around the Plateau that the uranium industry has repeatedly left in its wake is cleaned up.

GCT Comment #24

B. The White Mesa Mill

The White Mesa Mill is an acid-leaching, uranium-processing mill that turns uranium ore and other uranium-bearing substances into a product called yellowcake, which is then enriched for use in nuclear reactors. Black flake, a substance used in other industrial processes, is also made at the mill by extracting vanadium from some feeds. Mostly what comes out of the mill, though, is radioactive waste. This waste, commonly called tailings, is discarded in big pits spanning about 275 acres next to the mill. There are five of these pits, or "impoundments," at the mill, named Cell 1, Cell 2, Cell 3, Cell 4A, and Cell 4B. They and the mill are about five miles north of the centuries-old Ute Mountain Ute tribal community of White Mesa and about six miles south of downtown Blanding.

A company called Energy Fuels Nuclear, Inc., built the mill in the late 1970s to process low-grade uranium ore from the surrounding region.[9] Back then, the company planned to run the mill for 15 years, then close and reclaim it.[10] The radioactive tailings were to be cleaned up in phases while the mill was operating.[11]

But that didn't happen. Instead, Energy Fuels Nuclear, fired up the mill in 1980, made yellowcake for about three years, and pumped the resulting radioactive tailings into Cells 1, 2, and 3.[12] Then, when the price of yellowcake plummeted, the company fired most of the mill's workers and let the mill go dormant.[13] This pattern has continued ever since. An ore-processing "campaign" is run when yellowcake is fetching a good price, and then the mill lapses into "standby" when the price of yellowcake falls.[14] Though 37 years have passed, not one of the mill's big waste pits has been reclaimed.

Ownership of the mill has been similarly tumultuous. Over the years, it has changed hands at least four times.[15] *In the mid-1990s, after Energy Fuels Nuclear sold and rebought the mill, the company ran out of money. When it couldn't pay its employees, it fired them.*[16] *Within a month, the asset-holding parts of Energy Fuels Nuclear declared bankruptcy,*[17] *and the business was eventually liquidated.*[18]

Division Response: In this section of the Grand Canyon Trust's comments, a general discussion of the White Mesa Mill is provided. Detailed response to this comment is not required because it is in the nature of the commenter's version of background information regarding the Mill. Much but not all of this information is accurate. The Division incorporates, generally, by reference the Division General Response #1. In addition, the Division provides the following information in response to this background information:

The NRC has jurisdiction to determine the status of radioactive materials. A s discussed in detail in the Division's Response to Comment No. 1, mill discharges to the tailings management system are byproduct material, not waste. Further, in his recent order in a related matter involving the commenting party (referenced in Response to Comment No. 8), Judge Waddoups determined that this byproduct material has two components and that only the solids are called tailings, with the liquid portion of the slurry and any liquid discharge going by other names. To call the liquid "tailings" is not warranted by this record. As a result, Cells 1 and 4B do not receive tailings at this time. The fluids managed in Cells 1 and 4A are not tailings, and tailings have never been being placed in Cells 1 or 4B. *See* Memorandum Decision and Order at 35-38.

As with the reference to process fluid as tailings, the statement that the Mill did not operate as represented is misleading. The Mill has fulfilled its design function, and continues to do so to this day. Placing the Mill in standby status during periods of low demand is not a violation of the represented function of the Mill. The Licensee has been performing concurrent reclamation activities. *Grand Canyon Trust v. Energy Fuels Resources (U.S.A.) Inc.* (finding that the license had been engaged in decommissioning of Cell 2, contrary to the presentation here that the Licensee had done nothing toward cell closure).

---

[9] *Ex. 2 at 1-3 (arguing that the mill has independent utility for the purpose of processing low-grade, regional ores); id. at 10-21 (observing that small mines with low-grade ore would not be economically viable without the mill); Ex. 1 at 2-1.*

[10] *Ex. 2 at iii (explaining that production will last for 15 years); id. at 1-1, 3-15 (same); id. at 3-18 (showing projected operating life of 15 years and phased reclamation schedule extending no more than 5 more years) id. at 4-3 ("Based on the capacity of the tailings cells, the mill has a potential to operate 15 years."); Ex. 3 at 1-2 ("The mill is planned to have a 2,000 tons-per-day capacity and a projected life of 15 years."); id. at 5-38 ("The area occupied by the proposed mill and tailing retention system (about 310 acres) would be committed until the life of the mill ends, about 15 years.").*

[11] *Ex. 2 at 3-17 ("The tailings ce1ls will be reclaimed sequential1y as each cell is filled, beginning after about the fourth year of operation and every four years thereafter until termination of project operations.").*

[12] *Ex. 4 at 11 (Table 3 showing "tailings placement period" beginning in 1980 for Cell 2, 1982 for Cell 1, and 1983 for Cell 3).*
[13] *Ex. 5 at 2–3; Ex. 6; Ex. 7.*
[14] *Ex. 4 at 5 (showing "standby" periods in 1984, 1991–1994, 2000–2004, with minimal production in 1998 and 2005).*
[15] *Ex. 1 at 2-1.*
[16] *See Ex. 8.*
[17] *Ex. 9 at Addendum to Permit Transfer Request (p. 37).*
[18] *Stephane A. Malin, The Price of Nuclear Power: Uranium Communities and Environmental Justice, 96 (2015) ("Malin").*

GCT Comment #25

Today, a company called Energy Fuels, Inc., owns and operates the mill through subsidiaries. Energy Fuels is careful to claim that it and Energy Fuels Nuclear are "unrelated entities," [19] perhaps to distance itself from any liabilities that Energy Fuels Nuclear could not discharge through bankruptcy. But Energy Fuels, Inc., was formed in 2005 by a prior owner of Energy Fuels Nuclear[20] and touts on its website that "much of our senior management team began their careers and learned about the U.S. uranium industry from the earlier successes of Energy Fuels Nuclear."[21]

The mill's business model has also changed over time, no doubt due to volatility in the uranium market. Around the early 1990s, Energy Fuels Nuclear began pursuing a new source of revenue by processing "alternate feeds" and discarding the resulting waste at the mill. These feeds include uranium-bearing wastes from other contaminated places around the country. In 1998, for example, Energy Fuels[22] was paid over $4 million to process and dispose of radioactive soil that was contaminated not only by the Manhattan Project, but also by other industrial and chemical ventures.[23] From these sorts of feeds, the waste pits at White Mesa now contain radioactive and contaminated wastes from rare-metals mining,[24] uranium-conversion plants,[25] and contaminated defense facilities,[26] among other sources. The sludge from Sequoyah Fuels' defunct uranium-conversion facility that the company is seeking permission to process would bring the list of materials that Energy Fuels has been licensed to process to seventeen.

By running its business, Energy Fuels has also fouled the groundwater beneath the mill. Exactly how some of that contamination got into the groundwater aquifers beneath the mill is a subject of debate. But it's undebatable that the groundwater is contaminated by pollutants like nitrate, nitrite, chlorides, and chloroform.

Division Response: This comment goes to the corporate structure of Energy Fuels, Inc., including speculation about the intent of the company's corporate structure. Neither the NRC's nor the Division's rules mandate how Licensees be structured as a matter of corporate law. It is sufficient that the Licensee be a corporate entity in good standing with its state of formation and be authorized to conduct business in Utah, either as a Utah business entity or as a foreign business entity that is registered in Utah and has a registered agent in this state. The Licensee is in compliance with these requirements. This comment is speculative and goes beyond the scope of issues before the Director. The Licensee is a corporation in good standing and the financial assurance mechanism has been provided by a qualified and legitimate third-party. The purpose of financial assurance is to provide independent funding for the decommissioning of the White Mesa Mill in the event that the current operator, whatever its corporate structure, cannot fulfill its responsibilities. In the Division's view, the existing financial assurance mechanism is adequate to protect the State's interests and it is in compliance with applicable legal requirements.

GCT Comment #26

C. Wastes Generated by and Discarded at the White Mesa Mill

Two main waste streams are generated at the mill by processing ore and alternate feeds. The first is a radioactive slurry of crushed, watered-down, acid-soaked, leftover feed material that is pumped out of the mill from a series of eight big tanks called the counter-current-decantation

circuit. The second is a uranium-depleted solution, sometimes called raffinate or "process solution," that is discharged from solvent-extraction circuits. Both waste streams are pumped into the waste pits next to the mill.

When the mill first started running in about 1980, Energy Fuels pumped the waste slurry from the counter-current-decantation circuit into Cell 2. Since about the same time, Cell 1 has been used to get rid of raffinate wastes. By the mid-to-late 1980s, Cell 2 was full, or nearly full, of tailings and the company stopped sending the slurry to that cell (though it may have eventually topped off the cell with tailings as late as the mid-1990s).[27] But the company did not close or reclaim the cell. Instead, it kept burying trash

19 Ex. 10 at 3.
20 Malin at 95–96.
21 Ex. 10 at 3.
22 At the time, the mill was owned by a company called International Uranium (USA) Corporation. For simplicity's sake, these comments generally refer to the mill's prior owners as Energy Fuels.
23 See Ex. 11 at 1 (observing that Energy Fuels would be paid a fee of $4 million to process and dispose of the material, an amount that far exceeded the value of the yellowcake to be produced).
24 See Ex. 12 at 2–3.
25 See Ex. 13 at 1.
26 See, e.g., Ex. 14 at 1–4.
27 See, e.g., Ex. 4 at 11 (Table 3); Ex. 15 (aerial photograph of the mill taken in 1983 showing Cell 2 to be mostly full of tailings); Ex. 16 at App. L p. 1 (asserting that "Cell 2 ceased receiving tailings in 1995").

and contaminated wastes in Cell 2 for about two decades.[28] Throughout that time, when the mill was running, Energy Fuels pumped the waste slurry from the counter-current-decantation circuit into Cell 3.[29] In October 2008, Energy Fuels rerouted the slurry into Cell 4A. Eventually, the company plans to pump that slurry into Cell 4B, which is now used to hold wastes siphoned from Cell 4A.

Wastes generated at operations that recover uranium by in-situ leaching are also buried in the mill's pits. Unlike alternate feed, these wastes aren't processed at the mill before being discarded. These wastes include, for example, barium sulfate sludge from treating waste solutions at an in-situ uranium leaching operation Wyoming.[30] Leaking shipments of that sludge have arrived at the mill twice since 2015.[31] In the past, similar wastes have been shipped, at a minimum, from Texas, Nebraska, and Wyoming to be buried at the mill.[32]

Division Response: The legal questions regarding the legal status of alternate feed are *res judicata*. Collateral attacks on longstanding NRC decisions are not legally permissible in this forum. The Division is in no position to overturn long settled law but must abide by existing law on this topic. The Division General Response #4 and #5 are incorporated by this reference. In this case, the White Mesa Mill is the only operating conventional uranium mill in the country, and thus is the only currently available location to fulfill the intent of federal Criterion 2 referenced above to prevent the proliferation of small disposal sites.

The leaking shipments to which the commenter refers are not the responsibility of this Licensee of the State of Utah. The cases were referred to the appropriate authorities, enforcement actions were taken, and corrective actions are in place. (See NRC Documents ML17078A564 and ML17229B615.) To assign responsibility to this Licensee for the actions of another Licensee is unwarranted. The Division General Response #02 is incorporated by this reference.

GCT Comment #27

D. Source-Material and Byproduct Material Licensing

To mill uranium, Energy Fuels is required to get a license from the Utah Division of Waste Management and Radiation Control that authorizes the company to possess and process "source material"—generally meaning uranium ore—and to dispose of the waste "byproduct material" that the mill generates.[33] The Division is authorized to issue this license under state law, exercising authority delegated to the state by the U.S. Nuclear Regulatory Commission.

That delegation was made under the Atomic Energy Act of 1954, the fundamental federal law regulating source, byproduct, and other nuclear materials. That Act authorizes the Nuclear Regulatory Commission to issue regulations governing the possession and use of source and byproduct material "to promote the common defense and security or to protect health or to minimize danger to life or property…."[34]

The Commission has issued three main rules regulating uranium milling: (1) the agency's general standards setting radiation dose limits for the general public and mill workers (10 C.F.R. Part 20); (2) the Commission's rules for domestic licensing of source material (10 C.F.R. Part 40), which establish health, safety, financial, and other requirements that uranium-mill operators must meet to get a license; and (3) Appendix A to those licensing regulations, which establishes standards for managing and reclaiming mill tailings. The State of Utah has set its own radiation-dose standards and has adopted wholesale many, but not all, of the latter two Commission rules.[35]

*The main requirements for managing and disposing of tailings originate from a federal law passed in 1978 called the Uranium Mill Tailings Radiation Control Act. Congress found in UMTRCA that "uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the pu*blic*" and sought to regulate tailings in "a safe and environmentally sound manner … to prevent or minimize radon diffusion into the environment and to prevent or minimize other*

---

[28] *Id.*
[29] *Id.*
[30] *See Ex. 17.*
[31] *Id.*
[32] *Ex. 18.*
[33] *Utah Code § 19-3-104.*
[34] *42 U.S.C. § 2201.*

[35] Utah Admin. Code R313-24-4 (incorporating much of 10 C.F.R. Part 40 and Appendix A by reference); Utah Admin. Code R313-15 (establishing standards that apply to the Division's Licensees for protection against ionizing radiation).

environmental hazards from such tailings."[36] It was to comply with UMTRCA that the Commission issued Appendix A.[37]

An important feature of UMTRCA is that it assigns to the U.S. Environmental Protection Agency the authority and responsibility for setting general standards "for the protection of the public health, safety, and the environment from radiological and nonradiological hazards" posed by processing and disposing of tailings.[38] The Nuclear Regulatory Commission's rules for managing and disposing of tailings—namely, Appendix A—must conform to EPA's general standards.[39] EPA's standards for operating uranium mills are set out in 40 C.F.R. Part 192, Subpart D. We discuss those rules in more detail below.

Division Response: This comment references and interprets questions of law, as to which no technical response is required. The legal references cited speak for themselves.

GCT Comment #28
E. Reclamation Requirements

To renew Energy Fuels' radioactive materials license, the Division must be satisfied that the company's plan for closing and reclaiming the mill meets numerous technical and financial criteria.[40] Those criteria are set out in two places: (1) Appendix A to the Commission's regulations for domestic licensing of source material, which the Division has adopted by reference; and (2) state groundwater-protection rules.[41]

In broadest terms, Appendix A's goal is to secure "permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance."[42] To that end, it sets standards for where to put tailings-disposal sites, designing and building those sites, gathering baseline environmental data before milling operations begin, protecting groundwater, monitoring and inspecting tailings-disposal areas, closing and reclaiming those areas, and minimizing air-quality impairments from milling.[43] Two types of financial guarantees are also required.[44] First, mill operators must arrange a financial surety before they start milling uranium that guarantees enough money will be available to properly reclaim the mill and its wastes if the mill operator defaults on that obligation.[45] Second, mill operators must pay the state a fee that generates enough interest to pay for long-term site surveillance by the state or federal government after the mill closes.[46]

As soon as a tailings impoundment at a uranium mill "ceases operation," Appendix A requires mill operators to expeditiously build a "final radon barrier" over the impoundment "in accordance with a written, Commission-approved reclamation plan."[47] The final radon barrier must be designed to work for at least 200 years and to limit average releases of radon-222 to 20 picocuries per square meter each second

[36] *42 U.S.C. § 7901.*
[37] *Uranium Mill Licensing Requirements, 45 Fed. Reg. 65,521 (Oct. 3, 1980).*
[38] *42 U.S.C. § 2022.*
[39] *42 U.S.C. § 2114.*
[40] *See 10 C.F.R. § 40.31(h) (requiring uranium-milling applications to include written specifications for the disposition of byproduct material to achieve the requirements and objectives of 10 C.F.R. Part 40, Appendix A); Utah Admin. Code R313-24-4 (incorporating 10 C.F.R. 40.31(h) by reference).*
[41] *See Utah Admin. Code R313-24-4 (adopting Appendix A by reference but replacing Criteria 5B(1) through 5(H), 7A and 13 with Utah's ground water quality protection rules).*
[42] *10 C.F.R. Part 40, App. A, Criterion 1.*
[43] *See 10 C.F.R. Part 40, App. A, Criterion 1–8A.*
[44] *See id. at Criterion 9–10.*
[45] *Id. at Criterion 9.*
[46] *Id. at Criterion 10.*
[47] *Id. at Criterion 6A.*

(20 pCi/(m2-sec)).[48] *Other hazards posed by tailings impoundments—such as contaminants leaching into the ground or groundwater—must be controlled, eliminated, or minimized.*[49] *And impoundments must be closed to minimize future maintenance, meaning that the cover must hold up to earthquakes, floods, freezing, precipitation, intrusion from animals and plants, erosion, and nature's other onslaughts.*[50] *Deadlines for finishing the final radon barrier, retrieving windblown tailings, and stabilizing the tailings impoundment (including dewatering the impoundment) are to be established in a reclamation plan and as conditions of each mill's radioactive materials license.*[51]

Division Response: This comment references and interprets questions of law, as to which no technical response is required. The legal references cited speak for themselves. Please see General Response #14.

GCT Comment #29
F. Reclamation Plan Revision 5.1

In connection with the radioactive materials license renewal, the Division is proposing to approve Revision 5.1 of Energy Fuels' reclamation plan. Plan Revision 5.1 describes how Energy Fuels intends to go about closing and reclaiming the mill and its waste impoundments,[52] *and it sets out the company's estimates of what carrying out that plan will cost.*[53]

Energy Fuels is proposing to build a monolithic evapotranspirative cover—often called the "ET cover"—to serve as the "final radon barrier" over most of the mill's impoundments.[54] *According to the company, the ET cover has four layers: (1) 2.5' of interim cover, which is fill that Energy Fuels is supposed to place over the mill's waste pits to help reduce radon emissions while those pits are in use; (2) a 3–4' primary radon-attenuation layer made of highly compacted loam and clay; (3) a 3.5' "growth medium layer" that is supposed to store water, deter biointrusion, protect the primary radon-attenuation layer from frost, and further reduce radon emissions; and*

(4) a 0.5' erosion-protection layer composed of topsoil or topsoil-gravel mixture.[55] The basic idea behind this design is to use vegetation to absorb and remove precipitation from the cover through evapotranspiration so that precipitation doesn't seep into the tailings and eventually contaminate groundwater.

This design departs from the one Energy Fuels proposed in the last version of its reclamation plan, which the State approved in January 2011.[56] That plan called for construction of a "conventional" cover that Energy Fuels designed in 1996. That cover design would use a compacted clay layer placed on top of the interim cover to repel water infiltration into the tailings. From the bottom up, the cover would have a one-foot clay layer, two feet of compacted random fill, and 3 to 8" of rock armor on the top and sides.[57]

Though, according to Energy Fuels, final closure of Cell 2 began in or before 2008, and though federal and state law require Energy Fuels to expeditiously build a final radon barrier over closed cells in accordance with an approved reclamation plan, [58] Energy Fuels isn't planning to build a final radon barrier

---

[48] See Appendix A, Criteria 6 & 6A. A picocurie (pCi) is one trillionth of one curie (Ci), which is a unit for measuring the intensity of radioactivity of a material. See U.S. Nuclear Regulatory Commission, "Curie (Ci)," "Picocurie (pCi)" available at http://www.nrc.gov/reading-rm/basic-ref/glossary.html.
[49] Id. at Criterion 6.
[50] Id. at Criterion 6.
[51] See Appendix A, "Reclamation Plan" and Criterion 6A.
[52] See generally Ex. 1 at 3-1 to 5-2.
[53] See Ex. 19.
[54] See Ex. 1 at I-2, 3-4.
[55] Ex. 1 at 3-4.
[56] Ex. 20.
[57] Ex. 20 at 3-7.
[58] 10 C.F.R. Part 40, App. A, Criterion 6A.

over Cell 2 for at least six or seven years.[59] The problem is twofold. First, Energy Fuels' currently approved reclamation plan—Revision 3.2—is subpar, at best. Though the plan's exact shortcomings are debatable, at the very least, the conventional-cover design it includes may allow more precipitation to seep through the cover and into the tailings, which increases the risk of groundwater contamination.[60] And in any event, Revision 3.2 is badly outdated. Second, the Division isn't convinced that the ET cover proposed in Plan Revision 5.1 will be effective either.[61]

So, rather than cover Cell 2 with Revision 3.2's conventional design or Revision 5.1's evapotranspirative design, the Division and Energy Fuels have agreed in a Stipulation and Consent Agreement to build two small test sections of the ET cover in the corner of Cell 2 and gather performance data from them for seven years.[62] If the test sections meet performance

criteria (for how much precipitation seeps through the cover and how much vegetation grows on the cover), then Energy Fuels will finish building the ET cover on Cell 2.[63] *If the test sections don't meet those criteria, Energy Fuels will have a chance to revise the design to the Division's satisfaction.*[64] *If the Division is ultimately unsatisfied with Energy Fuels' proposed design, then the Consent Agreement calls for Energy Fuels to build the conventional cover on Cell 2.*[65] *According to the company's plan, the cover selected for Cell 2 eventually would be built on Cell 3, Cell 4A, part of Cell 1, and on Cell 4B depending on what kind of wastes go in that cell.*[66]

Division Response: The Division disagrees with this comment. The Division has carefully evaluated all technical and legal issues relating to the radon barrier and other issues on Cell 2 and has concluded that all these aspects of the operation are in compliance with all applicable legal, technical, regulatory, licensing, and engineering requirements. This comment is inaccurate in its assessment of the Licensee's intent and actions. The primary radon barrier is installed in its entirety over Cell 2, and was completed April 20, 2017. The commenter has failed to provide any rationale or evidence to support its speculation that the cover system design in Reclamation Plan 3.2b is inadequate. The comment merely concludes that Reclamation Plan Revision 3.2b is "subpar at best" but fails to offer any supporting proof. Making broad statements about how the system may operate gives no actionable information, but consists entirely of speculation. Furthermore, no waste goes into the cells. They receive tailings from ore and approved byproduct material. *See* Response to GCT Comment No. 1, above.

III. The Division should require Energy Fuels to revise Reclamation Plan Revision 5.1.

GCT Comment #30

A. The Division should require Energy Fuels to evaluate off-site disposal alternatives.

The possibility of moving the mill's radioactive wastes away from the mill to an off-site repository has never been examined. Yet the Division's rules require applicants for amended radioactive materials licenses to evaluate alternatives to the proposed licensing action, "including alternative sites and engineering methods, to the activities to be conducted pursuant to the license or amendment."[67] *Under that rule, the Division should require Energy Fuels to evaluate the relative environmental impacts and costs of moving radioactive wastes from the mill to an off-site disposal location.*

---

[59] *See Ex. 21 at 5 (providing for a cover test section to be constructed and monitored for seven years to see how well it works).*

[60] *Ex. 22 at E-8; see also Ex. 23 at 8 (acknowledging that the ET cover may perform better than the conventional cover).*

[61] *Ex. 23 at 8 ("The [Division] staff had a number of concerns with the proposed cover system and has worked with [Energy Fuels] through several rounds of interrogatories to resolve those concerns. Unfortunately, [Energy Fuels] could not resolve all of staff's concerns from information available during the review process.")*

[62] *Ex. 21 at 4–5.*

[63] *Ex. 21 at 7. There are two performance metrics. The average measured percolation rate from the base of a lysimeter in what's called the "primary test section" must be 2.3 mm/year or less*

during the five-year performance period. Ex. 21 at 5–6. At least 40 percent of the primary and supplemental test sections must be covered by live vegetation with "acceptable vegetation diversity" by the end of the 5-year performance period. Ex. 21 at 6.
[64] Ex. 21 at 7.
[65] Ex. 21 at 7.
[66] Ex. 1 at 3-3 to 3-6.
[67] R313-24-3(1)(c).

In 2005, the Department of Energy analyzed off-site-disposal options for tailings that were discarded by the Atlas uranium mill's owner on the banks of the Colorado River outside Moab, Utah.[68] Moving those tailings to the White Mesa mill was an alternative the Department considered.[69] Ultimately, the Department rejected that alternative, concluding that a new repository in Crescent Junction was a better disposal location.[70] Among its reasons were that the Crescent Junction site had better geologic isolation than White Mesa (reducing the risk of groundwater contamination) and fewer conflicts about using that area for radioactive-waste disposal.[71] EPA echoed these observations in comments on the Department's analysis.[72]

This evaluation suggests that off-site disposal alternatives for the radioactive wastes at the White Mesa mill may well be superior to permanently burying those wastes at the mill. Accordingly, the Division should insist that Energy Fuels analyze those alternatives so that the public and the Division may assess the relative environmental impacts and costs of off-site-disposal options. Particularly if the Division adheres to its planned performance test for the ET cover, and the cover ultimately fails that test, having an analysis of off-site disposal options in hand would be valuable. And it would be helpful to understand the prospects for off-site-disposal alternatives even if the Division abandons the performance test and requires Energy Fuels to promptly build a final cover on Cell 2, for some (if not most) of the mills cells will not be reclaimed for many years and could be moved off-site rather than capped in place.

Division Response: The question of the suitability of the White Mesa Mill for permanent disposal of mill tailings is *res judicata* and is not subject to collateral attack. "Off-site" disposal is equivalent to siting a new uranium mill operation in another location. Off-site disposal was considered and rejected during the NEPA siting study phase in 1978. At that time, it was determined that the site was suitable for permanent, on-site disposal of tailings and decommissioning debris. No new information has been brought forward that would contradict the conclusions of the NRC at that time that the site was suitable for on-site disposal and even if such information existed, this question is legally settled. Citing the Atlas project does not buttress the commenter's position because: (1) the Atlas project was sited next to the Colorado River; (2) the White Mesa site is remote, far from drainages and waters, and presents other geologic isolation characteristics that support the conclusions in the original siting study; and (3) relocating the former Atlas Mill tailings required two acts of Congress. The Division General Comments #01 and #16 are incorporated by this reference. The U.S. DOE will assume long-term stewardship of the White Mesa Mill facility under federal law. There is no reason to consider relocating the tailings materials. Doing so would just re-create the same kinds of issues presented in this matter in a different location, on top of resulting in unwarranted expenditure of costs.

GCT Comment #31

B. The definitions and standards used to establish reclamation milestones should be revised to be consistent with federal and state law.

Reclamation Plan Revision 5.1 uses several definitions and standards that are at odds with the impoundment-closure standards in federal and state law. The problem lies with how the plan redefines two regulatory terms of art—"operation" and "final closure"—that control when Appendix A's impoundment-cleanup requirements and deadlines are triggered. These inconsistencies should be eliminated to ensure that the company closes impoundments promptly and in compliance with the law.

1. Background

When a tailings impoundment "ceases operation," Appendix A requires uranium mill operators to expeditiously build a "final radon barrier" over the impoundment "in accordance with a written, Commission-approved reclamation plan."[73] Reclamation plans must have clear, enforceable deadlines, or as Appendix A puts it, "a schedule for reclamation milestones that are key to the completion of the final radon barrier…."[74] Milestones aren't flexible target timeframes or performance goals; they're "an action or event that is required to occur by an enforceable date."[75]

---

[68] *Ex. 24 at S-2.*
[69] *Ex. 24 at S-9.*
[70] *See Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand Junction and San Juan Counties, UT, 70 Fed. Reg. 55,358, 55,358–359 (Sep. 21, 2005).*
[71] *Ex. 24 at S-12.*
[72] *Ex. 25 at 4–5, 19 (observing that Energy Fuels' tailings-cover design may be inadequate).*
[73] *10 C.F.R. Pt. 40, Appx. A, Criterion 6A; Utah Admin. Code R313-24-4 (incorporating Criterion 6A and other parts of Appendix A by reference).*
[74] *10 C.F.R. § Pt. 40, App. A, "Reclamation plan."*
[75] *Id. at "Milestone."*

The event that triggers the expeditious-closure requirement for any given impoundment is taking that impoundment out of "operation."[76] Appendix A defines "operation" to mean that an impoundment is "being used for the continued placement of byproduct material or is in standby status for such placement."[77] Impoundments are in "operation," the definition goes on, "from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins."[78] So, there are two conditions that are essential for an impoundment to cease "operation." "Byproduct material" must have been placed into the impoundment to initiate an impoundment's "operation," and "final closure" must have begun to end the impoundment's "operation."

2. Problems with the Reclamation Plan's Definitions

There are two main flaws with the definitions Energy Fuels has put in Reclamation Plan Revision 5.1. First, the Plan defines the term "operation" so that its impoundment-closure requirements apply only to those impoundments used for disposing of "tailings sands," even though Appendix A's impoundment-closure requirements apply to impoundments used to dispose of any wastes produced by processing uranium. Second, the Plan defines the term "final closure" in a way that purports to allow final closure to begin under circumstances when it would not begin under federal and state law.

a. "Operation"

"Operation," according to Plan Revision 5.1, means a tailings impoundment that "is being used for the continued placement of tailings sands or is on standby status for such placement."[79] Under Appendix A, in contrast, impoundments are in "operation" when they're first used to dispose of "byproduct material," not just "tailings sands."[80] The term "byproduct material" means the "tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes."[81]

By its plain terms, Appendix A's definition of "byproduct material" includes everything that Energy Fuels puts in the cells at the mill: the mostly liquid raffinate wastes, semi-solid counter-current-decantation slurry, "tailings sands," and all the other uranium-milling wastes the company discards in the cells. Indeed, the radioactive materials license and groundwater discharge permit prohibit the company from disposing of anything other than "byproduct material" in the cells.[82] And in a pending Clean Air Act lawsuit, Energy Fuels has concurred that "byproduct material" under the Atomic Energy Act and UMTRCA includes all these wastes. "[B]yproduct material," the company argued, "is the broader category of waste produced at a mill and regulated under UMTRCA, while tailings"—by which Energy Fuels meant the same thing as "tailings sands"—"represent a form or subset of byproduct material."[83] Consequently, all the cells at the mill have been used for the placement of "byproduct material," and thus, all the cells have been put into "operation" under Appendix A. Any cell taken out of "operation" is therefore subject to the expeditious-closure and deadline requirements in Appendix A.

---

[76] *10 C.F.R. Pt. 40, Appx. A, Criterion 6A; Utah Admin. Code R313-24-4 (incorporating Criterion 6A and other parts of Appendix A by reference).*
[77] *10 C.F.R. § Pt. 40, App. A, "Operation."*
[78] *Id.*
[79] *Ex. 1 at 6-1 (emphasis added).*
[80] *10 C.F.R. § Pt. 40, App. A, "Operation."*
[81] *10 C.F.R. § 40.4; Utah Admin. Code R313-24-4 (incorporating 10 C.F.R. § 40.4 by reference).*
[82] *Ex. 26 at § 10.1.B; Ex. 39 at §§ I.C.2, I.D.7; see also Ex. 27 at § 10.1.B; Ex. 40 at §§ I.C., I.D.7.*
[83] *Ex. 28 at ECF p. 39–40.*

By defining "operation" to refer only to impoundments that have received "tailings sands," Plan Revision 5.1 unlawfully purports to limit Appendix A's impoundment-closure requirements only to impoundments that have received "tailings sands." The Plan doesn't say what "tailings sands" are or which cells have received them, but Energy Fuels has argued in pending litigation that the slurry pumped over the years to Cells 2, 3, and 4A is the only source of "tailings sands" at the mill.[84] Thus, under the company's view of the facts, "tailings sands" have not been discarded in Cells 1 and 4B (even though part of the slurry from the counter-current-decantation circuit has been siphoned into Cell 4B). And that being so, under the company's tailings-sands-based definition of "operation," Cells 1 and 4B would not be subject to Appendix A's expeditious-closure requirements when they are no longer in use.

That outcome would be contrary to Appendix A, whose expeditious-closure requirements apply to all cells at the mill. The Division accordingly should require Energy Fuels to revise Plan Revision 5.1 to use a definition of "operation" that is identical to the definition in Appendix A and to clarify how it applies to the mill's cells. In particular, the Division should require Energy Fuels to revise Section 6 of Plan Revision 5.1 as follows:

- *The definition of "operation" that appears in Section 6.2.1 should be changed to match the definition in Appendix A: "Operation means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins."[85]*
- *The definition of "byproduct material" used in the Nuclear Regulatory Commission's regulations (that has been incorporated by reference under State law) should be added to the Plan. The pertinent part of that definition is: "Byproduct Material means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes."[86]*
- *The Plan should clarify that Appendix A's impoundment-closure requirements apply to all cells at the mill, including Cells 1 and 4B, and will apply to any cells built in the future into which "byproduct material" is placed. Thus, for example, the plan's description of the existing "tailings management system at the Mill" should be revised to confirm that there are currently five waste impoundments at the mill: Cell 1, Cell 2, Cell 3, Cell 4A, and Cell 4B.[87]*
- *The Plan should include milestones for closing all the mill's impoundments, including Cells 1 and 4B, as well as any other so-called "evaporation ponds" built in the future. Thus, for example, the Plan should have deadlines for closing Cell 1 when it is taken out of operation and deadlines for closing Cell 4B if it is taken out of operation before Energy Fuels starts pumping "tailings sands" from the counter-current-decantation circuit into that cell. At a minimum, for closing "evaporation ponds," the Plan should have deadlines for removing freestanding liquids; excavating solids, contaminated soil, and the liner and burying those materials in an operating tailings cell; and building a final radon barrier over any section of those impoundments that will be covered in place.[88]*

[84] *Ex. 28 at ECF p. 15.*
[85] *10 C.F.R. Part 40, App. A.*
[86] *10 C.F.R § 40.4; Utah Admin. Code R313-24-4.*
[87] *Ex. 1 at 6-2.*

b. "Final Closure"

The second flaw in Plan Revision 5.1's impoundment-closure definitions is that the company has given the term "final closure" a meaning that is inconsistent with federal and state law. Neither Appendix A nor any other regulations adopted by the Nuclear Regulatory Commission define the phrase "final closure." EPA has, however, defined that phrase in a separate set of *Clean Air Act rules, commonly called Subpart W,*[89] *that apply to tailings impoundments. And the State has incorporated Subpart W into state law by reference.*[90]

For the reasons set out below, EPA's definition should control when "final closure" begins under Appendix A. Energy Fuels, however, has given the term "final closure" a different definition in Plan Revision 5.1. Final closure begins, according to the Plan, when an impoundment:

(A) is no longer being used for the continued placement of tailings sands and [Energy Fuels] has advised the Director in writing that the impoundment is no longer being used for the continued placement of tailings sands and is not on standby status for such placement; or

(B) is no longer being used for the continued placement of tailings sands, interim cover has been placed over the entire surface area of the impoundment, and dewatering activities have begun; or

(C) the Mill facility as a whole has commenced final closure and a written notice to that effect has been provided to the Director in accordance with this Plan.[91]

There are three main problems with this definition: (1) it doesn't match the definition in Subpart W, which could muddle when "final closure" begins for differing regulatory purposes; (2) like the Plan's definition of "operation," it also improperly purports to apply the concept of "final closure" only to those impoundments that contain "tailings sands" and not all impoundments containing uranium byproduct material; and (3) it creates an internal inconsistency in the Plan by allowing, under Option B, for "final closure" to begin when interim cover has been placed over an entire cell and dewatering has begun even though the Plan has milestones for placing interim cover and dewatering after final closure begins.

For the reasons set out below, the Division should require Energy Fuels to update Plan Revision 5.1 so that the definition of "final closure" matches the definition in Subpart W.[92]

i. EPA's Regulation of Tailings Impoundments

When Congress passed UMTRCA in 1978, it directed EPA to establish general standards to protect public health and the environment from hazards posed by processing and disposing of uranium-

---

[88] *See Ex. 1 at 3-5 to 3-6 (discussing the planned closure steps for Cell 1).*
[89] *This refers to 40 C.F.R. Part 61, Subpart W.*
[90] *Utah Admin. Code R307-214-1.*
[91] *Ex. 1 at 6-2.*
[92] *40 C.F.R. § 61.251(n).*

milling tailings.[93] *It also required the Nuclear Regulatory Commission's rules to conform to EPA's general standards.*[94] *For operating uranium mills, those standards are set out in 40 C.F.R. Part 192, Subpart D. EPA's initial version of those standards were issued in 1983 and included design, operating, and closure standards for the pits at uranium mills in which tailings are buried.*[95] *For example, these standards required impoundments to be closed so that radon releases would not exceed 20 pCi/(m2-sec) for 1,000 years.*[96] *The Commission revised its own regulations (in Appendix A) in 1985 to conform to EPA's rules.*[97]

By the late 1980s, EPA realized its rules had a flaw: They failed to set deadlines for closing tailings impoundments.[98] *Though the rules had performance standards that closed impoundments must meet, there was no mandate for when mill operators, like Energy Fuels, had to meet those standards. EPA set out to fix this problem in a rulemaking under the Clean Air Act.*

That story starts in late 1979, when EPA designated radionuclides as a "hazardous air pollutant" under the Clean Air Act after finding that exposure to radionuclides increases the risk of getting cancer and suffering genetic damage.[99] *At the time, the Clean Air Act required EPA to set emission standards for hazardous air pollutants that would protect the public health from those pollutants with an "ample margin of safety."*[100] *In 1986, EPA concluded that radon emitted from tailings impoundments poses a significant enough health risk (particularly of lung cancer) to warrant establishing emission standards for those releases under the Clean Air Act.*[101] *Those standards—codified at 40 C.F.R. Part 61, Subpart W—required mill operators to phase out big, radon-emitting tailings impoundments and transition to using just two smaller impoundments that were to be cleaned up one-by-one as they filled up, ceased "operation," and "final closure" began.*[102] *This was the first use of the term "final closure" in regulating uranium-mill impoundments.*

In 1989, EPA added a new rule to those standards—40 C.F.R. Subpart T—to set impoundment-closure deadlines and thereby fix the closure-limbo problem created by the agency's 1983 UMTRCA rulemaking.[103] *EPA recognized that "[t]he existing UMTRCA regulations set no time limits for the*

---

[93] *42 U.S.C. §§ 2022, 2114.*
[94] *42 U.S.C. §§ 2022, 2114.*
[95] *See Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites, 48 Fed. Reg. 45,926, 45,946–47 (Oct. 7, 1983).*
[96] *Id.*

[97] *See Uranium Mill Tailings Regulations: Conforming NRC Requirements to EPA Standards, 50 Fed. Reg. 41,852 (Oct. 16, 1985).*
[98] *See Health and Environmental Standards for Uranium and Thorium Mill Tailings, 58 Fed. Reg. 60,340, 60,341 (Nov. 15, 1993) ("Both the UMTRCA standards promulgated by EPA in 1983 and the implementing NRC standards promulgated in 1985, failed to require or otherwise establish compliance schedules to ensure that the tailings piles would be expeditiously closed, and that the 20 pCi/m2-s standard would be met, within a reasonable period of time.").*
[99] *National Emission Standards for Hazardous Air Pollutants: Addition of Radionuclides to List of Hazardous Air Pollutants, 44 Fed. Reg. 76,738, 76,738 (Dec. 27, 1979).*
[100] *Pub. L. 91-604 § 4(a), 84 Stat. 1685.*
[101] *National Emission Standards for Hazardous Air Pollutants: Standards for Radon-222 Emissions from Licensed Uranium Mill Tailings, 51 Fed. Reg. 34,056, 34,056–57 (Sep. 24, 1986).*
[102] *See 40 C.F.R. § 61.252(a) (1987) (requiring impoundments built after September 1986 to be closed in phases) and § 61.252(b), (c) (1987) (requiring impoundments existing as of September 1986 to be phased out of use).*
[103] *54 Fed. Reg. 51,654, 51,683 (Dec. 15, 1989).*

disposal of [tailings] piles" and "[s]ome piles have remained uncovered for decades emitting radon."[104] *Setting closure deadlines in Subpart T, EPA asserted, would assure that impoundments "will be disposed of in a timely manner after they are removed from service," thereby reducing radon emissions and protecting public health.*[105] *To meet that goal, Subpart T gave mill operators two years to close impoundments after they ceased to be "operational."*[106]

Protracted litigation over Subpart T ensued. Ultimately, a complex negotiation among EPA, the Nuclear Regulatory Commission, and affected states yielded an agreement to rescind Subpart T, but only after EPA amended its general standards under UMTRCA to require impoundments to be closed expeditiously according to deadlines, and only on the condition that the Commission amend Appendix A to conform to that change.[107] *To define when those requirements would be triggered, EPA's revised general standards, adopted in 1993, borrowed a functionally equivalent version of the agency's own prior definition of "operation" from Subpart W, under which operation continues until "final closure" begins.*[108] *The Nuclear Regulatory Commission, as it is required to do, then conformed Appendix A to EPA's general standards, adopting EPA's definition of "operation" and its use of the term "final closure."*[109] *The upshot under these rules was that impoundments are subject to Subpart W's two-impoundment limit while they are in "operation," and they become subject to Appendix A when "final closure" begins and "operation" ends.*

This history reveals three critical points about the term "final closure." First, EPA first coined that term for use in Subpart W in 1986. Second, Appendix A's mandate to close impoundments expeditiously and according to a deadline-driven reclamation plan after "operation" ceases and "final closure" begins was added at EPA's direction. Third, EPA used functionally identical definitions of "operation" in Subpart W and its general standards in Part 192 to establish a clear point at which impoundments were no longer subject to Subpart W's two-impoundment limit and had to be closed according to Appendix A.

In short, EPA is the architect of the impoundment-closure requirements and the author of the key regulatory language—including the terms "operation" and "final closure"—that trigger those requirements. EPA's definition of "final closure" should therefore control the meaning of that term under Appendix A.

---

[104] *Id.*
[105] *Id.*
[106] *Id. at 51,702.*
[107] *See National Emissions Standards for Hazardous Air Pollutants, 59 Fed. Reg. 36,280, 36,280–282 (July 15, 1994) (rescinding Subpart T and explaining the rule's history and other regulatory changes to 40 C.F.R. Part 192 and Appendix A that were made to ensure that closure deadlines were retained in those rules); Uranium Mill Tailings Regulations: Conforming NRC Requirements to EPA Standards, 59 Fed. Reg. 28,220, 28,220–221 (June 1, 1994) (conforming Appendix A to EPA's general standards and discussing the same rulemaking history).*
[108] *Compare 40 C.F.R. § 61.251(e) (1993) (defining "operation" to mean "an impoundment is being used for the continued placement of new tailings or is in standby status for such placement. An impoundment is in operation from the day that tailings are first placed in the impoundment until the day that final closure begins") with 58 Fed. Reg. 60,340, 60,355 (adopting the same definition but using the phrase "uranium byproduct material" interchangeably with the term "tailings") (Nov. 15, 1993).*
[109] *59 Fed. Reg. at 28,230 ("Operation means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins.").*

ii. Reclamation Plan Revision 5.1 should be revised to conform to EPA's definition of "final closure" as set out in Subpart W.

Earlier this year, EPA amended Subpart W. Among other revisions, the agency added a definition of "final closure" to that rule.[110] *That definition says that "final closure" means "the period during which an impoundment … is being managed in accordance with the milestones and requirements in an approved reclamation plan."* [111] *It begins when:*

> *the owner or operator provides written notice to the [EPA] and to the Nuclear Regulatory Commission or applicable NRC Agreement State that:*
>
> > *(1) A conventional impoundment is no longer receiving uranium byproduct material or tailings, is no longer on standby for such receipt and is being managed under an approved reclamation plan for that impoundment or facility closure plan; or*

(2) A non-conventional impoundment is no longer required for evaporation or holding purposes, is no longer on standby for such purposes and is being managed under an approved reclamation plan for that impoundment or facility closure plan; ….[112]

The Division should require Energy Fuels to revise Plan Revision 5.1 so that the Plan's definition of "final closure" matches the definition in Subpart W. This is important for four reasons. First, EPA's definition makes clear that "final closure" begins only when the deadlines (a.k.a. "milestones") in the reclamation plan have been triggered.[113] *That means, if deadlines don't start running, final closure can't begin, a critical condition to avoid delay. Second, EPA's definition leaves no doubt about when "nonconventional impoundments"—also called evaporation ponds—enter final closure and must be managed "in accordance with the milestones and requirements in an approved reclamation plan."*[114] *That fixes the problem that Energy Fuels' definition creates by referring only to impoundments used to discard "tailings sands," which are "conventional impoundments" according to Subpart W's definition of "final closure." Third, using the same definitions in Subpart W and the reclamation plan will ensure that the exact same event—proper notice to the Division and EPA—triggers "final closure," eliminating any possibility that Energy Fuels could claim that an impoundment is not in "operation" under Subpart W but also not in "final closure" under Appendix A. Fourth, adopting EPA's definition of final closure eliminates the internal inconsistency created by Energy Fuels' definition of that term when compared with the plan's milestones.*

Division Response: This comment presents a legal argument relating to what the commenter characterizes as the Division's misinterpretation of two "regulatory terms of art," being "operation" and "final closure." This will be referred to as the "GTC Final Closure Argument." It is an elaborate legal argument as to why the Division's interpretation and application of applicable legal requirements is wrong. The Division disagrees.

The GTC Final Closure Argument was the principal basis for the Grand Canyon Trust's legal claims against Energy Fuels in the U.S. District Court for the District of Utah referred to above. In that decision, Judge Waddoups spends considerable time delving into the GRC Final Closure Argument. *See* Memorandum Decision and Order at 28-39. That discussion is incorporated here by this reference. In short, the court found that Energy Fuels has correctly applied the legal definitions for "operation" and "final closure" and rejected the GTC Final Closure Argument. The Division concurs with this conclusion for the same reasons articulated by Judge Waddoups. But apart from Judge Waddoups' decision, the Department has made an independent determination that Energy Fuels is operating in full compliance of Subpart W for radon emission control, and that Energy Fuel's use of the terms "operation" and "final closure" in its Reclamation Plan Revision 5.1 is appropriate. Therefore, this comment is rejected. The Division also incorporates by reference its General Response #14.

GCT Comment #32

C. The reclamation deadlines in Revision 5.1 are inadequate.

1. Deadlines must be imposed for all key tasks for completing the final radon barrier.

Energy Fuels' reclamation plan lacks several deadlines the plan is required to have. Appendix A mandates that reclamation plans have "milestones that are key to the completion of the final radon

---

[110] *Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings, 82 Fed. Reg. 5,142, 5,179 (Jan. 17, 2017).*
[111] *40 C.F.R. § 61.251(n).*
[112] *40 C.F.R. § 61.251(n).*
[113] *Id. (final closure means the period when an impoundment is "being managed in accordance with the milestones and requirements in approved reclamation plan").*
[114] *Id.*

barrier…."[115] *At a minimum, milestones must be established for retrieving windblown tailings, stabilizing the impoundment (including removing freestanding liquids, recontouring, and dewatering), and finishing the final radon barrier.*[116] *Again, milestones aren't flexible goals. They're "an action or event that is required to occur by an enforceable date."*[117]

Reclamation Plan Revision 5.1 has a handful of deadlines that run from the date "final closure" begins or from a prior reclamation step. For example, the plan commits Energy Fuels to recontour impoundments within 180 days after freestanding liquids are removed.[118] *The interim cover must be finished anywhere from 19–33 months after recontouring is complete.*[119] *Other steps follow similar patterns.*[120]

The plan sets no deadlines, however, for some key reclamation steps. Cell dewatering, for example, is subject to no time limit. Instead, the plan has a performance standard to determine when enough dewatering has occurred to allow for placement of the final-cover layers.[121] *There is also no deadline for removing freestanding liquids.*[122] *Instead, the plan explains that, when final closure begins, Energy Fuels will "minimize" the addition of liquids to the impoundment, except for precipitation, and let liquids evaporate (unless they can be pumped elsewhere without interfering with mill operations).*[123]

This doesn't comply with Appendix A. The "milestones" in reclamation plans must be actions or events that are "required to occur by an enforceable date."[124] *The dewatering performance standard that Energy Fuels proposes thus doesn't qualify as a "milestone," nor does a commitment to "minimize" the addition of liquids to impoundments. Enforceable deadlines must be established for both tasks.*

Energy Fuels asserts that the time needed to dewater and stabilize impoundments "depends on physical and technological factors beyond [its] control," and that it is thus "not possible to establish absolute deadlines or milestones" when the reclamation plan is approved.[125] *This argument lacks merit for three reasons.*

First, there are no exemptions from Appendix A's deadline-setting requirements, for factors beyond Energy Fuels' control or otherwise. Factors beyond the Licensee's control are a failsafe

for Appendix A's expeditious-closure standard, but they are not an excuse for leaving deadlines out of reclamation plans. Again, Appendix A requires impoundments to be closed "as expeditiously as practicable considering technological feasibility."[126] That is basically a performance standard—one that specifies how fast impoundments must be closed ("as quickly as possible") and what considerations may temper that

---

[115] *10 C.F.R. Part 40, App. A, "Reclamation Plan" & Criterion 6A.*
[116] *10 C.F.R. Part 40, App. A, "Reclamation Plan" & Criterion 6A.*
[117] *10 C.F.R. Part 40, App. A, "Milestone."*
[118] *Ex. 1 at 6-3.*
[119] *Ex. 1 at 6-4.*
[120] *Ex. 1 at 6-5 (requiring vegetative cover to be planted in the first growing season after the final cover layers are built or, for the conventional cover design, that rock armor be placed 180 days after the final cover layers are built).*
[121] *Ex. 1 at 6-4 (settlement most slow to a rate of 0.1 feet for 12 months as measured in 90 percent of the settlement monitors installed in the impoundment).*
[122] *Ex. 2 at 6-3 to 6-4.*
[123] *Id.*
[124] *10 C.F.R. Part 40, App. A, "Milestone."*
[125] *Ex. 1 at 6-1.*
[126] *10 C.F.R. Part 40, App. A, Criterion 6A.*

pace (physical characteristics of the site, technological limitations, compliance with other regulatory programs, and factors beyond the Licensee's control).[127] So, when Energy Fuels points to "physical and technological factors beyond [its] control" as a reason not to set deadlines, it's borrowing language from Appendix A's definition of the phrase "as expeditiously as practicable considering technological feasibility."

But that language has nothing to do with Appendix A's deadline-setting requirements. Milestones must be established wholly apart from the expeditious-closure standard.[128] And there are no exemptions whatsoever from Appendix A's milestone requirements. Put differently, factors beyond a Licensee's control may be an acceptable justification for missing a deadline, but they are not a justification for not setting one.

Second, there is a failsafe in Appendix A if deadlines cannot be met. Deadlines may be extended, but only after allowing public participation, only after finding that radon-222 releases from the impoundment are less than 20 pCi/(m2-sec) on average, only if radon-222 emissions are monitored annually during the period of delay, and if an extension for placing the final radon barrier is sought based on cost, only after even more criteria are met.[129] By failing to include absolute deadlines in its plan, Energy Fuels is impermissibly attempting to bypass these requirements.

Third, it is possible to estimate how long it will take to stabilize an impoundment and set deadlines based on that estimate. For cell dewatering, in fact, Energy Fuels has already made

those estimates for all the mill's impoundments. To develop Reclamation Plan Revision 5.1, Energy Fuels modelled the cell dewatering times for Cells 2 and 3 to be 10 years.[130] And the company has modelled the dewatering time for the cell design used for Cells 4A and 4B to be 5.5 years.[131] The company's reclamation plan also has comparable estimates of the time needed to dewater those cells, plus an estimate of two years to dewater Cell 1.[132] Comparable modelling can no doubt be completed for the time needed for evaporating the estimated volume of freestanding liquids at the time final closure begins.

The Division accordingly should insist that enforceable deadlines be established in Plan Revision 5.1 for all reclamation steps that are key to completing the final radon barrier, including removal of freestanding liquids and dewatering. It is essential that the schedule of milestones be structured so that the first deadline starts running the moment that "final closure" begins, and the time limit for each subsequent reclamation step is automatically triggered when the prior step is completed or the deadline for the prior step passes, whichever occurs first. And the Division should require Energy Fuels to eliminate all qualifications and caveats from the schedule, such as allowing for "such longer time as may be required [to recontour an impoundment] if instability of the tailings sands restricts or hampers such activities."[133] That

---

[127] 10 C.F.R. Part 40, App. A ("As expeditiously as practicable considering technological feasibility, for the purposes of Criterion 6A, means as quickly as possible considering: the physical characteristics of the tailings and the site; the limits of available technology; the need for consistency with mandatory requirements of other regulatory programs; and factors beyond the control of the Licensee. The phrase permits consideration of the cost of compliance only to the extent specifically provided for by use of the term available technology.").
[128] 10 C.F.R. Part 40, App. A, Criterion 6A and "Reclamation Plan" (expressing the expeditious-closure and deadline requirements separately).
[129] See Appendix A, Criterion 6A(2).
[130] Ex. 22, App. J at J-4.
[131] Ex. 29 at 9.
[132] Ex. 19 at "Cell 1Reclamation" (pp. 19 and 21 of 92); "Reclamation of Cell 2" (p. 24 of 92); "Reclamation of Cell 3" (p. 37 of 92); "Reclamation of Cell 4A" (p. 48 of 92); and "Reclamation of Cell 4B" (p. 59 of 92).
[133] Ex. 1 at 6-4.

is the only way to make sure that deadlines have teeth and can only be extended for a good reason after going through the process Appendix A demands.

A proper schedule would conceptually work as set out in the following table (though we don't pass judgment on whether the time limit listed below for each step is appropriate):

Reclamation Task	Milestone
Removing Freestanding Liquids	Freestanding liquids will be removed from the impoundment 180 days after final closure begins.
Recontouring	Recontouring of the impoundment will be complete 90 days after freestanding liquids are removed or 270 days after final closure begins, whichever occurs first.
Interim Cover Layers	Interim cover will be extended over the entire impoundment within 270 days after recontouring is complete or 540 days after final closure begins, whichever occurs first.
Dewatering	Dewatering of the impoundment will be complete within 5 years and 180 days days after interim cover is placed or 7 years after final closure begins, whichever occurs first.
Final Cover Layers	Final cover layers will be placed within 365 days after dewatering is complete or 8 years after final closure begins, whichever occurs first.
Reseeding Vegetative Cover	Seeding for revegetation will be complete within 270 days after the final cover layers are placed or 8 years and 270 days after final closure begins, whichever occurs first.

Composing the schedule this way is clear and establishes true "milestones" that are required to occur by an enforceable date. If Energy Fuels ends up needing more time for any task, it may request an extension as provided by Criterion 6A in Appendix A: after public participation, only if radon-222 emissions are monitored annually during the period of delay and stay below 20 pCi/(m2-sec) on average, and if an extension for placing the final radon barrier is sought based on cost, only if the Division finds that Energy Fuels is "making good faith efforts to emplace the final radon barrier, the delay is consistent with the definition of available technology, and the radon releases caused by the delay will not result in a significant incremental risk to the public health."[134]

Division Response: The Division incorporates by reference its General Response #14. Moreover, the Division provides the following additional response to this comment. GCT is correct in its quotation of the requirement to have milestones in place in the reclamation plan, and that milestones are events or actions tied to enforceable dates. The Division, likewise, does not contest the subject matter to which the milestones pertain. However, the Division has considered factors as critical that GCT dismisses as irrelevant. The Division is focused on the end result of the effort, not on rigid adherence to the generic methodology codified in the regulations. For example, using an issue that will be explored further below and has received some treatment earlier in this document, the NRC would not have provided a definition of factors beyond the Licensee's control in 10 CFR 40 Appendix A without reference to limitations on its application unless the NRC contemplated a need for that provision in areas to which it was not explicitly attached later in the narrative. Taking the narrow view advocated by GCT would make

moot other provisions of Appendix A, and make both enforcement of and compliance with the regulations unreasonably difficult and expensive.

The commenter assumes that windblown tailings are not addressed at all, otherwise the discussion of milestones would have acknowledged and analyzed in some fashion the Licensees actions. The Licensee submits semi-annual effluent monitoring reports which present, among other things, plant and soil sample analysis for off-site dispersion of contaminants. Should contamination be noted above expected variation in background, the Division compels cleanup and reanalysis to demonstrate completeness of the effort. With that in mind, the Division is faced with the task of setting a redundant milestone in this case inasmuch as the intent is being met through other means. Studies by independent researchers have found contamination offsite, but not in quantities that exceed cleanup levels, or that exceed natural variation in the region in background levels.

Recontouring is tied to removal of freestanding liquid. Given the mill personnel's experience with stability of the tailings the Division accepts the Licensee's proposed timeline. Working on unstable tailings can result in vehicles or equipment becoming mired in the tailings and the drivers of those vehicles being exposed to acidic process fluid beneath the surface and radiation from the tailings. 180 days following removal of fluid from the cell is not an unreasonable expectation. Not all areas of the tailings become stable that quickly, so allowing the Licensee an additional 180 days to complete the work on the tailings surface is not unreasonable.

Dewatering time requirements have been estimated in the past, but the actual dewatering times have taken much longer than the models predicted. Without a reliable model, any date certain or estimated time interval is speculative. The Division accepts the use of settlement criteria as an interim measure while additional investigatory work progresses using the piezometers, settlement surveys and drain pumping to generate data from Cell 2 to adjust and calibrate the models. The reader should note that premature placement of final cover will obscure the surface of the primary radon barrier which has been placed on Cell 2 or which might be placed on any other cell, making settlement-induced defects hard to identify and repair. Since the Phase 1 cover on Cell 2 has reduced radon emanation levels to well below Subpart W limits, the benefits of placing additional cover layers prior to adequate completion of tailings consolidation do not outweigh the benefits of waiting for natural processes to complete. The primary radon barrier on Cell 2 is complete.

However, Energy Fuels provided a reply to this comment with a commitment to revise the Reclamation Plan, and has provided milestone triggers that are as aggressive as can be expected. The Division has reviewed and accepts the proposed changes to which Energy Fuels has committed. The commenter is referred to Energy Fuels' Reply Comments for more detail.

GCT Comment #33

In addition to requiring Energy Fuels to modify the schedule of milestones in Revision 5.1 according to the structure illustrated above, the Division should require Energy Fuels to:

- *Establish an absolute deadline for removing freestanding liquids, such as 180 days after final closure begins. Also, to meet Appendix A's requirement that impoundments be*

closed as quickly as possible considering technological feasibility, require Energy Fuels to stop adding liquids to the impoundment once final closure begins (rather than to "minimize" addition of liquids) and to pump freestanding liquids into other operating cells, regardless of whether doing so will force the company to curtail mill operations.

- *Eliminate the proviso in the recontouring milestone that allows for more than 180 days to finish recontouring "as may be required if instability of the tailings sands restricts or hampers*

---

134 10 C.F.R. Part 40, App. A, Criterion 6A.

such activities."[135] If Energy Fuels needs that deadline to be extended, it may apply for an extension as provided by Appendix A.

- *Establish an absolute deadline for completing dewatering that is based on current modelling of how long it will take to meet the settlement performance standard in the plan (e.g., for Cells 4A and 4B, 5.5 years after dewatering is commenced). If the settlement performance standard is met before the deadline, then the deadline for the next reclamation task (placement of final cover layers) should be triggered. If the deadline cannot be met despite proceeding "as expeditiously as practicable considering technological feasibility," as that phrase is defined by Appendix A, then Energy Fuels may apply for an extension according to the process laid out in Criterion 6A. The same modification should be made to the Stipulation and Consent Agreement for completing the final cover on Cell 2.*
- *Delete the second paragraph in Section 6.1 of the plan, which inaccurately asserts that "it is not possible to establish absolute deadlines or milestones for reclamation at the time of approval of this Plan."[136] Delete comparable statements elsewhere in the Plan that deadlines cannot be established.[137]*
- *Set a deadline for establishing vegetative cover and diversity that meets the design criteria for the ET cover. This modification should also be made to the Stipulation and Consent Agreement for completing the final cover on Cell 2.*

Division Response: The Division disagrees with the commenter. Please see the Division's responses to GCT Comment Nos. 31-32, above, and No. 34, below. The Division also incorporates by reference its General Response #14.

GCT Comment #34

2. The schedule that applies if the mill is closed violates Appendix A.

If Energy Fuels decides to shut down the mill, Plan Revision 5.1 modifies the impoundment-cleanup deadlines that would apply to impoundments that are closed while the mill is running.[138] Rather than establish deadlines that run from the day final closure of each remaining impoundment begins (as required by Appendix A), Revision 5.1 says that Energy Fuels will submit a separate decommissioning schedule to the Division when the mill closes.[139] Only after the Division approves that schedule would any closure deadlines be triggered.[140]

Under this plan, Energy Fuels would start demolishing the mill and retrieving windblown tailings 180 days after the schedule is approved and "sufficient" solutions evaporate from the cell that the dismantled mill will go in.[141] *Unreclaimed impoundments would be closed one-by-one, starting "as soon as reasonably practicable" after the Division approves the schedule.*[142] *So, if Energy Fuels closed the mill with five operating impoundments, until closure of the first impoundment was complete, the company wouldn't be required to start the first steps in its reclamation plan for the second impoundment—such as finishing placement of interim cover, recontouring, and dewatering (which could take years). And only after closing the second impoundment, would closure of the third impoundment have to begin, and so on. This could take decades.*

---

[135] *Ex. 1 at 6-4.*
[136] *Ex. 1 at 6-1.*
[137] *See, e.g., Ex. 2 at 6-1 ("to the extent that they can be established at this time").*
[138] *See Ex. 1 at 6-5 to 6-6 (§ 6.2.4).*
[139] *Id.*
[140] *Id.*
[141] *Ex. 1 at 6-6.*
[142] *Id. at 6-6.*

Impermissible delay taints this plan. The day "final closure" of an impoundment at the mill begins, the clock must start ticking on closure milestones—meaning enforceable deadlines—for that impoundment.[143] *When mill closure begins, it's necessarily true that "final closure" of all operating impoundments will begin. Initiating closure of the mill, that is, necessarily means that the whole facility is being managed in accordance with the mill's reclamation plan, including all impoundments that were still in operation. And that means all operating impoundments will enter "final closure": namely, "the period during which [the] impoundment … is being managed in accordance with the milestones and requirements in an approved reclamation plan."*[144] *Thus, initiating mill closure must simultaneously trigger "final closure" of all operating impoundments. And under Criterion 6A of Appendix A, that must trigger closure milestones.*

The upshot is twofold: (1) deadlines must be established for closing the last impoundment that account for decommissioning the mill and other structures and burying them in that impoundment before the final radon barrier is placed; (2) closure of all unreclaimed impoundments must proceed simultaneously, not one-by-one.

The reasoning behind the first point is simple. Energy Fuels plans to bury the mill and other leftover waste in the last open impoundment. Until that happens, it's impossible to place the final radon barrier on the last unreclaimed cell. And Appendix A requires a deadline to be set for completing the final radon barrier for that cell, like all others at the mill. Thus, to comply with Appendix A, a deadline must be established now for building the final radon barrier on the last unreclaimed cell that is based on a predicted decommissioning schedule for the rest of the mill.

The second point likewise follows from the standards in Appendix A. Closing impoundments one-by- one is impermissible under Appendix A because Criterion 6A insists that impoundments be closed "as expeditiously as practicable considering technological feasibility" after they stop

operating.[145] That phrase means "as quickly as possible" considering physical site characteristics, technology, regulatory requirements, and uncontrollable factors.[146] Waiting to start reclaiming an impoundment until closure of another impoundment is complete, by definition, cannot amount to closing the idle impoundment "as quickly as possible." Energy Fuels hasn't identified any physical characteristics of the mill site, technological limitations, or regulatory requirements that would justify closing impoundments sequentially. And the Division should prohibit the company from doing so.

The Division accordingly should require Energy Fuels to revise the reclamation plan so that:

- *Initiating mill closure also initiates final closure of all operating impoundments (including conventional and non-conventional impoundments alike, and triggers milestones for closing those impoundments;*
- *The plan includes a schedule for decommissioning activities that Energy Fuels must accomplish before completing the final radon barrier, such as dismantling the mill, digging up any non-conventional impoundments that won't be closed in place, and burying those materials in the last impoundment.*

Division Response: The Division disagrees with the commenter. The Division's response to GCT Comment Nos. 31 and 32 are incorporated by this reference. The Division also incorporates by reference its General Response #14. Moreover, the Division points out that the commenter's assertion that the impoundments must be closed simultaneously rather than sequentially ignores common construction practice and common sense. Large construction projects, particularly those involving large-scale earthmoving, are typically divided into practical phases that are implemented sequentially. This allows for efficient use of the most experienced and capable workers and equipment and prevents conflicts from overcrowding of the worksite. Furthermore, allowing sequenced closure of the impoundments allows for transfer of fluid from each impoundment as work progresses to the last impoundment for evaporation rather than forcing a more expensive and risky process of transporting the fluids offsite for disposal.

Engineers use models to predict the behavior of physical systems and to generate meaningful input to designs. Models do not include all inputs to the physical system, but make simplifying assumptions. Therefore, at best, models are approximations. Depending on the assumptions made in developing the model, the results of modeling may be a close representation of the physical system or a poor one.

The quality of the modeling effort is also a function of the model inputs. Often literature values are used, which may, or may not well represent the actual conditions ultimately encountered. The modeling done during the planning phases of the mill projected much faster dewatering performance than that encountered in the field. The Licensee is in the process of a second round of data gathering during operation (i.e., after the conclusion of the planning phase and commencement of operations) to "calibrate" the model and get a more realistic expectation for dewatering performance.

Due to the slowness of the dewatering effort, in 2007, the Division amended the Ground Water Discharge Permit to include a provision at Part I.D.3(b)(1) (now I.D.3(b)(3)) to calculate the phreatic surface above the slimes drain evacuation pump, and with that data to calculate the 3-

year running average of that elevation.[33] The three-year running average would then be plotted along with previous years' calculations. The measurements that facilitate that calculation were taken quarterly, so the plot would present the three-year running averages in temporal sequence. The Licensee was required to maintain a downward trajectory with no more than two consecutive calculations failing to show a downward trend.

Because the performance of the physical systems was unknowable at the time, the formula applied was arbitrary. But it served to encourage the Licensee to do the maximum possible to dewater. During the time the Licensee has been required to calculate according to that formula, the Division staff has noticed that the pace of dewatering has decreased and approached a horizontal asymptote. Factors beyond the Licensee's control have prevailed. However, the Licensee has installed piezometers and has collected samples of the tailings to be able to gather data about the condition of the tailings mass.

The Licensee has since installed the final radon barrier over Cell 2. The radon barrier material has surcharged the tailings mass, creating excess pore pressure as the fluid is compressed along with the tailings. As a result of the increased pore pressure, the phreatic surface has risen, and the amount of fluid available for pumping has also increased. The Division has exercised discretion in not citing the Licensee for the technical violation of the arbitrary schedule imposed because the Licensee is doing all it can and the delay is being driven by natural conditions. The Division has removed the schedule provision from the Permit.

The Division credits the Licensee's efforts to gain additional insights through using piezometers to monitor the phreatic surface in multiple locations at Cell 2 and through analyzing samples of tailings and slimes. Based on the technical data from the tailings mass at Cell 2, the Division is convinced, and finds, that the Licensee is doing all it can reasonably do to accelerate the dewatering and related consolidation of the tailings mass at this time. As opportunities to expedite dewatering present themselves in the future, the Division will pursue them.

The discussions regarding the dewatering schedule, here and above, underscore the impracticability of establishing arbitrary milestones for reclamation as demanded by the commenter. The Division interprets the rules to hold that the NRC expected situations to arise where the narrow definition of a milestone with an enforceable date attached to the mandated action would be impracticable. That is why the NRC noted exceptions to the practice of fixing firm dates for compliance. The Division finds that, notwithstanding the provision allowing the Licensee to seek revision of milestone dates, the current situation supports even more discretion on the part of the Division. The dates would need to rely on some predictive mechanism to be meaningful, and the modeling typically used for this purpose has proven to be highly inaccurate. Repeated processing of requests for extension of time will do nothing to help protect human health and the environment, but will unnecessarily divert limited resources of both the Licensee and the Division from that mission. It seems prudent to allow the Division and the Licensee sufficient flexibility to work on resolving this problem rather than blindly adhering to a

[33] 2008 GWDP Amendment Statement of Basis

mandated process.

_____
[143] *See 10 C.F.R. Part 40, App. A, Criterion 6A; 40 C.F.R. § 61.251(n).*
[144] *40 C.F.R. § 61.251(n).*
[145] *10 C.F.R. Part 40, App. A, Criterion 6A.*
[146] *10 C.F.R. Part 40, App. A, "As expeditiously as practicable considering technological feasibility."*

GCT Comment #35
3. Deadlines must be established as a condition of the radioactive materials license.

Criterion 6A in Appendix A is clear that "[d]eadlines for completion of the final radon barrier" and, if applicable, other interim milestones "must be established as a condition of the individual license."[147] *The Division's draft radioactive materials license doesn't do that. It's completely silent on the subject.*

The consequences of this lapse are more than ministerial. Under the Utah Radiation Control Act, civil penalties may be assessed for violating a radioactive materials license.[148] *Thus, putting reclamation deadlines in the license, as the Division is required to do, will give Energy Fuels more incentive to meet them and the Division more clout if Energy Fuels doesn't.*

The Division should correct this omission by stating as a condition of the license all milestones that are expressed in Plan Revision 5.1 (as revised according to our comments above).
Division Response: The Division disagrees with this comment. Its responses to comments 31-34, above, are incorporated by this reference. Furthermore, the Division notes that deadlines have been established as outlined in Sections 3 and 6 of Reclamation Plan Revision 5.1. The Division finds that the deadlines do have adequately-defined triggers that force the work forward in a way that provides flexibility for the Licensee to manage unpredictable site conditions. The Division has exercised its discretion in setting these deadlines.

The commenter seeks invocation of the penalty clause in the Rules to provide additional incentive for the Licensee to comply. The Division can, make a case to invoke the penalty provisions of Rule without having the license amended as the commenter demands. Implicit in this comment is an assumption that the Licensee is not compliant and needs that additional incentive. The Division does not share the belief that the license is reticent to do its duty. Again, referring to the case in the preceding response to comment, the Division believes the Licensee is going above and beyond to find a means of getting an uncooperative natural system to respond more quickly and allow more rapid resolution of the dewatering and settlement issues. The other milestones sought by the commenter either depend upon these processes, or reflect situations where operations exclusive of placing of tailings are still in process.

GCT Comment #36
D. Energy Fuels should not be allowed, let alone required, to revert to the cover design in Reclamation Plan Revision 3.2b.

If the ET cover test sections don't meet the performance criteria set out in the Stipulation and Consent Agreement, Reclamation Plan Revision 5.1 calls for Energy Fuels to build a cover that is "functionally equivalent to the Existing Cover Design presented in Reclamation Plan Revision 3.2b"—i.e., the "conventional cover" mentioned above.[149] That design was developed in 1996.[150] Calling it a conventional design means that compacted soil layers, rather than evapotranspiration, would be used to inhibit percolation of water through the cover. By all signs, this design would be far inferior at the mill to an evapotranspirative one.

Research since 1996 reveals that conventional designs often allow more water to permeate through the cover than the design was meant to allow, posing a risk of groundwater contamination. Indeed, the latest infiltration modelling for the 1996 conventional-cover design predicts that far more water will infiltrate through that cover than the ET cover. For that reason, installation of the conventional cover should not be an automatic backup plan if the ET cover doesn't meet the Consent Agreement's performance criteria. Only if the ET cover can't meet the Consent Agreement's performance criteria, and the conventional cover can, would it make any sense to revert to the conventional cover.

Regardless, the analysis supporting the conventional cover is badly out of date, casting serious doubt on whether that cover could possibly work as intended. For these reasons, the Division should not authorize contingent reversion to the conventional cover design. If the ET cover fails to meet the Consent Agreement's performance criteria, it would defy common sense and the law to allow Energy Fuels to build a less robust cover.

Division Response: The Division disagrees with this comment for several reasons. In addition to the responses provide above and General Response #14, the Division would like to add the following details in response to this comment:

1. The commenter assumes too much authority on the part of the Division to dictate the design. The NRC already approved the rock armor cover system. There is no basis in the record for the Division to challenge or overturn the NRC's longstanding decision. To the contrary, all the evidence in the administrative record supports the NRC's approval of the rock armor design. This is not an insignificant comment since the U.S. Government (Department of Energy) will assume long-term responsibility for the tailings facility upon closure of the facility. The party with the strongest interest in the nature and integrity of the final cover is the U.S. Government.

2. The NRC approved the final rock armor cover system under a doctrine of "reasonable assurance."[34] That doctrine was never directly defined in this context, but much

[34] NRC Inspection Manual, Part 9900: Technical Guidance as follows: "As commonly understood, safety means freedom from exposure to danger, or protection from harm. In a practical sense, an activity is deemed to be safe if the perceived risks are judged to be acceptable. The Atomic Energy Act of 1954, as amended, establishes 'adequate protection' as the standard of safety on which NRC regulation is based. In the context of NRC regulation, safety means

discussion has taken place in legal proceedings over that issue. An online law dictionary defines reasonable assurance to include two tests: (1) it is not possible to declare with absolute certainty that an event will or will not happen," and (2) "that while the standard conforms to limits it is not excessive."[35] In 48 FR 28204 the NRC stated, "In the Commission's view, the 'reasonable assurance' standard neither implies a lack of conservatism nor creates a standard which is impossible to meet. On the contrary, it parallels language which the Commission has applied in other contexts, such as the licensing of nuclear reactors, for many years. See 10 CFR 50.35(a) and 50.40 (a). The reasonable assurance standard is derived from the finding of the commission is required to make under the atomic Energy Act that the licensed activity provide 'adequate protection' to the health and safety of the public; the standard has been approved by the Supreme court, Power Reactor Development Co. v. Electrical Union, 367 U.S. 396, 407 (1961). This standard, in addition to being commonly used and accepted in the Commission's licensing activities, allows the flexibility necessary for the commission to make judgmental distinctions with respect to quantitative data that may have large uncertainties (in the mathematical sense) associated with it." The narrative in 48 FR 28204 also states, "The Commission would not issue a license unless it were to conclude, after such assessments, that there is reasonable assurance that the outcome will in fact conform to the relevant standards and criteria."

It may prove useful to note that recently the NRC adopted the EPA's doctrine of "reasonable expectation," defined in a regulation parallel to that which governs milling operations as follows:[36]

"Reasonable expectation means that the Commission is satisfied that compliance will be achieved based upon the full record before it. Characteristics of reasonable expectation include that it:

(1) Requires less than absolute proof because absolute proof is impossible to attain for disposal due to the uncertainty of projecting long-term performance;

(2) Accounts for the inherently greater uncertainties in making long-term projections of the performance of the Yucca Mountain disposal system;

(3) Does not exclude important parameters from assessments and analyses simply because they are difficult to precisely quantify to a high degree of confidence; and

---

avoiding undue risk or, stated another way, providing reasonable assurance of adequate protection for the public in connection with the use of source, byproduct and special nuclear materials."

[35] Thelawdictionary.org/reasonable-assurance/ accessed October 2, 2017

[36] 10 CFR 60:304

(4) Focuses performance assessments and analyses on the full range of defensible and reasonable parameter distributions rather than only upon extreme physical situations and parameter values.

The NRC has stated that reasonable expectation and reasonable assurance have the same meaning.[37] Even though the terminology may have changed, the principle still applies. Since the NRC approved the legacy cover system and would not have done so without "reasonable assurance" or "reasonable expectation" of its ability to perform, the Division has chosen to accept that determination instead of applying a more stringent standard and needing to justify why it is acting contrary to State Code regarding stringency.

1. In a similar line of reasoning, the NRC stated in 10 CFR 40 Appendix A, "Licensees or applicants may propose alternatives to the specific requirements in this appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Commission may find that the proposed alternatives meet the Commission's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E." Clearly, Appendix A is not mandatory if the demonstration in the preceding quotation can be made.

Further language in Appendix A states, "Available technology means technologies and methods for emplacing a final radon barrier on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary measures or techniques that would impose costs that are grossly excessive as measured by practice within the industry (or one that is reasonably analogous), (such as, by way of illustration only, unreasonable overtime, staffing, or transportation requirements, etc., considering normal practice in the industry; laser fusion of soils, etc.), provided there is reasonable progress toward emplacement of the final radon barrier. To determine grossly excessive costs, the relevant baseline against which cost shall be compared is the cost estimate for tailings impoundment closure contained in the Licensee's approved reclamation plan, but costs beyond these estimates shall not automatically be considered grossly excessive."

2. Because the rock armor final cover has been approved for many years, the Licensee has reasonably relied on that decision and has a vested right to implement that cover system.

3. Furthermore, the commenter cites research selectively. The design proposed by the Licensee was appropriately framed, with respect to Appendix A. The Division remains unconvinced that an ET cover is appropriate for the climate at Blanding, and shares the concern stated in Appendix A, Criterion 4: "Where a full vegetative cover is not likely to

[37] ML071520180

be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover must be employed on slopes of the impoundment system." Note that the default in Criterion A is a rock armor barrier as was included in the legacy cover system that the commenter seeks to bar. A demonstration project of sufficient brevity to keep the work moving ahead, yet sufficiently long to allow a robust analysis of the proposed design is warranted. If the ET cover system fails to produce sufficient plant diversity and density, the ET cover will be even more prone to infiltration than the legacy system while providing significantly poorer protection against erosion. Even the synthetic membranes demanded by the commenter will not provide long-term protection. Once exposed to sunlight because of loss of cover to erosion, the membrane will crack. Thus, both erosion and infiltration will penetrate deeper into the system, ultimately mobilizing the tailings and decommissioning debris. Pollution of the environment is a near certainty under those conditions.

4. If the demonstration project proves the design successful as proposed, the additional barriers proposed by the commenter constitute an unneeded expense with no discernible gain in protection of human health and the environment. If not, the Reclamation Plan reverts to the already approved system. The Licensee can always propose a new system, and if it addresses the weaknesses in the approved system or the system under investigation, the Division can consider that alternative at that time.

5. Finally, the commenter has likewise not demonstrated that this preferred cover system will meet the criteria for reducing maintenance demands on the Legacy Management office of the Department of Energy upon turning the site over to the DOE.[38] On the other hand, the Licensee has sought the expertise of qualified consulting specialists who wrote the guidance on ET cover systems, and has proposed a design these specialists feel will work. That design, not the commenter's preferred ideal, is before the Division for consideration. If the system fails to operate as designed, the Licensee can propose an alternative. Until an alternative is proven to work, not just having promising theoretical bona fides in a differing sub climate, the Division will continue to rely on the legacy design as the failsafe. The Division is not authorized to dictate the design when an alternative is properly proposed and provisions are made to vouchsafe its effectiveness prior to full-scale implementation.

6. The specific design preferred by the commenter includes many features, such as synthetic liners and a capillary break that may ratchet up cost without providing significant benefit. The NRC's standard has been one of reasonable assurance of meeting environmental objectives, which argues in favor of proving the proposed design, and if it proves insufficient to explore other possibilities at that time. The approved rock armor cover meets the NRC standard, hence the approval previously extended by the NRC. As a result, an ET cover is not the only option available.

[38] 10 CFR 40 Appendix A Criterion 6(7) and Criterion 12. See also NUREG-1620 p. 3-9, 3-16, and E-9.

[147] *10 C.F.R. Part 40, App. A, Criterion 6A.*
[148] *Utah Code § 19-3-109(1); see also Utah Admin. Code R313-14-15 (authorizing enforcement actions for violating legally binding "requirements") and R313-14-3(2) (defining "requirement" to include mandates such as license conditions).*
[149] *Ex. 1 at 5-1. See also Ex. 21 at 7 (§ D.7.b.iii).*
[150] *Ex. 30.*

GCT Comment #37

1. In arid environments, conventional cover designs generally pose greater risk to groundwater than evapotranspirative designs.

Performance evaluations from tailings and other waste covers built in the past several decades strongly suggest that evapotranspirative covers will outperform conventional covers in arid places, like White Mesa, Utah.

In addition to setting standards for cleaning up operating uranium mills, UMTRCA also created a program for cleaning up mills that were defunct by the time the law was passed in 1978. UMTRCA put the Department of Energy in charge of remediating these so-called "Title I" sites. Over the next 20 years,[151] the Department of Energy built 19 tailings disposal cells, mostly at uranium mills in the West, generally using a conventional design, though with a few vegetated covers.[152]

Research into how those and other tailings covers have fared reveals that these conventional designs often don't fend off water infiltration anywhere near as well as they were designed to. [153] Why? Deep-rooted plants, repeated freezing and thawing, desiccation, and construction defects, among other factors, can all degrade the cover.[154]

This research and other lessons learned from early Title I covers have led the Department of Energy to investigate evapotransiprative alternatives.[155] The cover built over the Monticello tailings site, which is about 25 miles from the White Mesa mill, is a leading example.[156] It's a composite design that has a traditional, compacted-soil layer on top of the tailings and an evapotranspirative cover on top of the compacted-soil layer, with a high-density polyethylene liner in between. The evapotranspirative cover has several elements. The top 8" are a gravel-soil mixture. Topsoil makes up the next 2'. Beneath that is about 16" of fine-grained soil to aid plant growth and provide frost protection. A foot of cobbles surrounded by soil are next to deter animals from burrowing into the cover. Another foot of fine-grained soil lies below that, then a geotextile separator. Last, a capillary break made of course sand sits above the liner as a place to store water until it's removed by evapotranspiration.[157]

Water-infiltration monitoring at the Monticello site (using a very large lysimeter) has revealed a rate of percolation through the cover of about 0.5 mm/year for the first thirteen years the cover was in service (through December 2012).[158] We've been unable to find directly comparable lysimeter data for conventional covers in the Title I program. But to provide some context, a percolation rate of 3.0 mm/year (often described in the literature as an EPA design target) corresponds to a saturated hydraulic conductivity of about 1 x 10^{-10} m/s. Measurements of

saturated hydraulic conductivity from tests on some conventional covers have often yielded results showing far greater conductivity (with measurements as high as 2 x 10^{-6} m/s).

---

[151] *Ex. 31 at Table 1.*
[152] *Ex. 32 at 1.*
[153] *Ex. 33 at 4-6 ("Several studies have shown that [compacted soil layers] in conventional covers often fall short of low-permeability targets, often during or shortly after construction, and sometimes by several orders of magnitude."); Ex. 35 at 5.*
[154] *Ex. 34 at 2.*
[155] *Ex. 34 at 2.*
[156] *Ex. 35 at 3; Ex. 35 at 5.*
[157] *See Ex. 35 at 3–4; Ex. 34 at 2.*
[158] *Ex. 34 at 4; Ex. at Slide 15.*

While it may be true that well-built conventional covers may be a defensible option under certain circumstances, the history of reclaiming Title I sites and recent research trends strongly suggest that evapotranspirative designs in arid environments will outperform conventional covers.[159]

Division Response: The Division is aware of the body of technical evidence relating to ET covers in arid environments. The Division disagrees with the approach proposed by the commenter to approve an ET cover at the White Mesa mill without sufficient site-specific evidence that it will perform in that location. For example, the Monticello, Utah climate is cooler and wetter than that at Blanding, and the cover system is a demonstration and research project using all the options available. Despite having a better climate for plant growth, at the Monticello site it still took several years of revegetation and irrigation efforts to encourage the vegetation to grow. The results at Monticello cannot be applied to Blanding. The data gathered through the present testing efforts will guide the Division's decisions about the feasibility of the ET cover.

The commenter demands that the Division accept the ET cover design without evidence that it will be effective. This is unwarranted, especially given the reservations regarding climate expressed in Appendix A. The design must be self-sustaining. Applying the Monticello cover design at the White Mesa Mill is not warranted because it remains to be seen whether it will meet this and other performance requirements. Furthermore, there are additional features in the Monticello design that may be unnecessary. The only way to know is to evaluate actual performance at the site. Just because a technology is available (synthetic liners, in this case), does not mean that it is needed.

GCT Comment #38
2. Modelling predicts the mill's 1996 conventional-cover design would put groundwater at more risk than alternatives.

In Plan Revision 5.1, Energy Fuels abandoned the 1996 conventional-cover design principally because research and modelling show that more water is likely to infiltrate into conventional

covers than ET covers.[160] In 2010, to help develop Revision 5.1, the company modelled infiltration and contaminant transport for four possible cover types—three evapotranspirative designs and the 1996 conventional cover design.[161] Based on that modelling, Energy Fuels concluded without equivocation that the conventional cover should be eliminated from further consideration "because the model predicted much higher rates of infiltration."162

About 75 to 300 times more water would percolate through the conventional cover than the evapotranspirative alternatives, according to the model.[163] It that prediction were to pan out, over 200 hundred years (the minimum performance period under Appendix A), 22' of water would go through the conventional cover and into the tailings.[164] If the tailings have a porosity of 45% (the figure used in the company's updated infiltration modelling),[165] that would mean a water-level rise on the liner of about 49'.[166] At that rate, unless enough contaminated water goes through the bottom of the liner, it would overtop the liner edges near the surface. In comparison, the evapotranspirative cover with the best modelled performance would allow 0.066' through the cover over 200 years, if it works as expected.

The company's groundwater discharge permit (and the law on which it's based) requires Energy Fuels to reclaim the impoundments in a way that "minimize[s] infiltration of precipitation or other surface water into the tailings."[167] If the ET cover test sections prove to be too permeable and fail the Consent Agreement's performance test, the current modelling predicts that the conventional cover will perform even worse, and hence, cannot minimize infiltration into the tailings. It would violate this infiltration-minimization mandate to require Energy Fuels to revert to the conventional cover if the ET cover test does

---

[159] *Ex. 37 at 3–4 (observing that, among the covers included in an EPA test program, conventional designs often allowed the most percolation, while ET designs performed better in arid regions).*
[160] *Ex. 22 at E-5 ("[R]ecent advances in cover design technology have emphasized the construction of vegetated, monolithic ET covers for minimizing infiltration through engineered cover systems, particularly in arid and semiarid regions.").*
[161] *Ex. 22 at E-1.*
[162] *Ex. 22 at E-8.*
[163] *Ex. 22 at E-7 (predicting an infiltration rate of 0.0092 cm/day for the conventional cover and a range of 0.00012 cm/day to 0.000031 cm/day for the evapotranspirative covers).*
[164] *Ex. 22 at Table E-2.*
[165] *Ex. 38 at 33.*
[166] *See Ex. 22 at ES-6, 3-2 (calculating water-level rise for the ET cover by dividing the total water flux by a tailings porosity of 57%).*
[167] *Exs. 39 and 40 at Part I.D.8(a); Utah Admin. Code R317-6-6.4 (allowing for discharge permits to issue if the applicant is "using best available technology to minimize the discharge of any pollutant"); 10 C.F.R. Part 40, App. A, Criterion 6(7) (requiring Licensees to minimize leaching of contaminants into groundwater); see also Ex. 1 at 3-5 ("The key state and federal performance criteria for tailings cover design and reclamation include … [m]inimize infiltration into the reclaimed tailings cells."); see also Ex. 1 at 3-5 ("The key state and federal performance*

criteria for tailings cover design and reclamation include … [m]inimize infiltration into the reclaimed tailings cells.").

not meet performance expectations and the company doesn't come up with changes that satisfy the Division.

Division Response: The Division relies on its prior and general comment responses here. While the applicable standards focus on minimizing infiltration, in the case of ET covers, unless sufficient vegetation grows on the cover, the transpiration effect will be minimized. ET covers are graded more shallowly in order to retain surface moisture and prevent erosion. Thus, a poorly-performing ET cover can, in fact, result in more the infiltration than a rock armor cover, which has steeper slopes and is designed primarily to shed surface water. There is inadequate data in the record upon which the Division could approve the proposed ET cover at the White Mesa Mill. The commenter's reliance the literature is, thus, speculative as applied to the White Mesa site.

GCT Comment #39
3. The 1996 analysis is outdated.

In 1996, Energy Fuels used modelling and other engineering assessments to evaluate how the conventional cover might perform. The key performance metrics the company considered were resilience from freeze-thaw cycles, radon attenuation, water infiltration, cover erosion, and slope stability.[168] That analysis is now over 20 years old and has many shortcomings. If the conventional cover or one similar to it were ever to be built at the mill, the analysis must be overhauled to justify adoption of that type of cover.

i. The freeze-thaw analysis uses obsolete data and modelling techniques.

When a tailings cover repeatedly freezes and thaws, its permeability can increase.[169] If that happens, the covered tailings may emit radon at a higher rate, and more water may infiltrate through the cover into the tailings, posing a risk of groundwater contamination.[170]

To determine whether freeze-thaw cycles would threaten the long-term durability of the conventional cover, Energy Fuels used a model in 1996 to forecast how deep frost would penetrate into the cover. The company fed a host of parameters—like average annual temperature, length of the freezing season, soil-freezing temperature, and soil-moisture content—into the model, which predicted that frost would form down to 6.8" into the conventional cover's 24" random-fill layer (the layer near the top, immediately beneath the rock armor).[171] Relying on that figure, the company concluded that freeze-thaw cycles wouldn't compromise the cover's ability to reduce radon emissions and surface-water infiltration (presumably because frost purportedly wouldn't get into the one-foot compacted clay layer beneath the 24" compacted random-fill layer).[172]

Those conclusions are no longer reliable, for there are post-1996 data and modelling techniques the company hasn't accounted for. In 2010, for example, Energy Fuels took new moisture-content measurements of the soil that is earmarked for the conventional cover's 24" random-fill

layer.[173] Those measurements revealed the stockpiled soil to be drier than prior measurements.[174] As a result, Energy Fuels used a moisture content of 7.8% when it updated its freeze-thaw analysis in 2012 for the ET cover's 42" frost-protection layer, whereas it used a figure of 11.8% for the conventional cover's 24" random-fill layer,[175] even though the exact same soil stockpiles would be used for the main frost-protection layers in both cover designs.[176] The 2012 analysis for the ET cover also used a century's worth of temperature data from Blanding, Utah to predict the maximum depth that frost could be expected to reach over a 200-year

---

[168] *Ex. 30 at 1–2.*
[169] *Ex. 41 (abstract of article reporting research results for tailings covers showing increases by an order of magnitude in hydraulic conductivity may occur from freeze-thaw cycles); Ex. 20 at 3-21 ("Repeated freeze/thaw cycles have been shown to increase the bulk soil permeability by breaking down the compacted soil structure.").*
[170] *Id.; Ex. 30, App. B, p. 1 of 32 (explaining that the upper cover layer subject to frost penetration "may not contribute to reductions of radon emanation from the tailings covers"); App. D, p. 3 of 34 (same for infiltration through the cover).*
[171] *Ex. 30 at 6–7, App. E at 2.*
[172] *Ex. 30 at 6–7.*
[173] *See Ex. 1 at 7–8 and Table 2-1.*
[174] *Compare Ex. 16 App. B. at Table A with Ex. 30 App. E at 3.*
[175] *Compare Ex. 16 App. B. at Table A with Ex. 30 App. E at 3.*
[176] *Ex. 16 at 2 ("The loam to sandy clay soil is the same material referred to in Titan (1996) as random/platform fill. This material is stockpiled at the site.").*

period.[177] The 1996 model, in contrast, appears to have predicted only an average frost depth based on temperature, freezing-point, and frost-season data over some unknown period.[178]

Using updated modelling techniques and data, the 2012 analysis predicted a maximum frost-penetration depth of 32", which would extend through the ET cover's 6" erosion-protection layer and well into the 42" frost-protection and bio-intrusion layer.[179] That result suggests that the 1996 model understates the potential frost-penetration depth for the conventional cover.[180] And differences in cover design (such as differing degrees of compaction) cannot account for all of the difference between the 1996 and 2012 results.[181] Because frost-penetration depth increases as soil gets drier, for example, overstating the moisture in the 24" random-fill layer in the 1996 model, would have led the model to understate frost-penetration depth.[182]

Regardless, the 2012 analysis makes plain that new data and modelling methods are available that could yield a better frost-penetration estimate than produced by the 1996 model. Indeed, the Division (through its own expert) made that very point in its interrogatories examining Energy Fuels' reclamation proposal.[183]

Division Response: The Division disagrees with the commenter's conclusions. The Division's Response to Comment No. 36 is incorporated by this reference. To be sure, the commenter

correctly points out that freezing temperatures will penetrate deeper in dry soils than in wet soils, but this fact does not mean that the approved rock armor cover is faulty or needs to be revised. Here, the most critical issue is not frost depth, but the combination of soil texture, soil moisture and soil temperature.[39] This information is not new, appearing in the technical literature in 1962, well before the legacy design was completed, and was well understood at the time the Licensee completed design of the approved rock armor final cover system. Just because technical data is old does not mean it is invalid, particularly when it comes to basic scientific facts such as how the rock armor final cover system will perform under site-specific conditions.

In this matter, the cover system has as two of its primary functions to control radon emanation and reduce rate of water percolating into the tailings mass. The radon barrier is a clay-rich, dense layer designed to inhibit radon emanation while providing a final check against water seepage into the tailings below, along with water-shedding or transpiring characteristics of the upper layers of the two cover systems in question. Frost depth reaching the radon barrier is a necessary condition for frost-related degradation of the radon barrier to occur, but it is not a sufficient requirement by itself. As indicated above, sufficient water penetration must occur. The relevant danger to the cover system is frost heave, a phenomenon where water expansion upon freezing breaks apart the structure of the soil.

The legacy cover system and the proposed ET cover system have different objectives, so using data from one to attack the integrity of the other, as the commenter has done here, is not useful in all cases. The ET cover design seeks to remove pore water from the cover through plant transpiration, leading to lower moisture content in the underlying soil. This is why the two designs used different model inputs, not that the soil moisture content needed to change for both cases. This takes the analysis back to where this response began. Frost will drive deeper in the ET cover than in the legacy cover. The comparison between the two assumes similarities that are not in evidence.

Understanding frost depth is important to be able to interpret the designs and expected function of the cover systems under discussion. As noted in NUREG/CR-7028, freezing of a densely compacted clay barrier changes the structure of the parts that freeze, introducing flow paths for percolation water to take through the cover.[40] Since frost depth is inversely proportional to pore water content, the expected higher pore water content of the soils above the compacted radon barrier serve to insulate the deeper layer from frost in the legacy rock armor cover. The ET cover, in theory, draws pore water out of the cover through plant roots, into the plant community, and transpires the water to the atmosphere, resulting in a drier regime in the upper layers of the ET cover system. Thus, the reported moisture content of the cover system and the frost depth will be different in the two designs.

---

[39] Penner, E; Ground Freezing and Frost Heaving; 1962, ¶9, 16; Accessed at http://web.mit.edu/parmstr/Public/NRCan/CanBldgDigests/cbd026_e.html#content on 4 October 2017

[40] NUREG/CR-7028, Volume 1, p. 6-17

The NRC achieved sufficient comfort with the design that it issued the license based upon its doctrine of reasonable assurance. As discussed in response to previous comments, this means that the NRC had confidence that the cover system would perform sufficiently well to meet the environmental protection standards applicable to the site. Reworking the legacy design based on the arguments presented by the commenter will not likely result in recommending any improvement to the design, and so is an unwarranted burden to place on the Licensee. The approved rock armor system has been shown to meet all applicable performance standards. There is no need to revisit these issues at this time.

GCT Comment #40

ii. Similar deficiencies afflict other parts of the 1996 analysis.

It's not only the freeze-thaw analysis that's outdated. The results of that analysis, for example, were fed into the 1996 water-infiltration and radon-attenuation modelling.[184] So, inaccuracies in the frost-penetration estimate could cause inaccuracies in those other models.

Other analytical shortcomings pervade the 1996 radon modelling. Among the parameters put into that model to forecast long-term radon-emission rates were estimates of cover-moisture content, tailings and cover porosity, and tailings radium activity.[185] Each of these inputs is outdated, and others may be too. Like the freeze-thaw model, the radon model used a moisture value for the random-fill layer (9.8%) that has since been reduced based on new sampling.[186] Moisture data for the conventional cover's one-foot clay layer hasn't been updated since 1996.[187] New sampling data is available from which to calculate tailings and

---

[177] *See Ex. 16 App. B.*
[178] *Ex. 30 App E. at 2.*
[179] *See Ex. 16 at 16, App. B; Ex. 1 at 3-8 to 3-9.*
[180] *This is true even if some of the difference between the 1996 and 2012 results is due to differences in cover design.*
[181] *For example, the 24" random-fill layer in the Conventional Cover would be compacted more than the top layers of the ET Cover.*[181]
[182] *Ex. 16 App. B ("The depth of frost penetration is reduced when the soil-water content increases because frozen water insulates underlying soils, thus the drier the soil the greater the depth of frost penetration.").*
[183] *Ex. 42 at 5 ("The frost penetration depth estimate presented by TITAN Environmental (1996) is out of date and needs to be replaced with an updated frost penetration depth calculation.").*
[184] *Ex. 30 at App. D, p. 3 of 34 (explaining that 6.8" of frost-affected random fill were excluded from infiltration modelling); App. B, p. 1 of 32 (same for radon modelling).*
[185] *Ex. 30 at App. B, p. 2 of 32.*
[186] *Compare Ex. 30 at App. B, p. 5 of 32 with Ex. 16 at C-4 and Attach C.2 (using sampling conducted in 2010 and 2012 to derive a moisture content for the random-fill stockpiles of 6.7%). See also Ex. 16 at C-1 ("The loam to sandy clay soil used to construct the ET cover, referred to in previous reports (Titan 1996, Knight Piesold 1999) as random/platform fill, is stockpiled at the site.").*

[187] *Ex. 16 at E-3 (describing the "Section 16 clay" that was sampled in 1996 for the conventional cover design documents).*

cover-material porosity.[188] *Moisture and porosity, in turn, both affect the radon-diffusion coefficients used in the 1996 model for tailings and cover materials.*[189] *Energy Fuels has also updated its radium-activity estimates since 1996 based on the types of materials discarded in each cell.*[190] *Considering all these interrelated variables, it is plain the 1996 radon modelling is obsolete.*

Similar deficiencies taint the 1996 water-infiltration model. The company predicted in 1996 that no precipitation would get through the conventional cover and into the tailings, but would instead all run off or evaporate.[191] *This prediction is dead wrong according to the company's 2010 infiltration-and-contaminant- transport model, which again, forecasts that 22' of water would go through the conventional cover in the first 200 years.*[192] *Given these divergent model results, at least one model must be inaccurate, and the 1996 model is the more likely culprit, given its age, the inferior quality of the data, and other shortcomings in the model. According to the 2010 modelling report, for example, better models are available than the one used in 1996.* [193] *More precise data than that used in 1996 for precipitation and other variables is also available.*[194] *And the 2010 model rejected at least one important assumption used in 1996: that surface water would run off of the impoundments despite how flat they are.*[195]

There are other shortcomings in the 1996 analysis. No vadose-zone contaminant-transport modelling was done to evaluate the likelihood that the cover will safeguard groundwater quality (though it was performed in 2010 for the ET cover).[196] *And no analysis has ever been done of how much damage to the conventional cover is likely to be caused by biointrusion—from plant roots growing into the cover or animals burrowing into it. These are not trivial oversights. If 22' of precipitation goes through the conventional cover in its first 200 years of use (an amount 300 times that predicted to flow through the ET cover) it only stands to reason that the quantity reaching groundwater could be far greater than that predicted by the 2010 vadose-zone contaminant-transport modelling for the ET cover.*[197] *Root penetration, likewise, is a source of blame for deteriorated performance of conventional covers.*[198]

---

[188] *Ex. 16 at C-3 (describing specific gravity and dry density testing of tailings and cover materials since 1996).*
[189] *See Ex. 16 at C-5.*
[190] *See Ex. 16 at Table C.1.*
[191] *Ex. 30 at 6 and App. D, p. 1 of 34.*
[192] *Ex. 22 at Table E-2.*
[193] *Ex. 22 at 3-2.*
[194] *Compare Ex. 22at E-6 (using a 57-year climate record (1932–1933) for precipitation and temperature input,) with Ex. 30 at App. D, p. 2, (explaining that the model used precipitation data from 1988 and 1990–93) p. 7 (using outdated, initial soil water content of 0.1180 (11.8%)).*
[195] *Compare Ex. 22 at 3-6 ("Given the flat nature of the cover (0.2 percent slope), no runon- or run-off-based processes were assumed to occur.") with Ex. 30 at App. D, pp. 1, 4 (explaining*

that model predicted precipitation would runoff soil cover or be evaporated and describing calculation of runoff curve).
[196] See Ex. 16 at 3 (explaining that ET cover design report "presents analyses not performed for the Titan (1996) design, including biointrusion, tailings dewatering, liquefaction, and settlement"); compare Ex. 30 (no analysis of these metrics) with Ex. 22 at 3-10 to 3-16, 4-5 to 4-16, App. L (explaining assumption that flux rates at the end of dewatering would presumably be equal to post-closure steady state because the increase in water levels is predicted to be minor, citing to infiltration modelling in Appendix E), and App. M.
[197] Ex. 22 at App. L at Figures L-2, L-3, L-4 (predicting the highest leakage through the cell liners whenwater levels in the tailings are the highest).
[198] See, e.g., Ex. 35 at 1 ("Early cover designs rely on compacted soil layers to limit water infiltration and release of radon, but some of these covers inadvertently created habitats for deep-rooted plants. Root intrusion and soil development increased the saturated hydraulic conductivity several orders of magnitude above design targets."); Ex. 43 at 60 ("Numerous researchers, including Waugh and Richardson (1997),

Considering all these problems with the 1996 cover analysis, there's no disputing that the analysis is out of date and should be completely overhauled if the conventional cover is ever to be built. Sticking to the current Stipulation and Consent Agreement, which if all else fails, obliges Energy Fuels to build the conventional cover without updating the 1996 design would be reckless.

Division Response: The Division incorporates its previous comment responses here. In addition, the Division rejects the commenter's attempt to theorize the existence of problems based on factually and technically inappropriate comparisons between dissimilar systems. The literature is silent regarding the failures the commenter speculates will arise. On the contrary, as noted in a previous comment, Appendix A to 10 CFR 40 specified conceded that an ET covert design may not be appropriate in the subject sub-climate,[41] and the proven next option is the type of system the NRC already approved for this site. The commenter has made broad statements about inadequacy without providing supporting evidence. Based on this administrative record, the Division defers to the previous approval extended by the NRC under its doctrine of reasonable assurance rather than violating the definition in 10 CFR 40 Appendix A of *available technology* that seeks to limit adoption of new approaches to those with a clear cost-benefit advantage.[42]

---

[41] Criterion 4(d)

[42] "Available technology means technologies and methods for emplacing a final radon barrier on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary measures or techniques that would impose costs that are grossly excessive as measured by practice within the industry (or one that is reasonably analogous), (such as, by way of illustration only, unreasonable overtime, staffing, or transportation requirements, etc., considering normal practice in the industry; laser fusion of soils, etc.), provided there is reasonable progress toward emplacement of the final radon barrier. To determine grossly excessive costs, the relevant baseline against which cost shall be compared is the cost estimate for tailings impoundment closure contained in the Licensee's approved reclamation plan, but

costs beyond these estimates shall not automatically be considered grossly excessive." The commenter's preferred system is an order of magnitude more expensive without demonstrable significant improvement in performance. The Division has received repeated requests/demands from commenters to adopt ideas that would unnecessarily run up the cost to the Licensee without significant benefit to the public or the environment. (See DRC-2014-003643 for a discussion of one such effort that included, among other items, the Monticello cover system. This document also demonstrates the Division's ongoing efforts to improve its processes and target endpoints.)

The demonstration project undertaken by the Licensee will provide sufficient data to indicate a future direction for modifying the ET cover design, if it is to be adopted for this site, while the NRC's previous approval of rock armor covers in arid locations and the performance of those covers to date warrants retaining the legacy design.

GCT Comment #41

4. Recommendations

Years of delay in preparing a high-quality reclamation plan has caused a serious and complex problem. All the evidence suggests that the 1996 cover design is second rate, at best, and a reclamation travesty, at worst. Yet there are serious questions about whether the ET cover will also come up short. So, the solution the Division and Energy Fuels have reached is to delay reclamation of Cell 2 another six or seven years, build test plots, collect more data, and then either finish the cover or go back to the drawing board.

All the while, for Energy Fuels to mill uranium, the law requires the company to have an officially approved, deadline-driven reclamation plan that says how the company will clean up its radioactive wastes.[199] Since the cover design in Plan Revision 5.1 is in limbo, to nominally fulfill that requirement, the Division has signed a Consent Agreement with an ill-considered automatic-backup plan: to build the 1996 conventional cover without ever updating that design, analyzing it, or testing it out. If that plan isn't a pretense meant to satisfy the law's requirements on paper but never to be carried out, then it's a reckless commitment that could have disastrous consequences.

What should be done? That's a hard question. A first-rate reclamation plan should have been worked out long ago and then routinely updated as technology improves. But the Division should at least do the following:

- *Revise the Consent Agreement to eliminate the provision (§ D.7.b.iii) that automatically requires Energy Fuels to build the 1996 conventional cover if an impasse is reached on alternative ET cover designs. Requiring Energy Fuels to build the 1996 conventional cover without updating that design could be a calamity. We imagine the Division has no desire to agree to that outcome. Yet, if the ET cover fails to meet the Consent Agreement's performance criteria, and Energy Fuels refuses to negotiate changes to the plan that are acceptable to the Division, the company can force the conventional cover to be built. The Division should prevent that outcome now by renegotiating the Consent Agreement to prevent automatic reversion to the conventional cover design.*
- *If the Division believes that a modified conventional cover design may outperform an evapotranspirative cover at the mill—a prospect that appears dubious without major changes to the 1996 design—then it should require Energy Fuels to immediately update the 1996 design. If there's any possibility that a conventional design will ultimately be used at the mill, then the Division should insist on working that design out now and avoiding future delay if the ET cover is a failure. If a conventional cover won't be built, it should be clearly ruled out now.*

Smith (1999), Waugh (2004), and Breshears and others (2005) describe the negative effects on low permeability barrier layers due to root penetration or macropores left by decomposing plant roots.").

[199] See 10 C.F.R. § 40.31(h) (requiring uranium-milling applications to include written specifications for the disposition of byproduct material to achieve the requirements and

objectives of 10 C.F.R. Part 40, Appendix A); Utah Admin. Code R313-24-4 (incorporating 10 C.F.R. 40.31(h) by reference).

- *Reconsider whether the performance test for the ET cover is worthwhile in light of the risks that more delay may exacerbate groundwater contamination or forestall reclamation altogether. And consider instead requiring Energy Fuels to promptly update the ET cover to meet state-of-the-art standards and to proceed with constructing it on Cell 2 without completing the 7-year performance test.*

Division Response: The Division has already responded to the comments raised here with the exception of root penetration. The Division has found that the Licensee's ET design adequately addresses the issue or root penetration by designing a highly-compacted layer at depth. The issue of root penetration was also addressed to the NRC's satisfaction with respect to the 1996 rock armor cover design. There is no reason to revisit the question of root penetration. This issue has been adequately addressed as to both the approved rock armor system and the ET cover that is presently under review.

GCT Comment #42
E. The final radon barrier design is inadequate.

Energy Fuels likely could improve the performance or reliability of the proposed ET cover in several ways. A capillary break could be installed for enhanced water storage. A geomembrane could be placed beneath the water-balance section of the cover to prevent infiltration into the radon barrier. The top slope of the impoundments could be increased to improve runoff and minimize ponding. A layer of cobbles or similar materials could be included to deter animal burrowing.

Energy Fuels considered making each of these changes to the ET cover design but ultimately chose not to. The company's basic rationale was that these modifications to the ET cover probably wouldn't provide material performance gains. But even if that were true, that's not a persuasive reason for leaving these design elements out. The company's groundwater discharge permit requires Energy Fuels to minimize infiltration of precipitation through the cover, a mandate that ultimately helps protect groundwater by minimizing contaminated seepage through the tailings. A capillary break, geomembrane, and steeper top slope could all help minimize infiltration through the cover, and those design elements should be used unless further analysis shows that they will detract from the cover's performance.

A similar rationale applies to preventing animals from burrowing into the ET cover. The cover must be designed under Appendix A to control radiological hazards for 1,000 years and to minimize disturbance of tailings by natural forces without ongoing maintenance.[200] Thus, even if a burrowing-prevention layer may be only a small, extra deterrent to burrowing, it should be included to minimize tailings disturbance and future maintenance.

1. Enhancements that will minimize infiltration into the tailings should be made.

Energy Fuels' groundwater discharge permit requires Energy Fuels to reclaim the impoundments in a way that "minimize[s] infiltration of precipitation or other surface water into the tailings."[201] This permit requirement makes good sense if compliance with Appendix A's groundwater-protection standards is to be achieved. Those standards mandate that, among other requirements, Licensees must "control, minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere" to the extent "necessary to prevent threats to human health and the environment."[202] Minimizing infiltration through an impoundment's cover minimizes the amount of water that could be contaminated by the tailings and escape into groundwater.[203]

---

[200] 10 C.F.R. Part 40, App. A, Criterion 1, Criterion 6(1), Criterion 6(7).

[201] Exs. 39 and 40 at Part I.D.8(a); Utah Admin. Code R317-6-6.4 (allowing for discharge permits to issue if the applicant is "using best available technology to minimize the discharge of any pollutant"); see also Ex. 1 at 3-5 ("The key state and federal performance criteria for tailings cover design and reclamation include …[m]inimize infiltration into the reclaimed tailings cells.").

[202] 10 C.F.R. Part 40, App. A., Criterion 6(7).

[203] For this reason, EPA's regulations for in-place closure of surface impoundments containing hazardous waste mandate that final covers "[p]rovide long-term minimization of the migration of liquids through the closed impoundment." 40 C.F.R. § 264.228(a)(2)(iii).

a. A capillary break should be added unless it would degrade the cover's performance.

Capillary breaks can improve the ability of evapotranspirative covers to store water until it can be removed by transpiration or evaporation. They're created by placing a coarser-grained material beneath a finer-grained, water-storage layer. [204] Differences in the hydraulic properties of the two layers cause water to be wicked into unsaturated areas in the finer-grained layer, allowing that layer to retain more water than it otherwise would.[205]

In 2010, to develop revisions to its reclamation plan, the company modelled infiltration rates for four cover types—three evapotranspirative designs and the 1996 conventional cover design.[206] The evapotranspirative designs that were modelled included a monolithic design (much like the one proposed in Reclamation Plan Revision 5.1) and a comparable design that added a capillary break between the water-storage and radon-barrier layers.[207] The model predicted that the cover with a capillary break would achieve the greatest reductions in water infiltration and would allow four times less water to percolate through the cover than the monolithic design.[208] Nonetheless, Energy Fuels argued that the monolithic design was "preferred" because the capillary barrier might not work as well as the model predicted and would make building the cover more difficult.[209]

The Division disputed this conclusion, arguing that capillary breaks "can substantially reduce cover infiltration rates."[210] The Division also took issue with comparisons Energy Fuels had drawn with the final radon barrier built at the Monticello tailings repository, pointing to the

absence of a capillary break in the proposed White Mesa cover as one of several differences in the White Mesa and Monticello cover designs that undermined comparisons between the two. The Division instructed the company to either include a capillary break in the cover design or "provide detailed analyses and additional infiltration sensitivity analyses demonstrating that a capillary break is not warranted."[211]

The only response Energy Fuels made, from what we can discern, was to defend the comparisons the company had drawn to the Monticello cover. It argued that the sand layer in the Monticello cover that was supposed to function as a capillary break isn't actually working that way, and as a result, the cover is functioning like a monolithic design.[212]

But even if that's true, it doesn't justify omitting a capillary break from the White Mesa cover design. Just because the capillary break hasn't worked at Monticello doesn't mean that the same would be true at White Mesa. If, for example, the capillary break at Monticello was compromised by infiltration of fine-grained materials during construction, as Energy Fuels postulates,[213] *construction improvements might be made at White Mesa to prevent that outcome. More important, the company has made no argument that including the capillary break in the Monticello cover has been detrimental to that cover's performance, and we can find nothing to suggest that it would be detrimental at White Mesa. Thus, there*

---

[204] *Ex. 44 at 5.*
[205] *Ex. 44 at 5.*
[206] *Ex. 22 at E-1.*
[207] *See Ex. 22 at E-3 to E-4.*
[208] *See Ex. 22at E-13 (predicting a water flux of 0.11 mm/year for the cover with a capillary break and 0.45 mm/year for the monolithic design).*
[209] *See Ex. 22 at E-9.*
[210] *Ex. 45 at 94.*
[211] *Ex. 45 at 13.*
[212] *See 38 at 49.*
[213] *See Ex. 38 at 50.*

appears to be no downside to including a capillary break in the ET cover at White Mesa. And since a capillary break could help minimize infiltration into the tailings, it should be included to comply with the groundwater discharge permit and to minimize leachate that could contaminate groundwater.

b. A composite barrier installed beneath the water-balance cover would add redundancy and likely reduce infiltration.

Placing a compacted-clay or geosynthetic-clay liner and geomembrane beneath the proposed water-balance cover likely would provide additional protection against infiltration if the water-balance cover doesn't work as well as expected. The Monticello tailings repository uses this design.[214] *And composite barriers standing alone can perform well at preventing infiltration.*[215]

Thus, it stands to reason that combining a composite barrier with a water-balance cover would provide for redundancy and enhance the odds that the cover at White Mesa will maintain low infiltration rates over its centuries-long performance period.

In our review of the available White Mesa reclamation documents, we have seen nothing to suggest that Energy Fuels considered using a compound design like this. The only discussion of a geomembrane that we have unearthed was about whether the proposed monolithic cover at White Mesa could properly be compared with the composite design built at Monticello. Energy Fuels argued that the performance of the Monticello cover provides a useful analogue because the measured infiltration rates at Monticello are for only the water-balance cover above the geomembrane.[216]

That may be true, but it doesn't justify omitting a geomembrane-topped composite barrier from the White Mesa cover design. Again, the Discharge Permit requires Energy Fuels to minimize infiltration through the cover and into the tailings. A redundant composite barrier, like that built at Monticello, would likely help meet that standard, even if the proposed monolithic ET cover performs relatively well. It is hardly far-fetched that the monolithic cover may deteriorate after centuries of service, and an underlying composite barrier would help guard against that risk. Regardless, absent compelling evidence that including a composite barrier in the cover design would diminish the cover's effectiveness it ought to be included.

Division Response: This comment suggests revisions to the ET cover system proposed by the Licensee. These comments are primarily directed to the Licensee and not the Division. The commenter does not have standing to propose revisions to the Licensee's ET cover design. If the Licensee desires to alter its ET cover design, it is free to do so. The only question before the Division is whether the ET cover system proposed by the Licensee meets applicable performance requirements. The Division notes that staff has high confidence in the technical qualifications and experience of the consultants and engineers the Licensee has engaged as to its proposed ET cover design, in particular C. H. Benson, who is the author of much of the published literature regarding ET covers at other facilities. His expertise on ET covers is well recognized by regulators and industry. Based on the record, the Division concludes that the proposed ET cover system is adequate to warrant the present testing efforts in order to make a final determination about its performance. The Division has concluded that it will not require further revisions to the proposed ET cover but will await the Licensee's action on this topic.

GCT Comment #43

c. Energy Fuels hasn't justified its refusal to increase the cover's top-slope inclination.

Energy Fuels has designed the ET Cover to have a top-slope angle ranging from 0.5 to 1.0%.[217] *This is unusually flat.*[218] *During its review of Energy Fuels' revisions to its reclamation plan, the Division argued that the company should increase the top-slope inclination to a range of 2–3 percent or provide a detailed analysis of why doing so wouldn't improve the cover's performance.*[219]

The company responded by asserting that most low spots would form early in the cover's service life, when settlement ranging from 0.88–1.56' would occur. The company promised to fill in these low

---

[214] *See Ex. 46 at 3-28 to 3-29.*
[215] *See Ex. 46 at Table 1.3 (generally showing lower infiltration rates for membrane-composite test covers in EPA's alternative cover assessment program than evapotranspirative counterparts).*
[216] *See Ex. 38 at 49.*
[217] *See Ex. 16 at 15.*
[218] *See Ex. 47 at 2-2 ("Most landfill cover system top decks are designed to have a minimum inclination of 2 to 5%, after accounting for settlement, to promote runoff of surface water. Slopes flatter than 2% may allow water to pond on the surface, if localized settlements occur, and are usually avoided.").*
[219] *See Ex. 45 at 14, 30–34.*

spots.220 After this "active maintenance" period, further settlement of the cover would range from 0.29– 0.71', according to the company's analysis.[221] *Having examined an area that Energy Fuels called the "critical case," the company asserted that "differential settlement is sufficiently low such that ponding and slope reversal is not expected to occur."*[222] *Yet the company never explains how much settlement would be expected to lead to ponding or slope reversal.*

In contrast, Energy Fuels hasn't offered any explanation for not simply increasing the top-slope inclination. The company has not argued that increasing the top slope would diminish the cover's ability to shed water or cause other performance problems. Accordingly, the Division ought to demand a better explanation or insist that the top-slope inclination be increased.

Division Response: In the Division's view and understanding, ET covers are designed with relatively flat slopes. The strategy is for the water to infiltrate slightly, support plant growth, and that the plant growth and root systems transpire moisture into the atmosphere. Relatively flat slopes are required because there is no solid erosion barrier as with the rock armor design. Thus, the ET cover relies on flat slopes for erosion resistance (particle suspension increases with fluid velocity, which increases with slope) and to encourage percolation of water into the cover (slower velocity during runoff increases residence time on the cover, increasing opportunity to penetrate the cover). An ET cover design requires water to penetrate to the water storage/growth medium layer to support the plant community required for the ET cover to resist erosion and transpire water from the cover. Demanding a steeper slope evidences an incomplete understanding of how the ET cover system is designed to work. Increased slope may be required if the ET cover demonstration leads to a conclusion that the ET cover will not perform adequately and cannot be adjusted to rectify the deficiencies and the currently-approved rock cover design is to be implemented. In that event, prevention of percolation becomes more critical and an increased slope may be warranted. The flatter slope will be evaluated mat the secondary test section, where both run-on and run-off can be evaluated as motive forces for suspending and carrying off material from the cover.

GCT Comment #44

2. A standalone barrier to deter burrowing should be added to the cover.

Unlike the Monticello cover, the ET Cover that Energy Fuels is proposing for White Mesa doesn't include a layer specifically designed to discourage animals from burrowing into the cover. Burrowing animals can cause all sorts damage to engineered covers. They can create pathways for water infiltration, roots, and other animals.[223] They can dig up waste and spread it into the environment.[224] They can increase erosion and soil-porosity.[225]

Several animals that may be present around the mill have burrowing depths that could penetrate into the radon barrier that begins 4' beneath the surface, such as badger, Gunnison prairie dog, red fox, northern pocket gopher, and the pocket mouse.[226] Badgers have burrowing depths up to 7.5', according to the company's data. That's deep enough to go through the primary radon barrier.[227]

The company has asserted that burrowing to this depth would be restricted by the highly compacted material in the primary radon barrier.[228] But it cites nothing to back up the claim that burrowing animals won't dig into soils as dense as the primary radon barrier. Energy Fuels otherwise asserts that the cover is thick enough to deter burrowing. But even if it's true that the cover is too thick to dig through, that says nothing about damage that can caused by many burrows going partway into the cover. And most importantly, it isn't a justification for leaving out a biointrusion layer, like the layer of cobbles used in the Monticello cover. Like many other elements of Energy Fuels' analysis, the company's arguments make no critique of how well a cobble layer would work as compared to its monolithic design.

Appendix A requires Energy Fuels to build the ET cover to control radiological hazards for 1,000 years and to minimize disturbance of tailings by natural forces without ongoing maintenance.[229] Even if a biointrusion layer is only a slight additional deterrent to burrowing, it should be included to meet that standard unless the company has demonstrated that it would degrade the cover's performance. The Division should demand that analysis or insist that a biobarrier be added to the cover.

Division Response: The Division will not require any changes to the ET cover design based on this comment because there is no basis upon which to do so. Based on this record, the Division has concluded that the Licensee has adequately addressed the biointrusion performance standard through the use of a highly compacted soil layer at 4' below finished cover final surface (conveniently, this layer is also the primary radon barrier and the clay-rich percolation cutoff). The adequacy of this biointrusion layer is included in the test section that will be used to evaluate root penetration and burrowing activity on the cover. Proximate colonies of Gunnison Prairie Dog should be attracted to the site, since the seed mix specified for the ET cover matches very closely the Prairie Dog's preferred forage. If the cover sufficiently resists the Gunnison Prairie Dog, it is reasonable to conclude that the badger will not be performing predatory burrowing therefor. The badger is a prolific enough burrower that cobbles and small boulders would not be sufficient deterrent; reduction of prey is the approach that is being tested here, assuming that the badger would burrow to protect its young near where it can find prey.

The Division is relying, in part, upon the independent, professional expertise of the designer of the cover system and his representations that the burrowing issue will not present a significant challenge to the cover. However, the secondary test section provides an opportunity to evaluate, to the extent that the red fox, pocket mouse, or other indigenous burrowing animal cooperates with the study, independently to assess the damage done by burrowing.

_____

[220] *See Ex. 38 at 5, F-6.*
[221] *See Ex. 38 at F-7.*
[222] *See Ex. 38 at F-7.*
[223] *See Ex. 47 at 2-40.*
[224] *Id.*
[225] *Id.*
[226] *See Ex. 16 at D-25.*
[227] *See Ex. 16 at 2 (explaining that the bottom of the primary radon barrier would range from 7–8' below the surface).*
[228] *Ex. 16 at D-25.*
229 10 C.F.R. Part 40, App. A, Criterion 1, Criterion 6(1), Criterion 6(7).

GCT Comment #45

F. The proposed long-term monitoring for the final radon barrier is inadequate.

Reclamation Plan Revision 5.1 calls for the final ET cover to be monitored in three ways: (1) for settlement; (2) to track revegetation rates; and (3) to evaluate erosional stability.[230] No monitoring of the cover-percolation rate is proposed, nor does the company plan to monitor changes in the cover properties. Though groundwater monitoring will presumably continue in some form to comply with the State's groundwater protection rules, it is unclear what monitoring will occur because neither the company's groundwater discharge permit nor its reclamation plan addresses that question.[231]

This defies common sense. Without monitoring percolation rates, there is no way to determine whether the cover is living up to its key performance benchmark. And without data about other changes in cover properties, it will be harder to diagnose problems. The expert in solid-waste containment that Energy Fuels has hired, Dr. Craig Benson, concurs. Groundwater wells aren't "always the best way to determine whether a system is functioning as designed," Dr. Benson has pointed out, because system failures are "detected too late and without enough information to fix the problem."[232] Added, to that engineered covers change over time, and the only way to make sure they're working as intended is to monitor them.[233] He therefore recommends adding "functional monitoring" to check whether the waste-containment system is working as designed.[234] A key parameter to monitor is percolation through the bottom of the cover, preferably using one or more large, pan lysimeters.[235] And guidance developed by Dr. Benson and others recommends monitoring other cover properties, such as water content and temperature, to evaluate changes over time and provide data should defects arise.[236]

The Division accordingly should require Energy Fuels to develop and carry out a functional monitoring plan to measure percolation rates through the cover and monitor other cover properties that would help diagnose infiltration problems. And so that the company has a

complete strategy for evaluating whether the final cover is working, the Division should also require Energy Fuels to develop a post-closure groundwater monitoring program, understanding that it may be revised in the future to account for changes in groundwater contamination at the mill. In short, the Division should insist that Energy Fuels develop a complete program for evaluating the final cover's performance and fixing defects.

G. The liner design for the Cell 1 disposal area is inadequate.

Under Reclamation Plan Revision 5.1, Energy Fuels is planning to dig up Cell 1, its liner, and contaminated soil beneath the cell and place all that material in another cell.[237] *After that, the plan gives Energy Fuels the option to use part of the pit left behind as a cap-in-place disposal area for other*

---

[230] *Ex. 16 at 24–25.*
[231] *The groundwater discharge permit requires monitoring through the term of the permit "or as stated in an approved closure plan." Exs. 39 and 40 (Part I.E). Yet the permit will expire 5 years after its issued, see Utah Admin. Code R317-6-6.6, and the proposed closure plans in Revision 5.1 are entirely silent on the subject of post-closure groundwater monitoring, see Exs. 1, 16, and 48 at 4 (asserting that "[e]xisting environmental monitoring programs," like groundwater monitoring, will continue during reclamation and decommissioning but failing to address post-closure monitoring). So, although Energy Fuels will remain subject to the State groundwater protection rules after mill closure and should be required to monitor groundwater, it is unclear what monitoring will be performed.*
[232] *Ex. 49 at 118.*
[233] *See Ex. 50 at 10-4 to 10-5.*
[234] *Ex. 49 at 118–119; Ex. 50 at 10-1, 10-4 to 10-5.*
[235] *See Ex. 50 at 10-5 to 10-8.*
[236] *See Ex. 10-12 to 10-14.*
[237] *Ex. 1 at 3-5 to 3-6.*

"contaminated materials and debris from the Mill site decommissioning and windblown cleanup."[238] *If this happens, Energy Fuels plans to line this "Cell 1 Disposal Area" with a 1' clay liner, fill it with contaminated waste, and cap it with the ET cover.*[239]

That plan flouts the law's design requirements for burying uranium-milling waste. The UMTRCA standards set by EPA require all surface impoundments to be built according to EPA's design standards for hazardous-waste impoundments,[240] *which appear at 40 C.F.R. § 264.221. Under those rules, all impoundments built after 1992 must have "two or more liners and a leachate collection and removal system between [those] liners."*[241] *Utah's groundwater-protection rules similarly require waste-storage pits to be designed according to the "best available technology."*[242] *Under these standards, a clay liner doesn't cut it.*

It's not clear why Energy Fuels' plan for the Cell 1 Disposal Area disregards these design requirements. The mill-decommissioning waste slated to go into the Cell 1 Disposal Area is

undoubtedly "uranium byproduct material," as EPA (and the Nuclear Regulatory Commission and State of Utah) define that term: "the tailings or wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content."[243] After all, if that waste weren't uranium byproduct material, Energy Fuels wouldn't be licensed to possess or discard it.[244]

Perhaps Energy Fuels believes that EPA's general UMTRCA standards don't apply to the company's operations at White Mesa when the Nuclear Regulatory Commission's rules don't conform precisely to EPA's standards, which is the case for the impoundment-liner standard. The Nuclear Regulatory Commission's liner requirements in Appendix A duplicate EPA's design standards for hazardous-waste impoundments built before 1992 but don't regurgitate EPA's standards for impoundments built after 1992.[245] Criterion 5A in Appendix A says that impoundments "must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, groundwater, or surface water at any time during the active life (including the closure period) of the impoundment."[246] Even under that standard, a geomembrane rather than a clay liner is almost always required.[247]

---

[238] *Ex. 1 at 3-5.*
[239] *Ex. 1 at 3-3.*
[240] *40 C.F.R. § 192.32(a)(1).*
[241] *40 C.F.R. § 264.221(c).*
[242] *Utah Admin. Code R317-6-6.1(A), R317-6-6.4(A)(3).*
[243] *40 C.F.R. § 192.31(b). See also 42 U.S.C. § 2014(e)(2); 10 C.F.R. § 40.4; Utah Code Ann. § 19-3-102(3); Utah Admin. Code R313-12-3.*
[244] *Utah Admin. Code R313-19-2(1).*
[245] *10 C.F.R. Part 40, App. A, Criterion 5A.*
[246] *10 C.F.R. Part 40, App. A, Criterion 5A.*
[247] *See Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites, 48 Fed. Reg. 45,926 (Oct. 7, 1983) ("The primary standard, 40 C.F.R. § 264.221, can usually be satisfied only be using liner materials (such as plastics) that can retain all wastes. Exemptions permitting use of other liner materials (such as clay) that may release water or small quantities of other substances or, in some cases, permitting no liner may be granted only if migration of hazardous constituents into the ground water or surface water would be prevented indefinitely."); Uranium Mill Tailings Regulations; Ground-Water Protection and Other issues, 52 Fed. Reg. 43,553, 43,557–558 (Nov. 13, 1987) (when adopting Criterion 5A in Appendix A, deferring to EPA's decision to generally prohibit clay liners).*

But even if Appendix A can be read to have a more lenient liner standard than EPA's standard for hazardous-waste impoundments, EPA's standard still applies. The language in EPA's general UMTRCA standards applies directly to uranium-milling operations. As those standards say at the outset:

> *This subpart applies to the management of uranium byproduct materials under section 84 of the Atomic Energy Act of 1954 (henceforth designated "the Act"), as amended, during and following processing of uranium ores, and to restoration of disposal sites following any use of such sites under section 83(b)(1)(B) of the Act.248*

There is no doubt that Energy Fuels is managing uranium byproduct materials at the mill. And the design standard in EPA's rule is phrased to apply directly to uranium-mill operators. It says that "surface impoundments subject to this subpart must be designed, constructed, and installed in such a manner as to conform to the requirements of § 264.221 of this chapter…."[249] That expresses a command that Energy Fuels must comply with, regardless of whether Appendix A has the same command.

Even assuming (for the sake of argument only) that EPA's general UMTRCA standards don't apply to Energy Fuels' when the Nuclear Regulatory Commission's rules don't conform to EPA's standards, the company is still required to comply with EPA's standards for two reasons.

Division Response: The Division respectfully disagrees with this comment because it is not supported by the administrative record and established law. The portion of Cell 1 designated to receive the last of the Mill's decommissioning debris would not be flooded with process solution as would the remainder of the cells during decommissioning. Mill decommissioning debris will not (generally) be wet material. Cell 1 will be the final depository to receive on-site decommissioning debris. The amount of process fluid would be reduced to residuals remaining in piping and process vessels and, based on the Division's analysis, is not projected to be sufficient to provide a driving head to force contaminants through the liner. On the contrary, the liner will be exposed immediately to rubble and piping from Mill structures and process equipment which may protrude beneath the finish plane of the cell liner construction sufficiently to puncture a synthetic liner. The clay option is more forgiving and less likely to breach under these conditions. 10 CFR 40 appendix A Criterion 5A(2) requires that the liner be "[c]onstructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head [no static head would exist here] and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation." The Division also notes the second paragraph in Appendix A, beginning with the following statement: "In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis." The standards the commenter cites were developed to address cases where significant amounts of fluid must be managed. Later on, the Appendix A language includes more guidance on deviations from the generic standards to customize to the site: "All site specific licensing decisions based on the criteria in this Appendix or alternatives proposed by Licensees or applicants will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Commission determines to be appropriate." The commenter's demand failed to account for the lack of several feet of tailings to cushion the liner against puncture by the rubble to be placed thereon as exists in the other cells that have received tailings. Finally, the Division understands that the U.S. Department of Energy has no issues with the specific plan as to site decommissioning and the use of Cell 1. Finally, the Division questions the commenter's standing to raise this comment in this situation, where the long-term stewardship of the White

Mesa Mill will fall to the U.S. Department of Energy. It appears that the commenter's concerns should be most appropriately raised with the U.S. Department of Energy.

GCT Comment #46

First, Utah state law requires all waste pits that may discharge pollutants to be built using "best available technology," and that technology is to use double-liners with an interstitial leak-detection system.[250] That is at least one reason why Cells 4A and 4B at the mill were built to that standard.[251] And there's no reason the "best available technology" for discarding uranium byproduct material in the Cell 1 Disposal Area should be any different.

Division Response: Again, the Division respectfully disagrees with this comment because it is not supported by the administrative records or established law. The Division's previous response is incorporated by this reference. As described in response to the previous comment, a synthetic liner is not always the best design for a variety of technical reasons. The commenter provides no basis for the opinion expressed here. To accept this opinion, one must believe that the materials to be placed in this cell are identical to those placed in the other cells. As already stated, this would not be the case. Determining the best available technology would need to consider more than the oversimplified argument put forward by the commenter. Otherwise, the language would not require "best available technology," but "double-liners with an interstitial leak-detection system." As for the leak detection capability, the use of interstitial leak detection systems makes sense in cases where significant quantities of leachate could be formed; that is not the condition expected in this instance. Before the U.S. Department of Energy's Legacy Management group takes responsibility for the long-term care of the site, a monitoring network will be designed and installed. This will be part of the final closure activities, and will consider existing monitoring points as well as optimum locations for additional monitoring wells.

GCT Comment #47

Second, EPA's radon-emission standards in Subpart W require surface impoundments used for discarding uranium byproduct material to comply with the agency's design standards for hazardous-waste impoundments.[252] That rule prohibits owners and operators of uranium mills from building a new "conventional impoundment" unless that impoundment is designed and built to "comply with the requirements of 40 CFR 192.32(a)(1)."[253] And, again, 40 C.F.R. § 192.32(a)(1) explicitly requires impoundments used for discarding uranium byproduct material to be built according to EPA's standards for hazardous-waste impoundments, which demand double liners and a leak-detection system for impoundments built after 1992.[254] The Cell 1 disposal area meets the definition of a "conventional impoundment" under 40 C.F.R. § 61.251 because it will be a "permanent structure located at any uranium recovery facility which contains mostly solid uranium byproduct material or tailings from the extraction

---

[248] *40 C.F.R. § 192.30.*
[249] *40 C.F.R. § 192.32(a)(1).*
[250] *Utah Admin. Code R317-6-6.1(A), R317-6-6.4(A)(3).*
[251] *See, e.g., Ex. 39 at 11–12 (Parts I.D.4 to I.D.6, I.D.12).*
[252] *40 C.F.R. § 61.252.*
[253] *40 C.F.R. § 61.252(a)(2)(i).*

[254] 40 C.F.R. § 192.32(a)(1) ("Surface impoundments (except for an existing portion) subject to this subpart must be designed, constructed, and installed in such manner as to conform to the requirements of § 264.221 of this chapter…."); 40 C.F.R. § 264.221 ("The owner or operator of each new surface impoundment unit on which construction commences after January 29, 1992 … and each replacement of an existing surface impoundment unit that is to commence reuse after July 29, 1992 must install two or more liners and a leachate collection and removal system between such liners.").

of uranium from uranium ore.[255]" It therefore must be designed to comply with EPA's surface-impoundment design standards under UMTRCA that are codified at 40 C.F.R. § 192.32(a)(1).[256]

True enough, Subpart W states at the outset that it "does not apply to the disposal of tailings,"[257] and perhaps Energy Fuels is silently relying on that statement to sidestep the liner requirements for the Cell 1 Disposal Area. But the Cell 1 Disposal Area will be placed in "operation" within the meaning of Subpart W, and that makes the area subject to Subpart W's impoundment-design requirements, even if the rest of Subpart W's requirements cease to apply immediately. The term "operation" means "that an impoundment is being used for the continued placement of uranium byproduct material or tailings or is in standby status for such placement. An impoundment is in operation from the day that uranium byproduct material or tailings are first placed in the impoundment until the day that final closure begins."[258] So, as soon as uranium byproduct material is placed in the Cell 1 Disposal Area, it will go into "operation," even if "final closure" begins the same day. That is enough to make Subpart W's design standard for conventional impoundments applicable.

Division Response: The issues raised in this comment have been fully addressed in the Division's previous responses as well as by Judge Waddoups in *Grand Canyon Trust v. EFRI*, Case #2:14-cv-243. This comment appears to be *res judicata* and should not be subject to collateral attack.

GCT Comment #48
IV. The surety is inadequate.

Appendix A requires Energy Fuels to get a surety that secures enough money for the Division to clean up the mill if the company doesn't and that fully funds long-term surveillance and maintenance of the reclaimed mill site.[259] The surety amount is to be based on the estimated cost for a third party to: (1) clean up the milling site to levels that allow unrestricted use of that area; and (2) reclaim waste areas according to Appendix A's technical specifications.[260] These cost estimates must also include "an adequate contingency factor."[261]

Energy Fuels forecasts that it can complete every reclamation task and clean up groundwater contamination at the mill at a cost of about $14.5 million.[262] Various indirect costs add another $2.8 million to the total reclamation cost.[263] The company's estimates also include about $875,000 to fund longterm surveillance and maintenance.[264] Last, a contingency amount of $3.3

million is added to cover unforeseen costs.[265] The company's estimate of the total reclamation cost is about $21.5 million.

These estimates are deficient, and as a result, the company's surety is inadequate. The biggest problem is that the contingency factor is far too low, resulting in just a few million dollars to pay for every possible unforeseen cost that may arise. There are other problems too. Energy Fuels has improperly based its reclamation estimates on the cost of building only the 1996 conventional cover, rather than also forecasting the cost of the ET cover and securing a surety for the more expensive reclamation plan. And the long-term care fund is likely to be inadequately capitalized if the surety is exercised.

_____

[255] *40 C.F.R. § 61.251(h).*
[256] *See 40 C.F.R. § 61.252(a)(1).*
[257] *40 C.F.R. § 61.250.*
[258] *40 C.F.R. § 51.251(e).*
[259] *10 C.F.R. Part 40, App. A, Criterion 9 and 10.*
[260] *10 C.F.R. Part 40, App. A, Criterion 9(a).*
[261] *Id.*
[262] *Ex. 19 at 3, "Cost Summary" (estimating direct costs of $14,476,933).*
[263] *Ex. 19 at 3, "Cost Summary" (estimating indirect costs of $2,786,357 for a profit allowance, licensing and bonding, contract administration, engineering design review, contractors' equipment floater, and insurance).*
[264] *Ex. 19 at 3, "Cost Summary" (including $876,425 for the long-term care fund).*
[265] *Ex. 19 at 3, "Cost Summary" (including a contingency of $3,325,170).*

The Division should fix these shortcomings. In particular, we urge the Division: (1) to independently and thoroughly evaluate the cost of closing uranium mills comparable to White Mesa and impose an adjusted contingency factor that accounts for the possibility that closure costs will far exceed Energy Fuels' estimates; (2) to require Energy Fuels to forecast the cost of building the ET cover, in addition to the 1996 conventional cover, and base its surety on the more expensive plan; and (3) to increase the amount set aside to fund long-term care.

A. Energy Fuels' contingency is too low.

Energy Fuels' reclamation-cost estimates include a contingency that is purportedly calculated at a rate of 25% of some other figure in the estimates, presumably the forecasted direct reclamation-costs. 266 The contingency that Energy Fuels includes is about $3.3 million.[267] That amount is far too low.

From what we can discern, cleaning up other uranium mills in the United States has cost far more on average than $21.5 million, the amount Energy Fuels would secure with a surety bond for reclaiming the mill. The expense of completing the Department of Energy's surface-decommissioning program under Title I of UMTRCA provides a rough starting point for

measuring the potential inadequacy of Energy Fuels' cost estimates, and in particular, the contingency those estimates include.

In 1982, the Department forecasted that the surface cleanup of the 24 sites included in the Title I program would cost about $1.7 billion.[268] By 1995, the Department's forecast for total cleanup costs had grown 37%, to $2.3 billion, without accounting for cleaning up groundwater contamination.[269] All told, the average surface-reclamation cost for cleaning up and burying the 24 Title I sites in 19 repositories was about $60–90 million, depending on which source is consulted.[270] Put differently, using the low end of this range, it cost $32 on average to clean up each cubic yard of waste remediated in the Title I program.[271] At that rate, it would cost $250 million to clean up the White Mesa mill if Cells 2, 3, 4A, and 4B were filled to capacity.[272] Or put yet another way, each acre of contaminated land in the Title I program cost about $380,000 to clean up, again using the low-end cleanup estimates.[273] So, if remediating the roughly 345

---

[266] The company's math doesn't look right. Twenty-five percent of the direct reclamation cost estimate of $14.5 million is roughly $3.6 million, not $3.3 million. If this is an error, it should be fixed. If it's not an error, it should be explained.
[267] Ex. 19 at 3, "Cost Summary."
[268] Ex. 51 at 7.
[269] Ex. 51 at 27.
[270] In 1995, the U.S. General Accounting Office projected total costs of the Title I cleanup program to be $2.3 billion, or $96.4 million per site on average. See Ex. 51 at 26. In 1999, the U.S. Energy Information Administration reported total costs for the Title I cleanup program of $1.45 billion, or an average of $61.5 million per site. See Ex. 52. The source of the discrepancy in these figures is unclear.
[271] Ex. 52. We've included the two sites in North Dakota in these calculations to avoid modifying the available data, even though they ultimately weren't remediated under the Title I program.
[272] See Ex. 4 at 6 (Table 2) (estimating capacity of Cell 2 to be 2,015,000 cubic yards and Cell 3 to be 2,345,000); Ex. 39 at 12, 17 (stating that capacity of Cell 4A is 1,600,000 cubic yards and capacity of Cell 4B is 1,900,000 cubic yards). Remediating 7,860,000 cubic yards of material at $32. per cubic yard would cost $251.5 million.
[273] See Ex. 51 at 26 (estimating that 3,894 acres of contaminated land were cleaned up as part of the Title I program). At a total cleanup cost of $1.48 billion, see Ex. 52 (1999 estimates from U.S. Energy Information Administration), the per-acre cost to remediate 3,894 acres would be about $380,000.

acres[274] occupied by the White Mesa mill site and its tailings cells is similarly expensive, the total cost would be around $130 million.

It is doubtless true that the expected cleanup for the White Mesa mill is distinguishable in some important respects from the cleanup of Title I sites. Several Title I sites involved costly cleanup efforts for neighboring properties that were contaminated by uranium-milling wastes.[275] We hope that won't be necessary at White Mesa. At about half the sites, tailings were moved at

significant expense to a new disposal site,[276] which Energy Fuels doesn't plan to do at the White Mesa mill. Some of the disposal cells that the Department of Energy built were excavated from scratch,[277] whereas that work has already been done at White Mesa if the cells are capped in place as planned. And the Department blamed much of its Title I-program cost overrun on updates to EPA's groundwater protection rules in the 1990s, which required some disposal repositories to be redesigned and some wastes to be moved to new locations.[278]

But these distinctions don't make the expense of cleaning up Title I sites irrelevant. The Department of Energy has estimated that only about 22% of the Title I cleanup cost was for remediating neighboring properties.[279] Reducing the average site cleanup cost by that rate still yields a cleanup cost of about $45–70 million per site. Similarly, when on-site disposal was accomplished at Title I locations, cleanup costs still averaged around $37–$56 million, again depending on which cost data is used.[280] At some of those sites, like Mexican Hat, Tuba City, and Shiprock, the Department consolidated wastes in pre-existing tailings disposal areas, suggesting that remaining closure steps would resemble those at the White Mesa mill.[281] And regulatory changes that increase costs, like those made to EPA's groundwater rules in the 1990s, could always happen again in the future, increasing the cost of the White Mesa mill cleanup.

Added to all that, none of the Title I cleanup figures cited above include the cost to remediate groundwater, which is contaminated at nearly every Title I site.[282] Though the Department of Energy is actively remediating groundwater at only a few sites, the costs to do that can be staggering. In the mid-1990s, the Department of Energy estimated that actively restoring Title I sites to background levels would range from $86–162 million per site.[283] And natural attenuation, the chosen strategy at most Title I sites,

---

[274] Ex. 19 at "Mill Decommissioning" (mill yard and ore pad area of roughly 60 acres); "Volume Calculation – Cell 1" (Cell 1 area of 60 acres); "Volume Calculation – Cell 2" (69 acres); "Volume Calculation – Cell 3" (74 acres); "Volume Calculation – Cell 4A" (41 acres); "Volume Calculation –Cell 4B" (41 acres).
[275] See, e.g., Ex. 51 (showing that over 4,000 so-called "vicinity properties" were cleaned up in Grand Junction, contributing to total projected cleanup costs of $746 million).
[276] See Ex. 51 at Table 2.1 (showing that contaminated wastes were moved at about half the sites).
[277] See Ex. 53 (describing cells built at Canonsburg, Durango, Grand Junction, Gunnison, Lake View, Naturita and other sites).
[278] See Ex. 51 at 27–28.
[279] See Ex. 51 at 24.
[280] Compare Ex. 51 at 27 with Ex. 52 (averaging the total disposal cost for Ambrosia Lake, Canonsburg, Falls City, Green River, Lowman, Maybell, Mexican Hat, Shiprock, Spook, and Tuba City).
[281] See Ex. 53 (describing caps built over contaminated materials at Mexican Hat, Burrell, Falls City, Maybell, Shiprock, Tuba City and possibly other sites).
[282] Ex. 53 (asserting that groundwater is not contaminated at only four sites, Mexican Hat, Burrell, Ambrosia Lake, and Loman).

[283] *Ex. 54 at 4-15. We've been unable to find updated, all-in cost estimates for sites with active groundwater restoration, like Tuba City and Monument Valley. A recent analysis of alternatives for replacing the aging and expensive groundwater treatment plant at Tuba City, estimated future life-cycle costs of $3.8–$12.5 million for various options, in net present value, assuming a 10-year operating timeframe. See Ex. 55 at 65.*

isn't cheap, ranging in cost from $14–24 million according to the Department's estimates.[284] *Those sites, of course, remain a liability that could eventually demand an expensive groundwater-restoration effort.*

The critical lesson from the Title I decommissioning program is that cleaning up uranium-milling wastes has often cost two-to-tenfold more than Energy Fuels is setting aside through a surety bond. Only the two smallest, least-contaminated sites were remediated for less than $20 million, about half the sites cost more than $50 million, and the most expensive cleanup exceeded $500 million (all without accounting for inflation since the 1990s, the cost of groundwater restoration, or the cost of repairing or replacing reclamation solutions that haven't worked).[285] *That history shows that costs to clean up the White Mesa mill may far exceed Energy Fuels' estimates, particularly if groundwater contamination is more expensive to remediate than the company is expecting. The contingency in the company's reclamation-cost estimates should guard against that risk. But at $3.3 million, the contingency comes nowhere close to the amount that taxpayers have incurred elsewhere to clean up uranium milling-wastes.*

The cost of cleaning up uranium-recovery facilities that were still operating when UMTRCA was passed in the late 1970s—often called "Title II" sites because Title II of UMTRCA specifies how they must be managed—could provide another point of comparison. But comprehensive information about those costs doesn't appear to exist. The only program-wide estimate for Title II sites that we can find is a 22-year old report prepared by the Department of Energy.[286] *That report includes forecasted costs for cleaning up 19 conventional uranium-recovery facilities under Title II.*[287] *In general, much like Energy Fuels' estimate for cleaning up the White Mesa mill, the cost estimates are far lower than those incurred for the Title I program, averaging about $14 million.*[288]

One reason for that discrepancy may be that the cost estimates came from mill owners and the regulators overseeing them, both of whom had an incentive to forecast modest reclamation costs that don't call into question whether making yellowcake is worth the cost of cleaning up the resulting mess.[289] *Energy Fuels, for example, reported that there would be no groundwater restoration costs at the White Mesa mill,*[290] *and that prediction has proved wrong to the tune of at least $1.2 million, and likely much more, if we understand the company's current groundwater-remediation estimates correctly.*[291]

Regardless of whether the 1995 estimates for Title II sites were biased by their source, it's plain that many of them have proved to be far too low. When EPA declared the Uravan mill cleanup to be complete in 2008, for example, the agency reported a total cleanup cost of more than $120 million.[292] *The estimate*

Those figures, of course, don't include the costs incurred to treat groundwater to date or the expense of engineering and design, pilot studies, regulatory oversight, monitoring, and the many other expenses of restoring groundwater.

[284] *Ex. 54 at 4-21.*

[285] *Ex. 52 (the least expensive sites, Spook and Lowman, covered about 20–30 acres and involved remediating less than 500,000 cubic yards of contaminated material combined; ten sites cost more than $50 million; and Grand Junction exceeded $500 million).*

[286] *See Ex. 56.*

[287] *Ex. 56 at Table 3.*

[288] *Ex. 56 at Table 3.*

[289] *Ex. 56 at Table 3 (reporting the source of cost estimates as data from the Nuclear Regulatory Commission, state agencies, and Licensees).*

[290] *Ex. 56 at Table 3.*

[291] *Ex. 19 at "Miscellaneous Items."*

[292] *Ex. 57.*

given in 1995 was $38 million.[293] *The forecasted cost for the Cañon City mill cleanup in 1995 was $12.8 million.*[294] *Yet state regulators in Colorado estimated in 2010 that the cost would run $43 million if the site is closed in place.*[295] *That figure would balloon to $895 million, according to the company that owns the mill, if the tailings are removed from the banks of the Arkansas River where they now sit.*[296] *The EPA's estimated cost to clean up the Church Rock mill site is $41.5 million,*[297] *another sizable increase over the mill owner's or regulator's estimate of $8.6 million in 1995.*[298] *Cleaning up the Homestake mill, which had a projected cost of $23 million in the Department's 1995 report,*[299] *had cost $50 million by August 2015 and was still ongoing.*[300]

At the Split Rock mill, decommissioning costs have been kept down by leaving groundwater contamination in place rather than cleaning it up, even though it will eventually pollute drinking-water wells on nearby ranches.[301] *After the company that owns the mill estimated that cleaning up groundwater would cost up to $117 million,*[302] *the Nuclear Regulatory Commission gave the owner permission to leave the contamination in place and close all the domestic water wells in the area.*[303] *We've been unable to unearth how much money the owner of the mill has spent on the cleanup so far, but it reportedly spent $18 million by 2006 just to operate its groundwater-treatment system before shutting it down.*[304] *In 1995, the estimate for groundwater remediation was $3.6 million.*[305]

Two other defunct uranium mills near White Mesa have been similarly costly to remediate outside of the initial UMTRCA program. Because the tailings from the former Atlas mill outside Moab were leaching contaminants directly into the Colorado River, the Department of Energy has built a new disposal cell in Crescent Junction, Utah and is hauling the Atlas tailings to that repository to the tune of $1 billion.[306] *And cleaning up the Monticello mill site had reportedly set the Department of Energy back $250 million by 2004.*[307]

While we wouldn't be surprised if there are examples of some Title II milling sites that were reclaimed for roughly the amount forecasted in 1995 or less, that doesn't undermine the fact that the cost

---

[293] *Ex. 56 at Table 3.*
[294] *Ex. 48 at Table 3.*
[295] *Ex. 58 at "Financial Assurance Evaluation," p. 2 (reporting an estimated total remediation cost of $43,754,099).*
[296] *Ex. 59 at 9.*
[297] *Ex. 60. This estimate may be for the surface-soil remediation only and not include the cost of remediating groundwater.*
[298] *Ex. 48 at Table 3.*
[299] *Ex. 48 at Table 3 (the Homestake mill appears under the label "Grants").*
[300] *Ex. 61 at 2.*
[301] *Ex. 62 at 3 (explaining that groundwater contamination will pollute domestic wells within 100–200 years).*
[302] *Ex. 62 at Attach. 2 p. 15 (describing costs of proposed drinking-well closure alternative and costs to perform three other cleanup alternatives); Attach. 2, p. 17 (describing plan to ban domestic drinking wells in a 3,600-acre area).*
[303] *Ex. 63 at 2.*
[304] *Ex. 64 at 4.*
[305] *Ex. 48 at Table 3.*
[306] *Ex. 65 at Slide 5.*
[307] *Ex. 66 at 2 ("Memorandum for the Secretary") ("Since these operations ceased, the Department's Grand Junction Projects Office has expended about $250 million to remediate and stabilize the Monticello Mill Site.").*

to clean up Title II mills has in many cases far exceeded initial forecasts and far exceeded the amount of money Energy Fuels is setting aside for reclaiming the White Mesa mill. It is that possibility of substantial unforeseen costs that Energy Fuels' contingency should cover, not the chance that few unforeseen costs occur.

Energy Fuels calculated its contingency using a flat rate of 25% at the Division's direction.[308] *The Division took that rate from decommissioning guidance published by the Nuclear Regulatory Commission, often called NUREG-1757 for short.*[309] *Though that guidance doesn't apply to uranium mills,*[310] *similar rates appear in the Nuclear Regulatory Commission's applicable technical guidance.*[311] *Both these documents have a critical common feature: The rate they suggest is a minimum.*[312] *The Division thus has discretion to demand a much higher contingency factor. And indeed, the Division is obligated by Appendix A to ensure that the contingency is "adequate."*[313]

Applying a contingency rate of 25 percent to Energy Fuels' reclamation-cost estimates without any critical analysis is facile and risky given the long history of uranium-mill cleanups that far exceed the amount Energy Fuels plans to set aside. There is a present-day risk that it will cost

far more than $21 million to clean up the mill, perhaps ten or twenty times more. If that happens, Energy Fuels might fund the cleanup as it's required to do. Or, it might go bankrupt, like its namesake, Energy Fuels Nuclear, did in the 1990s. And if that happens, in all likelihood, taxpayers will eventually pay to clean up the White Mesa mill. The Division has an opportunity through the surety to make sure that Energy Fuels, not the public, bears this risk that Energy Fuels' business creates. The Division should seize that opportunity and require a surety that will ensure that the mill gets cleaned up without calling on the public purse, whatever the cost.

We accordingly urge the Division to revisit the reclamation cost estimates, thoroughly and independently analyze the estimates Energy Fuels has made and the probabilities that those estimates may prove inaccurate, and require a surety amount (including a contingency) that conservatively guards against the risk that reclamation costs greatly exceed the company's forecasts.

Division Response: The adequacy of EFRI's surety is addressed in detail in the Division General Response #15. This response is incorporated by this reference. In addition, the Division responds as follows:

In a reported legal decision, the hearing officer for the NRC stated: "[T]he NRC seeks to regulate efficiently, imposing the least amount of burdens necessary to carry out our public health and safety mission."[43] The Division follows the same approach as the NRC. Here, the Division is of the view that the imposition of financial and regulatory burden the commenter seeks would be unreasonable, unfair and likely deemed unlawfully excessive on appeal since no rational justification can be made for the excesses.

The commenter cites numerous standards to which modern uranium milling facilities must be built. These standards represent preventive barriers to the release of pollutants to the environment. These modern standards reduce the probability of release happening and, when they do, the potential severity is reduced. The cleanup costs cited by GCT reflect facilities for which little or no work was done to prevent releases of pollutants to the environment. The Division finds that its implementation of these standards meets the test of reasonable assurance of satisfactory performance. In addition, the Division implements two other approaches that provide additional layers of confidence as to the reasonableness of the surety calculations. These include robust monitoring to detect releases that do occur, coupled with timely response to any identified releases, and an inspection program to evaluate the Licensee's operations and procedures. Details regarding this monitoring program, and Division oversight of the White Mesa Mill, and the NRC's direct oversight of the Division, are outlined in the Division General Response #01.

The GCT comments provide inadequate credit for the network of 74 monitoring wells the Licensee has installed to detect releases, the five piezometers installed for that same purpose and to monitor ground water elevations and the 18 wells installed to monitor ground water elevations and movement. Nor does the GCT approach provide adequate credit for the eight air monitoring

[43] ML14133A521 p. 17

stations used to detect airborne releases. To date, this network has detected two minor contaminant plumes, for which cleanup plans have been posted to the Division's website. Thus, the monitoring system is sufficient to trigger concurrent remediation. This was not done at the facilities cited in the comments. The execution of the cleanup plans is ongoing, and money for the portions not completed is in the current surety. The commenter's suggested modification to the surety is unsupportable by the evidence gained from the monitoring network.

The GCT asserts probability of significant incidence of contaminant release without justifying the claim with data or uncertainty analysis, citing only the conclusions from cases without prevention or detection measures or cleanup regimens executed during plant operations before the pollutants can spread. The Division rejects the claims of a significant contaminant release because it is not supported by any evidence in this record and, in fact, is contradicted by all available evidence in this record.

In a paper prepared to present the evidentiary requirements the NRC imposes so that Department of Energy licensing efforts could navigate the NRC review process, the author explained the levels of evidence required to support conclusions as to the "reasonable assurance" standard. The Division has adopted this approach. These standards are as follows:

- The NRC's use of reasonable assurance, and the DOE's strategy planning are intrinsically associated with describing and defending predictions and performance claims.
- A severe problem associated with the development of an acceptable strategy occurs when critical predictions and performance claims are stated without bounds and are based on data without addressing the effects of uncertainties in the data.
- If, in claiming performance or describing predictions, the reader is provided with assumptions without analyses of the consequences of the assumptions and without analyses of the differences in conclusions that could occur if the assumptions were modified, then evaluations pose major problems. In order to judge the validity of claims and predictions made under these conditions, the reader may be required to be better informed and to do more work than the authors of the claims. The problem has been noted repeatedly, and arguments without uncertainty analyses have been declared as unacceptable in the present regulatory framework.
- This leads to an obvious requirement for the justification for a finding of reasonable assurance:
- **If the uncertainties cannot be defined, the data cannot be defended.**[44] (emphasis in the original).

[44] Schweitzer and Sastre, Levels of Evidence for Reasonable Assurance Guides to Prediction, 1987, DOE Radioactive Waste Management Division, Department of Nuclear Energy, Brookhaven National Laboratory Associated Universities, Upton, New York, p. 5. Accessed October 10, 2017 at www.osti.gov/scitech/servlets/purl/5559384.

Here, the commenter has provided no evidence upon which to base an uncertainty analysis, let alone performing the uncertainty analysis. The commenter's position is unsupported by this administrative record.

The commenter also takes issue with the contingency line item for item portion of the financial assurance. The commenter's position conflicts with industry standard practice as well as NRC guidance regarding appropriate contingency factors for decommissioning. ASTM E2168 asserts that anything that can be foreseen and estimated should have its own budgetary *allowance*, reserving the *contingency* line item for the unforeseen and unforeseeable. This is consistent with the language in NUREG-1757, Vol. 3, which states: "The 25 percent contingency factor provides reasonable assurance for unforeseen circumstances that could increase decommissioning costs…."[45] Using the vocabulary correctly here is critical. Environmental remediation should, and does, appear in the budget. With the extensive monitoring network in place, the remediation estimate can be limited to known releases since releases will not go undetected.

Historically, the NRC has addressed ground water remediation in its surety reviews. In October of 1988, the NRC released a technical position on financial assurance that read, in part:

A major concern in the termination of a mill license is the restoration of aquifers that have been contaminated by the operation of a tailings impoundment. As this concern is added to the site specific reclamation plans, the Licensee should include these costs in its surety until the Licensee is released from further ground water restoration activities.[46]

Similarly, in its most recent guidance, the NRC stated:

"Facilities with fluid processes may have unplanned and uncontrolled leaks or spills. Occasionally leaks or spills will exceed the confinement capability of the facility or occur in an unconfined area and migrate into the environment. Once in the environment, the contaminants may spread through the subsurface, resulting in a potentially large volume of residual radioactivity in the subsurface that will require remediation before license termination. When such residual radioactivity is identified, the cost of remediating it must be included in the decommissioning cost estimate."[47]

The Division's rationale for adopting the 25% contingency value is straightforward, conservative, and supported by the record and applicable law and guidance. First, UAC R313-22-35(3)(h) incorporated NUREG-1757 Volume 3 by reference. That NUREG specifies a contingency value of no less than 25% as to certain categories of radioactive materials Licensees.[48] To be sure, NUREG-1757 does not by its terms apply directly to uranium mills.

---

[45] NUREG-1757, vol. 3, p. A-25.

[46] NRC, 1988, Technical Position on Financial Assurance for Reclamation, Decommissioning, and Long-term Surveillance and Control of Uranium Recovery Facilities, p. 22. This document was superseded by NUREG-1727, then by the NUREG-1757 series.

[47] NUREG-1757, vol. 3, p. A-26.

[48] NUREG-1757, vol. 3, p. 4-11, p. A-25, p. A-38.

Rather, it applies to facilities that possess radioactive materials for various purposes and that package and ship spent radioactive wastes for off-site disposal. As to such Licensees, the NRC recommends a 25% contingency factor. Based on all available information and in the Division's reasoned judgement, it finds that the 25% contingency factor is reasonable and is conservatively applied to the White Mesa Mill. Since the Division feels that the White Mesa Mill facility is well characterized, and the risks are well managed, evidence is lacking to justify a higher value for a contingency factor. The administrative record supports the Division's determination.

GCT Comment #49

B. Appendix A requires Energy Fuels to forecast the cost of both cover designs and secure a bond for the more expensive one.

The reclamation cost estimates in Revision 5.1 do not forecast how much it will cost to build the ET cover that Revision 5.1 proposes. Instead, the company has estimated the expense of building the 1996

---

[308] *Ex. 67 at 32.*
[309] *Id.*
[310] *Ex. 68 at 1-1 ("[This volume] applies to financial assurance requirements for Licensees under 10 CFR Parts 30, 40, 70, and 72, with the exception of Licensees (uranium recovery facilities) subject to Criteria 9 and 10 of Appendix A, "Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content," to 10 CFR Part 40, "Domestic Licensing of Source Materials.""). *
[311] *Ex. 68 at xi (Table 2, n.4) (explaining that "[g]uidance on financial assurance for uranium recovery facilities under 10 CFR Part 40 is provided in the Branch Technical Position (BTP), 'Technical Position on Financial Assurances for Reclamation, Decommissioning, and Long-Term Surveillance and Control of Uranium Recovery Facilities,' (issued October 1988)").*
[312] *Ex. 69 at 26 (requiring a minimum 15 percent engineering contingency and 10 percent contract-administration contingency); Ex. 68 at 4-11 (contingency factor must be "at least" 25 percent of all estimated costs); A-25 (explaining that a lower contingency may be allowed only under very narrow circumstances).*
[313] *10 C.F.R. Part 40, App. A, Criterion 9(b)(1)(ii).*

conventional cover. Only by examining each line item in the cover's design does this become apparent. The reclamation tasks for covering Cell 3, for example, include (among other elements) building a one-foot thick clay layer, a two-foot random-fill layer, and a half-foot rock armor,[314] *which are elements of the 1996 conventional cover design, not the ET design.*

Though we've found no explicit disclosure by Energy Fuels that its surety is based on building the 1996 conventional cover, the text of Revision 5.1 does promise an update to the reclamation cost estimates "when this Plan is approved and the Cell 2 cover performance test section … is verified [under the] Stipulated Consent Agreement…."[315] *This ambiguous statement could be read in two ways. First, Energy Fuels might be promising to update its surety twice: once when Revision 5.1 is approved and again when the Cell 2 performance test section is verified under*

the Stipulated Consent Agreement. Or, the company might be promising to update the surety only after both Revision 5.1 has been approved and the test section has been verified. Either way, this delay in updating the surety flouts Appendix A.

Under Criterion 9 of Appendix A, the surety amount "must be based on Commission-approved cost estimates in a Commission-approved plan, or a proposed revision to the plan submitted to the Commission for approval, if the proposed revision contains a higher cost estimate." [316] *That standard requires Energy Fuels: (1) to estimate costs both for the ET cover in its revised reclamation plan and for the 1996 conventional cover that the Division maintains is still an approved design,*[317] *and (2) to maintain a surety for the more expensive plan.*

Division Response: The Division concludes that no changes to the License should be required in response to this comment. The Division clarifies and validates that the existing surety is tied to the approved rock armor cover system. The rock armor system is more expensive to construct than the proposed ET cover system. Until the ET cover system is approved, the only justifiable bond amount should relate to the approved rock armor cover. If the Director approves the ET cover, at that time the surety bond would be re-calculated. The current bond meets all applicable regulations and requirements.

GCT Comment #50

C. Energy Fuels' surety doesn't include enough money for the long-term care fund.

Under UMTRCA, the White Mesa mill is ultimately to be turned over to the Department of Energy or the State of Utah, at its election, for long-term care.[318] *To fund the government's resulting perpetual monitoring and maintenance obligations, Appendix A requires Energy Fuels, when its license is terminated, to pay at least $250,000 (in 1978 dollars) to the United States or the State of Utah "to cover the costs of long-term surveillance."*[319] *At a minimum, the long-term care fund must be capitalized with enough money to cover annual site-surveillance costs using the interest generated at a rate of one percent.*[320] *The Division may also increase the funding requirement if it finds that long-term care of a particular site will cost significantly more than the annual-inspection costs contemplated by Appendix A.*[321]

Experience with long-term care of sites already in government custody has suggested that the minimum funding required by Appendix A is not enough. For the six Title II sites already under long-term surveillance by the Department of Energy, there are serious inadequacies in the minimum long-term care charges assessed to Licensees. These inadequacies stem from underestimated surveillance and maintenance costs,[322] *failure to incorporate pre-transfer costs,*[323] *and unexpected technical challenges with sites that had groundwater and cover problems after reclamation was complete.*[324]

---

[314] *Ex. 19 at "Volume Calculation – Cell 3."*
[315] *Ex. 1 at I-1.*
[316] *10 C.F.R. Part 40, App. A, Criterion 9(a).*
[317] *See Ex. 21 at 7.*
[318] *42 U.S.C. § 2113(b).*

[319] *10 C.F.R. Part 40, App. A, Criterion 10.*
[320] *Id.*
[321] *Id.*
[322] *Ex. 51 at 42–43; Ex. 70 at 8.*
[323] *Ex. 70 at 5.*
[324] *Ex. 71 at 12–16.*

The $250,000 minimum in Appendix A was set in 1980 before the government had any experience caring for remediated uranium mills.[325] *That figure assumed that the annual cost of surveillance would be about $5,300 per site in 1995 dollars.*[326] *But by 1995, the Department of Energy estimated that the real cost of annual surveillance and maintenance at each Title II site would be $21,000 in 1995 dollars (or, about $34,000 today).*[327] *This number includes $5,000 per year in site-maintenance funds, whereas the minimum charge included in Appendix A in 1980 assumed that ongoing maintenance would not be needed.*[328]

The annual interest on the long-term funding guaranteed in Energy Fuels' surety, about $875,000, would fall far short of these updated long-term maintenance estimates. At annually compounded interest rate of one percent, that fund amount would generate interest of $8,750 each year, assuming that the principal neither grows nor is spent. That would lead to a substantial shortfall if site maintenance costs were equivalent to an estimated $34,000 per year. And that may not scratch the surface. The Department of Energy estimated in 2001 that long-term stewardship costs (which include groundwater remediation) for the Monticello repository over the next decade would average about $386,000 per year and would rise to about $520,000 per year by the 2030s.[329]

Technical guidance for uranium-mill financial sureties published by the Nuclear Regulatory Commission in 1988 acknowledges that, in addition to inspections, long-term maintenance and groundwater monitoring, along with other measures, may be necessary at some sites.[330] *The guidance explains that these costs "should be added to the basic cost of annual inspection of the site by government authorities, as required under Criterion 10."*[331] *The Division should follow that guidance, complete a site-specific analysis of probable ongoing long-term costs at the White Mesa mill after reclamation, and establish a fund amount to be guaranteed in Energy Fuels surety that is sufficient to cover long-term costs at an interest rate of one percent.*

Division Response: The Division disagrees with this comment. It is not supported by the record or the law. The U.S. Department of Energy has long-term stewardship for the White Mesa facility. The adequacy of the Licensee's long-term funding impacts the U.S. Government more than any other stakeholder. Neither the U.S. Department of Energy nor the NRC in its oversight of the Division has raised any issues with the adequacy of the Licensee's long-term care fund. The Federal Government has not seen fit to change its recommendation regarding minimum funding for long-term care. The Division is following current guidance. Given the detail presented in response to the previous comments, the Division does not find that there are significant needs for which the costs have not already been accounted. Specifically, with respect to the Monticello site, the U.S. Department of Energy maintains a field office on the Monticello property to house workers while monitoring the experimental cover system; no such activity is

anticipated at White Mesa. Therefore, using Monticello as a benchmark will artificially inflate the cost without valid justification. Based on all available information in this record, the Division accepts the Federal estimate of $250,000 in 1978 dollars as being accurate. That estimate was made by the entity that will be tasked with the long-term care, and the Division has no information indicating site-specific need to exceed the minimum care expectation. Therefore, no change to the long-term care fund will be required.

V. The Division should deny Energy Fuels' application to process the Sequoyah Fuels sludge.

GCT Comment #51

A. Background

Beginning in 1969, the Sequoyah Fuels Corporation ran a uranium-conversion plant in Gore, Oklahoma that converted yellowcake into uranium-hexafluoride, which is used to create fuel rods for nuclear power plants. Following several tragic accidents, Sequoyah Fuels began decommissioning the plant in 1993.[332] A long-running dispute ensued among Sequoyah Fuels, the State of Oklahoma, and the Cherokee Nation about how to get rid of some of the plant's most radioactive waste,[333] including a dewatered raffinate sludge containing thorium, uranium, arsenic, beryllium, and lead, among other things.[334] A

---

[325] *Ex. 70 at 2.*
[326] *Ex. 51 at 8.*
[327] *Ex. 51 at 8.*
[328] *Ex. 51 at 8, 43.*
[329] *Ex. 72 at Table F-1.*
[330] *Ex. 69 at 25–26.*
[331] *Ex. 69 at 25.*
[332] *Ex. 73 at 1.*
[333] *Ex. 73 at 2.*
[334] *Ex. 74 at Table 12.*

The concentrations of arsenic, lead, barium, and beryllium in the Sequoyah Fuels sludge are an order of magnitude more than the levels in typical Colorado Plateau-derived uranium ore.

settlement was reached in 2004 in which Sequoyah Fuels agreed to dispose of the sludge off site.[335] This is the waste that Energy Fuels wants permission to process and discard at the White Mesa mill.

For about the last decade, Sequoyah Fuels has searched for an off-site disposal location willing to get rid of the sludge, and it has at least $3.5 million earmarked to pay for the disposal costs.[336] But it hasn't found a taker so far. According to Sequoyah Fuels, the high Thorium-230 concentrations in the sludge made it unacceptable for disposal in the Pathfinder mill tailings impoundment.[337] High concentrations of Thorium-230 and Uranium-238 also prevented Waste Control Specialists in Texas from disposing of the sludge.[338] EnergySolutions, which runs a low-level radioactive waste and uranium byproduct disposal facility in Utah, turned down the sludge because it has more uranium in it than EnergySolutions is licensed to handle.[339] That limit on

uranium concentration is one the Division imposed. Unlike the other potential disposal sites, Energy Fuels wants to process the sludge and discard it, but it hasn't yet gotten permission to do so.

Having so far come up empty handed, Sequoyah Fuels has recently renewed its effort to cap the sludge in place in Oklahoma.[340] That move prompted the State of Oklahoma and the Cherokee Nation to go to court to force the off-site-disposal plan.[341] They've argued that Oklahoma and the Cherokee Nation should not be blighted by the pollution the sludge may cause.[342] It is that prospect that the Division is proposing to export to White Mesa by approving Energy Fuels' request to process and discard the Sequoyah Fuels sludge at the mill.

Division Response: Please see General Responses #4 and #5 above.

GCT Comment #52

B. The Division has authority to deny the Sequoyah Fuels license amendment to protect the environment and public health, and it should exercise that authority.

Energy Fuels' "alternate-feed" business has never been blessed by an act of Congress, nor a state law, nor any other publicly debated sort of lawmaking. Instead, it was sanctioned by a few technocrats who decided to make the nation's radioactive-waste-disposal rules more pliable and the uranium-milling business more plump. That has enabled Energy Fuels to argue that it can discard the Sequoyah Fuels sludge at White Mesa when everyone else is turning it down.

To lawfully make yellowcake and bury the resulting wastes at its mill, Energy Fuels must process "ore" primarily for its "source material" content.[343] Source material means uranium or thorium, or any ore containing one of those elements at concentrations established by the Nuclear Regulatory Commission.[344] In the 1990s, Commission staff released guidance that defined "ore" to mean anything from which uranium or thorium are extracted in a licensed mill.[345] This tautological definition had the effect of

---

Id. The thorium activity and uranium-content of the Sequoyah Fuels sludge far exceed that of uranium ore.
See id. at Table 7.
[335] *Ex. 73 at 2.*
[336] *Ex. 75 at 1.*
[337] *Ex. 75 at 2.*
[338] *Ex. 75 at 3.*
[339] *Ex. 75 at 2.*
[340] *Ex. 75 at 4.*
[341] *Ex. 73.*
[342] *Ex. 73 at 3, 6, 9–11.*
[343] *See 42 U.S.C. § 2014(e)(2).*
[344] *42 U.S.C. § 2014(z).*

[345] *Uranium Mill Facilities, Notice of Two Guidance Documents: Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments; Final*

allowing Energy Fuels to run anything from which it could extract uranium through the White Mesa mill and discard the resulting wastes on site, provided the feed wasn't a so-called "listed" hazardous waste.[346] *Energy Fuels understood that to be true even if the company was paid to do so.*[347]

The State of Utah balked at this idea and took the issue to the Nuclear Regulatory Commission.[348] *The Commission ultimately decided against the State.*[349] *As a result, through a guidance document issued by Commission staff and an administrative appeal decided by five commissioners, Energy Fuels was given permission to make money disposing of radioactive waste at the White Mesa mill. That outcome bypassed any true public debate about how to get rid of a host of uranium-bearing wastes that have been discarded at the mill since the early 1990s. It also yielded just a few, mostly inelastic factors for determining what qualifies as an "alternate feed," leaving little room to constrain what uranium-bearing waste Energy Fuels may process.*[350]

The Division appears to believe it is bound by the Commission's guidance and administrative ruling.[351] *It observes that the State's application in 2003 to take over regulating uranium byproduct material as an "agreement state" included a "policy statement" recognizing that, for the White Mesa mill to be viable, Energy Fuels needed to be able to expand its business to include processing alternate feed materials.*[352] *But that's hardly a binding promise to allow Energy Fuels to process alternate feed according to the Commission's prior diktats. It's a statement of policy that the State may change. And the amendment that the Commission and the State of Utah ultimately signed to expand the State's agreement-state power, which reflects the binding commitments each party made, says nothing about allowing uranium mills to process alternate feed.*[353]

The Division also observes that the State committed in its 2003 agreement-state application to apply the Commission's guidance for evaluating whether to license alternate feeds for processing.[354] *But that description of the application omits an important caveat: The State agreed only to apply the Commission's guidance as a general matter "unless doing so will compromise protection of human health and the environment."*[355] *And again, the State did not commit to applying the Commission's guidance when those parties amended their agreement delegating authority to the State to manage uranium byproduct material.*[356]

In short, the Division is not bound by any past promise to the Commission to apply the Commission's alternate-feed policies and sign off on Energy Fuels' request to process the Sequoyah Fuels sludge, or any other alternate feed. The State of Utah has the authority to re-examine the conditions on

Position and Guidance on the Use of Uranium Mill Feed Materials Other Than Natural Ores, 60 Fed. Reg. 49,296, 49,296 (Sep. 22, 1995).
[346] *60 Fed. Reg. at 49,296–297.*
[347] *Ex. 11 at 1.*
[348] *Ex. 11 at 1.*
[349] *Ex. 11 at 1.*
[350] *See 60 Fed. Reg. at 49,296–297 (describing three conditions that allow materials to qualify as alternate feed).*
[351] *See Ex. 74 at 2.*
[352] *See Ex. 74 at 2. The policy statement talks about "uranium mills" generally, but in 2003, as now, White Mesa was the only operating uranium mill in Utah. See Ex. 76 at 1.*
[353] *Ex. 77.*
[354] *Ex. 74 at 2.*
[355] *See Ex. 76 at 2.*
[356] *Ex. 77.*

which alternate feeds may be processed, if at all. And the Division, at a minimum, has the authority to disregard the Commission's alternate-feed guidance so as to protect "human health and the environment."[357] *Indeed, that power is consistent with the Division's power to reject radioactive-material license amendments if they will be "inimical to the health and safety of the public."*[358]

We urge the Division to exercise that authority and prohibit Energy Fuels from discarding the Sequoyah Fuels sludge at the mill. If the company is being paid to process the Sequoyah Fuels sludge, which seems likely under the circumstances, it is mostly an environmental liability—a radioactive waste that isn't worth processing for yellowcake unless it can also be discarded into Utah's environment. That fact alone should be enough for the Division to conclude that disallowing Energy Fuels from processing the sludge will protect the environment and public health. We ask the Division to make that finding.

Division Response: Please see General Responses #4 and #5 above.

GCT Comment #53
C. The Safety Evaluation Report is deficient.

To determine whether to allow Energy Fuels to take the Sequoyah Fuels sludge, the Division hired URS Professional Solutions to prepare a "safety evaluation report" examining Energy Fuels' request. That report is deficient in several respects and should be revisited.

First, the report incorrectly assumes that the wastes from processing the Sequoyah Fuels sludge will go into Cells 4A and 4B only.[359] *But in the past, Energy Fuels has pumped wastes among the mill's cells and has directed wastes from its solvent-extraction circuits into Cell* 1. *The company plans to use solvent extraction to process the Sequoyah Fuels sludge.*[360] *So, it stands to reason that at least some wastes from processing the sludge will end up in Cell 1. The safety evaluation report should disclose this possibility and analyze what the impacts on Cell 1 would be.*

Division Response: At this time, it is expected that any tailings produced from the processing of the Sequoyah Fuels material will be placed in Tailings Cell 4A. If the Licensee chooses to send solution to Tailings Cell 1 that is their prerogative. Any "impact" that the material might have on Tailings Cell 1 will be seen through the daily inspections performed by the Licensee and through the Division's review of environmental reports. Therefore, no revision to the SER will be made.

GCT Comment #54

Second, the report makes numerous claims about how concentrations of various constituents in the mill's cells will change after disposal of the processed Sequoyah Fuels sludge.[361] *But the data used to evaluate those pollutant-concentration changes is based, not on discarding the sludge in Cells 4A and 4B as planned, but on discarding it in Cell 3. As result, the data appear to be erroneous, causing other conclusions in the report to be questionable, if not wrong. The report relies on that data, for example, to conclude that discarding the sludge in Cells 4A and 4B won't damage the liners in those cells.*[362] *The report also reprises the company's assertion that no constituent's concentration will go up by more than 0.10% in the cells.*[363] *Yet there's no analysis of how the Sequoyah Fuels sludge would affect the concentrations of contaminants in Cells 4A, 4B, or Cell 1 for that matter. The contaminant-concentration analysis should be revisited to assess the concentration changes in the cells the processed sludge will go in.*

Division Response: As discussed previously, the Sequoyah Fuels material has already been designated by the NRC as 11e.(2) byproduct material. The Licensee is required to sample the wastewater of the tailings cells on an annual basis. Any changes to constituent's concentrations will be observed during the Division review of the annual wastewater report. However, the tailings cells do not have a compliance limit for any of the constituents found in the cells and if concentrations were to go up to more than .010% in the tailings cells it still would not be a non-compliance issue. Therefore, no revision to the SER will be made.

GCT Comment #55

Third, the report repeatedly evaluates the potential threats posed by the sludge by comparing it to other stuff Energy Fuels has processed in the past. For example, the report observes that the sludge has more thorium in it than typical uranium ores, but less radium, leading to the conclusion that it poses "an

---

[357] *See Ex. 76 at 2.*
[358] *Utah Admin. Code R313-22-33(d).*
[359] *Ex. 74 at 31, 37.*
[360] *Ex. 78 at 2.*
[361] *See, e.g., Ex. 74 at 27 (describing Table 11 as a summary of "anticipated changes (e.g., percentage increase) in concentrations of metal and non-metal constituents in the tailings disposal area following disposal of the process residuals from processing of the [Sequoyah Fuels] Uranium Material"); 43 (discussing increased phosphate, aluminum, and iron concentrations); 46 (ammonia).*
[362] *Ex. 74 at 14.*

[363] *Ex. 74 at 31.*

incrementally higher radiological risk" than Colorado Plateau-derived ores and tailings.[364] *The report goes on to observe that, though there's more Thorium-230 and Thorium-232 in the sludge than most substances the mill has processed, there's less Thorium-230 than was present in the "Nevada Test Site Cotter Concentrate" and less Thorium-232 than in the "W.R. Grace alternate feed materials."*[365] *Phosphorous, the report says, is present in the sludge at a concentration of 19,600 mg/kg, but the "Cameco Calcined Product" had more.366 At 44,100 mg/kg, fluoride levels are less than the "FMRI alternate feed."*[367]

These comparisons are useless for evaluating the hazards the sludge poses. They say nothing about how hazardous the sludge is, only how hazardous it might be relative to other materials the mill has already been given permission to process. These comparisons are unintelligible absent some explanation of how the constituents of the Sequoyah Fuels sludge may affect the environment or public health at the concentrations at which they're present in the sludge.

Along the same lines, the only conclusion the report draws about how the Sequoyah Fuels sludge might affect the liners in Cells 4A and 4B was that it wouldn't "result in any additional detrimental impacts."[368] *But that could be true if the caustic substances that are already in Cells 4A and 4B are already causing severe detrimental impacts to the liners. Without any understanding of what the existing damage to the liners may be, it is meaningless to downplay the "additional" impacts that may occur.*

This sort of reasoning also predisposes the Division to approving ever-more-foul wastes for disposal at the mill. By comparing the Sequoyah Fuels' sludge ingredient-by-ingredient to the worst constituents of previously approved wastes, the Division can sanction its disposal on the reasoning that it's not much worse than the mixture that's already in the cells, even if standing alone it would be far more hazardous than any given waste previously processed.

These deficiencies in the report's analysis of the hazards the Sequoyah Fuels sludge may pose should be fixed, and the Division should make a new assessment of whether to license disposal of the sludge based on that revised analysis.

Division Response: As discussed in the Uranium Watch comments, URS used previously approved alternate feeds as a comparison of the types of materials that could be processed at the Mill and are considered environmentally comparable. Also this material has already been designated as 11e.(2) byproduct material by the NRC and therefore falls within the environmental envelope for uranium milling. These comparisons are an acceptable method to perform an analysis because it demonstrates that all of these constituents have been analyzed and found to be acceptable at the Mill. Therefore, no revision to the SER will be made.

VI. Conclusion

Though the Division has made commendable improvements in regulating the White Mesa mill, deficiencies remain. We urge the Division to remedy them.

Ute Mountain Ute Tribe – Division Responses to Specific Comments

The Division's General Responses, above, are intended to address the vast majority of the comments raised by the Ute Mountain Ute Tribe (UMUT). Those general responses are incorporated here. But in the interest of creating a more robust record of the Director's final determinations in this matter, a more detailed and specific response to all the comments submitted by the UMUT has been created here. One of the purposes of doing so is to create a more clear administrative record in the event that review of the Director's final determinations is required by others.

The following should also be noted. At the invitation of the Director, EFRI, the Licensee, submitted Responses to Selected Public Comments on October 23, 2017 (the "Reply Comments"). The Director also solicited Sur-Reply comments from the UMUT regarding the Reply Comments. These were submitted on December 4, 2017.

The Director has considered and has relied upon the Reply Comments and the Sur-Reply Comments in reaching a final decision on the merits of all the issues pending in this administrative record. More specifically, the Director has reviewed and has relied upon the detailed factual information and technical and legal analysis provided by EFRI in its Reply Comments pages 1-18 as relating to the comments raised by the UMUT. The Reply Comments and Sur-Reply Comments are designated as part of the Administrative Record in this matter. However, the Director has not created a separate response to the Reply Comments or the Sur-Reply Comments but has relied on the same in rendering a final decision in this matter. Following is the Director's response to the specific comments raised by the UMUT. These comments have been re-numbered in order to facilitate presentation of the comments and responses.

UMUT Comment #1

Scott Clow, Environmental Programs Director, Ute Mountain Ute Tribe, Oral Comment Received June 15, 2017.

"I am Scott Clow, the Environmental Programs Director for the Ute Mountain Ute Tribe. Good evening. In general, the State of Utah and Energy Fuels have not provided credible insurances and adequate protective measures to instill confidence in the White Mesa and surrounding communities that the members of these communities and their environments are safe from the documented impacts of the White Mesa Mill. More needs to be done to ensure the public health and environment are and will be adequately protected.

In regards to the reclamation plan and surety, the tribe is concerned that radioactive toxic waste in the tailing cells will be stored next to the White Mesa Community forever. It is imperative that reclamation be implemented in a technically sound and timely manner. The current surety as calculated and revised annually is insufficient to fully reclaim the facility when Energy Fuels decides to close the mill. We estimate the actual reclamation cost to be 30 to 130 million dollars more than the current surety based on most cost calculation methods. So, it's underfunded.

Regarding the groundwater permit renewal application, the groundwater in the Beryl Canyon Formation on the mill property has been impacted by facility operations. There are two contaminant plumes currently being remediated and there are statistically significant trends in monitoring network of continuing groundwater quality derogation. There's also clear documentation of offsite impact entrance seep, due to airborne deposition and storm water transport of uranium from the facility. The tribe is concerned that the signature of toxic waste from the tailing cells for mill operations is not being recognized in the monitoring well network installed to detect such leakage. It is not appropriate to reset compliance limits for monitoring wells based on the University of Utah Isotopic Study, which is outdated and does not reflect current conditions or the Pyrite Theory, which is not scientifically reported. The groundwater discharge permit must require an updated isotopic study and an investigation into hydro-geologic conditions including identification of preferential flow paths to the southeast of the facility similar in scope to the southwest hydro-geologic investigation, which the State required recently, and inclusion, a new point of compliance wells between cells 4A and 4B and monitoring well MW22. Furthermore, MW22 must also be designated as a point of compliance well. That's the nearest well to the Ute Mountain Ute boundary. A more sophisticated approach to data assessment in identification of the facility it impacts in the monitoring well network must be adopted in line with current Federal guidance for uranium facilities as described in the 2017 EPA document, Health and Environmental Protection Standards for Uranium Mill Tailings, where an approach to identifying impact by a single characteristic analyte is sufficient in contrast to the Utah Division of Waste Management and Radiation Control current, much narrower approach. The current approach is limiting to the point where a facility or tailing signature may never be recognized and is not protective of human health and environment. Regarding compliance with Air Quality regulations, as a phase disposal facility under 40CFR, Part 61 or the NESHAP, Subpart W, the mill should be required to continue filling Cell 3 with tailing sands and bring it closer to drawing and final closure as soon as possible.

Regarding alternative feeds and in-situ leach waste disposal, the practice of designating Cell 3 as a disposal location for in-situ leach waste because it is the only location with structural stability for truck transport and gravity flow disposal demonstrates that no cell was designed or built for such disposal activities including the most recently build cell 4B. A trucking ramp could be built to the modern cells, 4A or 4B, for disposal of these wastes instead of prolonging the life of Cell 3.

Regarding the Sequoyah Fuels Proposal, no other radioactive waste disposal in the United States will accept the Sequoyah Fuels material because of the concentrations of uranium or thorium-230 isotopes in the waste and White Mesa should also not accept it for that reason. The State of Utah contracts with URS as a consultant to review documents pertaining to mill operations and proposals. The URS Safety Evaluation Report for the Sequoyah Fuels Material Proposal is flawed and relies on Energy Fuel Resources statements and representation verbatim. URS is supposed to take an independent review on behalf of the State of Utah, not a reproduction of the proposal by Energy Fuels to accept the waste.

I added this comment after hearing a few other people speak this evening. Three leaking shipment of in-situ leach waste arrived at the mill in the last 2 years. That's a fact. We were informed last week by the Utah Department of Environmental Quality that the San Juan County

Emergency Response was notified to respond. So that's either a fact, or it's not a fact. But we were informed that that was the fact. Thank you for your time."

Division Response: The Division appreciates and shares Mr. Clow's concerns about understanding, and managing the impacts from the White Mesa Mill in order to ensure the public health and welfare are and will be adequately protected. The Division respectfully disagrees that the objective evidence in this administrative record is inadequate to instill public trust and confidence in the conclusion that the White Mesa Mill is being managed in accordance with all applicable environmental standards and requirements under state and federal law, regulations, and industry standards. The Division's General Responses to Comments 1 - 3 address these concerns in more detail.

With respect to Mr. Clow's concerns about the reclamation plan, the Division incorporates its General Response #14.

In response to Mr. Clow's concerns about the groundwater permit, the Division refers to its General Response #16.

With respect to Mr. Clow's comments on the NESHAP compliance (Subpart W), the Division refers to its General Response # 12.

Responding to Mr. Clow's concerns about the Sequoyah Fuels alternate feed proposal, the Division incorporates its General Response numbers 4 and 5.

In addition to the foregoing references, many if not all of Mr. Clow's comments are addressed below in the Division's response to the UMUT formal written comments.

UMUT Comment #2

Peter Ortego, General Counsel for the Ute Mountain Ute Tribe, Oral Comment Received June 15, 2017

"Hi. My name is Peter Ortego. I'm the General Counsel for the Ute Mountain Ute Tribe. Thank you for having this meeting today, I appreciate that. I appreciate that you listen to what people have to say. I think that is very important that you do that.

When the Nuclear Regulatory Commission delegated authority to the State, I'm afraid the State doesn't understand what that full authority is. There's a consultation requirement for the Nuclear Regulatory Commission, any Executive Branch Agency of the United States has to consult with tribes when they do anything that might affect that tribe. And clearly issuing this permit has an effect on two tribes, on a lot of people, but especially two tribes. You shouldn't just have hearings in White Mesa; you shouldn't just have hearings in Montezuma Creek; you should have consultation in Tselakai, and you should have consultation in Window Rock. You need to go talk to those Governments and hear from those Governments about what they think is going on and what they're seeing and what they're hearing. I think what you're going to hear is that they also understand the importance of money, they understand the importance of jobs, but they know it's not the most important thing. It really breaks my heart when I see companies come to Ute Mountain and they say, 'We're going to do this operation for you, we're going to do

this wonderful thing, and it's going to give you lots of money.', and the tribe unwittingly says, 'OK. We'll take your money. That's good. We'll work together. Hopefully, there will be some jobs; there'll be good things for the community, good things for the people. You're producing energy; you're producing oil; you're producing gas; that's great.' But then once the revenue stops and then once they start receiving enough income to keep their operations going, they leave it alone. They abandon it. It's not employing so many people anymore. It's not doing such an excellent job anymore. It's not maintaining safety the way it did when they first came out to talk to the tribe about how great this operation was going to be. So, what we see now is companies declaring bankruptcy now that oil prices are dropping. They're declaring bankruptcy right and left. And that's what's going to happen here. That's exactly what's going to happen here. The day Energy Fuels can no longer pay to keep this place clean. The day they get sued and a massive judgement against them, they're going to walk away and we're going to be stuck with this thing, the same way Ute Mountain is stuck with stuff, the same way I am sure Navajo is stuck with stuff, the same way this community today I am sure is stuck with things, that were supposed to happen in the past that didn't happen. I don't like the fact that money is the supreme thing to everybody, to me, health and environment is the most important thing. To me, social justice is the most important thing. Not money. How many jobs are we going to employ when we clean this thing up? Who's going to pay those people? When that company goes into bankruptcy, who's going to pay people to clean it up? Will those people be willing to clean it up without pay? Are we all going to have to march down there ourselves and clean that up, because there's no more money to pay to clean it up? Is it going to be the disaster I'm seeing at Ute Mountain? Is some company going to come to us and offer the mill to us for a dollar? Is that how it's going to work out? That's the future. It is inevitable. It is absolutely inevitable. These things do not last forever. We are acting as if we can deal with something that will last in perpetuity. I promise you, we cannot. You cannot even imagine in your mind what that means. Can any human being imagine infinity? I don't think so. So how can we imagine perpetuity? How can we talking about that today as if it is OK? As if we can prepare for that. I think we have to prepare for the worse. I think we need to prepare for absolute disaster. That's when we will know that we can handle having something like this in our area. When we can deal with the absolute worse that it does, that's when we can handle it. I don't think that any community can deal with the worse of what a mill like this can provide.

So, I'm really disappointed that money is the most important thing. It breaks my heart. It breaks my heart as the general counsel for the Ute Mountain Ute Tribe and as a citizen of this country. I hear all the time how important money is. We ignore endangered species for money. We ignore environment for money. We ignore a lot of things for money and later on it kicks us in the butt and we say, oh well.

There is data and I encourage everyone to look at it, understand it, and analyze it. I appreciate that there are speakers here today who are talking about facts, they're talking about data. However, just because someone tells you there is data, and it's bad data, don't just assume they are making it up. The Indians are used to being lied to for generations and generations, and generations and one of the things I really appreciate what they do, is they don't lie. They tell the truth, because they understand the importance of the truth, and they are telling you today, the truth. So, again, I thank you for having this meeting. I hope that we see you in Towaoc as well.

Division Response: Mr. Ortago's comments relate primarily to consultation issues with the UMUT. This comment is addressed in detail in the Division's General Response #6. Moreover, since the time that this comment was made, the Division understands that on September 5, 2017 Governor Gary Herbert and DEQ Executive Director Alan Matheson traveled to White Mesa and met with the UMUT regarding this matter. The Division also met with UMUT leaders regarding this matter at the Governor's office on December 15, 2017. Moreover, the Division and staff have met and conferred with the UMUT on many occasions regarding the present re-licensing matter. Further details regarding these consultation events are presented below. Finally, the Division is aware of the fact that when the White Mesa Mill was first sited and licensed by the NRC in the late 1970s, the Ute Mountain Ute Tribe and the Navajo Tribe submitted letters to the NRC stating that the tribes supported the siting of the White Mesa Mill (See Attachment 5). It is apparent from the administrative record that the NRC relied on tribal support in its final decision to issue the original license. Questions as to the suitability of the siting and nature and scope of the White Mesa Mill operations were thus decided by the NRC based on an administrative record in a matter that is now res judicata. These decisions are not subject to collateral attack in the present re-licensing proceedings. But even if this were not the case, there is nothing in this administrative record to support the apparent desires of Mr. Ortego in shutting down the Mill. Finally, the Division's response to the UMUT's formal, written comments, below, is also incorporated by reference here.

Ute Mountain Ute Tribe
Emailed Comment Received July 31, 2017

UTE MOUNTAIN UTE TRIBE
COMMENTS ON RADIOACTIVE MATERIALS LICENSE RENEWAL
PART I
JULY 31, 2017

Part I provides the UMUT comments on the RML Renewal and is divided into three major sections. For purposes of these comments, the Tribe refers to the Utah Division of Management and Radiation Control and its predecessor, the Utah Division of Radiation Control, as DWMRC or DRC.

In 2011, the Tribe submitted comments on the then proposed renewal of the RML for the Mill and expressed its concerns about the actual and potential impacts of the Mill on the White Mesa Community and surrounding area. (Letter from Ute Mountain Ute Tribe to Rusty Lundberg, DRC, Comments Regarding Denison Mines (USA) Corp. Radioactive Materials License Renewal DRC-045, Dec. 16, 2011. The Tribe hereby incorporates by reference its 2011 comments.

The Tribe also joins in and incorporates herein by reference the comments submitted by the Grand Canyon Trust during this current comment period.

***Section I** provides a snapshot of the Tribe's historical and cultural connection to the land around WMM and its nexus to the WMM facility.*

Section II *addresses the broad concerns and legal deficiencies identified by the Tribe in the current operation of the WMM by Energy Fuels.*

Section III *provides Tribal concerns on specific sections of the RML Renewal.*

I. Ute Mountain Ute Tribe's Historical and Cultural Connection and its Nexus to the WMM Facility

"Since the original environmental impact study which was prepared prior to EFN's mill being built excluded mention of my adjacent community of over 300 people as a population of concern, not even testing our wells as required by law, I hereby ask for standing that your agency give justification for this disregard."

Norman Begay, a White Mesa resident in an April 30, 1997 petition for standing to the Nuclear Regulatory Commission

It has been twenty years since Mr. Begay wrote that impassioned plea to the Nuclear Regulatory Commission (NRC) about the White Mesa Mill (WMM) and his sentiment still rings true for people of the Ute Mountain Ute Tribe's (UMUT) White Mesa community. The original Environmental Impact Statement, written in 1979, made scant mention of the public health, safety and environmental quality concerns of either the Ute Mountain Ute Tribe's White Mesa Community or their neighbors to the south, the Navajo Nation. Both federally recognized Tribes are downwind and downgradient from the White Mesa Mill and depend upon the Navajo Aquifer as the sole source for their drinking water and domestic use.

The Ute Mountain Ute Tribe is a federally-recognized Indian tribe with lands located in the states of Colorado, New Mexico and Utah. While Tribal headquarters are located in Towaoc, Colorado, the White Mesa portion of the reservation and its Tribal citizens comprises the second tribal community and are a major concern to the UMUT government. These lands are located just 3 miles south of the WMM facility in southeastern Utah. The lands, including nearby individual Indian allotments, are held in trust for the Tribe and for individual tribal members. As a federally-recognized tribal government, the Tribe exercises jurisdiction over these reservation lands, trust allotment lands and the tribal membership. Under the Tribe's Constitution, the Tribal Council is responsible for, among other things, the management and protection of Tribal lands and for the protection of public peace, safety, and welfare.

The Tribe's enrollment is approximately 2,100 members. The current population in White Mesa is approximately 350 residents, most of whom are enrolled members of the tribe. As generations of Utes did before them from time immemorial, the residents of White Mesa intend to raise their families there and continue their traditional cultural practices, many of which extend beyond reservation boundaries into their ancestral homelands throughout southeastern Utah.

Since its first inception, the presence of the WMM facility has threatened the health, safety, environment, and the natural and cultural resources which White Mesa residents depend on for their livelihood and to maintain cultural practices. Of particular concern is the threat the WMM facility poses to the air and water resources, especially considering that White Mesa is only a few miles downwind and downgradient from the WMM facility. Community members often

remark about a foul odor coming from the WMM facility during or following a wind or storm event, highlighting a heightened need to closely regulate and monitor air quality and a need for periodic updates utilizing the latest data collected.

The community of White Mesa depends entirely on groundwater resources buried deep in the Navajo Aquifer for its municipal and domestic needs including drinking water. Accordingly, there is a growing concern among community members that their water resources, including shallow groundwater aquifers and natural springs, are being contaminated by the activities occurring at the WMM facility. Monitoring and observation of groundwater by the Tribe reveals increasing levels of heavy metals associated with the activities of the WMM facility.

The gathering of medicinal plants and herbs, food, firewood and the harvesting of animals outside their reservation lands is commonplace, but is also jeopardized by the WMM facility. In addition, many historical and burial sites have been identified within the boundaries of the WMM facilities. Because their ancestors are buried there and they have a deep connection to the place. UMU Tribal Members continue traditional practices, which include hunting and gathering and using the land, plants, wildlife and water in ways that are integral to their culture. It is reasonable and imperative to the health and welfare of the Ute people to expect that those resources are not contaminated with hazardous and radioactive materials that have blown in the wind or traveled through the groundwater from this facility regulated by DEQ. 3

These issues and concerns of the Tribe are exacerbated by the limited amount of resources and economic development opportunities available to the White Mesa community. The operation of the last conventional uranium mill in the United States that borders the White Mesa community amounts to an inequitable distribution of environmental dangers to a low-income underemployed Indian community. As such, environmental justice demands that White Mesa receive the same equal degree of protections, involvement, consideration and access to decision-making processes, as their neighboring non-Indian communities, on all governing and regulatory matters having an impact on their lives, culture, resources and environment.

UMUT Comment #3

II. Ute Mountain Ute Tribe's Broad Concerns and Legal Deficiencies in the WMM Facility

The Tribe has serious concerns about the manner in which the WMM is currently operated and regulated. The Tribe has long expressed concern that the WMM operations (in particular, management practices that have allowed continued contamination of surface resources, groundwater resources, and surface water resources) pose serious threats to the health of the land and the natural and cultural resources within and around the Tribe's White Mesa community and to the health and welfare of its Tribal members and their future generations. The Tribe has also expressed concern that the poor quality of reclamation planning and surety estimations for the WMM facility will ultimately result in a legacy of environmental contamination and blight both in the White Mesa community and in surrounding communities. The Tribe submits these comments to identify the deficiencies in the operation of the WMM facility and to request that DRC take appropriate regulatory action to protect the health and safety of the public, UMU Tribal members, and the environment.

The Tribe wishes to remind the DWMRC that according to the "Rule of Law" promulgated by the State of Utah that:

The Director of the Division has the authority and responsibility to "ensure the maximum protection of the public health and safety to all persons at, or in the vicinity of, the place of use, storage, or disposal" of radioactive materials. Utah Admin Code R313-12-2. Before approving a radioactive materials license or license renewal the Director must determine that "the issuance of the license will not be inimical to the health and safety of the public". Utah Admin Code R313-22-33(d).

> *The Director's authority is not limited to including in a license only those expressly enumerated in the Division's rules. The Director has broad authority to incorporate into licenses "additional requirements and conditions with respect to the Licensee's receipt, possession, use and transfer of radioactive material subject to Rule R313-22 as the Director deems appropriate or necessary in order to … minimize danger to public health and safety or the environment." Utah Admin Code R313-22-34(2) (a). 4*
>
> *The Director also has broad authority, by order, to "impose upon a Licensee or registrant requirements in addition to those established in these rules that the Director deems appropriate or necessary to minimize any danger to public health and safety or the environment." R313-22-54.*

Under the "Agreement Between the United States Nuclear Regulatory Commission and the State of Utah for Discontinuance of Certain Commission Regulatory Authority and Responsibility Within the State Pursuant to Section 274 of the Atomic Energy Act of 1954, As Amended" ("NRC/Utah Primacy Agreement"), the Nuclear Regulatory Commission recognized that the State of Utah "has a program for the control of radiation hazards adequate to protect the public health and safety" with respect to both "source material" and "by-product material" (as defined by the Atomic Energy Act of 1954, and hereinafter "Radioactive Material"). The State has delegated its authority and responsibility for the regulation of Radioactive Material to the DRC. See, e.g., U.C. § 19-3-104(4). The Radiation Control Board has exercised its authority to regulate the use of Radioactive Material "to ensure the maximum protection of the public health and safety to all persons at, or in the vicinity of, the place of use, storage, or disposal." Utah Admin. Code R313-12-2. Thus, under both the Utah Code and under the DRC's own rules, the DRC maintains primary responsibility for regulating Radioactive Material to protect public health and safety.

Division Response: The UMUT's comments regarding the history and background of the region and the White Mesa Mill are noted. The Division is not aware of objective, science-based evidence that the White Mesa Mill is posing unwarranted threats to the public health or welfare, based on the reasons and evidence noted throughout this public participation summary and generally as well as here.

The Division appreciates the UMUT's comments and shares the Tribe's concerns about protection of human health and the environment, especially as to the residents whose homes and families live closest to the White Mesa Mill's operational areas. As the UMUT's comments

note, the Director has broad legal authority to compel compliance with stringent regulatory requirements governing site operations, environmental monitoring, public safety (dose), air and groundwater pathways, reclamation planning, and related matters. On these issues, there is broad consensus and agreement. There is disagreement about the reasonable findings that can be drawn from the objective facts in the administrative record. While the Director enjoys broad discretion and legal power, these are bounded by facts. The Director cannot make determinations unless they are supported by substantial evidence in the administrative record. Otherwise, on review, the Director's determinations would be overturned and remanded as being clearly erroneous under state law. *See* Utah Code Section 19-6-301.5. The Director's discretion is bounded by objective facts in this administrative record. Based on the Director's review of the evidence in this record, including all the comments and information submitted by the UMUT, the Director disagrees with the UMUT's conclusions because they are not supported by objective evidence or, in many cases, by sound legal analysis. Therefore, while the Director is concerned about the health and welfare of the White Mesa community as well as all residents who are potentially impacted by the White Mesa Mill, the objective evidence demonstrates that public health and welfare and environmental concerns about being managed well within acceptable legal and regulatory requirements under both state and federal law. A conclusion to the contrary would not be supported by the evidence in this record. In other words, the UMUT's claimed deficiencies in the operation of the White Mesa Mill are not supported by facts in this record. As a result, the level of regulatory action currently being undertaken and imposed by the Director is adequate to protect the health and safety of the public, UMUT members, and the environment. See Division's General Response #01.

UMUT Comment #4

I-II-A Fugitive Dust from the White Mesa Mill poses a hazard to public Health and Environment. The Tribe requires that better controls be installed and work practices be implemented to reduce this hazard.

In the Environmental Monitoring Plan 2016, the Tribe appreciates the additional soil monitoring sites along the fence lines and the two new monitoring stations requirements of DWMRC. The requirement for the radionuclide assessment for soils and effluents to include Th-232 concentration analysis is also a necessary improvement. These methods should assist to alert the WMM to any potential off-site migration due to air deposited activities from the mill.

In the revision from the 2009 to the 2017 WMM Storm water Best Management Practices (SWBMP) Plan and the 2016 Spill Prevention, Control, and Countermeasures (SPCC) Plan for Chemicals and Petroleum Products, no changes were made to the plans pertaining to the containment of the migration or the control pathways relating to air deposited radioactive materials generated from mill activities, including those related to the alternative feed material. Due to material identified leaving the site per the USGS Survey in 2011, that did indicate off-site migration, then the plans cited above continue to remain deficient in order to control deposition of for erosion control. Therefore the DRWRC must require the WMM to modify the SPCC Plan to correctly identify and control pathways for the movement of these materials.

In the Draft WMM Work Practice Standards for Control of Fugitive Dust Ore Receipt and Front-End Loader Operations, the DAQ Approval Order Opacity limit of 15% is provided for

regulatory control of radioactive materials on the ore pad, with a conservative measure of 10% applied in order that this threshold is not exceeded. The Standard states, "If it is observed that dusting is in excess of 10% during ore handling activity, the trained observer will notify operations personnel and ore handling operations will be slowed to control dust. In addition to these controls, and as a general dust control measure, water spray is applied on an as needed basis in the ore handling area…"

Opacity may be a useful tool and an indicator of dust concentrations, however, for a radiation worker, this is not an acceptable method to provide ALARA practices. Nor does opacity provide sufficient protection for elimination of radioactive dusts from spreading off-site. Other measures with a sound scientific basis must be implemented along with the opacity requirement and the "trained observer" who may or may not decide to apply water spray, or order the slowing down of the ore handling operations.

More detailed discussions can be found in correspondence from the Tribe to Rusty Lundberg, DRC, Comments Regarding Denison Mines (USA) Corp. Radioactive Materials License Renewal DRC-045, Dec. 16, 2011.

References:

Denison, Re: Interrogatory, Renewal Application for Radioactive Materials License (RML) No. UT1900479, to Dane Finerfrock, Executive Secretary, Radiation Control Board, Utah DEQ, Feb. 5, 2009.
EFR, WMM *Spill Prevention, Control, and Countermeasures Plan for Chemicals and Petroleum Products, Dec. 2016.*
EFR, WMM Revised Storm water Best Management Practices Plan, May 2016.
USGS, Natz, D., Ranalli, A., Rowland, R., and Marsten, T., Assessment of Potential Migration of Radionuclides and Trace Elements form the White Mesa Uranium Mill to the Ute Mountain Ute Reservation and Surrounding Areas, Southeastern Utah, 2012.
Ute Mountain Ute Tribe, Correspondence to Rusty Lundberg, DRC, Comments Regarding Denison Mines (USA) Corp. Radioactive Materials License Renewal DRC-045, Dec. 16, 2011.

Division Response: The commenter raises concerns about fugitive dust from White Mesa Mill operations. This topic is addressed in detail in the Division's General Response #08: Dose to the Public. By way of summary, under applicable NRC and state rules, the Licensee is required to ensure that radiation public dose levels at its property boundaries is no more than 100 mrem per year. There are now seven continuous monitoring points of compliance for this parameter. In years past, there were only five points of compliance. The point of compliance closest to the UMUT property is BHV6. The tribal boundary is approximately 2.5 miles away from this monitoring site. Therefore, it is expected that the airborne-related radiation levels at the UMUT property would be attenuated when compared to data from BHV6.

As detailed in the Division's General Response #08, the average annual dose at the BHV6 location, based on continuous monitoring starting in 2008 (from this location), over the past nine years, is 9.31 mrem per year. The level allowed by the NRC is 100 mrem. As stated, the boundaries of the UMUT property are about 2.5 miles away from this location so the actual dose

is expected to be attenuated. According to published data, the average human being receives 620 mrem per year, from a variety of sources including from natural background. Therefore, a hypothetical resident living in the vicinity of BHV6 would, in theory, receive a dose from Mill operations that is 0.015 percent higher than received by human beings through everyday exposures (unrelated to mill operation). The residents closest to BHV6 are 2.5 miles away. The evidence shows that airborne-related exposures are minimal and well within the NRC standard of 100 mrem per year.

The Division finds that a good, objective indicator of the risk to the public (outside of the White Mesa Mill property boundary) is the dose received by mill workers on site. Mill workers spend considerable time within the White Mesa Mill boundaries, performing a variety of tasks and functions. The Licensee is required to operate in such a way that the dose to its workers is "as low as reasonably achievable" or ALARA. According to the NRC, industrial workers are allowed a much higher dose of radiation that the NRC still considers to be safe. That dose is 5,000 mrem per year. As stated above, the public dose the NRC considers safe is 100 mrem per year. The higher dose for industrial workers is due, in part, to the fact that industrial workers are being paid for work and voluntarily agree to higher exposures than the public.

The Division is involved in monitoring worker safety at the White Mesa Mill. From 2007 through 2016, the average employee (counting all employees) at the White Mesa Mill, based on continuous monitoring equipment, received a dose of 100.6 mrem per year. During the same period, the highest dose received by any single worker was 368 mrem per year over the past 10 years (average). The highest dose any single worker received over the past 10 years was in 2010, when one worker received a dose of 490 mrem that year. That worker was allowed to receive 5,000 mrem that year under NRC's standards. Therefore, over the past 10 years, the average worker at the White Mesa Mill has received a dose equal to about two percent (2%) of the allowed dose and one worker, in 2010, received a dose only 10.2% of the dose allowed by the NRC for that year. If the general public were at risk from fugitive emissions as claimed by the UMUT and other commenters, it would be expected that workers would be receiving much higher doses. They are not. The low levels of worker doses are strong evidence that the general public is not at risk from mill operations. A contrary finding would be clearly erroneous based on this administrative record.

Turning to the specific comment here, the commenter requests that the DRWRC require EFRI to modify its SPCC Plan to correctly identify and control pathways for the movement of fugitive dust materials. This is not the purpose of the SPPC plan. According to the EPA, *"The purpose of the Spill Prevention, Control, and Countermeasure (SPCC) rule is to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines. The SPCC rule requires facilities to develop, maintain, and implement an oil spill prevention plan, called an SPCC Plan. These Plans help facilities prevent oil spill, as well as control a spill should one occur."*[49] The revised Environmental Protection Manual (EPM) was approved by the Director on December 10, 2014. The Licensee has implemented the required changes in the revised EPM. It is expected that any

[49] https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations/spill-prevention-control-and-countermeasure-19

potential for off-site release, will be identified by the enhanced environmental monitoring network.

In 2016, the Mill's Environmental Protection Manual was revised to address fugitive dust. Therefore, the Division concludes that no change is required to the SPCC Plan and the Division respectfully disagrees with this comment.

UMUT Comment #5

I-II-B Cell One should be closed, cleaned and re-lined or in the alternative close Cell One and change storm water management off the Mill Yard.

Because of the threat of serious groundwater contamination from leaking PVC liners, the Tribe's expert has recommended closure of Cell 1. However, the Tribe is concerned that necessary revisions to Reclamation Plan 5.1 and the Storm Water Best Management Practices Plan ("Storm water Plan") may require a liquids disposal cell in the current Cell 1 location to catch storm water runoff from the Mill Yard and prevent the discharge and dispersion of Radioactive Material, alternative feed material, and other chemicals in the washes and creeks west of Cell 1. Accordingly, the Tribe has identified two options to address the threat of groundwater contamination from Cell 1. First, EFRI could close, de-water, clean, and re-line Cell 1. Here, the Tribe asserts that DRC should require EFRI to dispose of waste and the current Cell 1 liner in a disposal cell designed to the standards used for Cells 4A and 4B. The Tribe also insists that DRC require EFRI to install a new liner system into Cell 1 that meets BAT/BACT in 2017 (which will, at a minimum, include a compacted clay base and two 60-mil HDPE liners). The Tribe also asserts that DRC should require EFRI to install a functional leak detection system in the re-lined Cell 1.

An alternative option to address the threat of contamination from Cell 1 would be to close and de-water the cell and move any remaining contents and the Cell 1 liner into a disposal cell with a liner designed to the standards used in Cells 4A and 4B. Here, DRC must also require EFRI to modify the storm water management at the facility to prevent the planned discharge of Radioactive Material from the Mill Site to the west of the Cell 1 location.

Division Response: The Division disagrees with the commenter. There is no evidence of groundwater contamination associated with the tailings cell impoundments. In fact, all the evidence in this record holds that all the tailings cells are sound and that there are no groundwater impacts associated with tailings. The only groundwater contamination relates to (a) legacy lab wastes and (b) nitrates. Neither groundwater contamination plume is related to radioactive materials and both are being addressed under formal approved corrective action plans.

Moreover, retrofits of the type proposed by the commenter are not standard practice where no evidence exists that the facility element is not functioning adequately. To the contrary, the Division's longstanding experience at this site is affirmative that the cell is functioning as intended, and that the monitoring system in place detects any releases rapidly from this cell. On June 2, 2010, while conducting routine daily monitoring, the Licensee noted fluid in the Cell 1 leak detection system. Repairs were attempted during the next two months. The cell was then

recharged with fluid. When the fluid level reached the repair elevation, the Licensee noted fluid in the leak detection system immediately. The fluid was drawn down again, and more extensive repairs were conducted. That time, the repair proved successful, with no reappearance of fluid in the leak detection system since then.

While the Cell 1 leak detection system does not meet 2017 design standards, this experience proves that it is working, and is effective in providing the protections required. New cells are required to meet more stringent, current standards. Existing facilities need only meet the standards in place at the time of approval, unless evidence indicates they are not providing the needed protections. The Division has concluded that no such evidence exists to require a change to Cell 1 leak detection at this time.

UMUT Comment #6

I-II-C Environmental Monitoring Program Needs - The Division of Waste Management and Radiation control has misrepresented the exposure pathway for wind borne contaminates in assessing risk to the White Mesa Community. The Tribe requests that licensing decisions and publicly disseminated decisions represent real scientific data.

On the DWMRC White Mesa Uranium Mill Frequently Asked Questions[1] fact sheet second page which refers to the monitoring wells and air monitors, is the statement, "Based on meteorological data at the site, the prevailing winds in the area flow to the northwest and away from those living in White Mesa, reducing the possibility of even the most minimal public exposure to particulates and radon from mill operations." This reflects the DWMRC's and EFR's viewpoint that the UMUT, the largest community closest to the mill, is not worth consideration as a receptor of any concern.

White Mesa meteorological data indicates that from 2011 to the present, the hourly-averaged prevailing winds mainly blow in the direction of either the northeast or southwest. The directions are variable based on diurnal patterns: the wind shifts from the southwest during the daytime to coming from the northeast during the nighttime, and during these transitions, the wind blows from the northwest. The wind patterns also change seasonally e.g., in the spring months, the winds blow from the northeast at a higher frequency than other seasons. The frequency of winds blowing for hourly averages from the northwest quadrant (270 to 359 degrees) to White Mesa are at an annual frequency of 27%, which is not a trivial amount. Another factor to consider is that this area is considered complex terrain and the canyons to the east and those to the west affect the wind patterns, sometimes drastically.

Also residents of the community complain of 'smelling' effluents from the mill. To demonstrate these statements, windroses for the year 2016, depicting the wind direction and velocity classes at the Tribe's White Mesa meteorological station, are presented in the figures below (some of the percentage labels change from figure to figure).[2]

---

[1] *https://documents.deq.utah.gov/communication-office/fact-sheets/White-Mesa-Uranium-Mill-Fact-Sheet.pdf*

[2] *UMUT, Air Quality Meteorological Data, 2016*

Division Response: The UMUT is correct the fact sheet should have stated that the prevailing winds in the area are toward the north**east** away from the White Mesa Community. There was an error in the fact sheet. It said north**west**. But the fact remains that the prevailing wind is in a direction away from the UMUT lands. In other words, most of the time, the winds blow in the opposite direction relative to the White Mesa Mill operation. The meteorological data from the Mill is similar to that from the UMUT (See Volume 4 of the license renewal application The Environmental Report Figure 3.3-1) as it shows some southerly wind patterns. The data is the same. For the majority of the time, the wind blows away from White Mesa and toward Blanding. The secondary wind pattern is to the southwest, again, away from the UMUT property, which is located to the southeast of the White Mesa mill. The third most predominant wind direction is from the Mill towards the UMUT lands (southeast). The dose evaluations are based on actual meteorological data taken at the site. Therefore, if the winds are coming from the NW for 27% of the time as represented by the commenter, the MILDOS evaluations take the frequency, wind speed, and particulate size into account when performing the calculations in the software algorithms. That is why BHV-4, BHV-5 and BHV-6 have been located where they are to monitor wind borne effluents such as dust coming from the Mill. As far as the claimed odor issues, the Division doesn't regulate odor. Although odors may be detected off the Mill property, since radioactive materials have no odor, the odors do not indicate that radioactive materials are traveling along with the odor. Odors are typically related to organic materials or chemical compounds. Certain radioactive particles can adhere to dust; however, as described in the Division's General Response #8 the analytical results from the boundary monitoring stations are well below regulatory standards.

Figure 1: White Mesa Community Windrose for 2016 over 24 hour period.

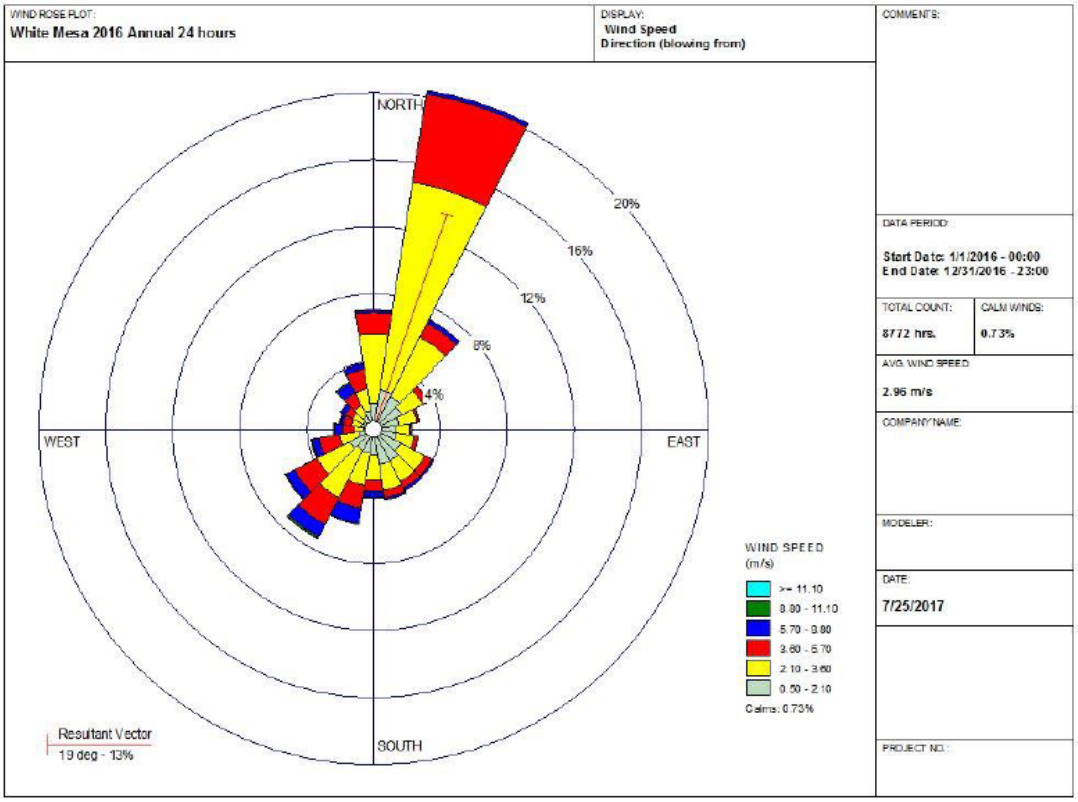


Figure 2: White Mesa Community Windrose for 2016 from 19:00-07:00 hours.

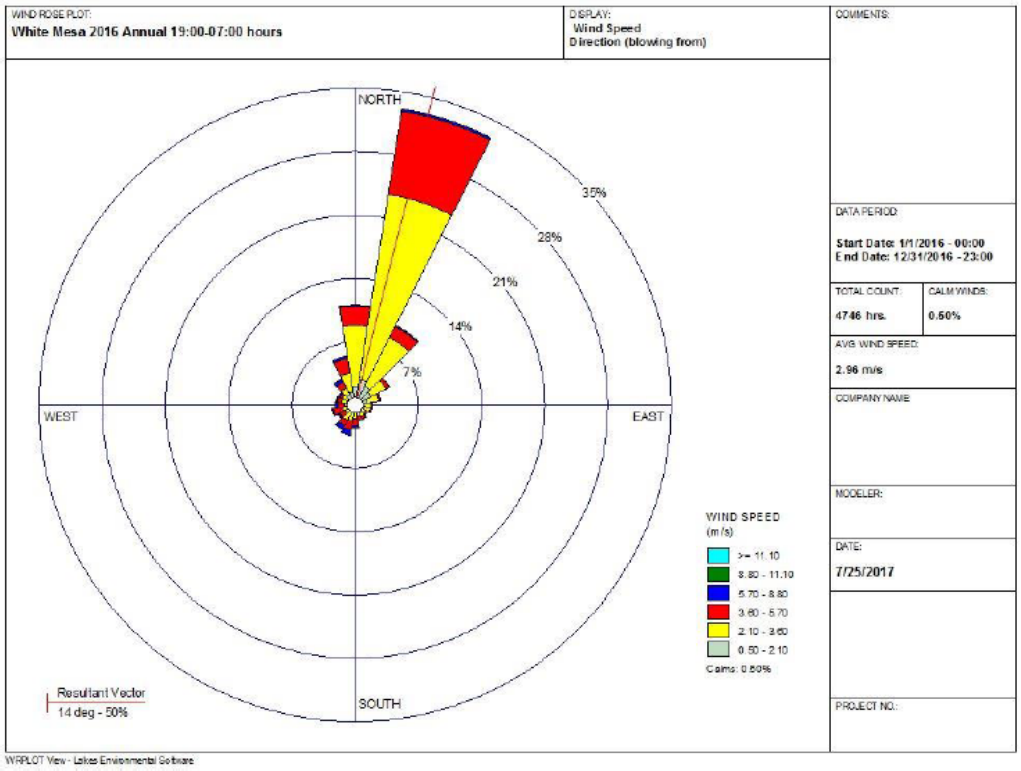


Figure 3: White Mesa Community Windrose for 2016 from 08:00 to 18:00 hours.

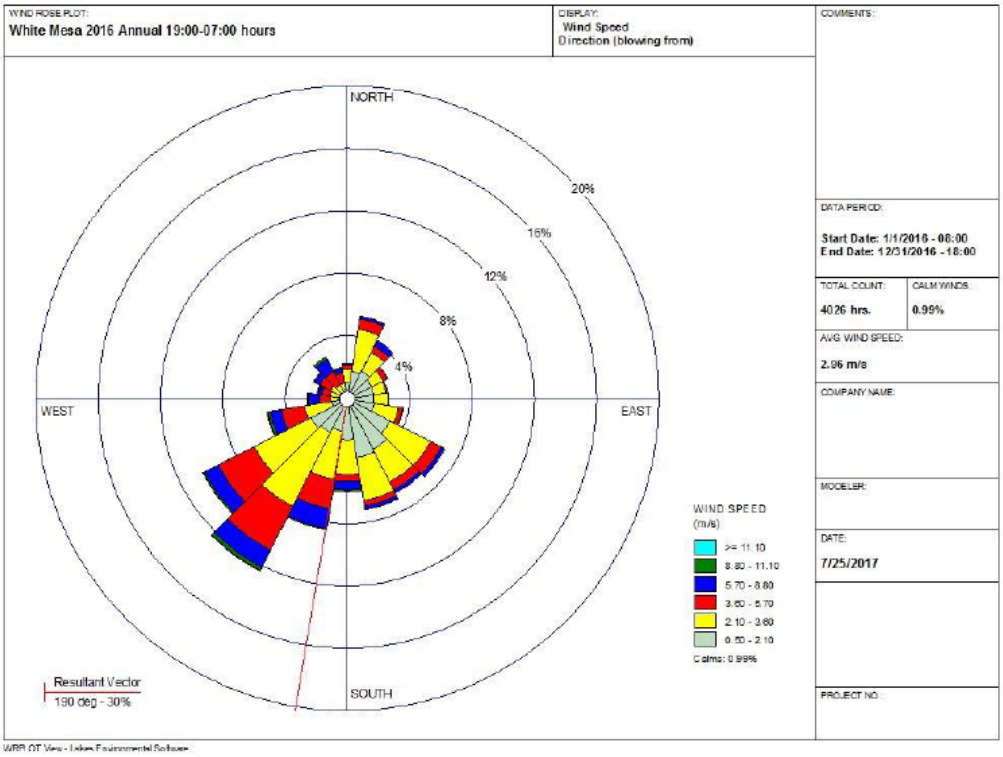
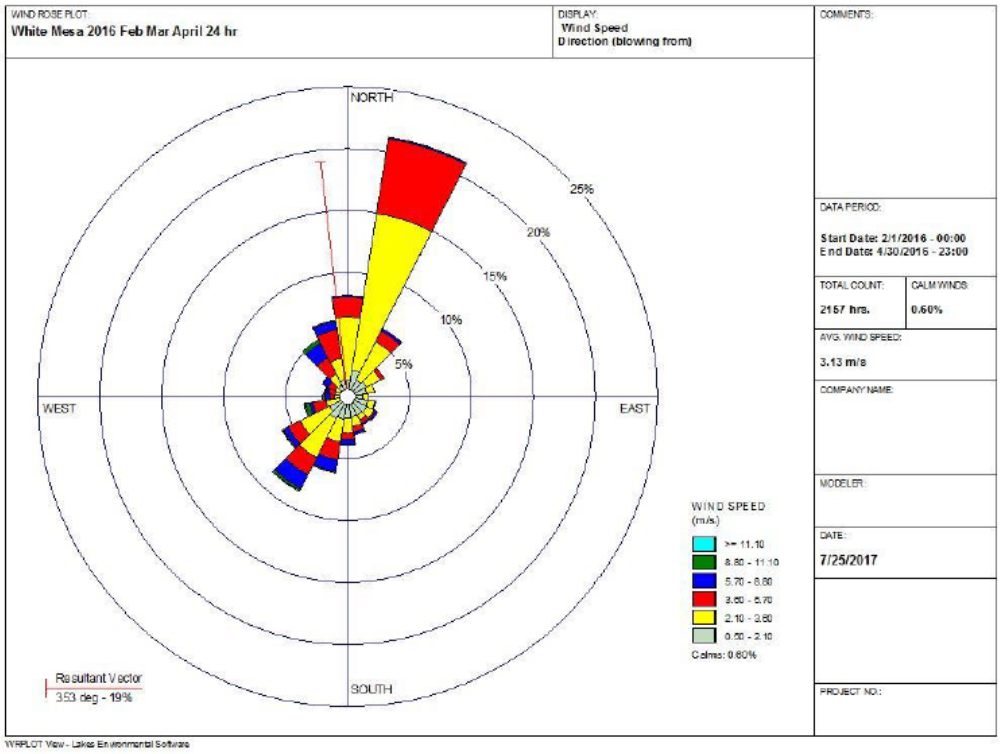


Figure 4: White Mesa Community Windrose for February, March, and April 2016 over 24 hour period.



UMUT Comment #7
I-II-D Require EFRI to permanently close Tailings Cell 2.

Require EFRI to cease putting any additional material into Tailings Cell 3 (including ISL Waste) and to permanently close Tailings Cell 3. Require that EFRI place adequate permanent cap systems on Tailings Cells 2 and 3. Require EFRI to cease putting any additional material (liquid or otherwise) into Tailings Cell 1. Here, the Tribe recommends that DRC require EFRI to re-line Tailings Cell 1 with a liner that meets BAT/BACT for 2011 so that the WMM has a functional liquids disposal cell for the life of the facility and to provide an adequate storm water catchment basin during reclamation of the facility. See Section IV (A) (1), infra (describing problems with liquid disposal and storm water runoff in Reclamation Plan 5.0). In the alternative, DRC could require EFRI to close and de-water Cell 1, place the remaining contents of Cell 1 in a disposal cell, and re-route storm water from the Mill Yard.

Division Response: The Division disagrees with the commenter. There is no basis in this record to require this action. Relative to Cell 1, see Division's Response to UMUT Comment No. 5, above. The Division further finds and concludes that the Licensee is operating within standards for protection of public health and the environment, as evidenced by all data and inspections to date (with allowance for violations noted and corrected). Cell 2 has received the permanent radon barrier, and all data in the records available to the Division indicate that the cell is functioning as required. Cell 3 is operated as required by the regulations and the RML and GWDP. No evidence has been presented to contradict the records on file, which records all indicate Cell 3 is functioning as required. The commenter has provided no rationale for taking the actions demanded.

UMUT Comment #8
I-II-E The DRC must require EFRI to install a leak detection system that allows EFRI to detect and clean up future leaks before the leaks cause groundwater contamination.
Pages 33-35 of the SER describe recent problems with the leak detection system ("LDS") for Tailings Cells 1, 2, and 3, and the RML Renewal contains new License Condition 11.3 to improve the LDS monitoring, operation, and maintenance. The SER and the RML Renewal do not, however, address DRC's fundamental problems with the LDS for Tailings Cells 1, 2, and 3: that there is no secondary low-permeability barrier below the primary low-permeability liner to accumulate leakage to the leak collection pipe and that the long horizontal distance to reach the collection pipe poses a risk of vertical seepage losses. These two problems with the LDS pose a serious risk that non-catastrophic leaks will not be detected until groundwater contamination has occurred and that there is no secondary liner to keep catastrophic or non-catastrophic leaks from resulting in groundwater contamination.

Division Response: The Division disagrees with this comment because it is not supported by objective evidence in the record. The UMUT's conclusions about the functioning of leak detection systems and liners for Cells 1, 2 and 3 are not supported by the cited data. Further, there is no legal requirement that these facilities meet 2017 standards, but rather the standards that prevailed at the time when they were constructed. Furthermore, the least sophisticated of the leak detection systems has been shown to work as demonstrated by the identification of the Cell 1 leak in 2010. The speculative fears expressed by the commenter do not constitute actionable

data in light of the evidence that the systems are working, and in light of the demonstrated effectiveness of the monitoring network backing up the leak detection systems. See the Division's Response to Comment No. 5.

UMUT Comment # 9

I-II-F The Tribe requests additional well monitoring on the WMM facility lands and also on their Tribal lands to ensure the safety of their domestic and drinking water.

The Tribe believes that the flow of the groundwater is south to southeast. They would like additional monitoring wells in areas of concern to them in order to allay their fears and suspicion about contamination. (Areas of concern e.g. MW22)

Division Response: There is no regulatory or technical basis to require additional monitoring wells between tailing Cell 4A and MW-22. Monitoring wells currently exist directly downgradient and cross gradient from Tailings Cell 4A. These wells will identify tailings cell leakage before anything would appear in MW-22 and at this time no tailings cell leakage has been observed. In regards to the requested three new monitoring wells made by the UMUT in other comments, although the Division sees no technical or regulatory basis to include monitoring wells in the location between Tailings Cell 4A and MW-22, EFRI has agreed to address the UMUT concern and voluntarily install three monitoring wells in the area between monitoring wells MW-17 and MW-22. The drilling and well installation will be included as a compliance schedule item at Part I.H.2 of the Permit. Designation of these wells as "compliance" or "general" monitoring wells will be determined after review of the Background Groundwater Quality Report found at Part I.H.3 of the Permit.

III. Tribal Concerns on Specific Sections of the RML

While Section II explains the overarching operational and legal deficiencies with the ongoing operation of the WMM, Section III of the Tribe's comments provides specific comments and requests on specific issues of the RML Renewal. To facilitate DRC review regarding these specific contamination issues, the Tribe will present each issue with an identification of the problem and a request for DRC to take to improve the public health, safety and environment. .

UMUT Comment #10

I-III-A Section 9.1 describes the area that the WMM encompasses as if to indicate that there's room for much more radioactive waste. The Tribe objects and requests to the WMM being used as a dumping ground for radioactive waste shipped by trucks over public highways from waste cleanup sites around the United States.

The Tribe has seen the investor piece generated by EFRI in which they anticipate processing copper at the WMM. (See Part I Exhibit A - Energy Fuels Investor piece) There needs to be an end to this radioactive and increasingly hazardous waste business at the backdoor of the White Mesa Community. Fifteen years was estimated to be original lifespan of the WMM. The original 1979 Environment Impact Statement (EIS) gave short shrift to the Tribe and the impact this radioactive facility would have on its people. A new EIS needs to be conducted to look at the true impact on the public health, environment and factor in environmental justice issues.

These wastes should not be disposed at the Mill. The Mill was originally designed and evaluated for processing low-grade uranium ores mined in the vicinity. It was never intended or designed or environmentally evaluated for disposal of radioactive wastes received form off-site sources, many of which include other hazardous waste constituents. Some of these wastes are being processed through the mill as so-called "alternate feed material" with the residues disposed in the tailings cells. The waste from the Dawn Mine near Spokane, Washington is radioactive waste water treatment sludge generated from treatment of groundwater that was contaminated by uranium milling operations of the same type being conducted at White Mesa.

So-called "ISL wastes" from in situ leach mining operations are being shipped to the Mill and dumped directly into Cell 3 – which was never designed for direct disposal of such wastes. This direct disposal activity is not mentioned on the DRC's FAQ web page which characterizes the Mill as a conventional processing facility rather than a disposal facility.

Radioactive wastes from other sites should be properly handled and disposed at the point of generation or at qualified radioactive waste disposal facilities under secure dry disposal rather than disposed as liquid waste at the White Mesa Mill.

Division Response: The Licensee has not presented any formal information to the Division regarding the processing of copper at the White Mesa Mill. This comment goes beyond the scope of the present re-licensing action. Currently, the license allows EFRI to process approved alternate feeds materials and to dispose of ISL wastes. For more details please see General Responses #4 and #5 above. The present relicensing action will not be stayed based on this comment.

UMUT Comment #11

I-III-B In Sec. 9.4.A, the Tribe requires that the Licensee must not make facility or process changes per this section of the license without Director approval on any Cell that is in final closure.

In the license application, the applicant cites this section in Vol. II, Appendix H, Sec. 4.0 of the Safety and Environmental review part of the application. Later in the application, within Reclamation Plan 5.1, the applicant eludes to the ability to dispose of materials in a Cell that is already in closure. This is not in compliance with all of the requirements of 10 CFR Part 40, Appendix A.

Division Response: The Licensee is in compliance with all applicable laws and regulations with regards to disposal activities within the various cells. In accordance with applicable federal law and policy, the Licensee can dispose 11e.(2) decommissioning debris from in-situ leach facilities and from the Mill itself in cells in final closure as the dewatering and consolidation of the tailings mass take place. The commenter cites 10 CFR 40, Appendix A as the source of provisions being violated, but fails to indicate what specific provisions are alleged to be violated, or any evidence that the Licensee is in violation. Additional information regarding 11e.(2) wastes is provided below and in the Division's general responses to comments.

Moreover, the commenter attempts to parse the meaning of the term "operation." Cell 3 is not in operation, with respect to the receipt of tailings.[50] This is important in considering regulations pertaining to radon control. However, nothing in the regulations prohibits the Licensee from continuing to accept decommissioning debris from in-situ leach operations that does not compromise ALARA considerations.

UMUT Comment #12

I-III-C In Sec. 9.5 Surety, the Tribe requests an increased level of surety that represents the true cost of reclamation.

The current surety for mill closure and reclamation is inadequate. In 2011, RRD Corp used two cost estimate methodologies, a built-up cost based on the proposed reclamation plan 5.0 and a benchmarking cost based on similar facility closures internationally. In 2010 dollars without any remediation of groundwater or offsite contamination the built up cost was $36.5m. The benchmarking costs was estimated at $91.3m in 2012 dollars, escalated to $128.7m for 2020 dollars. A third methodology- the Department of Energy cost for sites on a per-ton-based estimate was $470m. Clearly these are all much higher than the current level of surety approved by the Utah Division of Waste Management and Radiation Control (DWMRC) in 2017. The 25% contingency included in the annual surety calculation is too low. 40 CFR Part 10, Appendix A, Section 9 requires "an adequate contingency factor." The uncertainties regarding costs of groundwater remediation, required by section 10.21 of the proposed license, and other environmental liabilities currently undisclosed as well as the time required to dewater and reclaim 5 tailing cells make a 25% level of contingency inadequate. The Tribe requests ***a minimum*** *of 35% level contingency (as recommended by RRD International Corp., 2011), or preferably a larger contingency. (RRD report of 2011 attached as Exhibit H was also submitted by the Tribe in its Public Comments at that time and is resubmitted with these comments.)*

We also note that the Utah Division of Oil, Gas and Mining provides detailed guidance on calculating reclamation costs and surety estimates for coal mining operations. Calculation of reclamation costs and the surety estimate for the WMM should be at least as robust and comprehensive as those required by the State of Utah for reclamation of coal mining operations. . (See attached Part, I, Exhibit D – DOGM Revised Tech Directive 007.)

Division Response: The Division believes this comment is fully addressed above in General Response #15.

UMUT Comment #13

I-III-D Regarding Sec. 9.7 Cultural Resources Protections, the Tribe requests that procedures be implemented by the State of Utah at the White Mesa Mill for repatriation of human remains and related artifacts in the same manner as the Native American Graves Repatriation Act (NAGPRA).

Due to the sensitive and sacred nature of the lands the WMM sits up, they are already subject to the Archaeological Protection Act of 1979 (ARPA) and the National Historic Preservation Act

[50] *GCT v EFRI*, p. 35

(NHPA). The Tribe believes that the Native American Grave and Repatriation Act (NAGPRA) should also be complied with in order to return to their ancestors any human remains, funerary objects and sacred objects found when the ground is disturbed.

Division Response: The Division is sensitive to the fact that important archeological issues relate to the White Mesa Mill and related operations. The Division understands that these issues have been addressed by the UMUT, the NRC, and the Utah agency responsible for archeological issues, SHPO. The Division is not a party to these arrangements. The Division has provided a detailed response to this comment in its General Response #10, above.

UMUT Comment #14

I-III-E The Tribe would like the Tribal Historical Preservation Officer to be added to the Memorandum of Agreement and have the Tribe provide comments and amendments to the current MOA.

Long historical documented connection between the Ute Mountain Tribe and the sites at the mill. The ancestors of some Tribal Members may be located at the site, and the desecration of these causes cultural and spiritual damage to Tribal Members.

Division Response: The Division has provided a detailed response to this comment in its General Response #10 above.

UMUT Comment #15

I-III-F With regards to 10.5 ISL Waste Disposal, the Tribe does not support the continued use of Cell 3 for in-situ leach (ISL) waste disposal because it prolongs the life of the legacy cell and does not comply with phased disposal.

The continued use of Cell 3 for ISL waste disposal instead of tailings disposal contradicts the premise that the facility is defined as a phased disposal facility under 40 CFR Part 61 (NESHAPS Subpart W). As a phased disposal facility, EFRI must be making an effort to completely fill Cell 3 with tailings, bringing it closer to final closure. The goal of the work practices standard in the rule is to have two 40-acre cells in operation to cap the potential radon emissions at a safe level, not one 40-acre cell and one larger cell. EPA has delegated the authority to regulate air quality including radon at the White Mesa Mill, to the State of Utah, and EFRI has represented that it is a phased disposal facility. By allowing EFR to use it for ISL wastes with no foreseeable end date, the cell will remain open much longer than originally planned and much longer than EPA understood it would remain open in recently revising the rule. The explanation that it is more stable for truck traffic and that truck traffic would cause damage to the Cell 4A liner does not address the issue of misrepresenting the facility as a phased disposal facility to EPA when they were revising the rule. Cell 3 should be filled and closed as soon as possible. Alternative trucking access can be built adjacent to Cell 4A. The State cannot be complicit in misrepresenting the intentions of the facility owners to prolong the use of Cell 3 as long as possible.

Division Response: The Division believes that the General Response to Comment #12, combined with the Division's responses to the detailed comments presented by the Grand

Canyon Trust as to the adequacy of Reclamation Plan 5.1, adequately address this comment. In short, Tailings Cell 3 is almost full and is no longer taking tailings. When Cell 3 is completely full, ISL (aka 11e.(2) byproduct material) disposal will be directed to Cell 4A. At the current time, there is not enough tailings material in Cell 4A to safely dispose ISL material without damaging the liner or putting Mill employees at risk. EFRI is in full compliance with applicable rules, regulations and laws with respect to the operation of Cell 3. For reasons described elsewhere, the Licensee cannot yet complete the cap on Cell 3 without taking unacceptable risks regarding the longevity of the radon barrier. With respect to NESHAPS Subpart W, the court has determined that the Licensee is in compliance[51] as discussed more fully in the Division's responses to the specific comments presented by the Grand Canyon Trust. These are incorporated by reference.

UMUT Comment #16

I-III-G Regarding Sec. 10.20 Dawn Mining Company's Midnite Mine Alternative Feed Receipt and Processing, the Tribe believes this should be discontinued. White Mesa should not be a radioactive waste dump for the United States of America, including the Environmental Protection Agency and the Department of Defense.

The Midnite Mine alternative feed differs from other alternative feeds because it is ***not finite in quantity****. While Utah DWMRC has limited the total quantity to be received in this license, it is probable that another license amendment will be requested upon reaching the quantity limit. Because the material is being generated in perpetuity, they will continue to need to remove it from the location in Willpinit, WA. Authorizing the receipt of this material has set the stage for an expectation of its continued delivery to the White Mesa Mill. For this reason and the reasons set forth in the Tribe's unresolved Request for Agency Action dated August 11, 2014 – "In the Matter of: License Amendment 7: Radioactive Material License Number UT 1900479 (Dawn Mining Alternate Feed Amendment Request) July 10, 2014 Energy Fuels Resources (USA) Inc. White Mesa Mill," (See Part I, Exhibit B - UMUT Petition to Intervene 2014)*

The Tribe requests that the license condition be removed and the material no longer accepted at the mill. The handling of the material at the mill has also demonstrated another misrepresentation by EFRI and URS in their SER assessments that the bricks would retain structural integrity and pose no risk of release of fine particulates locally. The bricks have now been found to be more fragile and pose undue risks to the local environment.

As stated in other comments on alternative feeds by the Tribe, the facility is a uranium mill, not a RCRA compliant disposal facility.

Division Response: The Division disagrees with this comment. The Midnite Mine (aka Dawn Mining) alternate feed material comes from the cleanup of a uranium mill/mine site. More specifically it is filter cake that comes from the treatment of uranium contaminated groundwater. By placing a limit on the materials the EFRI receives from the Dawn Mining cleanup, an increase in the licensed volume would trigger a request from the Licensee to amend its

[51] *GCT v. EFRI*

radioactive materials license. In placing a volume limit on the AF materials that may be received from the Dawn Mining cleanup, the Division can review the new request and make a determination based on the merits of the request to increase the limit that was made by EFRI. The Director may approve or deny the request based on the merits of the request. However, the Division notes that in the future, it could classify the material as 11e(2) byproduct material because it comes from a uranium mill/mine site or classify it as equivalent feed because it comes from the treatment of uranium contaminated groundwater. For the time being, the Division decided to evaluate the material as an alternate feed as that was what EFRI proposed in the amendment request. No change will be made to the license based on this comment.

UMUT Comment #17

I-III-H The Tribe supports the requirement in Section 10.21 that all groundwater contamination at the mill site be remediated.

Division Response: Thank you for your comment.

UMUT Comment #18

I-III-I In Sec. 11.1 Records Retention, the Tribe requests that all records pertaining to the collection of environmental data, quality assurance of monitoring programs, investigations and corrective actions be retained for a longer period of time than 5 years.

This license is being proposed for 10 years, and in this age of digitization and electronic data and information storage, it does not pose an undue burden to retain records for a longer period of time. The Tribe recommends that such records be retained for the life of the facility to provide a longer term and more robust scientific record of quality assured data. This need was demonstrated by the lack of quality assurance metadata for historic groundwater data in 2004-2006 when the State justifiably caused much of the historic data integrity to be questioned and basically a reset of the concept of "background conditions" that are still being debated today.

Division Response: The commenter is requesting that the Division require the Licensee to follow requirements that are more restrictive than the EPA or NRC requirements. The Division is restricted and is not able to adopt requirements that are more restrictive than corresponding federal regulations unless certain conditions are met. The requirements in UCA 19-3-104(7) and UCA 19-3-104(8) state:

(7) (a) Except as provided in Subsection (8), and in accordance with Title 63G, Chapter 3, Utah Administrative Rulemaking Act, the board may not adopt rules, for the purpose of the state assuming responsibilities from the United States Nuclear Regulatory Commission with respect to regulation of sources of ionizing radiation, that are more stringent than the corresponding federal regulations which address the same circumstances.

(b) In adopting those rules, the board may incorporate corresponding federal regulations by reference.

(8) (a) The board may adopt rules more stringent than corresponding federal regulations for the purpose described in Subsection (7) only if it makes a written finding after public

comment and hearing and based on evidence in the record that corresponding federal regulations are not adequate to protect public health and the environment of the state.

(b) Those findings shall be accompanied by an opinion referring to and evaluating the public health and environmental information and studies contained in the record which form the basis for the board's conclusion.

The Division is not aware of information demonstrating that the federal requirement on recordkeeping is not protective of the public health and safety, or the environment. Without such evidence, the board may not adopt requirements that are more stringent than federal requirements. Finally, the present relicensing matter is not the appropriate forum for this comment. Utah law provides a separate procedure where the commenter can petition the Division/Board for a new rulemaking procedure. This cannot be accomplished via the present comment. It is procedurally inappropriate.

UMUT Comment #19

I-III-J With regards to Sec. 11.2, the MILDOS modeling based on air quality data must incorporate more comprehensive emission sources and more representative assumptions in its calculations.

In the Technical Evaluation and Environmental Assessment (TEEA) for the mill license, on the bottom of page 13, it is stated "MILDOS makes assumptions that are conservative in nature. The most restrictive assumption is that a uranium recovery facility (facility) will operate 365 days that the mill is working 24 hours per day…. Assuming the facilities are emitting radiation from operation over the months that they do not operate will overestimate the estimated exposures calculated for individuals with an 80 km area radius surrounding the facilities. MILDOS also assumes that all uranium ore received by the facility remains on the ore storage pad while MILDOS calculates emissions from processing that same ore; however the exposure from the ore storage pad actually constitutes a very small overestimation since the majority of the exposures calculated are from their point sources at the facilities (stacks)."

The MILDOS code evaluates doses from the point source terms. Attachment A to the TEEA states that the effluent amounts used were those from the stack reported in the SAERs, page 12:

> *"The Licensee provided the Division with the amount of yellowcake (in pounds) produced each assessment year (Table 11). Particulate emissions from the point sources were calculated by taking the particulate emissions reported in the Licensee's semi-annual environmental reports (SAER), converting the reported values to an hourly emission rate, determine the number of hours that the yellow cake and vanadium stacks were in operation and multiply the hourly emission rate by the number of hours in operation (Table 10). This value gives a more realistic estimate of the radionuclide emissions per year that are emitted from the stacks. The emissions from the vanadium stacks were determine(d) in the same manner as stated above."*

If the source term use in MILDOS were the actual amounts that were emitted from the mill for that year, then whether the source term was distributed over the year in a 24-7 manner as opposed to operating in shifts does not make any difference for the dose commitment (dose per

year) to the receptors and or population. Hence this is not a conservative estimate at all with respect to concerning the point source terms, but an estimate based on actual 'reported' emissions.

DRC Response: The Division is not certain what the commenter meant by "more comprehensive emission sources" in regards to the MILDOS evaluations and "more representative assumptions in [the Division's] calculations" by the commenter. Therefore, the Division is uncertain regarding an appropriate response to this portion of the comment. That said, the Division provides the following response:

The TEEA states

> ***In general**, MILDOS makes assumptions that are conservative in nature. The most restrictive assumption is that a uranium recovery facility (facility) will operate 365 days that the mill is working 24 hours per day…. Assuming the facilities are emitting radiation from operation over the months that they do not operate will overestimate the estimated exposures calculated for individuals with an 80 km area radius surrounding the facilities. MILDOS also assumes that all uranium ore received by the facility remains on the ore storage pad while MILDOS calculates emissions from processing that same ore; however the exposure from the ore storage pad actually constitutes a very small overestimation since the majority of the exposures calculated are from their point sources at the facilities (stacks).*

The above information was provided along with a number of other assumptions that the MILDOS-Area software makes that could lead to an overestimate of the dose to a member of the public. The stated assumptions included MILDOS's assumption that all materials received at the Mill, processed through the Mill's circuit, or disposed in the tailings cells are in secular equilibrium. There were a number of other assumptions stated that delineated other conservative assumptions made in the software. The information was stated to provide individuals with some knowledge of the conservative approaches taken by the software.

The commenter goes on to state that a description of the Division's methodology for estimating the emissions from point sources, particularly the yellowcake stacks and the vanadium stacks, resulted in dose estimates that were not conservative in nature but were dose estimates based on reported data. The commenter is both correct and incorrect in this statement. The Division used calculated estimates of the times the Mill was running along with the measured stack releases to determine the input for U-238, Th-230, Ra-226, and Pb-210 releases from the stacks which would account for the commenter's statement that the dose estimates were based on measured data. Therefore, for the isotopes emissions which were measured, calculated, and inputted (U-238, Th-230. Ra-226, and Pb-210), the commenter is correct. However, with respect to all of the other isotopes (progeny) in the U-238 decay chain, the emission values cannot be inputted. These values are calculated by the software assuming that secular equilibrium existed for all of the progeny which was not a true assumption for all of the materials received, processed, and disposed at the Mill. Additionally, the estimated running times for the sag mill and the yellowcake stacks are believed to be overestimated which would still make the values conservative, although not as conservative if the running times were not used in the evaluations.

Although the method used by the Division is not as fully conservative as assuming that the Mill runs 24/7, 365 days a year, there are many assumptions and factors used by the Division to ensure that the Division's MILDOS evaluations resulted in a conservative dose estimate.

Moreover, the real-time of actual doses received by White Mesa Mill workers and at the property boundary provide objective data to back up and confirm the results of the MILDOS evaluation with respect to the sources mentioned in this comment. There is no evidence to support a conclusion that the results of the MILDOS model are incorrect. To the contrary, the results of the MILDOS model are consistent with observed, measured doses, as discussed more fully above in the Division's Response to UMUT Comment No. 4.

UMUT Comment #20

I-III-K Other concerns, in Attachment A MILDOS, Table 9 p. 12-13, the values have no units. Please correct this oversight.

Also, in Attachment A, on p.12, it is stated, "As stated above, about 99.9 percent of the Ra-226 is separated from the yellowcake during processing and goes to Als the tailing cells as waste.

Therefore, there is only about 0.01 per cent of Ra-226 in yellowcake. This makes the presence of Rn-222 negligible."

If statement is true, then why are there reportable Ra-226 emissions in Table 9 for the Yellowcake Dryer/Packaging Stack?

DRC Response: The commenter is correct that the units were not included for Table 9 in Attachment A to the TEEA. Thank you for bringing this oversight to our attention. The Division will correct Table 9 to include the units referenced as curies per year. However, correction of this error has no impact on the ultimate conclusions in the TEEA.

Section 2.4, "Yellowcake Drying and Packaging" of the US NRC's Regulatory Guide 3.59 states that, "[n]o significant radon release occurs since only ~0.1 percent of the original radium-226 in the ore is found in the yellowcake." For tailings disposal, the same guidance document also states that "[e]stimates of radon release are based on about 99.9 percent of the radium-226 remaining with the tailings unless measurements that indicate lesser amounts of radium are available." Therefore, with the assumption of secular equilibrium used in the MILDOS-Area software, it can be assumed that 99.9% of the original radium-226 is disposed in the tailings cells and about 0.01 percent of the radium is included with the yellowcake production.
Regardless of the NRC's stated assumptions, the Division calculated the estimated Ra-226 emissions from the yellowcake stacks for each year of the Division's MILDOS evaluation as described in the above comment regarding the manner in which the emissions from the point sources were described. As described, the emissions were determined using the running times of the Mill and the measured emissions as reported in the Licensee's semi-annual environmental reports. Therefore, the assumptions that 99.9 percent of the original Ra-226 in the ore went to the tailings cells and 0.01 percent of the original Ra-226 was released through the yellowcake stacks were not used by the Division. In other words, correction of the data error suggested by the comment will have no bearing on the MILDOS evaluation results.

UMUT Comment #21

I-III-L Calculations should be implemented to assure that these statements in Question (2.) above, are valid for the yellowcake:

E.g., based on the assumptions above and only for the CP ore for year 2013, there were 105,920 tons received, and the Ra-226 content is 587 pCi/g (on average).

Ore mass in grams for 2013:

105,920 tons/year x 2000 lb/ton x 454 g/lb = 96,175,360,000 g/year

Ra-226 activity content in assumed 587 pCi/g (of ore)

=96,175,360,000 g/year x 587 pCi/g x 0.0001 (amount removed by processing)

= 5.66E+09 pCi/year

Ra-226 activity content per month:

= 5.66E+09 pCi/ year

Assuming yellowcake barrels are not shipped out at least monthly, there are 4.72E+8 pCi/month of Ra-226 in the yellowcake (per month). At the end of the month, the Rn-222, with a half-life of 3.82 days, would be in equilibrium with the Ra-226, or also have an activity of roughly 4.72E+8 pCi. In this exercise, the potential from only a subset of material has been considered, so all potential Rn-222 should be assessed for all ore and alternate feed materials that may be processed and emitted through the stack or vent in this facility. These should be added to the source term for the mill operations for MILDOS.

DRC Response: The Division believes that the source term for the Mill operations in MILDOS was properly calculated. The commenter indicated that calculations should be implemented to assure that the statements in Question 2, above, are valid for the yellowcake. As stated above in the response above, a substantial amount of Ra-226 is removed in the processing (99.9 percent) of the uranium, which would leave 0.01 percent of the Ra-226 in the yellowcake. This is a statement from the NRC's Regulatory Guide 3.59. However, the guide also states that if data is available, the data should be used instead of the given assumption. As stated in response to the question above, the Division used the sampling results to determine the stack emissions and did not use the NRC's assumption. The stated assumption was merely given to demonstrate that the majority of the Ra-226 is removed in the processing and ends up in the tailings cells as waste. In this comment, the commenter is providing a calculation of the amount of Ra-226 that the commenter believes is contained in yellowcake after processing is completed and the final product (yellowcake) is awaiting shipment after being packaged. The above calculation contains some invalid assumptions.

The commenter's calculation, above, shows that only 0.01 percent of the Ra-226 is removed in processing. This is not possible. If this was the case, there would be very little Ra-226 contained in the tailings cells and the emission of Rn-222 from the tailings cells would not be a concern. Since Rn-222 is a daughter product of Ra-226, it is not possible to have the majority of the Ra-226 remain with the uranium contained in the yellowcake and have the associated Rn-222

go to the tailings cell for emission from the tailings cell. The objective of processing the ore is to produce a yellowcake product with a 90 percent or higher concentration of uranium with as few remaining impurities as possible. The daughter products of uranium would be considered to be impurities; therefore assuming that virtually none of the Ra-226 is removed would negate salability of the product because the next step in the fuel cycle process does not want the Ra-226 in the product received.

The last section of the comment suggests that the Division needs to consider emissions from the yellowcake as it is stored in barrels awaiting shipment. There are no emissions to be considered at this stage. Once the yellowcake is packaged in a barrel and is sealed for shipment, there are no emissions from the barrels.

As stated in response to the above comment, the Division used the sampling results of the Ra-226 emissions to determine the source term and therefore is confident that the calculated source terms are correct.

DWMRC, Technical Evaluation and Environmental Assessment (and attachments), White Mesa Uranium Mill, Energy Fuels Resources, Radioactive Material License No. UT 1900479 and Utah Groundwater Discharge Permit No. UGW370004, May 2017.

UMUT Comment #22

I-III-M The Tribe requests that during the seven year test plot for Cell 2 described in the Stipulated Consent Agreement for Reclamation Plan 5.1, adequate radon flux monitoring continue.

The following diagram, Figure 5, is an attachment at the end of the CELL 2 RADON FLUX Report for July 2016. In the first third (from the left) of Cell 2 are the words "active construction ongoing", with no radon flux measurements taken at that location. (Also this designation was not on the 2015 flux reports for NESHAPs compliance). The diagram was enlarged in Figure 6 so that the words on the original document are visible. Figure 7 below is the from Appendix L, Cell 2 Reclamation Cover Implementation and Performance Assessment Plan, to the WMM Updated Tailings Cover Design Report, In Figure 7, the area in the southeast section of Cell 2 is the test plot for the cover design described in Reclamation Plan 5.1. This plan further describes how Cell 2 has been covered with 3 feet of soil, however as shown in Figure 5, another activity is ongoing. This is an intrusion to the protective radon barrier, which is supposed to ensure less than 20 pCi/m2-sec. At the minimum, this area must be measured for radon flux and the results presented in the quarterly report which is required per DWMRC.

Figure 5: Cell 2 Radon Flux Measurement Locations

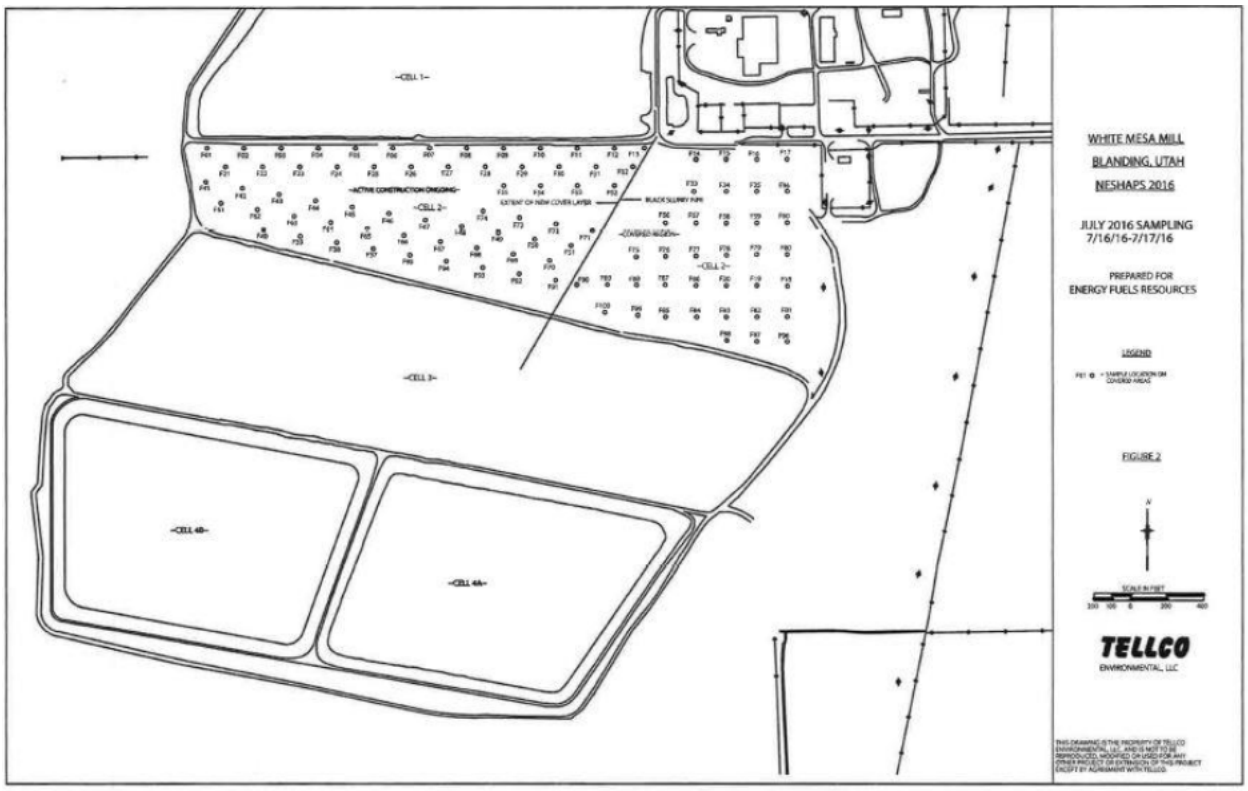


Figure 6: Cell 2 Radon Flux Measurement Locations (Enlarged) 17

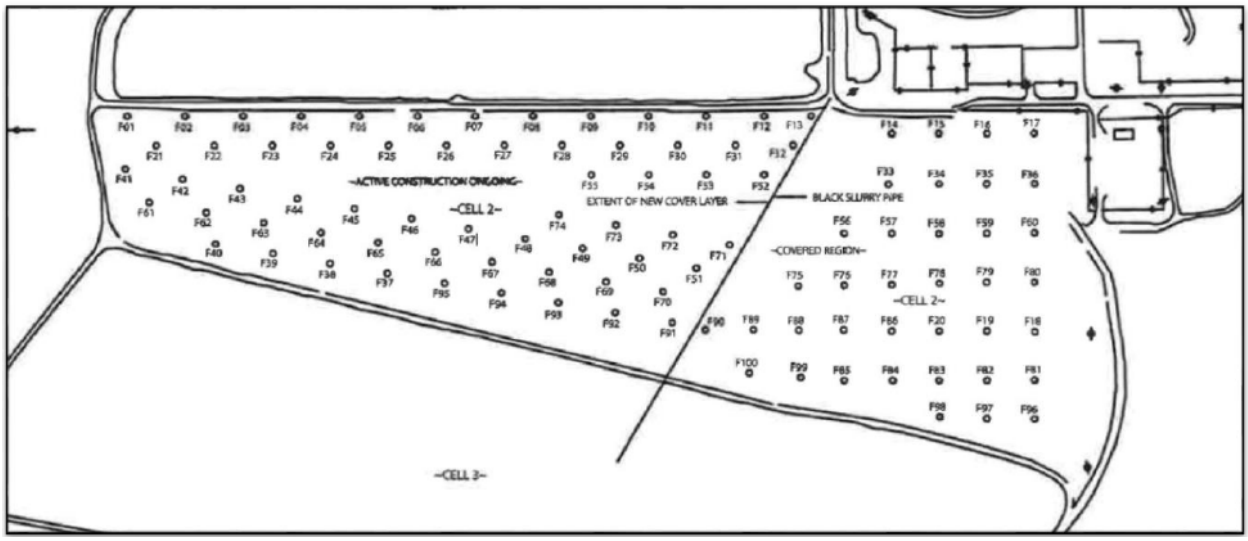
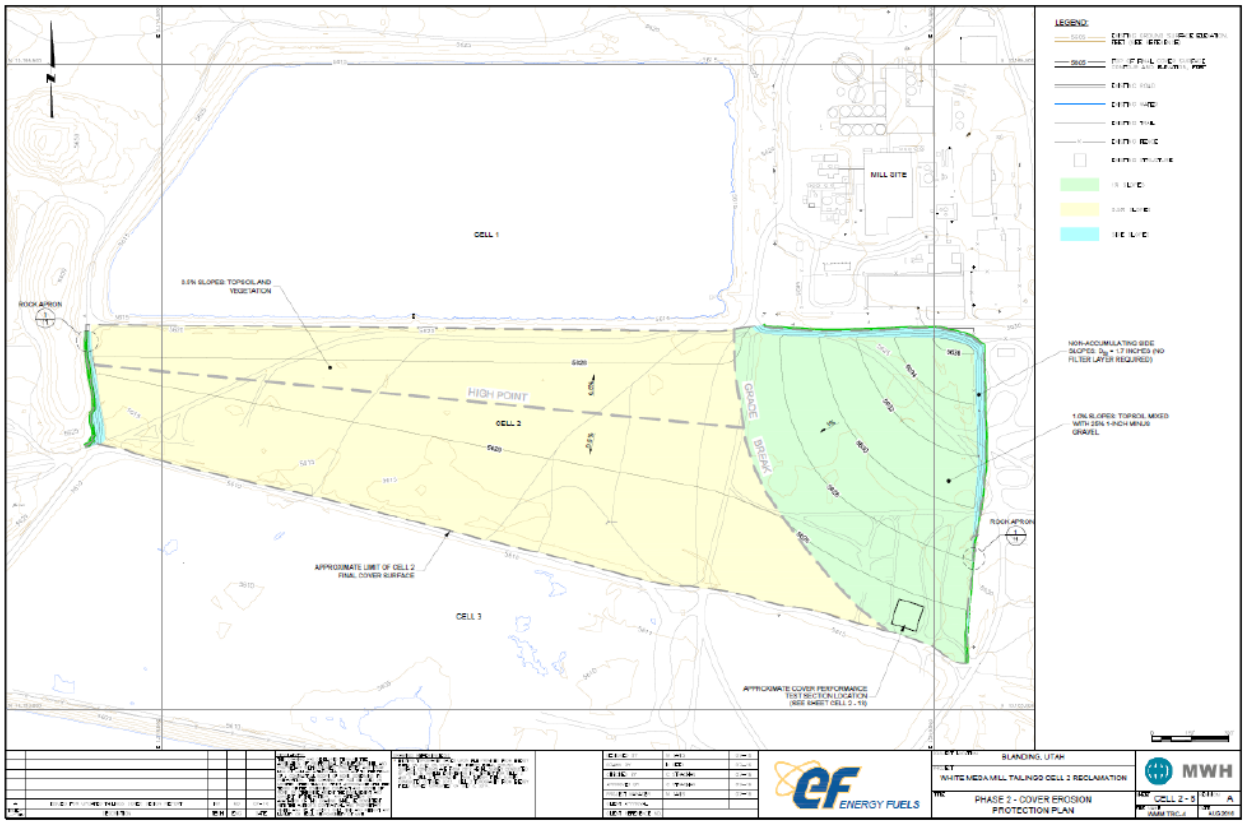


Figure 7: Cell 2 map in Reclamation Plan with Pilot Testing Area in SE corner



References

EFR, Correspondence from *Kathy Weinel, Quality Assurance Manager,* ***to Scott Anderson, Director, Division of Waste Management and Radiation Control, RE: State of Utah Radioactive Material License No. UT1900479, White Mesa Mill, Blanding, Utah, Semi-Annual Effluent Monitoring Report for Period July 1 through December 31, 2016, dated*** *February 27, 2017. DRC-2017-001602*

Energy Fuels Resources (USA) Inc., WHITE MESA MILL, Updated Tailings Cover Design Report, August 2016

Division Response: This comment is misguided because radon flux sampling is currently required on Tailings Cell 2 on a semi-annual basis and will continue until EFRI can demonstrate to the Director's satisfaction that the cover construction of Cell 2 is successful in meeting the radon flux standard. Further response to this comment is set forth in the Director's General Response #13 above. Therefore, no change will be made to the license.

<u>UMUT Comment #23</u>

I-III-N The Tribe requests that mitigation measures be immediately implemented to reduce radon flux on Cell 3. Having an exceedance of the regulatory standard for at least half a year poses a public health threat to the WMM workers, local residents and the community of White Mesa.

Cell 3 NESHAPS 2016 report contained two quarters where the flux measurements were above the regulatory limit of 20 pCi/m2-sec:

a. Third Quarter 2016 – 24.1 pCi/m2-sec, and

b. Fourth Quarter 2016 – 20.2 pCi/m2-sec.

While these levels when averaged with the results for the other two quarters, equaled 16.3 pCi/m2-sec for the annual rate, which is below the 20 pCi/m2-sec regulatory limit. This amount of radon contributes to elevated environmental levels which can be compared to 0.5 pCi/m2-sec, the low radon emanation levels in the testing area. These were elevated levels of radon in the environment for probably at least one half of the year, to which the community members at White Mesa may have been exposed.

References

***EFR, Correspondence from** Kathy Weinel, Quality Assurance Manager, **to Bryce Bird, Director, Utah DEQ, Air Quality Division, RE: White Mesa Uranium Mill National Emissions Standards for Radon Emission from Operating Mill Tailings Transmittal of 2016 Annual Radon Flux Monitoring Report for Tailing Impoundment 3, March 30**, 2017.*

Division Response: The limits for doses and exposures are typically written as annual limits. Although the commenter may not agree with the manner in which the NRC and EPA state that Licensees may demonstrate compliance with the limits, the Division must abide by the Federal requirements. Therefore, the commenter is correct that a Licensee may exceed a limit for a period of time as long as the limit is not exceeded for the time frame specified in the requirement. Therefore, if the Licensee's emission is higher than the regulatory limit for one half of the year, but during the other half of the year, the Licensee's emissions were below the limit and were low enough that when the two portions of the year were averaged and the limit was met, the Licensee is deemed to be compliant with the requirement, provided the requirement allows the values to be averaged. In this circumstance, the EPA allows the Licensee to average the radon flux measurements. Therefore, if the radon flux measurements, when averaged, meet the EPAs 20 pCi/m^2sec regulatory limit, the Licensee is in compliance.

Moreover, there is no indication in the real-time exposure monitoring at the White Mesa property boundary, or of worker exposures, suggesting that the radon flux exceedances during the two quarters at issue resulted in an impact to on-site workers or to the general public, as discussed in more detail in General Response #08 and the Division's Response to the UMUT Comment No. 4, above. Based on actual measured dose rates, both on-site workers and the general public were protected during the time that the radon flux exceedances occurred.

UMUT Comment #24

I-III-O The Tribe supports the requirement that all equipment installed for the purpose of identifying groundwater impacts from cells 1, 2, and 3 remain fully operational as described in Sec. 11.3. A Maintenance of Leak detection and monitoring facilities for Cells 1, 2 and 3.

The Tribe is concerned that lack of adequate functionality will cause confusion and misinterpretation of monitoring results. This has occurred in the first quarter of 2017 at MW-5. Inadequate maintenance is being referenced as a potential reason for exceedance of the ground

water compliance limit at that well. With the enforcement of this provision of the proposed license, such confusion and distraction from monitoring results can be eliminated.

Division Response: This comment is not clear. Monitoring well MW-5 is not a pumping well. If the commenter is implying that the leak detection system at Tailings Cell 3 contributed to the observed contaminant concentrations seen at MW-5, the Division has no evidence to support this theory. The contamination observed in well MW-5 during the first quarter of 2017 was identified through routine groundwater sampling; therefore, the sampling equipment to identify "groundwater impacts" appears to be working as designed.

UMUT Comment #25

I-III-P With regards to 11.3. E Response to Leak Detection, the Tribe requests that if the lowering of head pressure by increasing freeboard cannot determine the cause of the liner leak, all liquid should be transferred from the cell and the cell should be immediately closed, excavated, and reclaimed permanently*.*

Division Response: The Division is of the view that the contingency planning addressing the appropriate response action that would be followed in the event that a liner leak is detected is adequate. If corrective actions are not adequate to solve the problem, closure of a tailings cell, as suggested, would be an option. However, if a tailings cell were to leak, the Licensee would be allowed the opportunity to determine the cause of the cell leakage and propose a solution and implement the approved path forward. The Division will not dictate specific, mandatory steps in advance because the circumstances relating to any given hypothetical liner leak are highly variable and the Division believes that it's important to maintain flexibility to address specific situations that may arise. The comment's proposed, mandatory action is not warranted in the Division's judgment.

UMUT Comment #26

I-III-Q The Ute Mountain Ute Tribe requests that the Emergency Preparedness Plan be amended to include notification procedures to the White Mesa Community and Ute Mountain Ute Tribal officials. In addition, there are no specific procedures in the Emergency Response nor Environmental Monitoring Handbook for trucks delivering specifically delivering ISL Material; these need to be developed*.*

The White Mesa Ute community, a sovereign government, who shares a boundary with the mill, is not on any list or communication tree for ANY emergency involving potential off-site or public releases of hazardous or radiological substances. They are not listed as contacts within any of these documents:

- *EMERGENCY RESPONSE MANUAL FOR URANIUM CONCENTRATE SPILL or*
- *SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN FOR CHEMICALS AND PETROLEUM PRODUCTS, or*
- *TRANSPORTATION ACCIDENT RESPONSE PLAN.*

In terms of the policy of As Low As Reasonably Achievable (ALARA) and as a good neighbor policy for the nearest community residing near the mill, the Tribe requests immediate inclusion in the notification process in these plans for incidents such as:

- *Leaking shipment of radioactive ISL waste from Cameco Smith-Ranch ISL Facility in Glenrock, Wyoming on or about August 21, 2015;*
- *Leaking intermodal container of radioactive ISL waste from Cameco Smith-Ranch ISL Facility in Glenrock, Wyoming on or about March 29, 2016, resulting in spillage of radioactive material along US Highway 191 and at the entrance to the White Mesa Mill; or*
- *Leaking barrels of radioactive material transported by truck from Honeywell (Converdyne) and received at the White Mesa Mill on or about January 12, 2017.*

The Risk Management Plan's worst case scenario's for the Mill considers the total release of 140,000 pounds of anhydrous ammonia from the one of the two tanks over a 10 minute time period. This could result in a cloud of hazardous material that causes lung damage and lethality if enough is inhaled which could extend 12 miles. One report listing accidents in the USA from the years 1996 – 2011, found there were 939 accidents due to anhydrous ammonia, and resulting in 19 deaths and 1651 injuries. (Center for Effective Government, 2013). So this is a very real scenario. An effective plan for the neighboring communities, including the Tribe's White Mesa community must be made aware of the possibilities of such scenarios and have emergency preparedness operations or evacuation plans in place, for considerations especially of the elderly, children, and handicapped.

In line with the question above, in the DWMRC White Mesa Uranium Mill Frequently Asked Questions, it is listed: What is the Mill required to do if an Environmental Release Occurs? The response suggests that the mill's emergency response plan will address any issue "and has provided notifications for incidents in the past. DWMRC also provides required notifications to the appropriate parties," or only those parties require by state or federal regulation, and not those most likely to be affected by even the smallest radioactive or chemical spill, the closest community of White Mesa. The DWMRC answer to this question concludes with, "(DWMRC) encourages suggestions from the public on ways to improve the current notification process." So let this be the time that the Tribe, as a sovereign nation, and as a member of the public implores the DWMRC, the DEQ, and the State of Utah, for inclusion in this process.

See https://deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm

At the hearing in Salt Lake City, a Ute Mountain Ute Tribal Member who has resided in White Mesa throughout his life asked a question that could not be answered due to a lack of concise context regarding emergency response and safety for proximate residents. To clarify and assist the UDWMRC in responding to his comment, we have bolstered his concern with actual scenarios for the DWMRC to be able to adequately address his concerns. Mr. Dutchie asked at the hearing what the safe distant was if something went wrong at the White Mesa Mill. To add context, we have used specific examples for the response to public comment by DWMRC:

DRC Response: Although the Division may be able to help to mediate the Tribe's request to add the White Mesa Community and Ute Mountain Ute Tribal Officials to the notification list for the Licensee's Emergency Preparedness Plan, the Division cannot impose this requirement. The Tribe and the EFRI would need to discuss and come to an agreement regarding what type of situations would require the Licensee to notify the Tribe that a situation occurred. Additionally,

the Tribe would need to provide to EFRI the name and qualifications of individuals who are to receive the notification. Notifications made to untrained individuals would not be that helpful to the Tribe since the individual would not be aware if any specific protective measures that would need to be taken. If there is no individual in the White Mesa Community that is specifically trained as a first responder for hazmat situations, notification to the local emergency response organizations (fire departments, local law enforcement agencies, medical emergency response organizations) would be a more appropriate notification emergency or incident that occurred. Even though the White Mesa Community is part of a sovereign nation, in instances where emergency response is necessary and is not available in the Community, it is the Division's understanding that the local emergency responders for San Juan County would provide the necessary response.

The commenter provided some scenarios for the Division to review. Scenarios can only be evaluated on a case by case basis when the appropriate parameters are known. If the Division assumes the conditions that exist most often at the Mill, the prevailing winds are toward the northeast which would mean that the airborne scenarios stated would have little to no effect on the Community of White Mesa. Wind speeds and other variables necessary to provide a specific answer to the commenter were not provided. Therefore, any of the information provided in response to the commenter's scenarios are more generalized in nature. As stated at the hearing in Salt Lake City, each situation must be evaluated on a case by case basis because there are many possible variables that will affect the response necessary for an incident. The Division will address the scenarios as stated by the commenter.

UMUT Comment #27:

1. In the event of a release of 140,000 pounds of anhydrous ammonia (considered to be one of the worst-case scenarios of potentially acute toxins from the facility), what is the zone of exposure, in lateral distance from the mill's storage chemical storage facility, and what would be the emergency response procedure implemented to protect those residents and passers-by within the zone?

DRC Response: From the limited information provided in the comment, the Division is unable to determine the zone of exposure. In order to determine the zone of exposure, more information is necessary, such as wind speed, the direction of the wind, and other variables necessary to make this calculation. The Division is not a first responder. The Division notes that the 2016 Emergency Response Guidance Document published by the U.S. Department of Transportation and used by all first responders for a transportation incident, provides information for the first responders to use until the specific circumstances can be analyzed. For a highway tank truck or trailer, a first responder would first isolate the vehicle for 500 feet (150 meters in all directions). During the day, the first responder would then protect persons downwind for 0.6 miles (0.9 km) in low winds, 0.3 miles (0.5 km) in moderate winds, and 0.3 miles (0.4 km) in high winds. If the incident occurs at night, after the initial protection in all directions, the first responder would then protect persons downwind for 1.3 miles (2.0 km) for low wind conditions, 0.5 miles (0.8 km) for moderate wind conditions, and 0.4 miles (0.6 km) for high wind conditions. These are not absolute distances and the actual plume size, direction, distance, speed, etc. would need to be evaluated to ensure that individuals downwind are safe. The local and state emergency responders are aware of the anhydrous ammonia located at the Mill and are trained in the

appropriate responses to take. It is the Division's understanding that the White Mesa Community does not have any emergency response personnel located within the Community, However, the local emergency response personnel for San Juan County would provide the necessary support.

If such an event were to occur at or near the White Mesa Mill, the Licensee would implement its Emergency Response Plan and applicable procedures to handle a spill of this nature. The Licensee has submitted its Risk Management Plan and registered the hazardous materials on-site as required. The Licensee will comply with requirements to ensure the safety of the workers, the public and the environment in the mitigation of such an incident.

The Division also understands that at one point, the Tribe was working with the Utah State Emergency Response Commission with regards to the hazardous materials located at the Mill and was involved in regular meetings with the State and/or Local Emergency Response Commissions. Unfortunately, a number of years ago a dispute arose between the State and the Tribe which resulted in the withdrawal of the Tribe from participation in these groups. The Division has spoken with an individual in the State Agency with oversight of the State Emergency Response Commission regarding the issues and given the State Agency specific contact information for the individual responsible for emergency response for the Tribe located in Towaoc, Colorado. The Division has been informed that the State Agency will contact this individual to see if it is possible to reestablish the Tribe's participation with the State and/or Local Emergency Response Commission. If so, this may address the Tribe's concerns regarding notifications.

The commenter indicated that there was a worst-case scenario provided in the Licensee’s Risk Management Plan as required by the EPA. The scenario indicated that 140,000 pounds of anhydrous ammonia was released in a 10-minute period with a particular wind speed and atmospheric class. Although the given worst case scenario is unlikely to occur given the safety features of the Licensee’s storage tank, if the commenter wants to apply a worst case scenario, the commenter could assume that the winds were directed toward the White Mesa Community and were not in the direction of the prevailing winds for the entire time associated with the incident. If this is the case, the end point is 6.9 miles from the tank's location. If an incident of this nature occurred, EFRI would implement its Emergency Response Plan and would notify the Local Law Enforcement Agency (Sheriff's Office, Blanding Police, State Highway Patrol, as applicable), the Fire Department, including the Hazmat Response Team, if appropriate, and the local Emergency Medical Services, including local clinics and/or hospitals, if appropriate. EFRI would also implement its on-site emergency response procedures and rely on the local emergency response personnel to coordinate all necessary actions to protect members of the public, whether in the City of Blanding or in the White Mesa Community. This response may include doing nothing if the conditions do not cause members of the public to be at risk, it may include evacuation, if the risk to the public is high, it may require “shielding” in place (staying indoors and eliminate outside air from entering the home), shutting down highway 191, if warranted, etc. All of this would only be required for a short period of time. Protective measures would only need to be implemented until the anhydrous ammonia concentration levels dissipate enough to no longer be a concern. As far as the exposure to persons traveling Highway 191, people will travel along the highway at speeds greater than 50 miles per hour on average. Therefore, they will not be present for a long period of time. The necessary protection response

would depend on the concentration of the anhydrous ammonia in the air. Once they were notified of the emergency, the local emergency personnel would determine if travel on Highway 191 would need to be restricted in order to protect the individuals for the time necessary for the anhydrous ammonia to dissipate, or if appropriate, allow travel on the highway.

UMUT Comment No. 28:

2. From August 1 to September 6, 2016, during an ore processing campaign, the yellowcake drying ovens were operating at a level higher than their permitted drying capacity (letter to Utah DAQ September 22, 2016 by EFRI). This caused an excess of 346 lbs. of emissions over that period. What is the zone of exposure, in lateral distance from the mill's drying stacks, and what was the emergency response procedure implemented to protect those residents and passers-by within the zone? Please estimate the exposure to uranium oxide and other pollutants to the nearest resident (<2 miles), White Mesa residents (average of 4 miles), and those passers-by, such as school children on the bus between Bluff and White Mesa and Blanding on the highway next to the mill, twice per day as they started their school year.

Division Response: The commenter discussed an incident that occurred between August 1 and September 6, 2016, in which the drying capacity for the ovens were operated at a level that was higher than allowed, causing an excess of PM_{10} emissions for a period of time. The data shows that some of the PM_{10} emissions were in the form of nitrous oxide and portions were nitrogen compounds that may have contained ammonia or sulfate compounds. The incident was reported to the Utah Division of Air Quality and corrective actions were taken. Although the measured PM_{10} emissions from the stacks were temporarily in excess of the normal PM_{10} amounts released through the stacks, during calendar year 2016 they were still well below the yellowcake dryer system emissions permitted for the year.

Applying the windrose data discussed above, the area to the northeast of the White Mesa Mill (Blanding) would have seen (in theory) by far the most impacts from the events described as the prevailing wind is strongly in favor of that direction. The area to the southwest of the Mill (no residents) would have seen the secondary impacts from windborne particulates. The area to the southeast of the Mill (the UMUT property) would have seen the third highest impacts from windborne contaminants.

Yet such analysis based on prevailing winds is hypothetical because the environmental monitoring system at the Mill detected no impacts. This situation was not an emergency situation as far as radiological exposures were concerned. This question is addressed in part in the data presented in the General Response #08. The high volume air samplers set at the boundary of the Mill showed no discernable increase in radionuclide emissions during the time period in question. Evaluating actual, real-time measured impacts during the third quarter of 2016 (August – September), the air monitoring station BHV6 registered 0.0 mrem above background. Station BHV6 is located a far distance from the mill processing area. If radioactive particulates were carried in that direction, their presence would have been detected. Yet the station BHV6 registered 0.0 mrem. The UMUT land is located about 2.5 miles away from station BHV6. Thus, the data indicate that the UMUT property registered no radiological impacts relating to the events in question. The average for the third quarter of 2016 for all seven

monitoring stations (BHV3 is omitted since it's the background station), was 1.08 mrem above background. The NRC's annual dose limit is 100 mrem. Similarly, onsite workers during 2016 measured an actual dose of 110 mrem (average), while the single worker with the highest dose in 2016 was 310. The NRC's occupational standard is 5,000 mrem. There is no evidence showing that the events in question presented radiological hazards to the public or to workers. As stated in an answer to previous comments, the Licensee may have periods of time where radionuclides released may be higher than at other times. Under the NRC's regulations (and state law), doses to the public and to workers are measured cumulatively over a calendar year. In this case, however, the radiological releases did not increase as a result of this incident, as demonstrated by on-site compliance monitoring and the detailed monitoring of workers. In short, there is no evidence in this record that the events in question had radiological impacts on or off-site.

UMUT Comment #29

3. In March of 2012, a Ute Mountain Ute Tribal Member from White Mesa photographed a release from the facility and the Tribal government inquired about it with the Utah Division of Air Quality (photograph included in Sec. I-III-G). There is no record of the incident being reported by EFRI. The Tribe was informed by the Division of Air Quality that it was a malfunction in an alternative feeds circuit processing material at the time. Please estimate the exposure to uranium oxide, and other pollutants to the nearest resident (<2 miles), White Mesa residents (average of 4 miles), and those passers-by, such as school children on the bus between Bluff and White Mesa and Blanding on the highway next to the mill. (See Part I, Exhibit C – Energy Fuels letter).

Division Response: The commenter indicated that an incident occurred in March of 2012. The incident was reported to the Division of Air Quality by a Tribal member who lives in the White Mesa Community. The Division of Air Quality conducted an investigation of the incident and determined that there was a malfunction of the alternate feeds circuit. Based on the photograph, the commenter wanted the Division to estimate the exposures to uranium oxide and other pollutants to specific points outside the Mill's boundaries. During the period in which the incident occurred, the monthly air monitoring samples that had been operated continuously during the incident did not show a discernable increase in the measured uranium, Th-230, Ra-226, and Pb-210. Similarly, on-site workers during 2012 received a cumulative dose for the whole year of 106 mrem (average), where the highest dose a single worker received was 350 mrem. These doses are compared to the NRC's safe level for workers of 5,000 mrem. This data indicates that there was no increase of exposure to off-site members of the public, including the UMUT, or to onsite workers, from uranium oxide or other radionuclides despite the malfunctioning equipment at the Mill. Additionally, samples taken during the incident were analyzed for other pollutants (chlorine, hydrogen fluoride, acid gases, inorganics) and the samples did not demonstrate the presence of these pollutants. Given that the sampling results do not demonstrate an increase in pollutants or radionuclides, there is no indication of a dose increase to the stated members of the public. In fact, the evidence results in the contrary conclusion. Additionally, as indicated in the Division's response to the previous comment, dose is measured in real-time and is calculated on a cumulative, annual basis. A singular event will be detected in the monitoring system but its effects will be averaged over the year. The Licensee's regulatory standard as to worker exposures and public dose is measured on a cumulative annual basis.

As an overall comment addressing the reduction doses from the exposure to radioactive materials, the basic protection methods for the radiation emitted from the Mill are time, distance and shielding. The less time an individual spends in an area that is being exposed to radiation, the lower the dose the individual will receive, the further away from the source of radiation the less dose an individual will receive. In fact doubling the distance from a point source of radiation will decrease the radiation level to which an individual is exposed to ¼ of the original exposure. As an example if an individual is exposed to eight mrem at two feet from a point source, the individual will receive only two mrem at a distance of four feet from the same source. The last general protective measure is shielding. Most of the radiation emitted by U-238 and its progeny (daughter products) is in the form of alpha or beta particles.

Alpha particles are large particles and are typically stopped by a thin sheet of plastic, a sheet of paper, or they may even be stopped by the dead skin layer on a person's body. Therefore, alpha particles do not pose a hazard unless it is inhaled, ingested, or enters the body through an open wound. Additionally, since alpha particles are so large and heavy, the alpha particles will not travel long distances in open air.

Beta particles are smaller particles than alpha particles, but can be shielded using relatively thin materials. Beta particles may be stopped using several sheets of paper, a thin sheet of aluminum, a thicker sheet of plastic than that used to shield alpha particles, heavy clothing, etc. The beta particles produced by the U-238 decay chain can penetrate through the dead layer of skin into a few millimeters of the live dermis but do not penetrate further. Beta particles can travel further in free air than alpha particles.

The radioactive materials received, processed and disposed at the White Mesa Mill, including AF materials and ISL materials, are low level radioactive materials. The exposures from these radioactive materials are relatively small compared to exposures from other sources of radiation. Since the exposures from the radioactive materials are not large, an individual must be exposed to the materials for a longer time than if exposed to high level radioactive materials like the materials used in nuclear power plants.

Finally, the comment seeks analysis of impacts from the events in question on members of the public traveling on Highway 191. The data indicate that no such impacts occurred. Considering the low level radioactive materials received, processed, and disposed at the Mill, and the potential exposures to individuals traveling along Highway 191 taking the protection measures into account and the fact that much of the radiation emitted from the Mill is in the form of alpha or beta particles, the Division concludes that potential exposures to individuals traveling along the highway will be almost imperceptible. Given that individuals typically travel greater than 50 miles per hour along the highway and the Mill does not function 365 days a year 24 hours a day, the individuals do not spend much time in an area where they may be exposed to radiation. Also, the highway is some distance away from the portions of the Mill property where radiation is emitted. Lastly, individuals are usually in cars or vehicles which provide some degree of shielding especially considering that the radiation emitted from the radioactive materials at the Mill typically is in the form of alpha or beta particles (there is also some gamma radiation emitted at a lesser frequency than the alpha and beta radiation). In any event, the evidence

establishes that the dose to the public from the White Mesa Mill is far below the NRC's standard of 100 mrem per year.

UMUT Comment #30

I-III-R In Sec. 12.3, the DRC must require EFRI to identify and promptly minimize contamination pathways to Tribal resources and expand the area of survey to more than 5 kilometers (3.11 miles). The Tribe requests a clarification of the language stating the radius begins at the exterior boundary of the WMM and conduct a survey of on-site contamination pathways.

The Tribe commends DRC for adding the land use survey condition to the RML Renewal but asserts that the language provided in License Condition 12.3 of the RML is not sufficient to require EFRI to assess or correct potential routes of exposure between WMM facilities and UMU Tribal groundwater resources. Five kilometers is only 3.11 miles which would not properly include the entire community of White Mesa. Including this indicates that DRC has imposed the land survey requirement so EFRI and DRC can identify contamination pathways between WMM facilities and resources used by the public and by UMU Tribal Members. To begin, the language of License Condition 12.3 only requires EFRI to conduct an annual survey of off-site land use; it does not require EFRI to conduct an on-site survey of contamination pathways. Here, the Tribe notes that DEQ Divisions have already identified at least two important on-site pathways of contamination to UMU Tribal groundwater resources.

Division Response: The Division disagrees with this comment. In the Division's judgment and experience, the distance of five kilometers is consistent with the Division's other 11e.(2) licenses and is protective of public health and the environment. Therefore, no change to the license will be required in response to this comment.

UTE MOUNTAIN UTE TRIBE
COMMENTS ON THE ACCEPTANCE OF ALTERNATE FEED OF
SEQUOYAH FUELS
PART II
JULY 31, 2017

The following are the comments on the proposed acceptance of alternate feed of Sequoyah Fuels.

UMUT Comment #31

II-A The Tribe requires that Sec. 10.8 of the RML be removed and that the Sequoyah Fuels (SFC) material should be left in place in Gore, OK because a plan has already been approved by the NRC for its storage at that location. No other radioactive waste disposal facility will accept the Sequoyah Fuels material because of the concentrations of thorium isotopes in the waste and White Mesa Mill should also not be authorized to accept this material for that reason.

According to the Environmental Impact Statement (EIS) for the Reclamation of the /Sequoyah Fuels Corp Site In Gore, Oklahoma[1], the parties intended for this toxic and radioactive material to remain in that state.

Sequoyah Fuels has already considered and recommended on-site disposal at their Gore, OK facility. In 2015, Sequoyah Fuels notified the Oklahoma Attorney General's Office and the Cherokee Nation's Attorney General that it was their preferred alternative to immediately begin on-site disposal of the material in a manner that is protective of public health and already permitted by the Nuclear Regulatory Commission in order to continue implementation of reclamation activities at the location.[2]

The Sequoyah Fuels material is so radioactive that disposal of it requires at least 25 feet of radon-attenuating cover. The URS SER for the Sequoyah Fuels material proposal is flawed and relies on EFR statements and representations verbatim. URS is supposed to undertake an independent review on behalf of the State of Utah, not a reproduction of the proposal by EFR to accept the wastes.

Division Response: The Division disagrees with this comment for the reasons set forth in the General Response #04 and #05. In short, EFRI submitted an application to the Division to evaluate the Sequoyah Fuels material as an alternate feed. The review of that application by URS and the Division's independent evaluation of the URS report, has resulted in the Division's final determination that this proposal meets the criterion of an alternate feed material. The Division's authority is limited to the State of Utah. It is not within the Division's regulatory jurisdiction to decide what to do with the Sequoyah Fuels material. That decision is up to Sequoyah Fuels Corporation, the State of Oklahoma, and the NRC who has regulatory authority over Sequoyah Fuels. The only question presented to the Division is whether the Sequoyah Fuels material may be accepted by the White Mesa Mill. The record supports only one answer to this question, in the affirmative. This comment presents no cognizable basis to challenge EFRI's application.

UMUT Comment #32

II-B The Tribe requires that Sec. 10.8 of the RML be removed and that the Sequoyah Fuels (SFC) material should be left in place in Gore, OK because three other facilities have declined receipt of the materials due to its highly radioactive content.

Other disposal facilities have not accepted the SFC material due to its high thorium and uranium concentrations. The risk of excessive gamma emissions during the transportation, delivery, storage, and after placement of the processing waste stream for the SFC material is unsafe. Specifically:

- *Energy Solutions of Utah determined that it was unacceptable to dispose of the materials in their 11.e.(2) waste disposal cell due to the uranium concentration being higher than their waste acceptance criteria*
- *The Pathfinder Corporation of Wyoming determined the high thorium 230 concentrations are not acceptable for disposal in their impoundments*
- *Waste Control Specialists of Texas declined due to the concentrations of uranium 238 and thorium 230*[3]

While the Tribe recognizes that uranium will be extracted from the SFC material, the other constituents in it are not suitable for long-term disposal at the White Mesa Mill. As with other radioactive wastes legally labeled as 11.e. (2) by-product material, the last resort is to dump it at White Mesa. The mill is not a RCRA compliant waste disposal facility, though. It is a uranium mill. Radioactive material that is too radioactive to be disposed at Energy Solutions' licensed and modern waste disposal facility in Utah should not be sent to the far less stringently regulated and outdated White Mesa Mill located within a few miles of the White Mesa Community.

Division Response: Again, the Division disagrees with this comment as it is inconsistent with the facts and applicable legal requirements. According to federal law and policy, Criterion 2 in Appendix A: "Criterion 2—To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations must be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations." The Division notes the use of the word *must* in Criterion 2. As a matter of federal legal policy, the activity is not only permitted, it is strongly encouraged. This is so because the federal government must assume responsibility for long-term care and maintenance of 11.e(2) facilities, under federal law. Therefore, Criterion 2 is consistent with the federal government's long-term care and maintenance responsibilities. Moreover, according to the evidence of record, the data in Division's possession supports a finding that the risks to the public and the environment are not increased by accepting these materials.

Clearly, the NRC anticipated the activity occurring at the Mill when it issued a license in 1978. The NRC allowed this disposal activity to occur prior to Utah obtaining agreement state status and assuming the role of lead regulator of the site. From this, it is plain that the Division is

operating in accordance with NRC expectation and the Licensee is permitted to carry on the disposal activities disfavored by the commenter.

Based on the foregoing considerations and other matters of record, the question of whether or not the 11e.(2) material at issue here may be accepted at other facilities is not relevant to the question before the Division. Each facility that was mentioned has its own acceptance criteria based on different unique characteristics to each facility (i.e. State and Federal Regulations, geology and hydrogeology of each facility, embankment design, etc.). The White Mesa Mill does not have the same acceptance criteria. It is allowed to take 11e.(2) material. The Sequoyah Fuels material has been designated as 11e.(2) material by the NRC. Therefore, the material could have been put directly into the tailing cells without processing. However, the purpose of EFRI's alternate feed application is to process it for its uranium content. This comment presents no cognizable basis to challenge EFRI's application.

UMUT Comment #33

II-C The Tribe requires that Sec. 10.8 of the RML be removed and that the Sequoyah Fuels (SFC) material should be left in place in Gore, OK because the safety evaluation reports contains misleading omissions and inaccuracies.

The Safety Evaluation Report prepared by URS on behalf of Utah Division of Waste Management and Radiation Control (DWMRC) dated May 1, 2015, contains misleading omissions and inaccuracies. It accepts Energy Fuels Resources, Inc. (EFRI) statements as facts and does not conduct a robust evaluation of the safety of having that material delivered, stored and processed at the mill. It also lacks data about the concentrations of constituents in Cell 4A and the effects of adding the SFC waste to it. The analytical results for volatile organic compounds 2-butanone and 2-hexanone are described as being very close to the practical quantification limit and thus are likely to be present as a result of a laboratory or sampling error. Those concentration are not representative of the materials being shipped to White Mesa because the analyzed samples were from raw raffinate sludge, not the dewatered and concentrated alternative feed material. Table 2 which contains data including leachate that might offer insight into the extracted levels and remaining levels of volatile compounds, only has heavy metal data. The conclusion by URS in concurrence with EFRI that the volatile compounds are anomalous or negligible is misleading. It also states "EFRI indicated that based on its knowledge of processes used by SFC, no organic hazardous constituents were produced, used or stored at the Gore facility…" (pp.27) This contradicts the process description in Section 1.3 describing the solvent extraction phase using tributyl phosphate (of which 2-butanone is a chemical precursor) and n-hexane (potentially oxidized to form low levels of 2-hexanone).

[3] *Id.*

URS also omits information from the alternatives analysis in Section 4.4 that is presented by the Tribe in comment B above. It misleads the reader to think that the only alternative was to send it to the Cotter Mill, while several options were actually considered by SFC, with the safest being to leave it in Gore, OK. The Safety Evaluation Report needs to be revised to reflect independent science and not blindly accept statements by EFRI. Without an adequate Safety Evaluation

Report, the license component 10.8 to authorize the receipt of SFC material at the mill should be removed from the proposed license.

Division Response: The Division appreciates but respectfully disagrees with the UMUT comments that the URS SER for the Sequoyah Fuel material contains misleading omissions and inaccuracies. Process knowledge is a common and acceptable way to determine acceptability according to the NRC. In fact the NRC has already determined that the Sequoyah Fuels material is 11e.(2) material and therefore any organics that may be found in the material would also be considered 11e.(2) material. However, in the Division's view, the concentrations of 2-Butanone (methyl ethyl ketone) and 2-Hexanone detected in samples of raw raffinate sludge (both constituents were detected at levels very near their respective Practical Quantitation Limits (PQLs) - 0.3 mg/kg versus a PQL of 0.1 mg/kg for 2-butanone, and 0.08 mg/kg versus a PQL of 0.05 mg/kg for 2- hexanone). These concentrations are so low they are most likely attributable to laboratory contamination. Concentrations of these constituents, if present in the dewatered sludge (the SFC Material), are not expected to be present at high levels. However, 2-Butanone and 2-Hexanone, if they were to be present at high enough levels, could be incompatible with strong oxidizers. Even so, given the low concentrations of these constituents detected, and the fact that strong oxidizers are not expected to be present in the tailings environment (EFRI 2013a, Attachment 5, Table 3), 2-Butanone and 2-Hexanone, if present in the SFC Material are not expected to be incompatible with the tailings or with liners in Cells 4A and 4B or in a future tailings management cell constructed similarly to Cells 4A and 4B. Additionally, the SFC Material is not a RCRA oxidizer.

As the UMUT indicates in its review comment II-B, the SFC Material Alternate Feed Material is to be processed through the White Mesa Mill to recover its extractable uranium content. The Mill uses an acid leach process to recover the uranium from the material. This acid would destroy any organic material in the Sequoyah Fuels material. The processed SFC Material is then to be placed into Cell 4A or Cell 4B of the tailings management facility, or into a similarly designed future double-lined cell at the tailings management facility. These cells are equipped with a composite double liner system including two synthetic liners, a leachate collection and removal system (LCRS), and a leak detection system (LDS). Other alternatives for dispositioning of the SFC Material as discussed by in UMUT's Comment II-B were beyond the scope of this license amendment. The only options for the Division were whether or not the Sequoyah Fuels material could be processed as an alternate feed. Any other disposal options are for Sequoyah Fuels Corporation to evaluate. The liners and LCRSs and LDSs fitted in Cells 4A and 4B at the White Mesa Mill (and anticipated to be included in any future cells constructed in a similar fashion) are expected to provide better or equal performance to the liners incorporated into the other facilities discussed in UMUT Comment II-B. In short, this comment presents no cognizable basis to challenge EFRI's application.

UMUT Comment #34

II-D The Tribe requires that Sec. 10.8 of the RML be removed and that the Sequoyah Fuels (SFC) material be left in place in Gore, OK because delivery storage and ore pad management has too high a risk of radioactive release.

The proposed storage management with a dirt cover to reduce gamma emissions is a good idea, but it does not give any detail about how the sacks of material will be excavated from under the cover safely for processing without damaging the sacks prior to milling. This regulated process needs to be revised in more detail to prevent gamma exposure and toxic particulate releases.

Super Sacks of raffinate feed material have been sitting on a pad at the SFC in Texas site since 2005, the integrity of the Supersack material must be assessed to ensure that they will not be compromised resulting in a spill when unloading. The UMUT Air Quality Office contacted a woven polypropylene Supersack distributer (BAGS Corp) and asked if the Supersacks would last years exposed to the environment in Texas. Their answer was: "The bags will not last this long in outside environment. Maybe 3 to 6 months if they are covered from UV."

In the SER for the SFC, there is mention of consideration of breaking bags, and in the WMM License renewal application, there are the following conditions stipulated for the handling of the material, which also assumes failure of the packaging:

> *"(3) Soil cover shall be monitored daily for apparent dusting and will be sprayed with water when the cover soil, or the ore pad conditions in general, indicate the potential for dust generation; (4) If at any time, visible dust is observed to be originating from SFC Uranium Material stored on site or from the cover placed over this material, the EFRI RSO or his or her authorized representative shall take actions within 30 minutes to stop the generation of visible dust; and (5) All offloading of SuperSaks onto the storage pad shall cease when wind speeds exceed 20 mph, unless such Super Sacs are not damaged or leaking upon arrival and during offloading."*
>
> *Offloading and storage conditions have been 'addressed' by the license amendment, however, the procedures for loading the alternative feed material into the mill for processing is covered in the In the Draft WMM Work Practice Standards for Control of Fugitive Dust Ore Receipt and Front-End Loader Operations, which are inadequate for material this high in uranium and thorium activity.*

Division Response: The primary purpose of the Supersaks is to transport the Sequoyah Fuel material to the White Mesa Mill. Therefore the Supersaks have to meet U.S. DOT regulations for transportation of LSA-I material. So 49 CFR 173.427 applies to these shipment. Which means that prior to shipping this material in Supersaks, Sequoyah Fuels Corporation will have to certify that the Supersaks being used meet U.S. DOT requirements for shipping container integrity.

Once the Supersaks arrives onsite and are placed in storage, the Mill will inspect each sack weekly in accordance with the Mill's SOP. If a leaking sack is found than the Mill will have to follow its SOP to deal with the leaking Supersak. The SOP also describes how the Supersaks will be "excavated" from the temporary soil cover. In addition, Division staff has observed the handling of other alternate feed materials that come in Supersaks during inspections, including those that are under a temporary soil cover. When the material is processed, the Mill personnel will transfer it from the ore pad to the Mill, usually with a front end loader. At that time, the Supersaks are removed by hand. This type of work is done under the Mill's radiation work permit (RWP) process. The Mill's RSO and Safety manger will evaluate the work activity and

determine what extra precautions will need to be taken beyond normal Mill activities. The RWPs require extra radiological monitoring, personal protective equipment and dust control measures during that specific work activity. The Division inspects work done using RWPs on an annual basis to verify their effectiveness. EFRI is also required to follow the requirements of license condition 10.8. No change will be made to the license.

UMUT Comment #35

II-E Tribe requires that Sec. 10.8 of the RML be removed and that the Sequoyah Fuels (SFC) material be left in place in Gore, OK because the original environment analysis considered only conventional ores and cumulative risks over time have been inadequately considered by regulators.

According to mill representatives (H. Roberts) at the hearing[4] in Salt Lake City, Utah, on June 8, 2017, "That the mill has no predetermined operational life" which infers the mill has no operational closure date. An Environmental Statement (ES) [5]was performed per compliance with the mill's approval with these provisions:

1.1 Applicant's Proposal - …"The Applicant has designed for a 15-year project lifetime….

3.1 Mining Operations – "The White Mesa Uranium Project will process ores originating in independent and company-owned mines. Mines within 160 (100 miles) of Energy Fuels ore buying stations are expected to supply virtually all of the ore processed by the facility. Energy Fuels controls reserves of approximately 8600 metric tons (MT) (9500 tons) of U3O8 with an average ore grade of 0.0125% U3O8."

The Ute Mountain Ute White Mesa community is the closest community to the mill. Longtime residents have been living in proximity to the operating mill for 37 years to date. The DEQ has stated that the original environmental study was performed for surrounding populations to the mill's original license. However, the mill has been in operation for over twice as long as intended per the original environmental risk assessments, therefore the associated doses and risks to the White Mesa community members, some of whom were raised with the inception of the mill.

The UMUT's Environmental Department understands that the doses from the original ES were low for individual and population doses for the actual and potential residences. In addition, the DEQ MILDOS calculations for the yearly effluent releases from the mill (2007-2014) are also correspondingly low, however, a total of radiological and chemical risks have never been performed for the mill.

In addition, the original dose risk analysis took into consideration only the contribution to ores from the mines within 100 miles of the area. To date, the mill has received alternative fuels from states thousands of miles away, with ISL waste coming from Wyoming and Texas. These feeds that may go through the mill or bypass the processing stream (solely for end disposal), were never evaluated in the original ES.

---

[4] *Correspondence from Pennie Nielson, Alpine Court Reporting, Arlene Lovato, Utah Department Of Environmental Quality, July 5, 2017, DRC-2017-0047742.*
[5] *Final Environmental Statement related to the operation of White Mesa Uranium Project, Energy Fuels Nuclear, INC, NUREG-556, NRC, Docket Number, 40-8681. May 1979. Pp. 1-1, 3-1.*

The dose assessment performed in the original ES was based on older approaches and philosophies to dose assessment calculations (ICRP 2 versus ICRP 26).

In the Safety Evaluation Report for the Sequoyah Fuels Corporation (SFC) alternative feed material, there is also a higher amount of Th-232 and Th-230 activities than those evaluated in the 1980 ES, which only took into consideration the natural uranium ores from either Colorado or Arizona (per the SAER/URS report). The risk for the SFC Feed Material was being compared to what has previously been processed in mill, which includes alternative feed material which has higher activities of thorium isotopes also. The Tribe appreciates the analysis of comparison to some of the alternate feed materials already processed by the Mill, however, these were smaller quantities[6]:

- *NTS Cotter Corp material - 420 tons,*
- *Molycorp - 11,689,*
- *Heritage- 7374 tons,*
- *Fansteel – 1369 tons,*
- *Cameco UF4 - 462 tons*

The total of these quantities s is 21,314 tons, versus the 17,250 Super Saks of 2,200 pounds max and the 16,700 tons from the SFC (license amounts) which would approximate over 34,000 tons of material that contain not only thorium isotopes with a higher activity, but also the associated decay products.

The DEQ has requested WMM environmental sampling to include Th-232 analysis, however, this has been implemented in 2016, and because of no other historical data, a question of how much Th-232 has been released into the environment to date has not been quantified from the amount of alternative feed materials 'processed' in the past.

Historically, the mill accepted Th-230 with activities over 1uCi/g for processing (or about 1xE5 times more than what the neighboring ores contain). The Tribe has concerns that any material encompassed under 11e.(2), will be able to be processed at the mill, no matter the high concentrations of natural thorium contained in the material, which will end up in the conventional impoundments. As mentioned previously, these higher concentrations of thorium isotopes were never fully considered in the in the original risk analysis. The dose conversion coefficients in the MILDOS code which calculate the dose have default values that vary for U-238 compared to the thorium isotopes (particle class and size) by factors of 10 (and in the case of particle size 50 by a factor of 100-1000) as indicated for some default values as presented in the table below.

[6] *All quantities cited in EFR White Mesa Mill Updated Tailings Cover Design Report, August 2016.*

Table 1: Dose conversion coefficient default values[7] in MILDOS for U-238 and Thorium isotopes

	Inhalation Effective Dose for Adult mrem/yr per pCi/m3	Inhalation Particle Definition (AMAD)	Class	Ingestion Effective Dose Coefficients for Adult (mrem/yr per pCi)
U-238	2.51E1	1	Y	5.526E-4
	1.49E-4	50	Y	
Th-228	2.53E-1	1	W	7.62E-4
	12.1E-1	50	W	
Th-230	3.26E-1	1	W	1.33E-3
	2.66E-1	50	W	
Th-232	1.64E0	1	W	2.73E-3
	1.57E0	50	W	

In the SFC alternative feed material, the Th-230 content for the Arizona natural ores are not given, however, there is an assumed amount for Th-230 in the tables in Reclamation Plan Appendix C, Radon Emanation Modeling, (Attachment C.1, Radium-226 Estimation Tables) for the material processed by the mill for deposition into the tailings cells.

References:

Cember, H., Introduction to Health Physics, Third Edition, 1983.

Energy Fuels Resources, (USA) Inc., White Mesa Mill, Updated Tailings Cover Design Report, MWH, August 2016.

International Commission on Radiation Protection, Publication 2, Report of Committee II on Permissible Dose for Internal Radiation, 1960. (ICRP 2)

International Commission on Radiation Protection, Publication 26, Recommendations of the International Council on Radiological Protection, Vol. 1, No.3, 1977. (ICRP 26)

USNRC, Final Environmental Statement related to the operation of White Mesa Uranium Project, Energy Fuels Nuclear, INC, NUREG-556. Docket Number, 40-8681. May 1979. Pp. 1-1, 3-1.

[7] *MILDOS AREA 4.01, US Nuclear Regulatory Commission, Sept 2016.*

Division Response: The Division disagrees with this comment. It is undisputed in this record that the NRC has determined that the Sequoyah Fuels material qualifies as 11e.(2) byproduct material. This determination was made by the NRC, not the Division. In any event, because of the NRC's designation, RCRA and TSCA do not apply. Environmental analysis of the potential impacts this material may contribute if processed to recover its uranium values has been performed and review of that work did not reveal new concerns to current operations at the Mill. The material meets the definition of alternate feed presented in the 1992 and 1995 Federal Register and NRC guidance documents on alternate feed. Based on the administrative record, there is no legal or technical basis upon which the Director could deny the Licensee's request to process this material.

While it is true that in the original application, it was assumed that the Mill would operate for 15 years, it was also assumed that the Mill would operate for 24 hours per day, 340 days per year and would process 2,000 tons of ore per day. Six 80 acre tailing cells were also to be built and used.

The UMUT is well aware that this is not the case. The Mill has been licensed for 37 years and has not operated continuously over that time. That is why there is only one tailings cell currently closed, one 90% full, and one 40-acre tailing cell that is partially full. Therefore, the impact of the Mill is actually less than what was originally assumed. Additionally, it is up to the Licensee to determine how long it will be in operation. Nowhere in the original license for the Mill was the Licensee limited to 15 years of operation.

The impact of the Mill has been evaluated multiple times over the last 37 years. It has been evaluated during each RML Renewal, during each alternate feed amendment and during each facility expansion. The Division has completed these evaluations for the 2007 License Renewal, three different alternate feed amendments, relining of Tailings Cell 4A, and the Tailings Cell 4B construction. The NRC completed similar reviews when it regulated the Mill. All of these reviews include a written report that document what was evaluated and the conclusions of those evaluations. Those evaluations have examined applicable radioisotopes such as the different Uranium and Thorium isotopes and their progeny. They have also evaluated applicable chemicals, radon and radon flux, applicable transportation issues and etc. Those reports have been called SERs, Environmental Analysis, Statement of Basis, etc.

The Mill still performs the primary purpose for what it was originally designed and analyzed for in the 1978 EIS. The same processes are used. The same chemicals are used. The same risks and impacts on the environment and public still exist. Any slight variations, such as the alternate feeds, have been analyzed and documented individually on their own merits. So even though there is not one analysis for the entire 37 years of this Mill facility it has been analyzed extensively throughout its existence. The Division refers to its General Response #9 above.

Decisions regarding the approval of various alternate feed materials for processing at the Mill are made by the Director on a case-by-case basis. When reviewing a license amendment request for acceptance of an alternate feed material for processing at the Mill, the Division considers previous alternate feed materials accepted at the Mill and evaluates potential environmental

impacts associated with the acceptance, handling, and processing of the proposed alternate feed materials and the placement of the process residuals in the tailings management cells.

Concentrations of Th-232 in typical Colorado Plateau uranium ores are very low, i.e., on the order of a few pCi/g or less (SER, Table 7), similar to concentrations of Th-232 found in typical sedimentary and igneous rocks. Data are unavailable for confirming Th-232 activity concentrations of typical Arizona Strip uranium ores. However, concentrations of Th-232 in such ores are expected to be closer in value to Colorado Plateau uranium ores than to those in the SFC Material. The vast majority of the tailings in the cells are derived from uranium ores, including bedded sandstone deposit uranium ores from the Colorado Plateau that are characterized by low Th-232 contents.

Activity concentrations of Th-230 present in typical Arizona Strip ores that have been processed at the Mill to date have been estimated at about 1,550 pCi/g, based on the assumption that secular equilibrium exists between Ra-226 and Th-230 activity concentrations in the ores. This value is approximately 2.2 times the Th-230 activity concentration of 703 pCi/g estimated for a typical Colorado Plateau-derived uranium ore.

The total amount of tailings and process residuals resulting from previous alternate feed materials placed into Cell 3 is approximately 1,801,000 dry tons (EFRI 2013a, Attachment 5, Table 4). The total volume of tailings derived from alternate feed materials placed into Cell 3 that exhibited Th-230 activity concentrations (2,550 pCi/g or higher) noticeably higher than the estimated 1,550 pCi/g Th-230 activity concentration present in Arizona Strip ores is about 4,990 tons. This amount of alternate feed materials represents less than 0.3 % of the total amount of material that has been placed into Cell 3.

Cell 4A has a total tailings capacity of approximately 1,856,000 dry tons (EFRI 2013b, p.20). The total volume of alternate feed materials placed into Cell 4A that exhibited Th-230 activity concentrations noticeably higher than the 1,550 pCi/g Th-230 activity concentration present in Arizona Strip ores is approximately 2,430 tons. I f the processed SFC Material is placed in Cell 4A, and Cell 4A is filled to capacity, the total amount of the SFC processed material (about 7,520 dry tons) plus the amount of previously placed alternate feed materials having higher Th-230 activity concentrations (2,430 tons) than Arizona ores represents about 0.1 % of the total capacity of Cell 4A.

The amount of process residuals from previous alternate feed materials having Th-230 activity concentrations noticeably higher than the estimated Th-230 activity concentrations in typical Arizona Strip ores have been placed into Cells 3 and 4A. Additionally, the amount of process residuals from the SFC Material, if placed into Cell 4A, represents about 0.4 % of the combined amount of material that was placed into Cell 3 plus the amount of tailings/alternate feed materials that will be placed into Cell 4A assuming Cell 4A is filled to capacity. This placed alternate feed material and proposed SFC Material therefore represent a very small fraction of the total amount of processed material placed into the tailings management Cell 3 and planned for placement in Cell 4A.

The Division incorporates General Response #05 and its prior comment responses relating to the Sequoyah Fuels Alternate feed material here. No change will be made to the license.

UTE MOUNTAIN UTE TRIBE
WHITE MESA MILL GROUNDWATER DISCHARGE PERMIT UGW370004
COMMENTS AND STATEMENT OF BASIS
PART III
July 31, 2017

The Division Summary of the Tribe's Part III July 31, 2017 Comment Letter

The Ute Mountain Ute Tribe's Part III July 31, 2017 comment letter includes 6 Sections, 4 Attachments and 2 Exhibits. An outline of the documents submitted and the number of comments submitted by the Tribe is below:

1. Tribe Comment Letter
    a. Section 1 – Introductory Comments, 12 Comments
    b. Section 2 – Indicator Parameters, 10 Comments
    c. Section 3 – Updated Isotopic Testing, 13 Comments
    d. Section 4 – Pyrite/Redox/Dissolved Oxygen, 11 Comments
    e. Section 5 – Southeast Flow Gradient in Shallow Aquifer, 10 Comments
    f. Section 6 – Summary of Requested Actions, 15 Comments
2. Attachment A – Document titled: Schrauf, Todd, 2017, "Updated Data Review and Evaluation of Groundwater Monitoring, White Mesa Uranium Mill, Blanding, Utah." Prepared for the Ute Mountain Ute Tribe.
3. Attachment B – Document summarizing the analytical capabilities of the Vengosh Lab at Duke University.
4. Attachment C – Slide Presentation by the Pacific Northwest National Laboratory Subsurface Science Team titled "Advanced Geophysical Characterization and Monitoring Tools for Hanford Site Subsurface Cleanup Operations."
5. Attachment D – Single Slide Illustration titled: Arnold, Rick, "Potential Configuration of Perched Groundwater Levels and Associated Inferred Groundwater Flow Paths South of the White Mesa Mill."
6. Exhibit D – Letter from William J. Sinclair to David C. Frydenlund dated February 11, 1999.
7. Exhibit F – Memorandum from Loren Morton to Dane Finerfrock dated June 27, 2000.

Each of the comments included in the Tribes comment letter sections 1 through 6 is answered by the Division below. Where applicable, comments regarding the Division's review of attachments or exhibits of the letter are included.

Section 1: Introductory Comments

UMUT Comment No. 36:
1. The Ute Mountain Ute Tribe (Tribe) has depended on, and will continue to depend on water resources in the vicinity of the nearby community of White Mesa forever. Contamination of the shallow or deep aquifer systems by toxic metals and radioactive elements by the White Mesa Uranium Mill (the Mill) is a serious concern and threat to the health and welfare of the tribal community and the ecosystem that sustains the community and its members.

Division Response: The Division is well aware of the fact that the UMUT depends on and will continue to depend on water resources in the vicinity of White Mesa forever. Consistent with its mission to protect human health and the environment, the Division shares the UMUT's concerns about the harmful effects that contamination of these water resources would have if uncontrolled contamination were to occur. That said, the evidence in this record demonstrates a number of pertinent facts beyond reasonable controversy:

A. The groundwater permit compliance parameters and limits have been developed based on process solutions and reagents stored at the Mill and statistical evaluation of data understanding that the perched aquifer contains naturally high levels of some heavy metals. Protection of public health and the environment is of primary importance to the Division and guides the facility oversight.

B. The process and tailings ponds at the White Mesa Mill are not presently leaking and past minor leaks were quickly repaired. In other words, there is no evidence of impacted groundwater contamination caused by leakage from the tailings cells. This conclusion is supported by significant investigations by third-parties, including the University of Utah. While certain anomalies have been found, the scientific evidence has conclusively established that these anomalies pre-date White Mesa Mill operations and thus, represent natural background conditions, which is not surprising given the presence of natural radioactive materials in the region.

C. If the process and tailings ponds at the White Mesa Mill were to leak, such releases would be timely detected by the existing groundwater monitoring system in time for meaningful actions to be taken to control and remediate any releases.

D. If the process and tailings ponds at the White Mesa Mill were to leak, the natural groundwater gradient would carry contamination to the southwest, away from the UMUT lands. Human and environmental receptors that may come into contact with the shallow groundwater in the natural gradient direction are limited, given land use and natural geographical conditions.

E. The drinking water in the vicinity of White Mesa is derived from the deep aquifer located in the Navajo sandstone. This sandstone aquifer is the source of water for the UMUT residents as well as other residents in the vicinity of the White Mesa Mill. There exists a substantial aquitard between the shallow aquifer (the Burro Canyon aquifer) that lies directly below the White Mesa Mill, and the deep Navajo aquifer. This aquitard includes several hundred feet of natural bentonitic and highly impermeable clay as well as hundreds of feet of other types of low permeability rock and soils. As a result of this natural aquitard, the perched aquifer in the vicinity of the White Mesa Mill tailings cells (the Burro Canyon aquifer) percolates laterally to the southwest and emerges as springs along the western margin of the White Mesa geographical feature. Thus, even if there were an uncontrolled release of tailings wastewater into the shallow groundwater beneath the White Mesa Mill (which has not happened), the substantial aquitard

would be adequate to protect the drinking water resources in the Navajo aquifer for all users of this groundwater resources. The presence of this natural aquitard was a primary consideration relied upon by the NRC in the original siting of the White Mesa Mill in the 1970s.

F. If the process and tailings pond water at the White Mesa Mill were to leak, such releases could not flow southeast towards the town of White Mesa based on topographical relief of the White Mesa plateau. Large canyon areas exist directly south and southeast from the White Mesa Mill which create a barrier to any potential/possible flow path to the community of White Mesa. Potential flow in these directions would discharge to seeps and springs along the canyons at the contact between the Burro Canyon aquifer and the aquitard.

G. Within the confines of the White Mesa Mill property, there are two contaminant plumes that are confined in the shallow, perched aquifer. The groundwater monitor well system effectively identified these contaminant plumes. The contaminants of concern are nitrate (as N) and chloroform. The source of this contamination has been identified as (i) an old leach field where lab wastes including organic solvents were dumped; and (b) ammonium sulfate crystal chemical storage. Neither shallow groundwater plume is radioactive and neither plume is related to the process water or tailings impoundments. The nature and extent of both plumes have been determined with precision and neither plume poses a threat to human health. The Licensee is currently remediating these plumes under approved corrective action orders overseen by the Division. These plumes are wholly contained within the confines of its private property and are not expected to extend beyond private property boundaries. As required by the corrective action orders, these plumes are prevented from migrating by hydraulic capture zones using groundwater pumping wells. The orders additionally require that sentinel groundwater monitoring wells be monitored to detect if any contamination escapes the capture zones. In the event that any contamination is detected beyond the capture zone, the orders require expedient corrective actions. The Licensee has further provided adequate financial assurance to remediate both shallow groundwater plumes.

Based on the foregoing considerations, the Division must conclude, based on this administrative record, as did the NRC, that the important groundwater resources in the vicinity of White Mesa are adequately protected. Further response to the UMUT's comments on groundwater issues at the White Mesa Mill are found in the General Response #16, above. This section is incorporated here by reference.

UMUT Comment No. 37:

2. In support of these comments, the Tribe is providing an up-to-date, technical assessment of groundwater conditions at the Mill prepared by an experienced and qualified third-party contractor, Geo-Logic Associates. (Geo-Logic Associates, 2017). See Attachment A: Geo-Logic Report, including the Statement of Qualifications of the preparer, Todd Schrauf, PE. Geo-Logic Associates is a consulting firm of 250 professional geologists and engineers and support staff

with offices in 25 states and Peru. Geo-Logic Associates professional services include, among others, geology and hydrogeology, environmental engineering, geotechnical and geoenvironmental engineering, civil engineering, geotechnical laboratory testing, and liner electrical leak detection. The Geo-Logic Report confirms evidence of a signature of tailings solution in the groundwater at the Mill.

Division Response: The Division appreciates the UMUT's submission of the revised Geo-Logic Report. The Division has reviewed this report in detail. Our findings are discussed in response to several Tribe comments in this section. The Division's analysis of the data provided in the Geo-Logic report shows that the report does not confirm evidence of a signature of tailings solution in the groundwater at the Mill. The Geo-Logic Report, Section 3.4, explains the method used to calculate the average concentrations and provides a spreadsheet of the values used on Table 10 of the report. In some cases, and as explained in the Geo-Logic Report, sets of wells have been used to display data. The selection of data is biased and not representative of well-by-well analysis which considers background concentrations determined for individual wells. Using this culled data and estimated solubility limits for individual metals (using a specified pH's of 5 and 7), Geo-Logic has combined average metals concentrations for selected sets of wells and plotted these average concentrations in comparison with average tailings solution concentrations (Figure 30 of the Geologic Report) on different logarithmic scales. According to the Geo-Logic Report, the diagram (Figure 30) depicts that "the patterns observed show a general similarity in the relative concentrations of the various heavy metals, particularly for Tailing Cell 1, suggesting that the tailings solution is a likely source for the observed heavy metals concentrations in groundwater below the tailings cells."

This conclusion is not correct and is not supported by objective scientific data or analysis. Based on the Division's review, this data analysis is not representative of concentrations which would be expected in the event of a tailings solution release. The Geo-Logic report does not consider relative mobility of contaminants, background concentrations of metals, comparisons with GWCLs, or rising trends. It is expected that in the case of metals, the same metals will be found in the shallow aquifer Burro Canyon Rock as are found in the ore used to produce the tailings, and therefore the same metals will be found in natural background concentrations as are found in the tailings solution. The Geo-Logic Report has simply compared a biased assessment of background concentrations in the Burro Canyon Aquifer with average tailings solution concentrations.

The Geo-Logic Report plots concentrations on a site map of gross metals concentrations (Figure 33 of the Geo-Logic Report) in site wells and includes contour maps which claim to be indicative of tailings solution releases to groundwater based on the same reasoning as discussed for the Report Figure 30 discussed above. This is not representative of tailings solution discharge but again, is simply a representation of gross total background metals concentrations in the shallow aquifer.

For example, in the case of the Mill monitoring wells MW-32 and MW-29 which have the highest average concentrations of gross metals of all of the wells plotted on figure 24 of the Report, none of the metals exceeded GWCLs (based on statistical analysis of background concentrations) during quarterly 2016 monitoring, and very few GWCL exceedances have

occurred since the initiation of sampling at these wells in 2005. The 2004 Statement of Basis for the Permit recognized that background concentrations of heavy metals had not been established and that background reports were required prior to the establishment of GWCL's in the Permit.

UMUT Comment No. 38:
3. The Mill facility has negatively impacted groundwater quality in the shallow aquifer on the Mill property, and UMUT is concerned that a signature of more serious contamination caused by Mill operations, which is evident in the data being collected in the Mills monitoring network, is not being recognized and addressed by the Mill or Utah Division of Waste Management and Radiation Control (DWMRC).

Division Response: As discussed in the response to UMUT Comment No. 36, above sources of nitrate and chloroform contamination in the perched aquifer have been assessed and the contamination is being addressed in accordance with separate corrective action plans to delineate, monitor, capture, and remove the contamination. The corrective actions plans are approved as part of the previously referenced Stipulation and Consent Orders.

In the Division's reasoned, professional judgment, groundwater quality data do not support the UMUT's claims that groundwater contamination is being caused by leakage from the tailings cells. Pre-existing background concentrations were confirmed by the University of Utah Study. Background reports also identified pre-existing data trends, in cases where these trends are continuing or where the groundwater compliance limit is exceeded two consecutive times, the Permittee is required to conduct a source assessment to determine whether the source of the exceedance is the Mill. To date, none of the exceedances have been shown to be caused by tailings wastewater. Additional details regarding this issue are presented in the General Response #16. The UMUT's comment relates to naturally-occurring background conditions that pre-date operations at the White Mesa Mill.

UMUT Comment #39
4. Seepage from the tailings cells into the shallow groundwater is indicated by both the higher concentrations and specific types of heavy metals along with the increased acidity being detected in the Mill's monitoring well network. The signature of contamination in the groundwater is consistent with the chemistry of process waters and wastes from the Mill facility and is strong enough to be distinct from natural background conditions.

Division Response: The Division disagrees with this conclusion. In the Division's reasoned, professional judgment, heavy metals in the groundwater are consistent with the metals detected in common formations of the Colorado Plateau and not indicative of releases from the tailings cells. Since the tailings are composed primarily of ore from the Colorado Plateau, it is expected that these concentrations are similar. If tailings solution were released to the groundwater it would be expected that certain metals and other ions which are less reactive with the vadose zone chemistry (which display conservative contaminant transport) would arrive at the monitoring wells first. The use of groundwater data to try and compare the tailings waste water and the groundwater as being consistent is not representative of conditions which would exist in the case of tailings wastewater discharge to the groundwater. Additional details regarding this issue are

presented in the General Response #16. The UMUT's comment relates to naturally-occurring background conditions that pre-date operations at the White Mesa Mill.

UMUT Comment #40

5. The signature of contamination being observed supersedes and renders obsolete or out-of-date past technical reports DWMRC has concurred with to explain current negative trends in groundwater conditions at the site as being due to natural conditions in the aquifer.

a. While DWMRC and EFR interpret past technical reports as denying any impact to groundwater from cell leakage, they concede that deteriorating groundwater conditions are due in part to operations and anthropogenic activities that occurred and continue to occur at the Mill. For example, the recognized nitrate and chloroform groundwater plumes are attributable to contamination from Mill activities. The source of the chloride plume has not been determined. The Statement of Basis expressly attributes changes in ground water chemistry to ongoing pumping of wells. Other technical reports submitted by EFR or its consultants and accepted by DWMRC, such as the 2012 Investigation of Pyrite (Hydro Geo Chem, Inc. December 7, 2012) and numerous Source Assessment Reports on various monitoring wells point to well completions and to seepage from wildlife ponds (use of which was discontinued in 2012) as causes of changes in groundwater quality and.

b. DWMRC should no longer rely on past reports for justifying continual adjustment of natural background and corresponding modification of groundwater compliance limits to less stringent levels.

Division Response: The Division disagrees with this conclusion. In the Division's reasoned, professional judgment, the 2008 University of Utah Study and Report established beyond reasonable technical controversy that elevated concentrations in the groundwater were not caused by impacts from the White Mesa Mill. Therefore, the University of Utah Study verified the background studies prepared by the Permittee. The Division disagrees with the claim that the University of Utah Study is "out of date." To the contrary, it serves as a valid and current reference point for modifying GWCL's in the Permit. The UMUT's methodology for claiming a signature of contamination in the groundwater, using the Geo-Logic Report is not valid as discussed in the response to UMUT Comment No. 37, above. Additional details regarding this issue are presented in the General Response #16. The UMUT's comment relates to naturally-occurring background conditions that pre-date operations at the White Mesa Mill.

UMUT Comment #41

6. It is the declared public policy of the state of Utah "to conserve the waters of the state and to protect, maintain and improve the quality thereof for public water supplies, for the propagation of wildlife, fish and aquatic life, and for domestic, agricultural, industrial, recreational and other legitimate beneficial uses…." Utah Admin. Code R317-2-1A.

Division Response: Utah Administrative Code R317-2-1A is the Statement of Intent regarding the development and implementation of standards of Quality for Waters of the State. The intent of the rule is accurately quoted. The Division has concluded, based on this record, that this public policy has been and is being satisfied here.

UMUT Comment #42

7. To fulfill its obligations to protect public health and safety and the environment, including water quality, DWMRC should assume, rather than wholly dismiss, the very real possibility that the deteriorating groundwater chemistry at the Mill may well be and is likely resulting from cell leakage and other releases and activities at the Mill and should require EFR to take immediate actions to identify the sources of the contamination and implement effective corrective actions. .

Division Response: The Division disagrees with this comment. As explained above there is no basis to claim that groundwater chemistry is deteriorated due to discharges from the tailings cells. The Division requires and is continually reviewing data to determine if impacts are occurring to the groundwater due to Mill activities. Measured concentrations of compliance parameters in groundwater have been addressed to date and are attributed to background concentrations. Groundwater chemistry is maintaining beneficial use classification and groundwater standards for classification, based on review of all historical groundwater data for the tailings cell monitoring wells. Additional details regarding this issue are presented in the General Response #16. The UMUT's comment relates to naturally-occurring background conditions that pre-date operations at the White Mesa Mill.

UMUT Comment #43

8. As DWMRC has recognized in the 2011 Public Participation Summary document, due to the limited ability of the "leak detection systems" (LDS) for tailings cells 1, 2 and 3 the Point of Compliance (POC) monitoring well network is the "first line of defense" for detecting facility impact to groundwater. The design of the LDS for these cells has a "high potential for undetected leakage" (Exhibit D, DWMRC February 11, 1999) and are adequate for detecting only catastrophic releases at rates greater than 200,000 gallons per acre per day which is far in excess of Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) performance standards for leak detection efficiency of 1 gallon per acer per day, (Exhibit F, DWMRC June 27, 2000).

Division Response: The Division disagrees with this comment because it misrepresents the Division's statements and conclusions. The June 27, 2000 Division Memorandum speaks for itself. Under this document, the Division stated that five necessary operational phase improvements were listed to address the non-optimal cell 1, 2, and 3 leak detections systems. These five operation phase improvements were: 1. Additional Monitoring Wells, 2. Additional Head Monitoring and Reporting, 3. Additional Groundwater Monitoring Parameters, 4. Accelerated Closure and Compliance Schedule for Cell 2, and, 5. Retrofit Construction of Cell 4A. As of this date, all such improvements have been completed by EFRI. Additionally, the slimes drain pumping to reduce fluid accumulation, and reduce driving head at cell 2 has been implemented and fluids are removed to the extent practicable.

While the leak detection systems for tailings cells 1, 2 and 3 are not optimal, they do serve as an early warning of large leaks. The Permit includes requirements for "Discharge Minimization Technology" which requires that monitoring wells are in place and sampled directly on the downgradient margins of tailings cells 1, 2, and 3. In the event that a tailings wastewater release was not detected by the leak detection systems, these monitoring wells serve as points of detection where potential tailings wastewater release to groundwater would be detected as early

as possible. As discussed in multiple Division responses to the UMUT comments, there is no evidence that a release of tailings solution to the groundwater has occurred.

UMUT Comment #44

9. DWMRC should require all language included in the 2017 License Application referencing working, integral leak detection systems for tailings cells 1, 2 and 3 be amended to accurately reflect the inadequate design of these systems. It is misleading, for example on pages 32-34 of the 2011 Public Participation Summary (PPS) to describe the poor LDS for cells 1, 2 and 3 as functional. The detections of fluids in the cell 1 standpipe in 2010 are evidence of a catastrophic leak that should have triggered an investigation into the vadose zone beneath the tailings cells and a reevaluation of the findings of the nitrate contamination investigation report along with closer scrutiny of indicator parameters in the monitoring well network and is not evidence of a "working" leak detection event.

Division Response: The Division disagrees with this comment. There is nothing "misleading" in the 2011 Public Participation Summary. Cells 1, 2, and 3 were constructed and graded to provide a drainage collection point beneath the PVC FML. Although these wells are not optimal when comparing this system to more modern requirements and materials, Cells 1, 2, and 3 are considered to have a "functional" primary detection point in the event of a liner tear. Additional measures have been implemented at these cells to compensate for the older designs, as discussed above (e.g. Permit DMT requirements). In the Division's reasoned professional judgment, these additional measures are adequate to optimize the leak detection capabilities in the vicinity of Cells 1, 2, and 3. At this time, the Division will not require additional optimization on this part of the system because its performance is adequate to meet applicable requirements and needs.

UMUT Comment #45

10. As detailed in the 2004 Statement of Basis (SOB) for the facility, the POC monitoring well network was specifically designed and 38 indicator parameters were specifically selected with the intent of detecting the signature of contamination from cells at the earliest possible point in time due to the inadequate leak detection systems for the cells so the source of contamination could be halted and remediation undertaken before irreversible environmental damage occurs.

Division Response: The Division generally agrees with this comment but would like to provide additional background and update on the 2004 Statement of Basis ("2004 SOB") referred to in the comment. The 2004 SOB provides a basis for setting interim groundwater protection levels (GWPL's), "to be used as early-warning indicators of impending groundwater pollution" (2004 SOB Page 7), pending modification after completion of the existing well background groundwater quality report. Beginning on page 9 of the 2004 SOB there is a discussion of the selection of appropriate groundwater quality monitoring parameters for the tailings cell monitoring wells. Specifically, the determination of these parameters was made through examination of: 1. Feedstock materials; 2. Process Reagents; 3. Source Term Abundance; 4. Contaminant Mobility; 5. Contaminant Persistence/Transformation, and; 5. Detectability.

The 2004 SOB in multiple discussions of monitoring parameter selection states that a conservative approach was taken based on little information related to contaminant mobility and/or source term characterization. The conservative approach was to include all of the

parameters identified by evaluation of the feedstock materials and process reagents which could be routinely analyzed with appropriate detection limits and provide consistent data quality (detectability).

Since the time of the 2004 SOB, background reports have been prepared and infiltration and contaminant mobility modeling (based on better site characterization) has been conducted. Additionally, site-specific information regarding the tailings wastewater has been collected. Although this additional characterization work has been accomplished, the current Permit renewal still includes all 38 of the originally identified conservative compliance parameters. Therefore, the Permit condition has not changed.

UMUT Comment #46

11. The Tribe disagrees with DWMRC regarding the proposed GWCL modifications. The proposed modifications are not reasonable, are not supported by good science and are not protective of human health or the environment. A more protective methodology must be used to protect groundwater quality.

> *a. The Statement of Basis for Ground Water Permit (GWDP) No. UGW370004 2017 (2017 GWDP SOB) renewal describes Energy Fuels Resources (USA) Inc. (EFR) making multiple requests for modifications to ground water compliance limits (GWCLs) for multiple wells in the POC monitoring well network that have been exhibiting out of compliance (OOC) status for certain compliance parameters. DWMRC has concluded that these modifications are "reasonable and are further supported by the administrative record" (pg.2 2017 GWDP SOB) and has included the suggested revisions in this permit proposal.*

Division Response: The Division does not agree with this comment. The 2017 SOB includes a summary of source assessment documents submitted by the Permittee and Division review memos. Based on Division review of the SOB listed documents, revised GWCLs have been approved pending inclusion in the Permit renewal. The technical basis for approving these GWCLs is according to source activities outlined in each source assessment document based on an individual well and individual parameter in out-of-compliance status. The source investigations include several supporting lines of evidence to eliminate the Mill as the source of the exceedances, including:

- Evaluation of Tailings Solution Discharge Indicator Parameters (Cl, Fl, SO4, U) concentration and trends. These indicators are used in comparison to other compliance parameter since, based on distribution coefficients, retardation factors and high concentrations in the tailings solution they would be expected to arrive at the groundwater earlier than other parameters.

- Mass Analysis – Volumes of tailings wastewater which would be required to cause the concentration increase.

- Contaminant transport time of arrival to the point of exposure with consideration of unsaturated transport through the vadose zone and measured groundwater velocity.

- Pre-identified background concentrations and pre-identified concentration trends as documented in the groundwater background reports.

- Groundwater age dating and evaluation of isotopic fingerprint analysis as part of the University of Utah Groundwater Study[52] at the Mill.

Subsequent to the findings of the source assessments, if it is determined that the exceedance is due to natural background concentrations and not caused by Mill activities, then the GWCL is recalculated using all recent data and according to prescribed statistical guidance from the Environmental Protection Agency. These calculations are reviewed and affirmed by the Division. In the event that a calculated revised GWCL does not appear appropriate the Division discusses the proposed value with the Permittee and requires a recalculation to ensure compliance with Permit conditions. These measures are wholly conservative and provide GWCLs which are highly protective of the environment.

UMUT Comment #47

b. DWMRC is improperly allowing EFR to circumvent the Utah Groundwater Protection Regulations by constantly adjusting background levels to justify repeated resetting of GWCLs to more lenient compliance levels, rather than properly requiring EFR to adhere to the established regulatory process for setting alternate concentration limits – which necessarily requires, among other things, steps to correct the source of the contamination.

Division Response: The Division is not allowing the Permittee to "circumvent" Utah regulations. The Division is treating the Permittee in the same manner as it treats all permittees under similar circumstances. As with all such permits, the Permit at issue here is written in accordance with State Groundwater Regulations and includes references to the legal requirements that the Permittee must meet in the event of Probable Out-of-Compliance and Out-of-Compliance conditions at listed groundwater monitoring wells. This is the proper regulatory process as outlined in the Utah Groundwater Rules, Utah Administrative Code R-317-6.16, and is consistently implemented in State Groundwater Quality Permits in similar situations.

Alternate Corrective Action Concentration Limits (ACALs) are related to corrective actions. The ACL process is an option when implementing a corrective action plan. Utah Ground Water Rules related to corrective action are found in the Utah Administrative Code R-317-6.15. The Permittee has submitted contamination investigations and corrective action plans, as summarized in the 2017 Permit SOB for the nitrate and chloroform plumes. The nature and extent of the contamination has been characterized. The activities and operations that caused the releases have long been abated by ceasing operation or corrective action. The size, scope, and scale of

[52] Hurst, T.G. and Solomon, D.K., 2008, *Summary of Work Completed, Data Results, Interpretations and Recommendations for the July 2007 Sampling Event at the Denison Mines, USA, White Mesa Uranium Mill Located Near Blanding Utah,* Prepared by University of Utah Department of Geology and Geophysics.

the plumes are known. No localized use of the shallow groundwater at issue has been identified or is possible, given the localization of the contamination. Active remediation has been prescribed for this contamination and is outlined by order.

Regarding identification of potential contamination from tailing wastewater, based on available data, it is apparent that localized exceedances of generally applicable standards are likely to occur from time to time, due to fluctuations in groundwater background concentrations, during the time that corrective action is ongoing for the identified contaminant plumes. Such exceedances and fluctuations are not due to any releases of tailings wastewater. In this case the Permittee has definitively shown that the Mill is not causing these fluctuations and has submitted revised statistics, in conformance with EPA guidance, for revised GWCLs. No contaminant plume from the tailings cells is evident. For the reasons discussed in more detail in the 2017 Permit SOB and underlying reports, in the Division's reasoned technical judgment, revised GWCLs are more appropriate and protective than setting ACALs during the operational phase of the Mill.

UMUT Comment #48

> *c. When significant trends in background compliance well data are discovered, their source must be identified, and* ***the source of the trend must be found to be unrelated to the regulated facility*** *prior to modifying the associated compliance limit. (ASTM 2017; EPA 2009; Gibbons 1999; Utah Admin. Code R317-6-1 (definition of "background concentration")).*

Division Response: The Division has followed all applicable requirements in establishing GWCLs here. The sources of the trends have been identified, contained, and controlled. Several concentration trends were identified in the existing wells and new wells background reports. The bold language in the comment is taken out of context and is incomplete. The Utah Administrative Code R317-6-6.10.C allows that "[a]fter a permit has been issued, permittee shall continue to monitor background water quality contaminant concentrations in order to determine natural fluctuations in concentrations." The Permittee is in compliance with these conditions and revisions to GWCLs recognize the historical data collection and identified trends. The Division's review of proposed revised GWCLs recognizes the EPA 2009 Unified Guidance for Statistical Reviews and the Permittee proposals are in conformance with that guidance.

UMUT Comment #49

> *d. The ground water protection regulations in Utah Admin. Code R317-6 define the term "background concentration" to mean "the concentration of a pollutant in ground water groundwater upgradient or lateral hydraulically equivalent point from a facility, practice or activity* ***which has not been affected by that facility, practice or activity****." [Emphasis added.] Utah Admin. Code R317-6-1.*

Division Response: All applicable provisions of the Utah Administrative Code have been followed in establishing GWCLs and approving the corrective action plans here. The UMUT citation to this rule is out of context and incomplete. The Utah Administrative Code R317-6.10-C states: "Applicable up-gradient, and on-site ground water monitoring data shall be included in the ground water quality permit monitoring report." The Permittee is in compliance with this

requirement. Monitoring wells at the White Mesa Uranium Mill are regulated on an intra-well basis which means that an individual determination of background is required as to each monitoring well on site. All determinations of background groundwater concentrations performed for the White Mesa Mill have been accomplished in full compliance with Utah laws, rules, and regulations and have been conducted with good data quality management and statistical practices. In the Division's reasoned professional judgment, background levels for all monitoring wells at the Mill have been appropriately established.

UMUT Comment #50

e. Modification of compliance limits for POC wells with statistically significant increasing trends of indicator parameters is technically unsound and unacceptable for protection of human health and the environment.

Division Response: The Division disagrees with this comment. As explained in more detail above and in the 2017 Permit SOB and underlying reports relating to the approved corrective action plans, the approach adopted by the Division here is proactive, conservative, and highly protective in relation to increasing trends. The Division has required the submission of separate corrective action plans each time the limit has been exceeded. Statistical guidance would allow for increasing GWCLs well beyond what the Division has historically allowed. Ultimately, in response to these concerns, the Division may allow less protective yet accepted and approved statistical methods to be employed by the Permittee (e.g. Control Charts).

UMUT Comment #51

f. Groundwater compliance limits (GWCLs) were developed site specifically on a well-by- well (intrawell) approach using EPA RCRA guidance (EPA 2011 Unified guidance) to determine baseline levels unimpacted by Mill activities.

Division Response: This is correct. Intrawell statistics were incorporated into the permit based on recognized variability of groundwater concentrations in the Burro Canyon aquifer.

UMUT Comment #52

g. A foundational element of the Unified Guidance is that it is unacceptable to raise a GWCL for a POC well if there is a possibility that a facility may be the cause of the exceedance. The original GWCLs should be retained and the DWMRC review and approval of the modified GWCLs should be re-visited in a sound scientific manner prior to the proposal of modified GWCLs in the groundwater discharge permit for the facility.

Division Response: The Division disagrees with the UMUT's interpretation of the Unified Guidance as applied here. In the Division's reasoned, technical judgment, all GWCLs in the Permit and proposed by the Permittee were developed and reviewed based on "sound scientific manner" and in conformance with State and Federal Rules, applicable regulations, and the Unified Guidance. Even if there were a difference in the Unified Guidance and the Division's determinations here, the Division notes that the Unified Guidance is a guidance document and does not have the force of law.

UMUT Comment #53

h. Similarly, ground water protection regulations in Utah Admin. Code R317-6 define the term "background concentration" to mean "the concentration of a pollutant in ground water upgradient or lateral hydraulically equivalent point from a facility, practice or activity ***which has not been affected by that facility, practice or activity****." [Emphasis added.] Utah Admin. Code R317-6-1.*

Division Response: The Permit requires background determinations for monitoring wells hydraulically upgradient and lateral from the Mill. This comment has been addressed in detail, above, in response to UMUT Comments 48-50.

UMUT Comment #54

i. There has been no showing by EFR or DWMRC that the purportedly changing background concentrations detected in Mill monitoring wells "[have] not been affected by that facility, activity, or practice" as required by Utah regulations and he Unified Guidance. In fact, the very opposite is true - background concentrations have been and are being affected by the Mill operations and acitivities [sic].

Division Response: The Division disagrees with this comment because it is not supported by this record. There is no evidence that background concentrations have been and are being affected by Mill operations and activities. The background concentrations in the Mill monitoring wells are based on statistically sound data sets. In 2007, a specific study was conducted to verify that elevated concentrations of metals and other ions were not due to impacts from the Mill (University of Utah Report). Further response to this comment is found in General Response #16 and UMUT Comment Nos. 36 through 40, above.

UMUT Comment #55

j. A Source Assessment Report (SAR) is required under Part I.G.4.c. of the proposed GWDP; however, the Tribe maintains that SARs which have been completed to date for OOCs lack scientific rigor and provide inadequate technical basis for modifying GWCLs. The proposed modifications to the GWCLs in the draft permit are based on data which exhibit negative impact from the Mill and their approval would constitute endangerment to public health and the environment by masking and administratively covering a toxic contaminant release.

Division Response: The UMUT assertions that the SAR's "lack scientific rigor" or that the SAR's "provide inadequate technical basis for modifying GWCLs" are not supported by technical rationale or evidence. Therefore, the Division cannot accept the comment. Regardless of this conclusion, in the Division's reasoned technical judgment, the Division has made the affirmative determination that the SAR reviews have been conducted appropriately. The relevant Division review documents relating to this topic are publicly available on the Division's website and are part of this record.

UMUT Comment #56

12. The multiple lines of evidence approach proposed by EFR in SAR reports and adopted and approved by DWMRC consistently rely on three arguments to reach a conclusion that the Mill is not the source of OOC parameters: (1) a review of plots of indicator parameter concentration

trends; (2) the 2007/2008 University of Utah (Isotope) Study and (3) geochemical influence from pyrite oxidation. Sections 2-4 of the following comments address these arguments.

Division Response: This statement is generally correct. The Division incorporates its General Response #16 and its Responses to UMUT Comment Nos. 36-40, above. Additional responses on this topic are also provided below.

Section 2: Indicator Parameters

UMUT Comment #57

13. As detailed in the 2004 GWDP SOB, each of the 38 parameters selected by DWMRC for monitoring as an early warning indicator of groundwater pollution was selected based on concentrations in source material (ore, alternate feed materials, process solutions and reagents) and mobility in the environment as determined by partitioning coefficients (Kd values) and retardation factors (Rf). At the time of the 2004 GWDP development, Kd and Rf factors were based upon generic literature values. Contaminant mobility in the subsurface is a fundamentally complex subject, which as recognized by DWMRC, depends on site-specific values for Kd and Rf factors, among other site specific geochemical and hydrological considerations which interact to influence the speed of contaminant transport within the vadose zone and aquifer. Page 15, 2004 GWDP, "Ideally, these Kd values are determined independently for each permitted facility, using laboratory or field-scale tests with site specific groundwater and soils and/or aquifer materials."

Division Response: The Division generally agrees with the UMUT's presentation of the technical data and characterization of the 2004 GWDP SOB. In short, the use of site-specific partition coefficients (Kd) and retardation factor (Rf) are parameters used in groundwater transport models to describe the chemical interaction between a contaminant and the receiving geological mineral matrix. As discussed above, the 2004 SOB states that site specific Kd and Rf had not been evaluated at that time; therefore, the full identified suite of parameters, as determined by investigations of mill processes and reagents used were included in the existing permit. The full suite of parameters is still proposed in the 2017 SOB and the Permittee has not proposed reducing the number of monitoring parameters based on geochemical transport modelling. In this sense, the proposed permit renewal is no less conservative than the existing permit and the Permittee will still be required to sample groundwater for the 38 identified compliance parameters.

UMUT Comment #58

14. DWMRC should use all 38, not merely four, of the DWMRC's specifically selected indicator parameters and use a more sophisticated approach as intended when the 2004 GWDP SOB was developed. Page 7 of the 2004 SOB details the development of GWCLs for each of the 38 chosen parameters, "to be used as early warning indicators of impending groundwater pollution."

Division Response: The Division disagrees with this comment. The Permit requires that groundwater monitoring wells be sampled and analyzed for 38 compliance parameters. Intra-well background statistics are performed at the Mill due to recognition of the heterogeneous nature of the Burro Canyon Formation. It is acknowledged and observable that parameters (e.g.

heavy metals, nutrients, other inorganic and organics) which are detected at the tailings cell monitoring wells are also detected at wells located hydraulically upgradient from the Mill and tailings cells and at wells far downgradient from the Mill.

The Division regularly reviews the monitoring well data (submitted in quarterly reports) and compares those measured concentrations against their corresponding GWCLs. Again, the GWCLs have been established with consideration of background monitoring concentrations on an intra-well basis. This is in recognition of the anisotropic and heterogeneity of the Burro Canyon aquifer. The Division also notes that several of the parameters in respective wells were identified as having pre-existing upward or downward data trends. The GWCLs are based on statistical analysis using an evaluation of all historical groundwater monitoring data for each well.

If any of the monitoring concentrations exceeds the GWCL then Energy Fuels is required to report the exceedance and commence accelerated monitoring for that well and parameter. If the concentration of a parameter exceeds the GWCL in two consecutive samples then Energy Fuels is required to notify the Division of the "out-of-compliance" status, continue accelerated monitoring, and submit a plan and time schedule for assessment of the source of GWCL exceedances.

The Permittee submits the plan and time schedules and source assessment reports to the Division according to the requirements of the Permit for review and approval. Source assessments generally include the following types of evaluation which serve as lines of evidence when determining whether the GWCL exceedance was or was not due to Mill activities. These lines of evidence include the following:

- Evaluation of Tailings Solution Discharge Indicator Parameters (Cl, Fl, SO4, U) concentration and trends. These indicators are used in comparison to other compliance parameter since, based on distribution coefficients, retardation factors and high concentrations in the tailings solution they would be expected to arrive at the groundwater earlier than other parameters.
- Mass Analysis – Volumes of tailings wastewater which would be required to cause the concentration increase.
- Contaminant transport time of arrival to the point of exposure with consideration of unsaturated transport through the vadose zone and measured groundwater velocity.
- Pre-identified background concentrations and pre-identified concentration trends identified in the groundwater background reports.
- Groundwater age dating and evaluation of isotopic fingerprint analysis as part of the University of Utah Groundwater Study at the Mill.

Thus all 38 groundwater parameters are being used for compliance purposes in that a single exceedance of any of the parameters requires the Permittee to initiate accelerated monitoring, and a consecutive dual exceedance requires the Permittee to investigate the source and confirm that the Mill is not the source of the GWCL exceedances. Further response to this comment is provided in the Division's General Response #16 and its Responses to UMUT Comment Nos. 36-40, above.

UMUT Comment #59

15. Recent federal guidance confirms that a nuanced approach for determining compliance with discharge permits and successfully detecting contamination is the correct approach for regulator to take. The recently revised proposed rule for In Situ Leach Uranium Operations, Health and Environmental Protection Standards for Uranium and Mill Tailings, 40 CFR Part 192, 82 FR 7400, 7409 (U.S. EPA, 2017) clarifies that a determination of contamination may be based on one indicator parameter being out of compliance. Additional geochemical and isotopic characterization work and evaluation needs to be required.

Division Response: The Division disagrees with this comment. The legal regulation cited in this comment, 40 CFR Part 192, is a proposed rule for uranium in-situ recovery (ISR) facilities and is not legally or technically applicable to conventional uranium milling facilities such as the White Mesa Mill. Although the proposed rule does require Licensees to demonstrate stability standards (based on the nature of ISR extraction processes), it is unclear how the UMUT sees this proposed rule as a "nuanced" approach since the methodology of confirming whether maximum concentrations are exceeded and follow up actions are the same as those currently included in the proposed Permit for the Mill. Specifically, the proposed ISR rule requires that the maximum concentration of constituents defined in the proposed rule (arsenic, barium, cadmium, chromium, lead, mercury selenium, silver, nitrate as N, molybdenum, Ra-226 + Ra-228, and combined uranium isotopes 234, 235 and 238) be set according to the lowest of: 1. MCLs in 40 CFR 141 and 143, or; 2. The maximum concentration specified in Table 1 to Subpart A of the subject Part. The proposed rule also recognizes the potential of high background concentrations in groundwater and allows maximum concentrations to be set by background: "*where a background concentration is determined to be higher than the lowest value in the applicable regulations, the background concentration will serve as the constituent concentration standard*."

Corrective actions for ISRs are covered according to excursion and stability monitoring requirements which are unique to ISR processes and in particular to monitoring separately defined indicator parameters, as well as other requirements; although it should be noted that the general compliance requirements are similar to those in the draft Permit. It is noted that if the maximum concentrations cannot be restored then the proposed rule allows that alternate concentration limits (ACLs) may be set according to stability monitoring findings and continued monitoring to determine long-term stability. The Tribe should note that the implementation of ACLs, based on associated contaminant transport modelling, recognizes that the groundwater has been deteriorated by ISR activities but demonstrates that constituents which now exceed maximum concentrations (reset to a provisional point of compliance standard) will not pose substantial present or potential hazard to human health or the environment.

Although at some point it may be appropriate to set ACLs at the White Mesa Mill based on contaminant transport modelling, it is currently understood that in the case of chloroform and nitrate contamination, the expectation as required by the corrective action plans, is that the Permittee will remove or otherwise treat the contamination and return the groundwater to Utah Ground Water Quality Standards.

Additionally, as discussed in multiple responses to the UMUT comments, there is no justification to require additional geochemical and isotopic characterization based on a single exceedance of a GWCL. The permit addresses corrective actions in the event that a parameter exceeds its GWCL and additional corrective actions in the event that the GWCL is exceeded two consecutive times.

UMUT Comment #60

16. UDWMRC should require development of and assessment methodology for site specific Kd (soil partitioning values) for each parameter with site specific geochemical analytic data and associated modeling and interpretation. Currently generic literature values and concepts are being used for decision-making by EFR and DWMRC in contrast to scientific based best practices (U.S. EPA, 1999) and DWMRC own recommendations (2004 GWP SOB).

Division Response: The Division disagrees with this comment. As discussed above, Kd and Rf are used in groundwater transport modelling. The Permittee has conducted such modelling to demonstrate the efficacy of a proposed revised cover design. Ultimately, though this modelling was useful, the Division is requiring the additional demonstration of the cover through onsite test sections. This is to eliminate some of the assumptions made in the transport modelling.

The use of literature values for Kd, as discussed in the 2004 SOB has not affected decisions related to monitoring parameter selection in the Permit or indicator parameters used as one of the lines of evidence for reviewing OOC source assessment reports.

UMUT Comment #61

17. It concerns the Tribe to see broad generalizations, including generic Kd and Rf factors, for specific constituents of concern, being used by DWMRC for the evaluation and analysis of potential indicators of contamination.

a. For example, page three of a DWMRC February 16, 2017 letter responding to the Tribes concerns about groundwater contamination at the Mill states in regards to chloride, "there is no retardation of movement through the vadose zone." A review of the science literature regarding chloride mobility in the vadose zone reveals a plethora of evidence and data that thin clay layers have been shown to retard chloride by retaining the ions in their matrix. Clay layers have been documented to exist both in the vadose zone as well as at the bottom of the tailings impoundments. Retardation of chloride mobility is noted in foundational scientific texts such as Study and Interpretation of the Chemical Characteristics of Natural Water, USGS Water-Supply Paper 2254, Hem 1992 and in many peer reviewed papers published and readily available. In fact, this phenomenon has been observed in the same geologic formations encountered at the Mill site (USGS 1995) and under similar hydrologic conditions (Applied Geochemistry, 2008.) Cells 4A and 4B each have a compacted clay liner installed while each of the legacy cells have received copious amounts of fines (clays) from geologic formations specifically documented as retarding chloride mobility. Kaolinite clay layers in the Burro Canyon formation are also documented in multiple site investigation reports. The most recent hydrogeology report developed for the site, "Hydrogeology of the White Mesa Uranium Mill, Blanding Utah" prepared by Hydro Geo Chem and dated June 6, 2014 describes kaolinite clays and shale layers and cementing in the Burro Canyon formation in detail with descriptions in the text, well logs and geologic cross sections.

Division Response: The Division disagrees that it is engaging in broad generalizations. The Kd and Rf are tools used for geochemical modeling for projections of contaminant transport. The identification of contamination in groundwater may consider inputs used for geochemical modeling but these are not necessarily expected outcomes or as reliable as consideration of actual groundwater data. As discussed by the Tribe, when developing a conceptual model it is best to use as much site collected, and bench tested data as possible to calibrate the mathematical model. However, this does not imply that the modelling is accurately representative of site conditions and conclusions must be analyzed to ensure that inputs are conservative.

Chloride is widely recognized as a conservative tracer in the environment. The issue of potential retardation of chloride due to interaction with very fine grained clays has been discussed previously. Regarding clay layers in the cell liners. Cells 1, 2 and 3 do not include clay or compacted clay layers. Cells 4A and 4B include a 0.2 inch Geosynthetic Clay Liner (GCL) of low permeability bentonite clay. Regarding clay layers in the Burro Canyon Aquifer in the area of groundwater monitoring, the Division is not aware of fine grained or compacted clay layers. If tightly compacted clay layers were present, they would be supported by evidence in drill logs or perched saturated zones. For the most part, the drill logs show sandstone and conglomerate down to the screened interval. Some logs show a shallow zone of Mancos shale (erosional remnants of negligible thickness) and occasional deeper thin shale layers. The Burro Canyon stratigraphy is discussed in the Energy Fuels June 6, 2014 Hydrogeologic Report Section 3.1.2.2. Even if tightly packed clay lenses were present it is most likely that the amount of retention of chloride ions in these layers would be minimal due to the high concentration of chloride in the tailings solution. Likewise, the GCL layer in Cells 4A and 4B would likely have a minimal effect in reducing chloride concentrations in the tailings solution in the event of a leak or tear.

UMUT Comment #62

18. Although site-specific factors may retard and reduce the effectiveness of chloride as a primary indicator parameter across the site, no source has been identified for the active existing chloride plume at the Mill. DWMRC and EFR have continually cited chloride as the primary, most useful indicator parameter of tailings cell contamination, while not requiring a source identification investigation into the source of the chloride plume is unacceptable. The data clearly shows that the source of the chloride plume is centered near the southeast corner of cell 1, the corner that cell 1 was constructed to drain towards coincidentally. Chloride concentrations have remained high near the center of the plume (TW4-24) while increasing significantly in most of the wells surrounding this high point, including TW4-19, 20, 21, 22, and MW-28, 30 and 31 indicating that the source of the chloride plume remains active in the subsurface. A comprehensive source assessment report and contamination investigation should be required to determine the chloride source and any OOC co-contaminant prior to approving the proposed GWCL modifications for any wells associated with the chloride plume.

Division Response: The Division disagrees that the evidence of record suggests that the source of the elevated chloride detections is related to Mill operations. Detailed technical responses to this comment are available in the administrative record, specifically the investigation and corrective action reports. The data in this administrative record demonstrates, and the Division in its reasoned technical judgment has found, that the source of the chloride plume is much

farther to the north and east than the southeast corner of cell 1. Initially, the tailings cells were considered as a potential source for the nitrate and chloride plume during the source investigation and preparation of the source assessment report. But several lines of undisputed evidence led the Division to eliminate the tailings cells as a potential source or contributor to the plume. The onsite source assessment considered all potential and possible onsite Mill sources as well as offsite Mill owned and operated facilities and historical facilities and ponds. Data collected during that investigation did not determine a definite source for the chloride. It is noted that although the chloride may be from an offsite source not affiliated with the Mill, the chloride will be captured is association with the hydraulic capture and pump related to the Nitrate Plume. Additionally, there is no Utah Water Quality Standard (Clean-up) standard for chloride.

UMUT Comment #63

19. Similarly, uranium, which has been cited by the Mill and DWMRC as one of the primary/best indicator parameters, is well-known to be extremely sensitive to redox conditions and may readily be geochemically affected by site-specific factors (ammonia release and nitrate plume will affect uranium mobility for example, see Applied Geochemistry, 2013) which would retard its mobility and therefore utility as a key indicator parameter. This concept of uranium mobility retardation and associated limitations for detecting a contaminant plume associated with uranium recovery operations is recognized in recent federal guidance (USEPA, 2014).

Division Response: On the one hand, the Division agrees, generally, that among the metals compliance parameters in the Permit, uranium is considered a reasonable indicator parameter given its high relative concentrations in tailings wastewater and low relative concentrations in groundwater. All of the metals are subject to adsorption reactions in the vadose zone. Preferential adsorption will depend on geochemical conditions and limited sites for surface complexation reactions. Further details regarding this topic are provided in the General Response #16, above, and in response to UMUT Comments 36-40.

UMUT Comment #64

20. Fluoride is another constituent cited by the Mill and DWMRC as one of the best indicator parameters - "Fluoride is the fastest-moving available indicator of tailings seepage" (Energy Fuels Resources and Utah Division of Radiation Control DRC Memo: II DRC-2013-003137 II). Fluoride trends have not been scrutinized or investigated by Mill staff/contractors or DWMRC in that context, despite the alarming fluoride levels at MW-22, the southernmost well at the site and the closest monitoring well to the Tribe despite the fact that the fluoride spike to alarming levels far beyond what may be considered natural. These alarming fluoride levels are accompanied by an enormous pH decline and a significant (exceeding many Utah groundwater protection criteria) recent rise in metals that have been associated with alternate feeds (beryllium and cadmium, manganese) and other trace metals associated with uranium ores such as cobalt, copper, molybdenum, nickel, and zinc. Elevated levels of fluoride found naturally in aquifers are found in geochemical conditions quite different from the Burro Canyon aquifer at the site, natural fluoride in high concentrations usually associated with neutral to alkaline pH, low calcium, high sodium and bicarbonate concentrations (Elango and Brindha, 2001; Handa, 1975, Valenzuela-Vásquez et al., 2006; Edmunds and Smedley, 2005) which is further indirect evidence that the high abundance that has appeared in MW-22 has an anthropogenic source that warrants serious and detailed investigation. Fluoride and each of the metals listed here were

chosen in the 2004 GWDP SOB based on abundance in sources at the Mill and high potential for migration in the subsurface. Wells like MW-22 which exhibit significant trends for multiple indicator parameters require a rigorous source investigation including detailed geochemical and isotopic analysis to rule out Mill operations as a source of the contamination.

Division Response: On the one hand, the Division agrees, generally, that among the metals compliance parameters in the Permit, fluoride is a reasonable indicator of impacts from Mill operations. However, as with uranium discussed above, its presence does not automatically indicate that Mill operations are the source. Fluoride, like uranium, is also naturally occurring. In this case, extensive geochemical modeling completed for the Mill (Infiltration and Contaminant Transport Model Dates) demonstrated that the indicator parameters Cl, Fl, and SO4 would be transported in the vadose zone with little or no retardation. Source assessment reports utilize several studies for evaluation of the Mill activities as a source. In the case of monitoring well MW-22, it was concluded by the University of Utah Study that White Mesa Mill activities and processes are not the cause of elevated concentrations at that well. Additionally, the White Mesa Mill monitoring well network has monitoring wells much closer to the tailings cells and processing areas which would be a much earlier detection point of potential discharges. These nearby monitoring wells to the tailings cells do not show the same elevated concentrations as monitoring well MW-22. In the case of indicator parameters (Uranium, Chloride, Fluoride and Sulfate) in monitoring well MW-22, Uranium is showing a strong decreasing trend, Chloride is showing a decreasing trend, Sulfate is showing a slightly increasing trend and Fluoride is showing an increasing trend. These trends are inconsistent with a finding that the Mill is the source of these elements. Therefore, the Division has concluded, in its reasoned professional judgment and based on the technical evidence in this record, that tailings cells are not the source of the concentrations seen at MW-22. Further response to this comment is found in the record and in this public participation summary.

UMUT Comment #65

21. DWMRC has determined that the natural variation at the mill site and the unique nature of the material and related process reagents used at the site required the selection of an expanded suite of indicator parameters and required GWCLs to be determined on a well by well basis. The same reasoning also requires that site-specific geochemistry be used in the decision making process for each well and for each indicator parameter when screening for trends and potential facility impact. Geoscientists have acknowledged for many years that the default values found in literature can result in significant errors in the detection and remediation of pollutants in groundwater and that values calculated using site-specific conditions are "absolutely essential" (U.S. EPA, 1999).

Division Response: The Division reviews all historic data for all compliance parameters when reviewing data trends and GWCL exceedances.

UMUT Comment #66

22. We request that the SAR's conducted to date for wells MW-24, MW-28, MW-5, MW-31 (in addition to all wells exhibiting a significant decline in pH which will be discussed in greater detail below) specifically are required to be performed again at a more rigorous scientific level considering all of the 38 constituents required for monitoring as indicator parameters of facility

impact at a more sophisticated and detailed level, site specific geochemistry and incorporating analysis from updated isotopic testing which also needs to be required.

Division Response: The Division disagrees with this comment. In the Division's reasoned judgment, it concludes that the SARs conducted by the Permittee for monitoring wells MW-24, MW-28, MW-5 and MW-31 were conducted in compliance with Permit requirements, State of Utah rules and regulations, and in accordance with Director review and approvals. There is no technical or legal basis for the Director to require more rigorous review.

Section 3: Updated Isotopic Testing

UMUT Comment #67

23. In 2009 the Tribe commented regarding the need for an updated isotopic study during the public comment period regarding a proposed modification to the GWDP for the Mill. At that time, we implored DWMRC to keep a provision in the GWDP requiring additional isotopic characterization work. UDWMRC removed the provision, but noted in the public response summary that they, "continue to believe that additional study of isotopic geochemistry at the site is appropriate at some time. However, we agree it is DUSA's prerogative to defer such study until a monitoring well or contaminant passes into out of compliance statues by exceeding its respective ground water compliance limit."

Division Response: Under applicable legal requirements, the Permittee source assessment reports are definitive without the use of additional isotopic water analysis. Such is not required. In the Division's reasoned technical judgment, the University of Utah Study's detailed characterization of the White Mesa Mill surface water sources proved that elevated metals in groundwater were background and not caused by Mill activities.

UMUT Comment #68

24. Since 2009 there have been many, many wells that have passed into out of compliance status for a varied host of indicator parameters. As of the first quarter 2017 groundwater monitoring report there are twenty wells and sixty-eight parameters in accelerated monitoring/out of compliance status. It is far past time to require additional necessary isotopic/geochemistry characterization work.

Division Response: The Permit includes specific requirements for source investigation and follow-up actions for any parameter which goes into out-of- compliance status. If it is determined that the exceedance was caused by natural variations in the groundwater then it is appropriate to adjust the GWCL according to the extended data set including more recent data points and in conformance with statistical guidance. Additional isotopic/geochemistry characterization is not needed to verify that the current wells and parameters in "out-of-compliance" status were not caused by Mill activities. In many cases the current out-of-compliance parameters were noted to have an increasing concentration trend in the background groundwater report. Here, the Division is being conservative in requiring that in those cases (increasing trend) the Mill needs to prepare an updated source assessment to verify that the increasing concentrations were not due to Mill activities and re-calculate GWCLs based on the enlarged data set.

UMUT Comment #69

25. All proposed GWCLs modifications should be withdrawn pending completion and analysis of such work.

Division Response: The Division disagrees with this comment because it is not in accordance with applicable laws. The GWCL modifications at issue have been proposed by the Permittee. The Division has reviewed this proposal and has found that it was made in accordance with Permit Requirements and State Rules and Regulations. The Division has further determined that an isotopic study is not a State or Federal requirement and is not otherwise needed here for complete review of source assessment reports and proposed modifications. Many of the current exceedances were noted as increasing trends at the time of the Permittee background groundwater reports.

UMUT Comment #70

26. The University of Utah, 2008 Study which contained analysis of samples collected in 2007 – ten years ago, expressly recommended additional investigative isotopic work be done at that time. Radical changes in water chemistry and flow conditions since then obviously require a follow-up isotopic study be conducted. The Tribe requests such a study be performed as a condition of the current permitting and include: a) performance of additional isotopic/geochemical investigation and characterization work; b) further investigation in the area of MW-27 and further investigation in the area of MW-22 (see University of Utah, 2008, page 54); and, c) reduced purge times for groundwater sampling and performance of passive sampling near the top of the water column (University of Utah, page 55).

Division Response: The University of Utah report recommended that additional isotopic work would be pursued to identify the surface source for monitoring well MW-22 since the monitoring results in this well showed a small contribution of recent water that had a signature not associated with White Mesa Mill surface water impoundments. While this data might be of some value, at this time, the Division does not see a need for further investigation of this surface source since it is clearly not associated with the White Mesa Mill. The details regarding the anomalous conditions at MW-22 are not highly relevant given its remote location within the White Mesa Mill's private and controlled property boundaries. There are no known potential receptors accessing or using this localized groundwater, which is also contained exclusively in the perched (Burro Canyon) aquifer. Finally, effective monitoring wells on the same groundwater path line are present that are much closer to potential Mill sources. As a result, MW-22 has limited value as a monitoring well location. It is cross-gradient from potential Mill sources and would not detect releases from Mill operations.

UMUT Comment #71

27. The University of Utah Study did identify that there was active groundwater recharge and flow dynamics across the site which, along with the study's numerous recommendations for further investigations, are further compelling arguments for additional isotopic testing and investigation prior to any serious discussion of raising compliance limits.

Division Response: Based on the University of Utah report and additional data and considerations of record, the Division, in its reasoned technical judgment, has found that compliance monitoring wells were impacted by infiltration from the wildlife ponds that were in use at the time, through the use of direct correlation with identified isotopic fingerprints. Using the same methodology, the Division found that groundwater sampled in the compliance monitoring wells was not impacted by tailings wastewater. In the Division's reasoned technical judgment, further isotopic testing is not required to rule out the tailings impoundments. This question is now settled.

UMUT Comment #72

28. On August 9, 2016 Scott Clow and Colin Larrick from the Tribe's Environmental Programs Department met with DWMRC to discuss groundwater conditions at the Mill facility. At that meeting the DWMRC staff informed Mssrs. Clow and Larrick us that additional isotopic characterization work, similar to the University of Utah Study completed over eight years ago, would be a valuable and important project which would help immensely in defining current conditions and potential impacts. The DWMRC recommended the Tribe find a graduate student and program that could do the work.

Division Response: The Division incorporates its response to UMUT Comment No. 71, above. In the event that the UMUT would like to undertake and pay for additional isotopic groundwater sampling and analysis at the White Mesa Mill, the Division will consider such a request.

UMUT Comment #73

29. Since that time, the Tribe connected with Duke University Nicholas School of the Environment's PhD Candidate, Nancy Lauer who is working with Dr. Avner Vengosh, Senior Lecturer of Geochemistry and Isotope Hydrology (http://sites.nicholas.duke.edu/avnervengosh), who have offered to sample/analyze and interpret results in a report at no cost to EFRI, DWMRC or the Tribe using cutting-edge pattern recognition techniques for a comprehensive suite of isotopes, metals and ions.

Division Response: The Division is unaware of the intention, scope or quality control regarding the proposed project. Information submitted relevant to the Duke University Nicholas School of the Environment is generic and provides very little information other than a vita pertaining to Dr. Avner Vangosh and the abilities/resources provided at the laboratory.

UMUT Comment #74

30. Nancy Lauer planned a sampling trip in November, 2016 and coordinated with the Tribe to collect nine samples from our two monitoring wells, a community supply well in the community of White Mesa, four springs around White Mesa and Recapture Reservoir which is the source of part of the process water EFRI uses. Nancy Lauer also attempted to coordinate with EFRI for access to the facility in order to sample on site wells however permission was denied and we understand that EFRI would not allow access unless they were compelled by DWMRC.

Division Response: The Division acknowledges receipt of two letters from the UMUT, one dated December 16, 2016 and another dated January 20, 2017, that reference a project allegedly being coordinated between the Ute Mountain Ute Tribe and the Duke University Nicholas

School of the Environment. According to these letters, the proposed action was being conducted by the Ute Mountain Ute Tribe based on discussion during a meeting between the Division and the Ute Mountain Ute Tribe that occurred on August 9, 2016. But the discussion at the August 9, 2016 meeting was exclusively regarding the University of Utah Study and whether the conclusions made per that report were still valid. The Ute Mountain Ute Tribe specifically raised concerns that the University of Utah Study was conducted in 2007/2008 and that revisiting the study procedures, to obtain evidence of groundwater age and isotopic signatures of groundwater should be revisited. The meeting did not address the Duke University proposed study.

The Division was not aware of the sampling trip planned for November 2016 or provided information regarding the Duke University study or its scope. Division has not been provided an understanding of what sampling is being proposed and conducted by Duke University, how samples will be collected and analyzed, or quality assurance standards which will be used to ensure validity of the sample results and conclusions. The Ute Mountain Ute Tribe letters include a website link, http://sites.nicholas.duke.edu/avnervengosh . However, upon Division search, this website is a biography of Dr. Avner Vengosh (Duke University Professor) and summarizes some of his projects. The website does not provide any details regarding a proposed project at the White Mesa Uranium Mill.

The Division is additionally unclear if the samples collected by Nancy Lauer (Duke University) at the locations stated by the Ute Mountain Ute Tribe have been analyzed or if the Ute Mountain Ute Tribe has received results of those samples or been advised of findings related to the sample results.

UMUT Comment #75

31. It is the Tribe's understanding that DWMRC would like to see a detailed scope of work and proposal and are sure that if DWMRC facilitated communication and site access Duke University would he pleased to develop a document that would be adequate. Attached to our comments is a detailed description of the Vengosh Laboratory Analytical capabilities and methods (Attachment B: Vengosh Methods).

Division Response: The Tribe's statement that the Division should facilitate the development of a study plan with Duke University is unclear. It was the Division's understanding that the Tribe's intention was to propose a study for additional isotopic investigation in the region of the Mill. Based on this understanding, the Division needs to understand the details and scope of the Tribe's proposal. The Division appreciates the Tribe providing information related to qualifications of Dr. Vengosh and the capabilities of the Vengosh Laboratory. However, this is not a proposal for Division review regarding a project at the Mill.

UMUT Comment #76

32. The Tribe requests that prior to any official approval of compliance limit increases that Duke University be allowed to proceed with sampling this well along with the other facility wells included in the University of Utah Study and selected wells in the nitrate and chloroform plume areas. Detailed isotopic, metals and ions analysis would assist in identifying the source pH decline and of the increases in metals of concern while providing extremely valuable baseline data which would be informative and help provide answers to all parties.

Division Response: Issuance of the Permit is not dependent on completion of sampling by Duke University. As stated above, the Division has yet to receive any information regarding the proposed Duke University project.

UMUT Comment #77

33. The Tribe also requests that DWMRC compel EFRI to allow the Duke University study to proceed to sample at list of wells minimally including the fifteen wells sampled in the University of Utah Study, TW4-24, TWN-2, and WW-2.

Division Response: As stated above, the Division would be happy to review and comment on the proposed Duke University project. Please submit detailed information regarding the project plan, scope and quality assurance. These will be reviewed on their own merits, outside the scope of the present re-permitting action.

UMUT Comment #78

34. The original GWCLs should be retained and the DWMRC review and approval of the modified GWCLs should be re-visited in a sound scientific manner prior to the proposal of a new groundwater discharge permit for the facility.

Division Response: The Division disagrees with this comment because it is not supported by the record. In the Division's reasoned technical judgment, the GWCLs proposed for modification in the Permit were submitted and reviewed in conformance with the Permit, Utah laws and rules, and in a "sound scientific manner" as discussed more fully herein and in the record.

UMUT Comment #79

35. The Tribe requests the following elements be included, at a minimum, in a permit condition requiring an updated study:

a. Isotopic Groundwater and Surface Water Investigation and Report - within 90 calendar days of issuance of this Permit, the Permittee shall submit an isotopic groundwater and surface water investigation report for Executive Secretary approval. The purpose of this investigation and associated report shall be to characterize chemical composition, noble gas composition, and age of the groundwater monitoring wells and surface water sites.

b. Minimum locations required to be included in the study: On-site Wells: MW-1, Mw-18, MW-19, MW-27, MW-02, MW-29, MW-30, MW-31, MW-05, MW-11, MW-15, MW-14, MW-3, MW-3A, MW-22 (wells included in initial 2007 University of Utah sampling). In addition, all POC wells not included in the University of Utah Study and; TWN-2, TW4-24, MW-24, WW-2 and Springs: Entrance Spring, Westwater Spring, Cottonwood Spring, Ruin Spring.

c. An examination of groundwater age and isotopic/geochemical conditions using a comprehensive analytical suite of major and trace elements (including all analytes required under Table 2 of the GWDP at a minimum) with the addition of stable isotopes of oxygen, hydrogen, carbon, boron, strontium, lithium and isotopes of radionuclides (uranium, radium, lead-210). After concentrations have been obtained for each well, the

Permittee must verify if any of the monitoring wells have been influenced by the artificial recharge from the tailings and/or facility operations.
d. An examination of isotopes of Deuterium and Oxygen-18 in water at each sampling location to determine geochemical characteristics including but not limited to evaporative signature.
e. The purpose of this supplemental investigation and associated report shall be to establish and evaluate isotopic benchmarks, geochemical characteristics, and a ground/surface water age at these locations. The Permittee must conclusively demonstrate that the supplemental investigation conducted is similar to the one performed by the University of Utah in July 2007.

Division Response: The Division disagrees with this comment for the reasons set forth in more detail in its responses to the UMUT comments. In short, there is no technical, factual, or legal basis to require supplemental groundwater isotopic study in the groundwater Permit.

Section 4: Pyrite/Redox/Dissolved Oxygen

UMUT Comment #80
36. To date there is no scientific evidence that proves pyrite oxidation in the Burro Canyon Formation is causing pH declines. Numerous scientific reports document that the unconfined Burro Canyon Formation has been oxygenated for a long period of geologic time. Testing by EFRI consultants during the course of the pyrite investigation support the conclusion that the formation has been oxidized, and there was no pyrite detected by X Ray Diffraction analysis for any of the samples collected from the vadose zone.

Division Response: The Division disagrees with this comment because it is not supported by the evidence in this administrative record. In the Division's reasoned judgment, the pH reductions are not caused by releases from Mill operations. According to the Pyrite Report, pyrite was detected by X-Ray Diffraction in samples from MW-3A, MW-24, MW-26, MW-27, MW-28, and MW-32 at concentrations ranging from 0.1% to 0.8% by weight. The percentage of pyrite found in the core samples MW-24 core was 0.08 % Fe2O3 which corresponds to 0.8 g/Kg of the formation. The pH decreases in monitoring well MW-24 are discussed in section 4.3.2.2 of the Pyrite Report which includes a discussion of geochemical modeling results.

UMUT Comment #81
37. DWMRC has maintained that the lack of pyrite in the vadose zone is not important and that potential oxidation of groundwater in the saturated zone may have occurred causing pyrite dissolution and a corresponding pH decline and metals increase.

Division Response: The Division disagrees with this comment. Although pyrite dissolution is considered a potential mechanism for the reductions in pH and rise in metals concentrations at several monitoring wells, this is not a primary basis that Division is using to adjust GWCLs. The results of the Pyrite Study and Report showed a possible mechanism and explanation for the site-wide pH decreases. This may be a reasonable explanation given that oxygen was introduced at the well screen at the same time as pH decreases began (2009). This also may be an explanation

as to why pH decreases are more pronounced at some wells more than others since available pyrite in the saturated zone is different for each monitoring well.

The Division's position finds further support in a recent technical study funded by the Bureau of Indian Affairs. The findings of a December 16, 2016 Bureau of Indian Affairs study (Page 1), based on its review of data and documents, the Bureau of Indian Affairs additionally found that "*observed pH decreases and increase of metals concentrations in wells downgradient of the tailings cells are not necessarily due to tailings cell leakage."*

UMUT Comment #82

38. This line of reasoning does not hold up to scrutiny. Tailings disposal of concentrated pyrite mineral tailings waste into lakes exposed to the atmosphere has been a standard practice in the mining industry for decades and has been shown to limit pyrite oxidation and associated acidity increases. How could well pumping or infiltration of surface water which would need to travel many meters through the unsaturated vadose zone be a plausible mechanism to create a more oxidizing environment than a surface water body exposed to the atmosphere, even if there were sufficient un-oxidized pyrite minerals in the saturated Burro Canyon formation? A review of the scientific literature on the subject will show that it is well established that pyrite oxidation under saturated conditions is limited and would not be expected to produce dramatic acidity increases.

Division Response: The Division disagrees with this comment. Based on available information, the Division has concluded that the reductions in pH in monitoring wells site wide are due to natural conditions and not to releases from the tailings impoundment. The Division has concluded that a possible explanation for the natural reduction in pH in these areas is attributable to iron pyrite oxidation.

It is a scientific fact, beyond controversy, that iron pyrite (FeS_s), when exposed to the environment, is oxidized and forms sulfuric acid in the presence of humidity. Iron pyrite thus oxidized is the primary factor resulting in acid mine drainage at mining properties worldwide. Its behavior and effects are well known and well-documented in peer-reviewed scientific literature. It is also well known from the mining industry generally that tailings disposal in surface lakes occurs on the bottom of the lake and to avoid effects of acid mine drainage, the disposal is dependent on maintenance of anoxic conditions in that lake zone. Likewise, if deposited in an anoxic zone in a lake, iron pyrite will not be reactive due to a lack of oxygen to catalyze dissolution.

Applying this information here, and based on available data, the Division has concluded that in groundwater, the natural iron pyrite in the Burro Canyon Formation was likely oxidized in unsaturated zones. However, due to non-reactive (oxygen poor) conditions of the groundwater zones, similar to the practice of tailings disposal in lakes, the pyrite was preserved. Samples collected from the saturated zones of core samples found that trace amounts of iron pyrite were detected as discussed in responses above. If oxygen was introduced into the groundwater or if the previously saturated zones were dewatered, pyrite oxidation and sulfuric acid generation may occur.

UMUT Comment #83

39. Another logical inconsistency with the foundation of the pyrite theory DWMRC has accepted as part of the rational for modifying GWCLs for lower pH values is that, as detailed in the Infiltration and Contaminant Transport Modeling (ICTM) report (February 6, 2013 URS Technical Memorandum), site wells in the shallow unconfined aquifer are assumed to be under fairly oxic conditions naturally, stating, "the presence of measured dissolved oxygen in groundwater suggests that oxic conditions and aerobic processes are likely to dominate redox conditions in groundwater". Measuring of dissolved oxygen in wells during the University of Utah study has proven this supposition to be true during sampling in 2007, before the pH decline and supposed oxygenation of the aquifer occurred.

Division Response: As discussed above, the reductions in pH are observed site wide, including monitoring wells upgradient and far downgradient from the White Mesa Mill. The pH reductions are not caused by Mill activities but are due to natural processes in the aquifer. Ultimately, the presence of pyrite which was detected in core samples showed that pyrite was available for dissolution in the aquifer and had not been oxidized. Pumping activities or other changes in the aquifer system may have catalyzed the pyrite dissolution reaction of the observed and measured pyrite. As discussed above, the pyrite study is not a primary line of evidence when reviewing Permittee source assessment reports. The Division has agreed that pyrite dissolution is a possible mechanism for the reductions in pH ,but through other lines of evidence as discussed in comments related to source assessment reports above, the actual mechanism is not needed to conclude that discharges from the Mill are not the cause of the reductions since this can be determined through other forms of assessment.

UMUT Comment #84

40. It is also important to note that the TWN-series wells upgradient of the tailings cells, although included in the redevelopment event which EFR and DWMRC have associated with pH decline do not exhibit this phenomenon (described in Hydro Geo Chem, 2011).

Division Response: The Division disagrees with this comment because it is not supported by the facts. The technical data show that decreasing pH trends are, in fact, also occurring in monitoring wells upgradient and far downgradient from the tailings cells. This is another line of evidence supporting the Division's reasoned conclusion that the decreasing pH trends relate to naturally-occurring conditions and are unrelated to Mill operations. This conclusion is well supported by the evidence in this record.

UMUT Comment #85

41. The highest rate of pH changes are evident areas downgradient and adjacent to the tailings cells, particularly areas not impacted by infiltration from the wildlife ponds.

Division Response: This comment is not supported by specific references to the evidence in the record. As a result, the Division cannot provide a specific response except to incorporate its previous responses to comments relating to the decreasing pH trends.

UMUT Comment #86

42. The wells with the lowest pH are found at the downstream edge of Tailings Cell 1 (MW-24 and MW-28), near the southeast corner of cell 2 (MW-32), and at downgradient well MW-22.

Division Response: The Division disagrees with this comment because it is not accurate, nor is the UMUT's inference accurate that this evidence shows impacts from the White Mesa Mill. Based on the evidence in this record, the Division, in its reasoned technical judgment, finds as follows:

- MW-24 shows decreasing pH trends. However, monitoring well MW-2, directly downgradient and nearby MW-24, is not showing same trend and was shown by the University of Utah report, as found by the Division, that it is not being impacted by tailings wastewater. Therefore, this trend is naturally-occurring.

- MW-32 is located hydraulically cross-gradient from the tailings cells. Therefore, pH declines cannot be attributed to tailings wastewater.

- MW-28 recent data shows higher pH results and higher scatter of results indicating that the pH may be stabilizing and that the lowering trend is abating. Again, this is evidence that there is no impact from tailings wastewater.

- MW-22 is a mile downgradient from the facility and wells on the same groundwater flow pathline near the White Mesa Mill do not show the same trends. Therefore, the data from MW-22 is isolated. MW-22 is an anomaly in the groundwater monitoring network and was shown by the University of Utah report, and determined by the Division, not to have been impacted by Mill activities.

UMUT Comment #87

43. Limited analytic testing Hydro Geo Chem (Hydro Geo Chem, 2012) conducted during their pyrite investigation showed that the Burro Canyon aquifer material had little to no acid generating potential and some results exhibited a significant excess of acid neutralizing carbonate material, results consistent with modeling conducted by MWH for the ICTM report which concluded that the Burro Canyon geology contained sufficient carbonate material to neutralize extremely acidic tailings cell fluids. These results are not consistent with an explanation pinning pH decline on Burro Canyon geology.

Division Response: The Division disagrees with this comment because the UMUT's comment fails to cite specific information regarding its comment. The Division agrees that part of the ICTM report investigation included soil samples directly beneath the tailings cells in an effort to predict the buffering capacity of those soils. However, this is totally inapplicable to the discussion of observed pH changes in the groundwater. The Hydro Geo Chem report did find measurable pyrite in cores submitted for analysis and further modeled the reductions of pH which could be expected if dissolution of the pyrite were catalyzed. The Division is confused regarding the Tribes statement that the Hydro Geo Chem report "showed that the Burro Canyon aquifer material had little to no acid generating potential." Conversely, the Hydro Geo Chem report showed that, based on analyzed soil samples, pyrite was available for dissolution and generation of sulfuric acid. The Hydro Geo Chem report findings are consistent with the study.

UMUT Comment #88

44. At a minimum, further investigation and testing regarding the validity of the pyrite theory needs to be conducted immediately, and solid scientific evidence should be presented/reviewed and approved prior to using this theory as part of the rational for closing out source assessment reports and raising compliance limits for indicator parameters of tailings cell solutions and/or facility impact to groundwater.

Division Response: The Division disagrees that further investigation and testing as to the so-called "pyrite theory" is warranted at this time because the Permittee has shown and the Division has concluded that the pH declines are not caused by White Mesa Mill operations. Available evidence has conclusively established that the Mill's tailings operations are not responsible for the site wide pH trends. As a result, there is no technical or legal justification to require the Permittee to continue to investigate the pyrite issue. Proving the pyrite theory is not necessary in order for the Division to eliminate, conclusively, the tailings cells from the realm of possible causes for the pH trend issues. Permittee source assessment reports have been prepared and reviewed in conformance with the Permit and State laws and rules.

UMUT Comment #89

45. Require measurement of Dissolved Oxygen as part of field parameter set; amend Part I.E.1.(d) of the GWDP amended to add Dissolved Oxygen (mg/L) to required field parameters list

Division Response: Discussions related to field parameter collection of dissolved oxygen may be appropriate. If it is determined that dissolved oxygen is a useful field collection parameter then this can be added separately in the Mill Quality Assurance Plan which would effectively require the additional field parameter under the Permit Part I.E.1. Part I.E.1(d) could then be modified under a future Permit modification or renewal.

UMUT Comment #90

46. Rescind DWMRC approval of the modified GWCLs based on the December 7, 2012 pH/pyrite investigation report and related documents, EFR October 2012, Source Assessment Report White Mesa Uranium Mill, prepared by Intera Geosciences and Engineering and the EFR November 9, 2012 pH Report White Mesa Uranium Mill, prepared by Intera as the source of pH decline/metals increase documented in the April 25, 2013 DWMRC letter to Jo Ann Tischler, Director Compliance Energy Fuels Resources with the Subject: Energy Fuels Resources (USA) Inc. October 10, 2012 Source Assessment Report White Mesa Uranium Mill and associated pH documents (dated November 9, 2012 pH report and December 7, 2012 Pyrite Investigation Report): DRC Findings and condition a requirement for a new pH investigation report for OOC wells requiring extensive and comprehensive isotopic/geochemical investigation including humidity cell testing.

Division Response: The Division disagrees with this comment. The Permittee proposed GWCL modifications and Division reviews were conducted in compliance with Permit requirements and State Laws and Regulations. Based on the conclusions of the Division review of the Permittee source assessment reports, the Division has concluded, in its reasoned technical judgment, that the modification of GWCLs is appropriate and will be included in the Permit renewal. As

discussed above, there is no regulatory justification to require additional "isotopic/geochemical investigation" at this time. The proposed Statement of Basis and Permit will not be changed.

Section 5: Southeast Flow Gradient in Shallow Aquifer

UMUT Comment #91

47. Despite repeated assertions from EFR and DWMRC that the groundwater flow gradient in the shallow Burro Canyon aquifer is primarily to the southwest, there is substantial evidence that the bulk of groundwater is flowing in a southeastern direction. This distinction has important implications since the POC monitoring well network is orientated in a NE to NW trend and there is a large gap to the SE of the facility where the sole monitoring well, the southernmost well in the network and the closest well to UMUT, it displaying extremely alarming trends in toxic metals and other parameters indicative of impact from the facility.

Division Response: The Division disagrees with this comment. Based on groundwater elevation data collected at all the monitoring wells installed for the White Mesa Mill, including all the Point of Compliance Wells, Piezometers, Background Monitoring Wells, General Monitoring Wells and Corrective Action Monitoring Wells (Chloroform and Nitrate CAP Wells), the Division has determined, in its reasoned technical judgment, that the groundwater is flowing in a predominant south-southwesterly regional direction. Groundwater contour maps showing groundwater flow directions are prepared which show contours reflecting predominant groundwater flow. This conclusion is well-supported by this administrative record. The comment's proposed conclusion is not supported by credible evidence in this record.

UMUT Comment #92

48. Groundwater flow direction generally follows topography. As acknowledged in the 1979 Final Environmental Impact Statement and re-iterated in the latest Reclamation Plan 5.1 on page 1-10, "the site is located on a peninsula platform tilted slightly to the south-southeast"

Division Response: The Division disagrees with this comment because it misrepresents the administrative record and the known facts about the White Mesa area. Neither the 1979 Final Environmental Impact Statement nor the Reclamation Plan 5.1 page 1-10 states that groundwater flow direction general follows topography. These statements are regarding topography in the region of the Mill and conclusions that the White Mesa Platform is "well protected from runoff flooding" due to its overall lack of significant topographical relief. In no part of these statements is groundwater flow direction mentioned. To the contrary, the groundwater flow pattern in the area is well-documented as discussed in the Division's Response to UMUT Comment No. 93.

To be sure, natural topography does influence localized recharge areas to groundwater and may impact water levels and flow directions due to localized groundwater elevation differences in areas of recharge. This localized effect is easily seen in response to the artificial recharge from the wildlife ponds which caused localized higher elevations in groundwater and impacted local horizontal groundwater flow directions. But localized recharge effects do not alter the gradient in the shallow, perched, Burro Canyon aquifer. On top of that, the regional White Mesa topography does not indicate a preferential area for groundwater recharge. Subsurface stratigraphy impacts of the Brushy Basin Member which perches the shallow aquifer is well

defined in the area of the White Mesa Mill and kriged contour lines based possible effects from this contact indicate a west-southwest tilt. As a result, in the vicinity of the White Mesa Mill and surrounding areas, there is no communication between the shallow, perched aquifer and the deep Navajo aquifer. Recharge to the deep aquifer occurs in different areas.

UMUT Comment #93

49. Groundwater flow is generally downhill, e.g. MW-22 has the lowest water level recorded in the monitoring well network and professional assessments of recent site levels demonstrate that the potentiometric surface indicated by water levels indicates a SE flow gradient (Attachment D, Groundwater Flow Paths South of White Mesa Mill).

Division Response: The Division disagrees with this comment. The "professional assessment" referred to and submitted as Attachment D relates to a limited assessment prepared by Rick Arnold, EPA Region 8 Hydrologist. However, Mr. Arnold apparently did not undertake a comprehensive review of abundant data and the factual basis of his diagram is not stated. Mr. Arnold's alleged SE flow gradient is not based on data but is speculative. It is curious that Mr. Arnold would not have contacted the Division in preparing his report. The fact remains that ample data exists in the area of the White Mesa Mill to support the Division's reasoned, technical determination that the regional flow directions are to the south-southwest. In particular, ample data has been collected to determine that potential discharges of tailings wastewater to the groundwater would be detected by the current groundwater monitoring well network. Mr. Arnold seems to be uninformed and unaware of the data relating to groundwater flow. He makes no attempt to explain his findings in light of the large data set available.

Based on the University of Utah Report, monitoring well MW-22 is suspected of having been impacted by nearby artificial recharge source. However, there is no regulatory basis to investigate this source since upgradient monitoring results do not indicate the same anomaly and are not impacting the integrity of the Mill groundwater monitoring well network.

UMUT Comment #94

50. Groundwater flow to the southeast is also evident in the saturated thickness of the burro canyon aquifer, which is substantial in the southeast portion of the site and extremely limited in the southwest portion (Geo-logic, 2017). Saturated thickness is expected to influence the transmissivity of the aquifer and contaminant migration due to the presence of higher conductivity layers and channels within the Burro Canyon aquifer. As saturated thicknesses increase, there is a larger probability of these layers and channels being intercepted, this concept is recognized in a variety of EFR reports, notably the quarterly chloroform and nitrate reports which discuss saturated thickness and interception of channels of preferential flow. Higher conductivity channels provide preferential channels for contaminant migration and their presence is consistency with the lithology of the perched aquifer sandstone as noted in numerous geological and site specific reports. Figure 3 of the Geo-Logic Report included as Attachment A illustrates the significant saturated thickness of the Burro Canyon aquifer in the southeast portion of the site.

Division Response: The Division, in its reasoned professional judgment and based on the evidence in this record, disagrees that the evidence of saturated thickness of the perched aquifer

at the southeast areas of Figure 3 of the Geo-Logic Report supports a conclusion that groundwater in the shallow aquifer flows to the southeast. This localized phenomenon (the saturated thickness of the perched aquifer) is most likely due to artificial recharge from surface ponding. It is unrelated to groundwater flow direction. At the two monitoring well sites used to prepare that part of the figure, piezometer 5 has shown a greater saturated thickness due to infiltration from the southern wildlife pond that has been discontinued. It is noted that the water level elevation has dropped 16 feet since the southern wildlife pond was taken off line in 2011 and continues to drop as evidenced by the quarterly water level measurements. This constitutes a continued decrease in saturated thickness in this area and does not support the UMUT's proposed finding that shallow groundwater is flowing to the southeast.

UMUT Comment #95

51. The lone monitoring well in the southeastern portion of the site, MW-22 is the closest well in the monitoring well network to Tribal Lands and the decline of water quality exhibited at this location, with the strong signature of facility impact remains a high level concern.

Division Response: The Division disagrees with this comment and incorporates its numerous responses on this topic. Without repeating these, the Division notes that monitoring well MW-22 is the farthest southeast monitoring well from the White Mesa Mill operational areas. It is located approximately one mile cross-gradient from the tailings cells. The chemistry at MW-22 is anomalous and is possibly impacted by nearby surface water pooling and/or historical land uses. Monitoring wells on the same groundwater flow path near the White Mesa Mill do not exhibit the same chemical concentrations as seen at MW-22. Therefore, it is not being influenced by Mill operations.

UMUT Comment #96

52. Water levels in MW-22 have increased close to seven feet since it's installation in 1994, the timing coincides with the observance of seepage from the wildlife ponds and indicates that there is a high hydraulic conductivity connection between MW-22 and upstream areas. Water levels at MW-22 responded more quickly than the nearest upgradient well, MW-17 suggesting a higher conductivity conduit between MW-22 and upgradient areas, a conduit that may bypass MW-17 (Geo-Logic, 2017).

Division Response: This comment is not supported by the facts. The water level elevation in monitoring well MW-22 in 1994 was 5,445.12 ft-amsl. The water level elevation measured on March 30, 2017 was 5,451.05. This is an increase of 5.93 ft. However, the 1994 water level data is not deemed reliable since it was taken shortly after well construction. If the MW-22 water level is analyzed from 2006 to present then a rise of only approximately two feet is found during the 11-year period. The water level at MW-22 has been consistently around 5451 ft-amsl. If a claimed "conductivity conduit" existed as hypothesized by the UMUT, then an immediate reduction in water level should have been observed when the wildlife ponds were taken off line in 2010. No reduction in water level at MW-22 is observed. As explained above in great detail, the Division disagrees with the UMUT's comment as to the causes of the anomaly conditions in MW-22.

UMUT Comment #97

53. The University of Utah report published in 2008 provides further evidence for preferential flow in the vicinity of MW-22 and clearly called for further investigation at this location. Tritium was found in MW-22 indicating that recent recharge from a surface water source is occurring and influencing the well and MW-22 exhibited sulfur isotopes with ratios similar to surface water sites. The University of Utah actually identified the likely area of recharge as an area encompassing the Mill facility and tailings area, "The southern margin of artificial recharge is likely to be between MW-27 and MW-31 while the northern margin appears to be between MW-18 and MW-19." (University of Utah, 2008 page 27).

Division Response: The Division disagrees with the UMUT's interpretation of the 2008 University of Utah report as relating to shallow groundwater flow direction. Although MW-22 deep sample is mentioned in the paragraph on page 27, the area of recharge described is in reference to monitoring wells MW-19 and MW-27 and does not refer to monitoring well MW-22. The paragraph on page 27 of the University of Utah Report states "*Tritium in MW-22 deep indicates a small amount of recharge taking place near the well*." This is further supported in the next paragraph on that page which states "*Tritium in MW-22 deep suggests that an extremely localized area of recharge is occurring near that well*." This is additionally supported in the Report on page 44 which states that, in the absence of an evaporated stable isotope signal, it does not appear that the elevated uranium values at MW-22 are the result of leakage from the tailings cells or wildlife ponds. The Report also definitively states that MW-22 does not bear isotopic fingerprints associated with surface water sites related to the Mill. This is verification that, as of the date of the Report, 2008, monitoring well MW-22 was not impacted by discharges from White Mesa Mill activities.

UMUT Comment #98

54. Fluoride, beryllium, cadmium and thallium concentrations have all increases on significant trend lines to levels beyond state groundwater quality standards and have been accompanied by a precipitous decline in pH which has been measured below 4.5. Additional analytes indicative of facility impact include cobalt, copper, manganese, molybdenum, nickel, zinc and sulfate which are all increasing in concentration. The dramatic fluoride spike detected in MW-22 starting in late 2012 is correlated with a dramatic spike in fluoride levels present in the tailings solutions.

Division Response: The Division incorporates its prior comment responses relating to MW-22 here. There is no need to repeat these responses. The Division disagrees with the UMUT's conclusions because they are not supported by the record. Monitoring well MW-22 is installed one mile downgradient from the White Mesa Mill's operational areas. Many other compliance monitoring wells and corrective action wells are located much closer to the relevant operational areas on the same flow path as MW-22. None of these wells indicate there is any release to groundwater from Mill operations apart from the two non-radioactive plumes addressed above. The extensive monitoring array includes compliance monitoring wells MW-17 and MW-25 and the chloroform TWN series monitoring and pumping wells and monitoring well MW-32. None of the monitoring wells closer to the White Mesa Mill show any results similar to MW-22. Finally, given the time it requires for groundwater to flow in the shallow aquifer, impacts in MW-22 cannot possibly be related to Mill operations.

UMUT Comment #99

55. The Tribe requests that DWMRC designate MW-22 a POC well and require a SAR for all OOC parameters along with the inclusion of three new point of compliance monitoring wells between tailings cell 4A and MW-22.

Division Response: The Division disagrees with this request. Its responses to comments dealing with MW-22 are incorporated herein by this reference. For the reasons discussed above in more detail, there is no regulatory or scientific justification to designate MW-22 as a point of compliance monitoring well. The Permit includes MW-22 as a general monitoring well requiring comprehensive groundwater sampling on a semi-annual frequency. The current requirements of the Permit are highly protective of the environment and public health. There is no technical or legal basis upon which to adopt this comment.

In regards to the three new monitoring wells, although the Division sees no technical or regulatory basis to include monitoring wells in the location between Tailings Cell 4A and MW-22, EFRI has agreed to address the UMUT concern and voluntarily install three monitoring wells in the area between monitoring wells MW-17 and MW-22. The drilling and well installation will be included as a compliance schedule item at Part I.H.2 of the Permit. Designation of these wells as "compliance" or "general" monitoring wells will be determined after review of the Background Groundwater Quality Report found at Part I.H.3 of the Permit.

UMUT Comment #100

56. DWMRC must require an investigation regarding higher permeability zones in the Burro Canyon Formation and potential for water/contaminant preferential flowpaths to the southeast of the site require a detailed southeast hydrologic Investigation and report to define, demonstrate and characterize the hydraulic connection and local groundwater flow directions between the tailings and MW-22. This investigation and report should be similar in scope and requirements to the Detailed Southwest Investigation report which DWMRC previously required, and include multiple piezometers, borings and/or monitoring wells to complete a detailed subsurface characterization of groundwater flow at a sufficient resolution to identify any existing preferential channels of migration.

Division Response: The Division's detailed responses to the issues related to MW-22 are incorporated herein. The Division disagrees with this request. There is no justification to require a southeast study. The southwest study was conducted in order to delineate dry zones in the Burro Canyon aquifer and to ensure that the monitoring well network installed for Cell 4B was of proper design. Additionally, the southwest study better defined flow paths, aquifer permeability and groundwater travel times in that area to project potential pollutant pathways and timelines, as well as investigating the source(s) of recharge at seeps and springs on the boundaries of the White Mesa Plateau, especially Cottonwood Seep for reasons discussed in the study. The requested requirement will not be added to the Permit.

Section 6: Summary of Requested Actions

UMUT Comment #101

Based on the foregoing comments and the Geo-Logics Report, the Tribe requests DWMRC take actions to address in a substantive manner (for example by imposing additional permit/license

requirements and conditions with strict timelines) prior to approving the proposed license and discharge permit. The Tribe requests these actions include:

> *1. The SAR's conducted to date for wells MW-24, MW-28, MW-5, MW-31 (in addition to all wells exhibiting a significant decline in pH which will be discussed in greater detail below) are required to be performed again at a more rigorous scientific level considering all of the 38 constituents required for monitoring as indicator parameters of facility impact at a more sophisticated and detailed level, site specific geochemistry and incorporating analysis from an updated isotopic data.*

Division Response: The Division incorporates its previous responses to comments on these points. The Permittee SARs and Division reviews were conducted in conformance with State laws and regulations using appropriate lines of evidence to eliminate Mill activities as the source of exceedances. No additional study is required or warranted.

UMUT Comment #102

> *2. Stop using rationale sourced from EFR regarding using only four of the 38 DWMRC specifically selected indicator parameters as part of the DWMRC rationale for approving modified GWCLs and move to a more sophisticated approach as intended when the 2004 GWDP SOB was developed. Page 7 of the 2004 SOB details the development of GWCLs for each of the 38 chosen parameters, "to be used as early warning indicators of impending groundwater pollution."*

Division Response: The Division incorporates its previous responses to comments on these points. The Permit includes 38 compliance parameters and requires the Permittee to sample the wells at an appropriate frequency. The four indicator parameters selected as one of the many lines of evidence used in source assessments are appropriate for their intended purposes and will continue to be used.

UMUT Comment #103

> *3. Require development and assessment methodology of site specific Kd (soil partitioning values) for each parameter with site-specific geochemical analytic data and associated modeling and interpretation.*

Division Response: The Division incorporates its previous responses to comments on these points. Site specific Kd values were developed for each compliance parameter as part of the Infiltration and Contaminant Transport Groundwater Modelling done for the evaluation of final tailings cell cover. The development of Kd values for geochemical modelling does not indicate that the modelled value is truly representative of adsorption processes in the vadose zone since the reactions are dependent on evaluated geochemical conditions, solution ion competition and limited adsorption sites which are not necessarily consistent. The development of Kd does not negate the value of widely used ion tracers which are consistently shown to transport conservatively with little or no reactivity during transport. Geochemical modeling has adequately shown that Chloride, Fluoride and Sulfate are abundant in tailings wastewater and are conservative tracers to detect tailings wastewater in groundwater at the Mill. No requirement will be added to the Permit.

UMUT Comment #104

4. Require as a condition to the proposed GWDP an Isotopic Groundwater and Surface Water Investigation and Report.

Division Response: The Division incorporates its previous responses to comments on these points. There is no regulatory or scientific basis to require additional isotopic sample collection and analysis at the Mill groundwater monitoring wells at this time. The 2008 University of Utah Study confirmed that the elevated concentration in monitoring wells were not due to the discharge of tailings wastewater. The Permit requires that 38 compliance parameters be analyzed on an appropriate frequency. Although exceedances of some parameters have occurred, these exceedances are expected based on previously identified increasing trends in background or have been shown not to be related to Mill discharge of tailings wastewater according to source assessment investigations and multiple other lines of evidence. No requirement will be added to the Permit.

UMUT Comment #105

5. Require measurement of Dissolved Oxygen as part of the field parameter set.

Division Response: The Division incorporates its previous responses to comments on these points. Discussions related to field parameter collection of dissolved oxygen may be appropriate. If it is determined that dissolved oxygen is a useful field collection parameter, in addition to redox which is currently included as a field collection parameter, then this can be added separately in the Mill Quality Assurance Plan which would effectively require the additional field parameter under the Permit Part I.E.1. Part I.E.1(d) of the Permit could then be modified under a future Permit modification or renewal. There will be no modifications of the current proposed Statement of Basis and Permit.

UMUT Comment #106

6. Rescind DWMRC approval of the modified GWCLs based on the December 7, 2012 pH/pyrite investigation report and related documents, EFR October 2012, Source Assessment Report White Mesa Uranium Mill, prepared by Intera Geosciences and Engineering and the EFR November 9, 2012 pH Report White Mesa Uranium Mill, prepared by Intera as the source of pH decline/metals increase documented in the April 25, 2013 DWMRC letter to Jo Ann Tischler, Director Compliance Energy Fuels Resources with the Subject: Energy Fuels Resources (USA) Inc. October 10, 2012 Source Assessment Report White Mesa Uranium Mill and associated pH documents (dated November 9, 2012 pH report and December 7, 2012 Pyrite Investigation Report): DRC Findings, and impose a permit condition requiring a new pH investigation report for OOC wells including extensive and comprehensive isotopic/geochemical investigation including humidity cell testing.

Division Response: The Division incorporates its previous responses to comments on these points. Although pyrite dissolution is considered a potential mechanism for the reductions in pH and rise in metals concentrations at several monitoring wells, this is not a primary basis that the Division is using to adjust GWCLs. The results of the Pyrite Study and Report showed a

possible mechanism and explanation for the site-wide pH decreases. This may be a reasonable explanation given that oxygen was introduced at the well screen at the same time as pH decreases began (2009). This also may be an explanation as to why pH decreases are more pronounced at some wells more than others since available pyrite in the saturated zone is different for each monitoring well. There is no scientific or regulatory basis to require an "extensive and comprehensive isotopic/geochemical investigation including humidity cell testing." The proposed modified GWCLs will not be rescinded in the Permit.

UMUT Comment #107

7. Require direct testing of liner integrity and leak location surveys for the three legacy cells and direct testing of subsurface leakage to the vadose zone under the three legacy cells. Identify appropriate methodology by evaluating existing technologies, including but not limited to: electrical integrity surveys of the liners and advanced geophysical characterization of the vadose zone using high performance subsurface imagery techniques (Please see Attachment C for additional information regarding this technology and note that Dawn Wellman manager of the Environmental Health and Remediation market sector at Pacific Northwest National Laboratory. , Pacific Northwest National Laboratory PO Box 999 Richland, WA 99352 (509) 375-2017 has been contacted by the Tribe and is available to share information via phone calls, video conferencing, etc. with DWMRC regarding advanced vadose zone characterization).

Division Response: The Division incorporates its previous responses to comments on these points. Attachment C of the Tribe comments is a power point presentation titled "Advanced Geophysical Characterization and Monitoring Tools for Hanford Site Subsurface Cleanup Operations." The slides present the use of high resolution geophysical techniques for groundwater remediation and tank monitoring at the Hanford site.

The presentation is regarding the use of imaging to help monitor vadose zone remedial actions (desiccation and groundwater amendment) taking place at Hanford. The tool is helpful since desiccation or the addition of amendments (liquid or gas) changes saturation and pore fluid conductivity in the vadose zone and allows for a tool to investigate a site scale measurement of contaminant plume remediation. Additionally the slides present potential capabilities of external leak detection at tank farms using current injection electrodes and voltage measurements (metal pipes and tanks); although the conclusion of this use indicated that the method presented was "overly optimistic."

The Division is unclear how the Tribe views the geophysical techniques presented in Attachment C as applicable for liner integrity and leak location surveys at the Mill or why the Tribe sees these techniques as needed or dependable. Current monitoring requirements at the Mill are effective and dependable means to monitor the groundwater and potential tailings wastewater releases to the environment. No additional action will be undertaken by the Division.

UMUT Comment #108

8. Require Source Assessment Report and Contamination Investigation for the Chloride plume prior to approving modified GWCLs for wells associated with the chloride plume.

Division Response: The Division incorporates its previous responses to comments on these points. A Groundwater Corrective Action Plan (CAP) has been approved and is being implemented for remediation (contaminant removal) of the chloride plume. The source has been identified and the plume is delineated and under active pumping remediation and monitoring. There is no justification to further investigate the source of the plume since it has already been identified. No requirement for additional source assessment will be included in the Permit.

UMUT Comment #109

9. Require a detailed southeast hydrologic investigation and report to define, demonstrate and characterize the hydraulic connection and local groundwater flow directions between the tailings cells and MW-22. This investigation and report should be similar in scope and requirements to the Detailed Southwest Investigation report which DWMRC previously required of EFR, and include multiple piezometers, borings and/or monitoring wells to complete a detailed subsurface characterization of groundwater flow at a sufficient resolution to identify any existing preferential channels of migration.

Division Response: The Division incorporates its previous responses to comments on these points. Based on groundwater elevation data collected at all of the monitoring wells installed for the White Mesa Mill, including all of the Point of Compliance Wells, Piezometers, Background Monitoring Wells, General Monitoring Wells and Corrective Action Monitoring Wells (Chloroform and Nitrate CAP Wells), the groundwater is flowing in a predominant south-southwesterly regional direction. Groundwater contour maps reflect the predominant groundwater flow.

It is recognized that that groundwater mounding from the upper wildlife ponds disrupted the regional flow directions and produced southeasterly flows in the northeast portion of the site (towards entrance spring), however these flow directions have been stabilizing since discontinuation of use of the ponds in December 2011.

Since groundwater flow directions and potential directions of contamination in the groundwater due to tailings wastewater discharge are well defined and would not flow to the southeast towards monitoring well MW-22, there is no justification to require a detailed southeast hydrologic investigation. No requirement will be added to the Permit.

UMUT Comment #110

10. Inclusion of three new point of compliance monitoring wells between tailings cell 4A and MW-22.

Division Response: The Division incorporates its previous responses to comments on these points. There is no regulatory or technical basis to require additional monitoring wells between tailing cell 4A and MW-22. Monitoring wells currently exist directly downgradient and cross gradient from tailings cell 4A. However, EFRI has agreed to address the UMUT concern and voluntarily install three monitoring wells in the area between monitoring wells MW-17 and MW-22. The drilling and well installation will be included as a compliance schedule item at Part I.H.2 of the Permit. Designation of these wells as "compliance" or "general" monitoring wells

will be determined after review of the Background Groundwater Quality Report found at Part I.H.3 of the Permit.

UMUT Comment #111

11. Designate MW-22 a POC well and require a SAR for OOC parameters.

Division Response: The Division incorporates its previous responses to comments on these points. Monitoring well MW-22 is the farthest southeast monitoring well from the Mill, approximately one mile cross gradient from the tailings cells. The chemistry at MW-22 is anomalous and is likely impacted from nearby surface water pooling and/or historical land uses as confirmed by the University of Utah Study. Monitoring wells on the same groundwater flow path near the Mill do not exhibit the same chemical concentrations as seen at MW-22. There is no regulatory or technical basis to designate MW-22 as a point of compliance well. No designation will be made in the Permit.

UMUT Comment #112

12. Add a stipulation to include a sampling schedule required for the deep water supply wells completed in the N aquifer at the Mill site under the Safe Drinking Water Act (SDWA) and for results to be provided in annual 4th quarter groundwater reports.

Division Response: The Division incorporates its previous responses to comments on these points. There is no hydraulic connection between the perched (shallow) and deep aquifers. The perched Burro Canyon Aquifer is separated from the deep Navajo Aquifer by approximately 1,100 feet of Morrison and Summerville Formation materials with low average vertical permeability. More than 200 feet of Brushy Basin Member bentonitic clay is directly beneath the shallow aquifer which perches and isolates the aquifer from underlying materials. Wells which penetrate the Brushy Basin confining layer are subject to drill permits administered by the Utah Division of Water Rights which require that the well drilling and construction be sealed to prevent any cross communication between the perched and deep aquifers. The Division has no regulatory or technical basis to require monitoring of deep water supply wells for contamination from the Mill. No stipulation will be included in the Permit.

However, the on-site deep water supply wells are regulated by the Utah Division of Drinking Water (DDW). The DDW described to the Division that, if any of these constituents sampled exceed a maximum contaminant level (MCL), or if there is any detectable concentrations of volatile organic compounds (VOCs) observed, DDW will enforce remedial action. The Tribe is welcome to contact DDW and make the same request.

UMUT Comment #113

13. The Tribe requests that uranium isotopes be required during scheduled monitoring events for MW-26 and that the activity ratio (AR ratio) be calculated and reported with regular monitoring reports. The GWCL for uranium in MW-26 is proposed to increase dramatically. We understand that this is a pumping/remediation well and that DWMRC has inserted a caveat that any interpretation of data from this well needs to be understood in that light, i.e. that DWMRC expects concentrations to vary and that increasing contaminants will likely not be viewed as facility impacts. The AR ratio has

been well-established as a reliable method for determining if uranium present in groundwater has an anthropogenic or natural signature, and DWMRC has agreed with past recommendations (USGS report review findings) that including it as a monitoring constituent for monitoring wells at the facility would be a good idea.

Division Response: The Division incorporates its previous responses to comments on these points. The Division does not see the use of uranium isotopic activity analysis and ratio as an effective regulatory tool in the Permit. There are no State Ground Water Quality Standards for uranium isotope activity. Therefore, in the event that an activity ratio indicated a tailings wastewater source of uranium, there would be no applicable standard associated with the finding.

Due to analytical limitations, the use of uranium activity ratios is likely not a reliable/reproducible method for tailings source identification in groundwater. Specifically, measurement of uranium isotope activity by alpha spectrometry yields high error terms making comparison of sources with "near" natural (unimpacted) ratios unfeasible. Measurement of uranium isotope mass by induced coupled plasma – Mass Spectromety (ICP-MS) also has large error terms and further requires the conversion of each isotope mass to equivalent activity, resulting in additional potential errors.

Based on the lack of a Utah regulatory standard for uranium activity ratios and analytical method errors a requirement for determining uranium activity, ratios will not be included in the Permit for monitoring well MW-26.

UMUT Comment #114

14. As suggested in DWMRC review memo (DWMRC, June 27, 2000) and recommended in the Geo-Logic Report as a standard industry practice, EFR should be required to calculate an annual water balance for water received, consumed and lost at the Mill, and report the balance with annual DMT reports to assist with evaluation and performance of the discharge minimization technology required under the GWDP. Currently, there is no accounting of water use and loss at the Mill.

Division Response: The Division incorporates its previous responses to comments on these points. There is no technical basis or need to calculate an annual water balance. This type of calculation at the Mill would include large assumptions and be of little practical use (e.g. losses to evaporation, inputs from precipitation, process discharges and extractions). The volume of water potentially lost through cell bottom liners would likely be unreliable due to these assumptions. Current actions to monitor cell losses using leak detection systems and/or discharge minimization measures are dependable and adequate. No requirement will be added to the Permit.

UMUT Comment #115

15. The thorium isotopes, Th-230 and Th-232 should be assayed individually in the conventional compound effluent in the Annual Tailings Cells Wastewater Sampling Report. Using gross alpha as a surrogate does not allow quantification of these isotopes individually (or any other additional alpha emitter present in the tailing cell effluent "soup")

Division Response: The Division incorporates its previous responses to comments on these points. There is no evidence that tailings cell effluent is discharged to the environment. The tailings cells are designed and operated as total containment cells. The Mill tailings system utilizes tailings and evaporation cells for disposal, evaporation, and management of Mill tailings. The Permittee conducted a voluntary analysis during 2016 to better characterize the radiological constituents and physical properties of solutions in the tailings cells. This analysis included thorium-230 and thorium-232. This analysis, as well as analysis for radium and uranium isotopes in the tailings solution (effluent) is included in the Permittee Annual Tailings Cells Wastewater Sampling Report which is publicly available. No requirement will be added to the Permit.

References

Applied Geochemistry, 2013. Miao, Ziheng. Akyol, Hakan N. McMillan, Andrew L. Brusseau, Mark L. Transport and fate of ammonium and its impact on uranium and other trace elements at a former uranium Mill tailing site.

Applied Geochemistry, 2008. Hart, Megan. Whitworth, T.M. Atekwana, Eliot. Hyperfiltration of sodium chloride through kaolinite membrane under relatively low heads- Implications for groundwater assessment.

ASTM International. January, 2017. D6312-17. Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs at Waste Disposal Facilities.

Brindha, K. and Elango, L. (2011) Fluoride in Groundwater: Causes, Implications and Mitigation Measures. In: Monroy, S.D. (Ed.), Fluoride Properties, Applications and Environmental Management, 111-136.
https://www.novapublishers.com/catalog/product_info.php?products_id=15895

Edmunds, W.M. and Smedley, P.L., 2005. Fluoride in natural waters. In: Selinus, O. (Ed.), Essentials of Medical Geology. Elsevier Academic Press, London, pp. 301-329.

Geo-Logic Associates, July 2017. Updated Data Review and Evaluation of Groundwater Monitoring. White Mesa Uranium Mill Blanding Utah.

Gibbons, Robert D. February, 1999. Use of Combined Shewhart-CUSUM Control Charts for Groundwater Monitoring Applications.

Handa, B.K. (1975) Geochemistry and genesis of fluoride containing ground waters in India. Groundwater, 25, 255- 264.

Hydro Geo Chem, Inc. February 12, 2010. Letter to David Frydenlund. Re: Interpretive geologic cross-sections and additional supporting data requested in the URS round 2 Interrogatory Statement regarding the Groundwater Discharge Permit for proposed Tailings Cell 4B at the White Mesa Uranium Mill Site.

Hydro Geo Chem, Inc. September 20, 2011. Redevelopment of Existing Perched Monitoring Wells White Mesa Uranium Mill Near Blanding, Utah.

Hydro Geo Chem, Inc. December 7, 2012. Investigation of Pyrite in the Perched Zone. White Mesa Uranium Mill Near Blanding, Utah.

Hydro Geo Chem, Inc. June 6, 2014. Hydrogeology of the White Mesa Uranium Mill. Blanding Utah.

Ref. above in the indicator parameter/chloride retardation discussion as it describes clay layers in the technical data which the state said had not been documented in their 2017 response letter on the subject to us

Utah Division of Waste Management and Radiation Control, February 16, 2017. Re: Response to Ute Mountain Ute Tribe Letters Dated December 16, 2016 and January 20, 2017. DRC-2017-001146.

USGS 1995. Dam, William L. Geochemistry of Ground Water in the Gallup, Dakota, and Morrison Aquifers, San Juan Basin, New Mexico. U.S. Geological Survey. Water Resources Investigations Report. 94-4253.

USGS 1992. Hem, John D. Study and Interpretation of the Chemical Characteristics of Natural Water Third Edition. U.S. Geological Survey Water Supply Paper 2254.

U.S. EPA, 01/19/2017. Health and Environmental Protection Standards for Uranium Mill Tailings, Proposed Rule. 82 FR 7400.

U.S. EPA, September 2014. Draft Technical Report Considerations Related to Post Closure Monitoring of Uranium In-Situ Recovery (ISL/ISR) Sites Background Information Document for the Revision of 40 CFR Part 192. EPA-402-D-14-001.

U.S. EPA, August 1999. Understanding Variation in partition Coefficient, Kd, Values. Volume 1: The Kd Model, Methods of Measurement, and Application of Chemical Reaction Codes. EPA 402-R-99-004A.

U.S. DOE. 2010, December 01. Technical Report: Remediation of Uranium in the Hanford Vadose Zone Using Ammonia Gas: FY 2010 Laboratory-Scale Experiments. Szecsody, James E. ;Truex, Michael J.; Zhong, Lirong.; Qafoku, Nikolla.; Williams, Mark D.; McKinley, Jame P.; Wang, Zheming.; Bargar, John.; Faurie, Danielle K.; Resch, Carles T.; Philips, Jerry L.

U.S. DOE. 2014, September. Scale-up Information for Gas-Phase Ammonia Treatment of Uranium in the Vadose Zone at the Hanford Site Central Plateau. Truex, MJ.; Szecsody, JE.; Zhong, L/; Thomle, JN.; Johnson, TC.

DWMRC. February 11, 1999. Letter from William Sinclair, Director Utah Division of Radiation Control to David Frydenlund, Vice President and General Counsel International (USA) Corporation.

DWMRC. June 27, 2000. Memorandum from Loren Morton to Dane Finnerfrock. International Uranium Corporation White Mesa Uranium Tailings Facility: Engineering Design and As-Built Reports; Staff Findings, Conclusions and Recommendations.

DWMRC. February 16, 2017 letter from Scott Anderson, Director DWMRC to Scott Clow, Director, Ute Mountain Ute Environmental Programs Department, "RE: Response to Ute Mountain Ute Tribe Letters Dated December 16, 2016 and January 20, 2017".

URS. February 6, 2013. Technical Memorandum to John Hultquist, Utah Division of Radiation Control. Review of September 10, 2012 Energy Fuels Resources (USA) Inc. Responses to Round 1 Interrogatories on Revised Infiltration and Contaminant Transport Modeling Report, White Mesa Mill Site, Blanding, Utah, report dated March 2010.

U.S. Environmental Protection Agency, August, 1989, "Requirements for Hazardous Waste Landfill Design, Construction and Closure", Technology Transfer Seminar Publication, EPA/625/4-89/022

U.S. Environmental Protection Agency, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance Document. EPA/530/R-09/007.

http://www.itrcweb.org/gsmc-1/Content/Resources/Unified_Guidance_2009.pdf

University of Utah, May, 2008. Solomon, Kip D. Hurst, Grant, T. Summary of work completed, data results, interpretations and recommendations for the July 2007 Sampling Event At the Denison Mines, USA, White Mesa Uranium Mill Near Blanding.Department of Geology and Geophysics University of Utah

Valenzuela-Vásquez, L., Ramírez-Hernández, J., Reyes-López, J. et al. Environmental Geology (2006) The origin of fluoride in groundwater supply to Hermosillo City, Sonora, México 51: 17. https://doi.org/10.1007/s00254-006-0300-7

Jurgens, B.C., McMahon, P.B., Chapelle, F.H., and Eberts, S.M., 2009, An Excel® workbook for identifying redox processes in ground water: U.S. Geological Survey Open-File Report 2009–1004 8 p.

UTE MOUNTAIN UTE TRIBE
COMMENTS ON RECLAMATION PLAN 5.1
PART IV
JULY 31, 2017

The following are the UMUT Comments on Reclamation Plan 5.1 for Radioactive Material License #UT1900479, Amendment #8.

UMUT Comment No. 118:

IV-A With the exceptions of the Evapotranspirative cover (ET Cover) components of the revised cover design from the 5.0 version, the other major concerns raised by the Tribe in 2011 need to be included in the 5.1 version regarding the disposal area located in the current area of Cell 1.

The Tribe requires a more robust liner system than a compacted clay liner.[1]
The contaminated material disposal area in current of area of Cell 1 lacks several protections for long term reclamation. A clay liner described in Reclamation Plan 5.1, Attachment A Technical Specifications for Reclamation of the White Mesa Mill Facility, Blanding Utah, Part 4.2.2, under the disposal area is inadequate for multiple reasons:

- *A clay liner in an arid environment is likely to dry out over time and crack*[2]*, reducing its effectiveness in containment over the required 1000 year performance period as specified in 10 CFR, Part 40 Appendix A, Criterion 6.*
- *In Reclamation Plan 5.1, Appendix B, Preliminary Decommissioning Plan 2.6.2 (3), EFRI states that "the liquid, sediments and solids collected will either be reused or transported to the last active tailings cell or Cell 1 Disposal area, or treated for permitted discharge."*
- *Disposal of liquids in the clay lined disposal area would not meet industry or regulatory standards for a double-lined liquid cell with leak detection.*
- *Random Materials in the proposed demolition disposal area will contain radioactive material due to the burden of costs and pollution control associated with cleaning such debris, and thus should be contained within a synthetically lined tailings system (60 mil HDPE is the industry standard)*[3]*,*

---

1 see Exhibit T, December 16, 2011 Comments on DUSA RML Renewal RE: Reclamation Plan Deficiency List
2 see RRD Corp, December 2011, Part 1.1
3 see RRD Corp, December 2011, Part 1.3

Division Response: The Division has provided detailed responses to issues relating to Reclamation Plan 5.1. These are found in the General Response #14 above as well as in the Division's responses to the specific comments raised by the Grand Canyon Trust. Because of the similarity of the comments and responses from those sources, these are generally incorporated by reference here. In the following section, the Division will attempt to respond to specific issues raised by the UMUT that are not otherwise addressed. The hope is to avoid too much

duplication and repetition but at the same time, attempt to provide full, detailed, and adequate responses to the important comments raised by the UMUT here.

UMUT Comment No. 119:
IV-B The Tribe requires the proposed storm water catchment basin (adjacent to the contaminated material disposal area shown in Reclamation Plan 5.1 Drawing REC-3) to be relocated.

Positioning a body of water (after storm events and prior to evaporation) against the containment dike for the disposal area poses risks to the integrity of the dike and may cause seepage into and leaching from the radioactive materials within the disposal area, especially when considered over the required 1000 year performance period.

Division Response: The Division disagrees with the commenter. The design does not position "a body of water" against the containment dike for the disposal area. The commenter references a feature more aptly described as a "sedimentation basin." Sedimentation basins are often employed by engineers as a surface water "best management practice" in order to protect surface water quality. In the Division's reasoned technical judgment, the sedimentation basin in Reclamation Plan 5.1 represents the appropriate use of a standard best management practice that would be expected in the final grading plan. Plan Sheets Rec-1 and Rec-3 show the grading of the sedimentation basin. The effect of the design contours is to slow storm water while passing the relatively flat surface of a broad channel over 750 feet in width. That sedimentation channel terminates in a discharge flume. The slope of the channel is intended to be gentle enough that sediment suspended in the storm flow will tend to settle out on the channel surface. The design feature is not intended to, and will not retain water. With no retention, the dangers cited by the commenter are not material in the judgment of the Division. It is physically not possible, given the design grades, for seepage into the disposed material to occur as envisioned by the commenter, so leaching likewise will not occur due to this design feature.

UMUT Comment No. 120:
IV-C The Tribe requests that the storm water management during decommissioning and reclamation be revised in the Reclamation Plan to avoid discharge of radioactive storm water from the site.

Storm water management during reclamation is proposed to conform to the current, approved Storm Water Best Management Practices Plan with water being diverted from the mill and ore pad areas into the Cell 1 area of the facility, as described in Reclamation Plan 5.1, Appendix B, Preliminary Decommissioning Plan Part 2.6.1. The plan also calls for Cell 1 to be excavated, a sedimentation basin built for non-radioactive storm water, and the disposal area to be isolated from the rest of the storm water from the mill and ore pad area. It is unclear how drainage into Cell 1 as approved in the Storm Water Best Management Practices Plan can continue if cell 1 doesn't exist any longer in its current form. Either the disposal area will catch storm water from the mill and ore pad area and function as an illegal evaporation pond before its final cover is installed, or the radioactive storm water will be diverted into the retention basin for non-radioactive storm water, or all of the water will need to be pumped to the last active tailings cell. The cell 1 disposal area is also proposed to be designed with its eastern dike 6 feet higher than

top of the adjacent storm water basin, so it will not catch direct run-off from the mill area during decommissioning and demolition.

Division Response: The Division disagrees with this comment. The Reclamation Plan calls for surveys to be performed and reclamation activities to be undertaken in conformance with rigorous standards. Areas contributing storm water must not result in radiation levels distinguishable from background. The referenced license provisions will be modified as part of the normal license termination plan to allow for discharge of water from areas remediated to "free release" standards. This means that residual radiation levels must be indistinguishable from background levels. Discharges from contaminated areas will not be released to Westwater Creek prior to completion of remediation. Inasmuch as background represents the level of uranium and other radioactive materials naturally occurring in the area, no readings can be taken that reliably will represent any level of radioactivity lower than background. Thus, background is the maximum cleanup level achievable, and represents the same risks and characteristics as found in the natural environment.

UMUT Comment No. 121:
IV-D The Tribe requests that a biointrusion barrier be installed in the final cover design.

Reclamation Plan 5.1 lacks an adequate biointrusion control above radon barrier, as described in Appendix A, Tailings Cover Design, Section L.2.1 shows the biointrusion included as part of the compacted soil within Layer 3, Growth Medium Layer. Installation of a specific biointrustion layer directly above the radon barrier would be more effective and protective throughout the 1000 year performance period. The potential drying and cracking of clay would make it more effective to install a clean rock layer to deter intrusion by mammals and invertebrates.

Division Response: Final decisions about this topic are premature and are outside the scope of the present relicensing action. Here, the design proposal referenced and is currently under evaluation by the Division and other consultants. The designer claims that the highly-compacted primary radon barrier is deep enough and dense enough to serve the biointrusion function. The need for a biointrusion barrier will be determined through the course of the field demonstration study as discussed in more detail in the administrative record. This comment is premature.

UMUT Comment No. 122:
IV-E The Tribe requests that a capillary break be installed in the final cover design.

Reclamation Plan 5.1 lacks a capillary break. As described in Appendix A, Tailings Cover Design, Section L.2.1 shows the "water storage" included as part of the compacted soil within Layer 3, Growth Medium Layer. If the soil is compacted sufficiently to also be a biointrusion layer, it is likely it will not hold sufficient water to be effective in water storage during wetter times, such as winter when plant transpiration is reduced. A capillary break would increase water storage and reduce likelihood of percolation to the radon barrier.

Division Response: As discussed in the Division's Response to Comment No. 121, this comment is premature. The design proposed by the Licensee is currently under study. The designer is depending on the plant community on the cover surface to draw off percolated water,

eliminating the need for a capillary break. If the field study reveals a need for a capillary break, one will be added to the design. This issue will be the subject of future actions by the Division and falls outside the scope of the present relicensing action.

UMUT Comment No. 123:
IV-F The Tribe requests that a geomembrane be installed in the final cover design.

Reclamation Plan 5.1 lacks a geomembrane above the radon barrier. A geomembrane would greatly reduce the likelihood of percolation to the radon barrier. A geomembrane could also perform as a biointrusion layer. The proposed design for on-site storage of the SML material in Gore, OK includes a geomembrane as well as the synthetic liners on the bottom of the cell. Clearly the by-product and waste material in White Mesa requires the same protection to be durable for the 1000 year performance period. To maximize performance for the 1000 year performance period, the best design would employ a capillary break, biointrusion barrier and a geomembrane below the growth layer and vegetative cover.

Division Response: For the reasons discussed above, this comment is premature and this topic falls outside the scope of the present relicensing action. The design proposed by the Licensee is currently under review by the Division. The designer is depending on the plant community on the cover surface to draw off percolated water, eliminating the need for a geomembrane. If the field study reveals a need for a geomembrane, this will be discussed with the license about possibly adding this to the design. It should be noted that the literature contains no assurances that a geomembrane will remain intact for the intended 1,000 years of the cover system's design life. Rather, the geomembrane is intended to provide additional protection until the cover system matures and can function well without it.

UMUT Comment No. 124:
IV-G The Tribe requires a correct representation of materials to be permanently contained in Cell 2.

Cell 2 waste is misrepresented (Appendix A, Tailings Cover Design, Section L.1, pp. 1), the type of material in Cell 2 in not fully represented by EFRI. The material contains large quantities of mill waste, such as contaminated equipment and crushed barrels.

Division Response: The Division disagrees with this comment. The Division's rationale, determinations, and positions are discussed in great detail in this PPS. In short, the Licensee is allowed by federal law and policy (and is actually encouraged to do so by the U.S. Department of Energy) to dispose 11e.(2) byproduct, decommissioning debris, and non-RCRA mill waste in the cell caps. Cell 2 is no different. From observations made during site inspections, the Division has not documented any violation of those permissions.

UMUT Comment No. 125:
IV-H The Tribe requires a correct representation of materials to be permanently contained in Cell 3.

Cell 3 waste is misrepresented (Appendix A, Tailings Cover Design, Section L.1, pp. 1): The type of material in Cell 3 in not fully represented by EFRI. It also has large quantities of In-Situ Leachate waste materials and mill wastes. A correct representation materials to be permanently contained is required.

Division Response: The Division disagrees with this comment for the same reasons discussed in its Response to UMUT Comment No. 124.

UMUT Comment No. 126:

IV-I The Tribe requires that DWMRC must not allow continued disposal into a cell in final closure.

Reclamation Plan 5.1, Part 6.2.3 (d) states that "the license authorizes a portion of a specified impoundment to accept uranium by-product materials that are similar in physical, chemical and radiological characteristics to the uranium mill tailings and associated wastes already in the pile or impoundment, from other sources, during the closure process and on-site generated trash. Reclamation of the disposal area. As appropriate, must be completed in a timely manner after disposal operations cease in accordance with paragraph (1) of Criterion 6; however these actions are not required to be completed as part of meeting the deadline for final radon barrier construction for the impoundment." Section 6.2.3(d) does not tell the whole story about this possibility for continued disposal in 10 CFR Part 40, Appendix A. It quotes part of Criterion 6A paragraph (3), but does not put into the full context of specifically ***needing approval by the Commission, or this case the Agreement State of Utah****, the need for a specific approved deadline for completion of the final radon barrier, and possibly interim milestones for the very items that EFRI has stated they cannot have milestones for: dewatering and stabilization in particular. Paragraph (3), also requires compliance with Paragraph (2) that alludes to further need for approval by the Commission or the Agreement State for extensions of time for milestones, after a public participation process, and ensuring compliance with the NESHAPS Subpart W radon emission standards, and that they are making good faith efforts to install the final radon barrier. (10 CFR Part 40 Appendix A Criterion 6A, paragraph (1-3)) It appears that the applicant is trying to obtain this authorization for continued disposal into a cell that has been declared to be in final closure by accomplishing only part of the approval and compliance requirements. If this is the justification for failing to fill Cell 3 with tailings instead of in-situ leachate waste, it should not be authorized based on the fact that EFRI violated the NESHAPS Subpart W emission standards on cell 3. This also contradicts the definition of closure that applied by both U.S. EPA in 40 CFR Part 192, 40 CF Part 61 and by the Nuclear Regulatory in 10 CFR Part 40, Appendix A. Both agencies clearly distinguish between when a cell, or conventional impoundment, is in "operation" and when it is in "final closure." The two cannot be simultaneous and thus EFRI cannot dispose of anything in a cell that is in final closure. And a phased disposal facility will inherently have some cells in final closure if it has more than 2 operational cells, as described in 40 CFR Part 61, subpart W. Once a cell is in final closure, it must be dewatered, stabilized and the radon barrier built and that cannot be accomplish "as expeditiously as practicable considering technological feasibility" when there is hole with liquid waste being put into it.*

Division Response: The Division disagrees with the commenter. The commenter cites a narrow definition of closure with which the court in Grand Canyon Trust v. Energy Fuels disagrees. The commenter also interprets exceeding Subpart W NESHAP radon flux standard in a manner inconsistent with the court's understanding in that case. A careful reading of the NESHSAPS language in 40 CFR Part 61, Subpart W and the language in 10 CFR 40 Appendix A regarding milestones and installation of the radon barrier reveal that the purpose is control of radon flux over the long term, and responding assertively if the radon flux is above the standard. The court found the Licensee to be in compliance with Subpart W because of the actions taken in response to radon emission above the standard.

In-situ decommissioning debris that has been classified as 11e.(2) byproduct can be disposed in the tailings cell cap. Please see General Response #14 above. To prohibit the Licensee from accepting and disposing that material would place Utah in a position of regulating more stringently than the NRC. Under Utah law, the Board may not adopt a rule that is more stringent than a federal rule on the same topic unless the Board makes a finding that the federal rule or standard is insufficient to protect public health and the environment.

Dewatering is not an event that the Licensee chooses to accomplish one day and is completed on a date certain following. Modeling predicted the dewatering time and function to expect for the tailings being produced, based upon assumptions made prior to construction of the mill. The modeling proved to be grossly optimistic, which implicates the underlying assumptions as inaccurate. The dewatering process is taking much longer than expected. The Licensee is currently studying the situation to determine new model inputs that can provide a better model. The radon barrier's integrity depends on elimination of differential settlement in the tailings mass, which depends on removing the fluid from the tailings mass. The fluid fills interstices between tailings particles, retarding consolidation. Setting hard-date milestones under these conditions is an exercise in futility and leads to proliferation of requests for extension of time. The Division is interested in solutions that work long term, not just in meeting a narrow reading of the regulation. Given the instances where the NRC included references to flexibility in the application of timelines, the Director has a level of discretion to acknowledge when rigid dates associated with the milestones would produce a negative effect and to allow flexibility for those cases. This is one of those cases. Notwithstanding these facts, EFRI has included in its responses to the comments received a time-certain following commencement of final closure that can be used to set the hard-date milestone the commenter seeks once final closure begins.

The commenter is incorrect in suggesting that the Licensee reserved capacity in the tailings impoundment for in-situ leach debris that should have been used for tailings, and is doing so to skirt regulation. The tailings impoundment was approved with a fixed tailings capacity. The decommissioning debris meets the definition of 11e.(2) byproduct material, just as do tailings, but the decommissioning debris is only emplaced above the tailings, in the cap. Nevertheless, since the material in question meets the definition of 11e.(2) byproduct material, it can be disposed anywhere in the impoundment that does not jeopardize liner integrity, e.g., through puncture. Notwithstanding that fact, the Licensee's standard operating procedure, which the Director approved, limits placement of this debris to locations above the tailings, below the

highest elevation of the liner, and at a sufficient distance from the perimeter of the cell to assure protection from puncturing the liner.[53]

UMUT Comment No. 127:
IV-J The Tribe is requiring clarification on figure 1A and soil sampling methodology.

Reclamation Plan 5.1, Attachment A, Technical Specifications for Reclamation of the White Mesa Mill Facility, pp. A-33 shows data for Figure A-1, as of September 2011. This was the S-shaped 30 m x 30 m soil scanning procedure described in the 2007 license application. It appears that now a grid pattern for gamma surveys and subsequently related soil sampling and remediation decision-making is planned to be employed. The currently proposed grid pattern will differentiate 3 classes of survey and sampling areas and not employ the S-shaped survey pattern described in the 2007 license application with reclamation Plan 5.0. Thus it appears that Figure A-1 is not meant to be in the plan at this time or its methodology used for final soil contamination assessments. Please clarify if this is a 'left-over' from Reclamation Plan 5.0 or if it has any use in the new methodology.

Division Response: Both the S-pattern scan and the grid pattern will be used, but in different situations. The S-pattern is to be used where low likelihood of contamination is expected, with the more systematic grid pattern being used where higher likelihood exists. The methodology is described in NUREG-1575, which is a carefully crafted, statistically-based standard designed to identify efficiently areas needing decontamination. If the scanning program is followed as designed by EFRI, the method leads to better than 95% probability of identifying all contamination and 10% probability of requiring cleanup of an area that has no contamination. The guidance in the NUREG specifies how to classify the areas to be surveyed. Since operations are ongoing at the Mill, the specific areas to be surveyed may change due to alterations in operating patterns (changes in haul routes, etc.), so the areas are appropriately not delineated yet.

More specifically, Attachment A to the Reclamation Plan, pages A-23 through A-53 should inform the reader of the probabilities of effectively identifying areas requiring cleanup based on the scanning patterns detailed in the Plan. The scan design was based upon requiring a 95% probability that the scan would identify all areas requiring remediation and a 10% probability of requiring more remediation than necessary. For a discussion of the methodology employed, the reader should consult NUREG-1575. NUREG-1575 presents a protocol design developed jointly by the EPA, the NRC, the DOE and the DOD for cases like this. 95% confidence in successfully identifying contamination is typical for this kind of work. The lateral and vertical definition sought by the commenter is spelled out in the referenced guidance; which guidance was produced specifically to provide the scientific integrity necessary to successful remediation.

The starting point for grid sampling, for example, is determined by selecting coordinates for the start point through the use of a random number generator, which precludes any ability to set the grid in a manner intentionally to miss contamination. That point selection will be made at the time of commencement of the survey, prior to the survey. Likewise, the delineation of survey

[53] SOP PBL-10

units will await the commencement of decommissioning so that events that occur between now and the commencement of decommissioning can be considered in selecting boundaries for the various grades of survey areas. This is all in accordance with the cited guidance. If those decisions are made today, either the scientific/statistical basis of the method may be compromised in the future, or the decisions made today will need to be discarded in favor of a new set of boundaries and starting points. The characterization should use the most up-to-date data available rather than being rigidly fixed at an arbitrary date perhaps years in advance of commencement of the physical work.

UMUT Comment No. 128:

IV-K The Tribe requires proper consideration of Th-230 and Ra-226 activity concentrations to be protective of public and safety throughout and beyond the 1,000 year performance period.

For the tailing impoundments and radon cover design, the concentrations of the amount of Th-230 and Ra-226 were calculated to be a weighted average based on past data. A projected concentration should be added to the source term activity concentrations. With the acceptance of alternative fuels as a historic option, a more conservative estimation should be performed with materials with increased Th-230 and Ra-226 activity concentrations to specifically include the amounts of alternative feed materials in the current license and the one under consideration for renewal. For example, in the case of SFC raffinate and materials, (Th-230 activity concentrations from 43,900 to 74,400 pCi/g) those quantities should be added to the source term. Also the source term from the Dawn Mining operation in Wellpinit, Washington, as well as others.

Although the concentrations of uraniums and thoriums were compared to those already processed through the mill and disposed in the impoundment cells in the SER for the SFC Fuel processing, this is an additional source and the MILDOS code should be run so results could be compared to the previous estimated MILDOS doses, to ensure risks or doses, associated with the additional source material, not previously considered, is at a minimum level for the potential receptors.

Division Response: The commenter has indicated that the Division should consider the estimated dose to members of the public from alternate feeds material (SFC materials, Dawn Mining Materials, and others) and compare the results of the estimate with the previous dose estimates to "ensure that risks or doses, associated with the additional source material, not previously considered, is at a minimum level for the potential receptors." Although not required, as stated in the TEEA, one of the reasons that the Division decided to complete an independent MILDOS evaluation was to consider the AF materials in the evaluations. Therefore, for the tailings impoundments, all AF materials received, processed, and disposed through the end of calendar year 2006 were included in the evaluations and therefore the dose estimates, For the AF materials received possessed and disposed from 2007 to 2014, the Division evaluated the estimated dose to a member of the public by evaluating the emissions from the AF materials from receipt through all of the processing, through disposal in the tailings impoundments, and then if applicable, through the dewatering process for the tailings impoundment. Even though the AF materials were not in secular equilibrium, the Division took this into account and calculated separate input values for each of the isotopes used by MILDOS in its calculations of

the estimated dose from the Mill's operations except those from the tailings cells. Since the input isotopes are the isotopes with the longer half-lives in the U-238 decay chain, and the decay products of each of these isotopes are calculated by the software code, the Division was attempting to reset the initial values used in the calculations since the AF materials were not in secular equilibrium. Since there was sampling data available for Tailing Cell 2 and Tailing Cell 3 that contained AF materials and Cell 4 was just beginning to accepting tailings, actual data (including the wastes from the AF materials) was used in the estimation of the dose from Tailings Cell 2 and Tailings Cell 3. Since the two tailings cells were representative of the materials received, processed, and disposed at the Mill, the sampling results were also used to determine the estimated dose from Tailings Cell 4A. Future evaluations of estimated will be conducted as necessary, and if any adjustments to the tailings cells cover is necessary, it will be discussed with the Licensee.

In response to the comments relating to tailings cell cover design found in Reclamation Plan 5.1, the Division refers to its General Response #14.

UMUT Comment No. 129:
IV-L The Tribe requests that institutional control plan for security and maintenance of facilities be developed to prevent intrusion.

Though there are funds set aside for long term closure, there is no mention of an institutional control plan for security and maintenance of facilities to prevent intrusion other than a fence, mainly to keep out grazing cows. This is a concern for the tribal members of the future, that they remain aware of the health and environmental risks associated with intrusion of the remediated facility which lies adjacent to their tribal lands. The highest activity of radon release from the Th-230 and Ra-226 decay was at the 1000 year mark (the last time frame considered in the analysis).

References:
Water Balance Covers for Waste Containment, Principals and Practice, Albright, Benson and Waugh, ASCE Press 2010

40 CRF Part 61 6

40 CFR Part 192

10 CFR Part 40

URS, for Utah DEQ, DRC, Safety Evaluation Report (SER) for Amendment Request to Process an Alternate Feed Material (the SFC Uranium Material) at White Mesa Mill from Sequoyah Fuels Corporation, Gore, Oklahoma, May 2015

Division Response: The institutional control period will be managed by the United States Department of Energy's Legacy Management Office. That office has a standard to which the site will be fitted. The physical aspects of those standards are incorporated in the Reclamation Plan, even though the Plan does not reference the standards specifically. 10 CFR 40 Appendix A

Criterion 6 states that the effective date of the cover is to be 1,000 years. This is the standard dictated by law that the Division is required to use. The Division understands that UMUT interests are for a much longer timeframe but State law does not allow the Division to be more stringent than federal regulations unless the Board makes a finding supported by facts in connection with its rulemaking. The Board has not done so with respect to this requirement. The Division also notes that radioactivity naturally decreases over time. It is therefore expected that the risks posed by the site will decrease with time as radioactive materials naturally decay.

Attachment 1
Transcript from the
June 8, 2017 Public Hearing

Attachment 2
Transcript from the
June 15, 2017 Public Meeting

Attachment 3
EFRI Response to Comments

Attachment 4
Sur-Reply Comments

Attachment 5
Referenced Documents

Attachment #6
Comments Addressed the General Comment Section

Attachment #7
Comments Addressed in the Specific Comment Section

Attachment #8
Statement of Basis
Final Radioactive Material License
Final Groundwater Quality Discharge Permit