

UTAH DIVISION OF WASTE MANAGEMENT AND RADIATION CONTROL
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

Purpose

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 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 DWMRC is the agency in administering these rules and regulating activities in the State of Utah that involve radioactive materials. Pursuant to regulation implementation, the DWMRC has issued a RML to the Licensee to possess and manage radioactive materials and 11e.(2) wastes. In order to assist the DWMRC in ensuring that all applicable regulatory requirements are currently being satisfied and will continue to be satisfied, the DWMRC statutes require the Licensee to have their RML routinely reviewed and renewed.

As part of their responsibility, the DWMRC 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 the Licensee's RML and in the License Renewal Application.

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 Inc. (Amendment #5) after it bought the White Mesa Mill from Denison Mines
- May 2017, DWMRC 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>.

TEEA Outline

Since the 2011 public comment period, the following have been added to the RML renewal and will be discussed in the TEEA:

- A MILDOS modeling of the White Mesa Uranium Mill's operation (performed by the DWMRC staff) (Attachment A)
- Reclamation and Decommissioning Plan (Rev 5.1), which changes the tailings cover design from a rock armor cover to an evapotranspirative (ET) cover. This includes an Infiltration Contaminant Transport Modeling (ICTM) review of the ET cover (Attachment B)
- Alternate Feed request for material from the Sequoyah Fuels facility in Oklahoma (review and separate SER performed by URS) (Attachment C)

Additionally, the TEEA also includes the following documents:

- The Public Participation Summary from the October 14 – December 21, 2011 public comment period for the License Renewal, that has been updated to include current activities at the Mill (Attachment D);
- A revised draft RML (Attachment E); and
- Renewal of the GWQDP - Statement of Basis and revised Permit. (Attachment F)

MILDOS Write-up

The U.S. Nuclear Regulatory Commission (NRC) and the Utah Division of Waste Management and Radiation Control (Division) accept the results of a software modeling program to demonstrate compliance with the regulatory limits specified in the Code of Federal Regulations and the Utah Radiation Control Rules (Rules), respectively. For the Division, the specific Rules the software used to show compliance with are R313-15-101(4) and R313-15-301(1)(a) for the areas surrounding uranium recovery facilities. The accepted modeling program is the MILDOS-Area program (MILDOS) which was developed by the Argonne National Laboratory (Argonne) for the NRC and is supported and maintained by Argonne. The software began as a program that was run on a mainframe computer and was modified over the years to run on desktop models using the Windows operating system, including updates to the operating system as they occur. Many changes to the MILDOS program have been made through the years to update it due to changes in technology and regulations. A discussion of the history of the MILDOS program can be found in the MILDOS-Area User's Guide (Draft), September 1998.

In estimating doses from uranium recovery facilities, MILDOS calculates doses from the radionuclides of the uranium-238 (U-238) decay chain. There are specific input values for U-238, thorium-230 (Th-230), radium-226 (Ra-226), lead-210 (Pb-210) and radon-222 (Rn-222). The other radionuclides in the decay chain are accounted for within the calculations contained in the MILDOS code. 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 a year and will run 24 hours a day (See Table 2 for percentage of time the Mill was operational). Assuming the facilities are emitting radiation from operations over the months that they do not operate will overestimate the estimated exposures calculated for individuals within 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 the point sources at the facilities (stacks). In addition to the conservative assumptions already built into the MILDOS code, the DWMRC added to the conservative dose estimate by the approach the DWMRC took when conducting their assessment. Each time the DWMRC ran the MILDOS code is referred to as a "run." For each year, the DWMRC ran the code for several sets of sources and summed the estimated doses from each run to provide a total estimated dose. The DWMRC ran a set of ten separate MILDOS runs for each assessment year in order to account for the following:

- Each of the ore types and their respective grades received by the Mill during the assessment year. The ore types are Colorado Plateau ores (CP ores), Arizona Strip (AS ores), Alternate Feed Materials received in bulk (AF-B), and Alternate Feed Materials received in Containers (AF-C);
- Receptor points representing points where individuals reside and separate receptor points only occupied by non-residents;
- Beach Areas and Covered Areas of Tailings Cells present or in operation during the assessment year;
- Point Sources and Area Sources other than the tailings cells present at the Mill;
- Calculated weighted average grades of ores assumed to be processed in the assessment year; and
- Estimated particulate emission rates, either actual or that were calculated using the U.S. Nuclear Regulatory Commission's Regulatory Guide 3.59 for guidance or measured data.

As a result of the DWMRC's approach to handle the various items listed above, the contribution to the estimated dose of the receptors from the particulate and radon emissions from Tailings Cells 2, 3, and 4A were included in multiple runs for each assessment year. Therefore, the estimated dose reported in the DWMRC's independent analysis of the estimated dose from the Mill site is an overestimate

Background for the Analysis

In 2007, the licensee submitted the results of a MILDOS assessment in their license renewal application to demonstrate compliance with exposure limits specified in the Rules and in 40 CFR 190.10(a) of the U.S. Environmental Protection Agency's (EPA) requirements. Additionally, in 2008, the licensee updated their MILDOS submission to demonstrate that the addition of Tailings Cell 4B would not increase the radiation emissions from the White Mesa Mill (Mill) to levels that would exceed the regulatory limits for doses to individuals specified above. The licensee used MILDOS, version 2.20 β , to calculate the estimated doses in both their 2007 and their 2008 assessments. In their analysis, the licensee assumed that the worst case

scenario was to operate the Mill with ores received only from mines in the Arizona Strip (AS Ores). The licensee used this assumption because AS Ores typically have higher concentrations of the radionuclides of interest than Colorado Plateau ores and are a source of ore that the Mill receives consistently.

In 2011, the DWMRC completed review of the 2007 license renewal application and sent the renewed license out for public comment. Numerous comments were received from the public. One commenter stated that the DWMRC had not conducted an independent assessment of the doses from the Mill's operations and that the licensee's previously submitted assessments did not include receipt and processing of alternate feed materials. Although it is not required by law to perform an independent analysis of the doses from the Mill's operations, the DWMRC determined that an independent analysis would be appropriate in this instance. However, by 2011, MILDOS had been updated. When the DWMRC began its independent assessment, MILDOS, Version 3.10, was in use. Many of the internal calculations and models had been updated since MILDOS, Version 2.20 β , had been published; therefore, the results of the DWMRC's assessment cannot be directly compared to any of the licensee's previous assessments. As of March 2016, a new version of MILDOS was published; therefore, in the future, another version of MILDOS will be used in the evaluation. There are many modifications to the new version of MILDOS that will help in assessing future dose estimates.

The DWMRC conducted dose assessments for each year of the Mill's operation from 2007 through 2014. Unlike the licensee's previous dose assessments, the DWMRC specifically included the alternate feeds received and processed by the Mill. Where possible, the DWMRC used measured data for the source terms for particulate releases (U-238, Th-230, Ra-226, and Pb-210) and radon emissions (Rn-222) from point and area sources. If direct data was not available, the DWMRC used NRC's Regulatory Guide 3.59 as guidance for calculating the source terms for the particulate releases and radon emissions. Dose estimates were calculated using information regarding the specific ores received each year and the actual yellowcake produced from the processing of CP Ores, AS Ores, and AF (both in bulk and in containers). Other differences between the licensee's assessment and the DWMRC's assessment of estimated doses from the Mill include using a different point of origin, different receptor points, average weighted grades (radionuclide concentrations) of ores received, as well as other assumptions. Attachment A to this document contains more information regarding the DWMRC's use of MILDOS, Version 3.10, to calculate the estimated dose from the Mill.

The DWMRC compared the MILDOS results with the regulatory limits in the Rules and EPA requirements. In R313-15-301, the Rules specify that a member of the public cannot be exposed to a total effective dose equivalent (TEDE) that exceeds 100 millirem (mrem) in a calendar year from the licensee's operations. This limit is the only limit of the three requirements that requires the inclusion of exposures to radon produced by the licensee's operations. The other two regulatory limits are specific, in that radon is to be excluded when calculating the dose to compare with either limit. 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 last regulatory requirement is EPA's requirement found in 40 CFR 190.10(a) which restricts the licensee from exposing an individual member of the public to a dose equivalent that exceeds 25 mrem to the whole body, 75 mrem to the thyroid, or 25 mrem to any other organ of the body. As stated before, these two regulatory limits are annual limits (calendar year), exclude any exposure from radon, and the exposures must be from the licensee's operations.

After completing the estimated dose calculations for the years 2007 through 2014, the DWMRC found that the licensee was in compliance with the three regulatory requirements stated in the paragraph above. Table 1 shows the maximum estimated doses per year, without regard to age class, compared against each of the limits. The results in Table 1 consider occupancy factors for the non-residential receptor points. An occupancy factor is a normal factor used in calculating potential exposures or doses to an individual from a particular source of radiation. Using occupancy factors in calculating the amount of shielding necessary to meet regulatory limits regarding doses, to determine the amount of time that someone may be in a particular area before exceeding a certain dose, and to calculate estimated doses to individuals is a standard procedure in the health physics field. An occupancy factor accounts for the time that an individual is potentially exposed to the source of radiation. As an example, the amount of shielding required in a medical facility's wall to protect individuals walking down the hall beside the wall would be less than the amount of shielding required to protect individuals who would be sitting in chairs against the same wall if the area is a waiting room instead of a hallway since the person in the waiting room would receive more radiation because they were exposed to the radiation for a longer time period. Although the amount of shielding would be different and the instantaneous exposure to the individual in the hallway would be higher, the licensee would be compliant in both instances. This is an example of a calculation where an occupancy factor is consistently used in determining compliance with the limits for a dose to an individual from a source of radiation. For residential receptor points, like a home, the occupancy factor is considered to be 100 percent even though individuals do not typically stay in their homes 24 hours a day, 365 days a year. For non-resident receptor points, like a transient individual on a highway, occupancy is determined by an estimate of the time an individual will be at the receptor point since the individual will not be present at that location for the majority of the year. For the purposes of the DWMRC's assessments, the receptor locations identified as "resident" locations were assigned an occupancy factor of 1 (100 percent occupancy). Non-residential receptor locations identified as, "industrial," were given occupancy factors equivalent to an individual working at the location for eight hours a day for 50 weeks of the year (assumes a two week vacation). The remaining non-residential locations that are outside of the Mill's property are on Federal lands and the assumption was made that an individual would stay at the location for 14 days which is the maximum time allowed by Federal agencies to camp or stay on Federal lands. Assuming that the Mill runs constantly throughout the year, the highest estimated doses at the receptor points, taking occupancy into account, for each limit per year are shown in Table 1.

Table 1

	Rule R313-15-301(1)(a) 100 mrem TEDE/year (mrem)	Rule R313-15-101(4) (air emissions no radon) 10 mrem/year (mrem)	40 CFR 190.10(a) 25 mrem whole body or 25 mrem any other organ/year* (mrem)
2007	1.43	.25	2.0
2008	1.73	.82	4.27
2009	2.60	1.09	6.10
2010	3.43	2.40	16.2
2011	6.17	2.95	14.8
2012	3.37	2.09	12.0
2013	2.27	1.6	10.9
2014	2.79	0.41	5.55
Maximum	6.17 (2011)	2.95 (2011)	16.2 (2010)

The DWMRC found that the licensee did not exceed the limits specified in the Rules and did not exceed the applicable EPA limit. For the EPA limit, the teenager was the limiting class of individuals for the Bone Dose and the Infant was the most limiting class for the Ave. Lung Dose. The DWMRC determined that the highest exposure values were found at the three locations they evaluated along the eastern edge of the Mill's boundary and recommended that the licensee add additional air monitoring stations. One of the evaluated points on the eastern boundary was contained within the Mill's boundaries, the second and third receptor points evaluated were a little northeast and southeast of the Mill. The eastern edge of the Mill's boundary is close to Highway 191. On the eastern side of Highway 191, the land in line with the Mill's boundaries is primarily owned by the federal government and has not been developed for camping or any specific recreational uses. The occupation of the area by any individual member of the public is transient and primarily limited to travel along Highway 191. Therefore, an individual who would possibly be exposed to radiation emissions from the Mill is not likely to be exposed for 24 hours a day and 365 days a year even if the Mill was capable of operating constantly. The assumption that the area would be occupied by the same individual for a period of 2,000 hours in a year assumes that a future business would open to the east of the Mill if the land was developed. Any future development of the land would be required to be reported to the DWMRC under the requirements of License Condition number 12.3 of Utah Radioactive Materials License UT 1900479.

Table 2

	2007	2008	2009	2010	2011	2012	2013	2014
Percent of days the Mill was operational in the year	42 %	64 %	38 %	56%	68 %	31 %	36 %	Not Requested (68%)*

*A value of 68% was used for 2014. This is an over estimate based on the tons of ore processed in 2014, but the DWMRC did not request the number of days that the Mill was in operation. Even though the Mill was probably not in operation for 68% of 2014, the DWMRC did not want to underestimate the amount of time that the Mill did operate. These values were not used in the calculation of the estimated doses from the Mill's operations, but are shown to demonstrate that the Mill is not in constant operation.

Reclamation and Decommissioning Plan Rev. 5.1

The Licensee submitted Revision 4.0 of the Reclamation Plan on November 25, 2009. Before the DRC had completed review of Revision 4.0, the Licensee submitted Revision 5.0 on September 29, 2011 to include provision of an evapotranspirative (ET) cover system. The DWMRC staff had a number of concerns with the proposed cover system and has worked with the Licensee through several rounds of interrogatories to resolve those concerns. Unfortunately, the Licensee could not resolve all of staff's concerns from information available during the review process.

Recognizing the potential for the ET cover system to provide superior performance to the more traditional cover system included in all versions of the Reclamation Plan through the currently approved Revision 3.2B, DWMRC staff has worked with the Licensee to craft a reclamation plan and a process for implementing that plan that allows the Licensee to prove the capability of the design over time, while allowing immediate construction of the Radon barrier envisioned for the ET cover on Cell 2 to address current Radon emanation concerns. The results of this review and negotiation process is a pair of documents, Reclamation Plan Revision 5.1 and a February 23, 2017 Stipulation and Consent Agreement for implementation of the Plan, which staff has included as Attachment B to this document.

Reclamation Plan 5.1 provides that the Licensee can install the Primary Radon Barrier for the ET cover on Tailings Disposal Cell 2 immediately. A pair of test sections will also be constructed to the full design specifications of the ET cover system to study the performance of the cover. Should the study reveal performance of the system that meets expectation, or that indicates that the system can be altered to perform to expectation, the ET cover design can be adjusted (if required) and can be completed on Cell 2 and any other subsequently closed cell. If the test results in data that do not support adequate performance of the ET cover system, then the Reclamation Plan calls for reverting to the legacy cover system included in all previous revisions of the Plan (i.e. traditional rock cover). Revision 5.1 includes the specifications for the legacy

cover, so approval of that element is retained.

Sequoyah Fuels Alternate Feed Request (URS Review and Write-up)

The Licensee submitted a license amendment application with a cover letter dated December 15, 2012 to the DRC to amend its RML. The proposed amendment would allow the Licensee to receive and process up to 16,700 tons gross weight (7,520 tons dry weight) of Uranium Material from the Sequoyah Fuels Gore Facility. The DRC contracted with URS Professional Solutions, LLC (URS) to complete the review of the amendment application and write the SER for the amendment request.

URS conducted a review of the alternate feed amendment request. URS concluded that the environmental impacts from the Sequoyah Fuels alternate feed material will not have a significant adverse effect on public health or on the environment. The DRC staff reviewed URS's SER and concurred with URS's conclusions. The SER that was prepared by URS for the DRC regarding this Amendment request is found in Attachment C of this document. However, the SER was completed before the DRC was merged with DSHW to form the DWMRC. Therefore, whenever the DRC is mentioned in the SER it is implied to mean the DWMRC. The SER documents how the amendment request was reviewed and the conclusions for the acceptance of this request. License Condition 10.8 has been added to the RML.

Changes to the RML (including redline/strikeout)

In the redline/strike out version of the RML there will be three colors:

- Text written in Red are changes from the original renewal license proposed in 2011;
- Text written in Blue are changes made to the RML in License Amendments 5 through 7; and
- Text written in Green are changes to the RML for the current proposed renewal license.

A clean copy of the final RML is also attached.

The changes considered below succeed the previous license and will be incorporated into Amendment 8 of the License.

SUMMARY OF LICENSE CHANGES

The following is a list of additional changes being made to the RML after the Public Comment Period for the RML renewal that occurred in November 2011.

General modifications throughout the License and Permit:

- DRC changed to DWMRC of Waste Management and Radiation Control in response to Senate Bill 244 of the 2015 Utah General Session.

License Change Summary

License Condition ⁽¹⁾	Change Type ⁽²⁾	Description of Changes
3	Minor	Reset amendment number to “8 (Renewal)” to indicate which amendment was the license renewal.
4	Minor	Reset expiration date to be 10 years from license execution in accordance with R313-22-34(1)(b).
9.1	Major	Removed language prohibiting new construction of tailings disposal impoundments until the new reclamation plan is approved by the Utah Division of Waste Management and Radiation Control (DWMRC). Reclamation Plan 5.1 is being approved with this licensing action.
9.2	Minor	Changed the Utah Division of Radiation Control to Utah Division of Waste Management and Radiation Control. Updated phone number and P.O. Box number
9.4	Minor	Spelled out Nuclear Regulatory Commission for the acronym NRC. Also, deleted the word corporate and replaced it with Mill and capitalized Radiation Safety Officer. Deleted C in acronym.
9.5	Minor	Removed redundant wording that is already covered by License Condition 10.21, changed the contingency fee from 15 to 25 percent, and changed the name of the Insurance Company that is holding the Surety Bond.
9.6	Minor	Removed the acronym RML and removed the sentence about Corporate Radiation Safety Officer.
9.10	Minor	Removed reference to NRC Regulatory Guide 1.86 and replaced it with a new reference of Table 2 of NRC Regulatory Guide 8.30.
9.11	Minor	Deleted License Condition and added language “Reserved”.
10.1	Minor	Added phrase “as amended” in paragraph B and corrected the date referenced.
10.5	Minor	Changed paragraph E. to indicate the ISL Standard Operating Procedure has been approved and shall be followed.
10.8	Major	Added language to authorize the Sequoyah Fuels Alternate Feed
10.10	Minor	Added the word “Reserved”.
10.12	Minor	Added the word “Reserved”.
10.13-10.16 and 10.18	Minor	Deleted License Condition and added language “Reserved”. Deleted by DRC, UDRC Amendment: 8 Renewal”
10.19	Minor	Corrected the spelling of the word “Oklahoma”.
10.20	Minor	Changed wording to require dust control measures only if the containers in which the materials are contained are leaking or damaged.
11.2	Minor	Changed wording in the first Paragraph from “The licensee shall implement the effluent and environmental monitoring program

1 License conditions not listed in the table are those that remain unchanged from the last License amendment.

2 The Director deems minor changes as those that are insignificant in nature, or result in more protection of human health, safety, and/or the environment. Major changes are those found otherwise, and are only made after exposure of the License to public comment and resolution thereof.

License Condition ⁽¹⁾	Change Type ⁽²⁾	Description of Changes
		specified in Section 5.5 of the renewal application, as amended by the submittal to the NRC dated June 8, 1995, and as revised with the following modifications or additions” to “ The licensee shall implement an effluent and environmental monitoring program as described in Sections 2 through 7 of the NRC Regulatory Guide 4.14 Radiological Effluent and Environmental Monitoring at Uranium Mills, and as revised with the following modification, additions and exceptions”
11.3	Minor	Paragraph B. added the words “leak detection system” and deleted the duplicate word “that”.
11.7	Minor	Changed opening paragraph to indicate that the “Settlement Monitoring” Standard Operating Procedure has been approved and shall be followed.
11.8	Minor	Changed opening paragraph to indicate that the “Movement (Displacement) Monitoring” Standard Operating Procedure has been approved and shall be followed.
11.9	Major	Requirements from the License Condition was completed and the License Condition was removed.
12.3	Major	Changed requirement from annual to once every two years.

Explanation of Changes:

License Condition 3:

Three RML amendments have occurred since the 2011 public comment period. Therefore, the renewal became Amendment #8.

License Condition 4:

The license expiration date will be changed to ten years in accordance with R313-22-34(1)(b) after the final RML is signed by the Director of the Utah Division of Waste Management and Radiation Control.

License Condition 9.1:

A new reclamation plan (Rev. 5.1) with a new cover design for the tailings cells is being approved with the license renewal and allows the public to review and comment on Reclamation Plan 5.1. Therefore, the language that prohibited new construction of tailings disposal embankments until the new reclamation plan is approved by the Utah Division of Radiation Control (DRC) was removed.

License Condition 9.2:

In July 2015 the Division of Radiation Control and the Division of Solid and Hazardous Waste were merged to form the Division of Waste Management and Radiation Control. Therefore, the reference to the Utah Division of Radiation Control was changed to Utah Division of Waste Management and Radiation Control. In addition, the phone number and P.O. Box number was also updated.

License Condition 9.4:

During the 2011 Public Comment Period one commenter made the comment that the NRC had not been defined in the Radioactive Material License. Therefore, Nuclear Regulatory Commission was added to define the acronym NRC.

Also, during the 2011 Public Comment Period the Licensee reminded the DRC that they do not have a Corporate Radiation Safety Officer, so all references to the Corporate Safety Officer have been removed.

License Condition 9.5:

License Condition 10.21 obligates the Mill to remediate any groundwater contamination in accordance with applicable regulations and a schedule approved by the Director. It is therefore not necessary to include the phrase “for a minimum period of time, after facility closure to be determined by the Director” in License Condition 9.5. Changed the contingency fee from 15 to 25 percent, and changed the name of the Insurance Company from Aspen American Insurance Company to Argonaut Insurance Company that is holding the Surety Bond.

License Condition 9.6:

During the 2011 Public Comment Period the Licensee reminded the DRC that they do not have a Corporate Radiation Safety Officer, so all references to the Corporate Safety Officer have been removed.

License Condition 9.10:

Removed the reference to NRC Regulatory Guide 1.86 because it was terminated by the NRC on August 30, 2016. Replaced NRC Regulatory Guide 1.86 with Table 2 of NRC Regulatory Guide 8.30 “Health Physics Surveys in Uranium Recovery Facilities” Revision 1 dated May 2002. The requirements are the same.

License Condition 9.11:

Paragraph A, B and D are complete with the approval of the revised Reclamation Plan (Revision 5.1). Paragraphs C and E are adequately covered in License Condition 9.5. Therefore it was determined to delete the requirements of the license condition and place it in “Reserve”.

License Condition 10.1:

During the Public Comment Period one commenter corrected the DRC as when the Atomic Energy Act was signed from 1953 to 1954. The year was changed and the word as amended was added.

License Condition 10.5:

The License Condition use to require the Licensee to provide a Standard Operating Procedure to be for DRC approval by December 1, 2010. During the Public Comment Period several commenters asked if that had been done and if the procedure had been approved. The Licensee did meet the deadline of December 1, 2010 and it has been approved. Therefore, the License Condition is being changed to indicate that the requirement was met.

License Conditions 10.8, 10.10 and 10.12:

Added the word Reserved and changed Amendment: 5 Renewal to Amendment: 6 Renewal.

License Conditions 10.13 through 10.16 and 10.18:

While conducting an inspection of the Mill's Alternate feed program in 2012, a DRC inspector identified several approved alternate feeds had not been received by the Mill for several years or not at all. After further discussion with the Licensee, it was determined that these alternate feeds would no longer be received by the Mill and therefore the License Conditions approving them are being removed.

License Condition 10.19:

During the Public Comment Period a commenter identified the misspelling of Oklahoma. The DRC corrected the spelling error in the License Condition from "Okalahoma" to "Oklahoma".

License Condition 10.20:

License Condition 10.20 has been modified to require the dust control procedures only if the containers are damaged or leaking. To date the containers have not been damaged or leaking and there has been no possibility of dust generation, and hence there has been no need for the specified dust control procedures to date.

License Condition 11.2:

It was also identified that the document referenced in License Condition 11.2 was outdated and referenced the RML renewal application from 1995. Therefore, it was decided by the DWMRC staff to reference NRC Regulatory Guide 4.14, which the Mill's Environmental Protection Manual is based on instead referencing a specific version of the Mills Environmental Protection Manual.

License Condition 11.3:

In paragraph B of the License Condition the words "leak detection system" were added to clarify what the paragraph was meant to address. In addition, a grammatical error was corrected by deleting the word "that" which was repeated twice in the second sentence.

License Condition 11.7:

The License Condition required the Licensee to provide a Standard Operating Procedure to be for DRC approval by December 1, 2010. During the Public Comment Period several commenters asked if that had been done and if the procedure had been approved. The Licensee did meet the deadline of December 1, 2010 and it has been approved. Therefore, the License Condition is being changed to indicate that the requirement was met.

License Condition 11.8:

The License Condition required the Licensee to provide a Standard Operating Procedure to be for DRC approval by December 1, 2010. During the Public Comment Period several commenters asked if that had been done and if the procedure had been approved. The Licensee did meet the deadline of December 1, 2010 and it has been approved. Therefore, the License Condition is being changed to indicate that the requirement was met.

License Condition 11.9:

This License Condition was added during Amendment No. 7. The Licensee revised their Environmental Protection Manual. The revision included additional air monitoring stations, new soil sampling location and added nuclides. The plan was reviewed by the DWMRC and approved on December 10, 2014 (DRC-2014-007121). The Redline/Strikeout version can be found at DRC-2014-006785; therefore, the License Condition is no longer needed and has been removed.

License Condition 12.3:

It was agreed by the DRC and Denison Mines (now Energy Fuels) prior to the public comment period that the frequency of the “land use survey” would be every two years. So the frequency of the survey has been changed from annual to once every two years. Therefore, License Condition 12.3 has been changed accordingly.

General Changes throughout License:

Changed the reference of Executive Secretary to Director of the Utah Division Waste Management and Radiation Control (Director). Also corrected changes done for the RML renewal from 5 Renewal to 8 Renewal.

GWQDP Renewal

The Groundwater Quality discharge Permit No. UGW370004 (Permit) was initially issued on March 8, 2005 to the operator of the Facility, International Uranium (USA) Corporation (“IUC”). The operator of the Facility became Denison Mines (USA) Corp. on March 29, 2007, when the parent companies, International Uranium Corporation and Denison Mines Corp. merged. The Director of DWMRC (“Director”) approved the transfer of control of the Facility to the Permittee (EFRI) on June 27, 2012, who is the current owner and operator of the Facility.

The Permittee has submitted three versions of the renewal application: 1) The original application during September 2009, 2) Revision 1 dated July 2012, and 3) Revision 2 dated June 2014. The revisions were submitted by the Permittee in response to review comments made by the Director. Based on the Directors review of the June 2014 second revised application, it appears that all comments were addressed by the Permittee and that the application is complete.

Attachment F to this document contains the Statement of Basis (SOB) for the Permit and revised Permit. The SOB discusses the review of the Permit Renewal application and changes to the Permit.

Environmental Analysis of the Proposed Licensing/Permitting Action

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 semi-annually 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.

Technical Evaluation of the Proposed Licensing/Permitting Action

The DWMRC Staff conducted a review of the Licensee's 2007 renewal application. This review included, but was not limited to, a review of the Mill's Standard Operational Procedures, the Reclamation and Decommissioning Plan, the Emergency Response Plan and the Stormwater Best Management Practices Plan. The DWMRC staff has concluded that the Mill meets all required operational procedures, plans and staffing as required by State of Utah rule, Federal Regulation and Radioactive Materials License conditions. DWMRC Staff also conducts a minimum of eight (8) Health Physics (Radiation Safety), six (6) Engineering, and four (4) Groundwater inspections per year. In addition, DWMRC Staff reviews 26 quarterly and annual reports submitted by EFRI to the DWMRC regarding Health Physics, Engineering and Groundwater requirements. The DWMRC Staff has concluded that the Mill meets all technical requirements.

Conclusion

Since the White Mesa Uranium Mill meets all environmental and technical regulatory requirements, DWMRC Staff recommends that the Director of Waste Management and Radiation Control renews the radioactive materials license.

References

Denison Mines (USA) Corp. (2007) *White Mesa Uranium Mill License Renewal Application State of Utah Radioactive Materials License No. UT1900479, Volumes 1 through 5*, Denver, CO.

Denison Mines (USA) Corp. (2008 through 2010), *Responses to DRC Health Physics and Engineering Interrogatories*, Denver, Co.

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

Utah Division of Radiation Control (2008 through 2010), *Health Physics and Engineering*

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Interrogatories, Rounds 1 through 3, Salt Lake City, Utah.

Utah Division of Radiation Control (2011), *Safety Evaluation Report for the 2007 License Renewal Application*, Salt Lake City, Utah.

Utah Senate Bill 21, 2012 General Session, retrieved from:
<http://le.utah.gov/~2012/bills/sbillenr/sb0021.pdf>

Utah Senate Bill 244, 2015 General Session, retrieved from:
<http://le.utah.gov/~2015/bills/static/SB0244.html>

Note- the 2007 Renewal Application, the Interrogatories, the Responses to the Interrogatories, and the 2011 Safety Evaluation Report can be found at:
<https://deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm>

Attachment A
MILDOS

Attachment B
Decommissioning and Reclamation Plan 5.1 and Stipulation and Consent Agreement

Attachment C
Sequoyah Fuels Alternate Feed Safety Evaluation Report

Attachment D
2011 Public Participation Summary

Attachment E
Redline/Strikeout text of Energy Fuels. 11e.(2) RML

Attachment F
Statement of Basis for the renewal of the Permit
Redline/Strikeout text of Energy Fuels. Permit