

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
March 2017

Public Comments were received from:

Mr. David C. Frydenlund (EFRI - Vice President Regulatory Affairs and Counsel)

Ute Mountain Ute Tribe

Ms. Sarah Fields (Uranium Watch/Glen Canyon Group/Sierra Club/Living Rivers)

Colorado Environmental Coalition, *et al.*

Mr. Armond Winter

Mr. Bradley Angel (Green Action for Health and Environmental Justice)

Mr. Steve Erikson

Note: Ms. Sarah Fields also made verbal comments at the Public Meeting held on November 10, 2011 at the Blanding Arts and Events Center in Blanding, Utah. Review of the transcript of these verbal comments shows they are repetitive of her written comments submitted on December 21, 2011. Consequently, this Public Participation Summary focuses on the December 21, 2011 written comments, as addressed below. Ms. Fields' verbal comments at the November 10, 2011 Public Meeting can be found in the Official Transcript of the meeting.

ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
BAT	Best Available Technology
CFR	Code of Federal Regulations
cm	Centimeter
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRC	Utah Division of Radiation Control
DWMRC	Utah Division of Waste Management and Radiation Control
DUSA	Denison Mines (USA) Corp.
EFRI	Energy Fuels Resources (USA) Inc.
EPA	U.S. Environmental Protection Agency
ICTM	Infiltration and Contamination Transportation Modeling Report
Kd	Distribution Coefficient
km	Kilometer
LDS	Leak Detection System
Licensee	Denison Mines (USA) Corp.
LRA	License Renewal Application
Mill	White Mesa Uranium Mill in Blanding, Utah
millirem	One Thousandth of One Roentgen Equivalent Man
NRC	U.S. Nuclear Regulatory Commission
pCi	Picocurie; 10^{-12} curie
Permit	Ground Water Quality Discharge Permit No. UGW370004
rem	Roentgen Equivalent Man
RML	Radioactive Materials License
RPP	Respiratory Protection Program
RSO	Radiation Safety Officer
RST	Radiation Safety Technician
RWP	Radiation Work Permit
SER	Safety Evaluation Report
SOP	Standard Operating Procedure
SPCC	Spill Prevention Control and Countermeasures
s	Second
TDS	Total Dissolved Solids
TEDE	Total Effective Dose Equivalent
TEEA	The 2017 Technical Evaluation and Environmental Assessment for the White Mesa Uranium Mill RML Renewal
UAC	Utah Administrative Code
UF4	Uranium Tetrafluoride
U ₃ O ₈	Uranium Oxide
yd	Yard

BACKGROUND

The Utah Division of Waste Management and Radiation Control (DWMRC) licenses the White Mesa¹ Uranium Mill facility near Blanding, Utah under State of Utah Radioactive Materials License (RML) No. UT1900479 (the License). The License, as amended, authorizes Energy Fuels Resources (USA) Inc. (EFRI)² to receive and process natural uranium-bearing ores, specified alternate feed materials, and possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by uranium recovery operations.

Denison Mines (USA) Corp. (now EFRI) submitted a renewal application for the License on February 7, 2008. After reviewing the renewal application, the DRC 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. In response to these comments, the DRC did not issue a final license renewal at that time. Instead, DRC management decided that the DRC staff should perform new, independent MILDOS-AREA modeling. This new modeling effort required significant time and additional data obtained from EFRI from 2007 through 2014. The MILDOS-AREA modeling is now completed. In addition, during this time DWMRC staff has also undertaken the following matters relating to the 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;

¹ Beginning in 2004, the Utah Department of Environmental Quality, Division of Radiation Control (DRC) regulated uranium mill operations in the State of Utah under agreement from the US Nuclear Regulatory Commission. On July 1, 2015, responding to legislation enacted earlier that same year, the DRC merged with the former Division of Solid and Hazardous Waste to form the Division of Waste Management and Radiation Control. To avoid confusion, and unless otherwise specified, the name "Division of Waste Management and Radiation Control" will appear in this Public Participation Summary to refer to the Division of State government performing this regulatory function.

² The entity that owns the White Mesa Uranium Mill Site 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 appear in this Public Participation Summary to refer to the owner of the White Mesa Mill.

- 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 of the foregoing matters related to the pending license renewal, including significant new data. Therefore, the license renewal process itself has been significantly delayed. This delay is entirely consistent with the public participation process required by Utah law. Through the 2011 comments, a large number of valid technical issues were raised that required extensive evaluation and consideration, including the gathering and evaluation of significant new data. At this time, the DWMRC is now ready to issue a final license renewal that incorporates all of the foregoing matters. In anticipation of that event, the DWMRC would like to provide its formal, comprehensive responses to the public comments received during 2011.

Based on the foregoing, the following Public Participation Summary summarizes and provides responses to public comments the DWMRC received regarding the License renewal application during the comment period between October 14 and December 21, 2011. Individuals and interested groups submitted written comments during the comment period (see Attachment 1). In addition, this Public Participation Summary addresses verbal public comments received during a public meeting held on November 10, 2011 in Blanding, Utah (see Attachment 2 for a transcript of the meeting).

Mill Description

The White Mesa Uranium Mill processes natural uranium ores and alternate feed materials for Uranium Oxide (U_3O_8). Over the course of time, the different owners of the Mill have constructed five tailings or evaporation cells, two 40 acres (Cells 4A and 4B) and three larger (Cells 1, 2, and 3) impoundments. Each received approval under the regulatory framework that existed at the time of construction and each received approval as a tailings disposal or evaporation cell. A description and use for each impoundment is described below:

- Cell 1: The Nuclear Regulatory Commission (NRC) approved Cell 1 in June of 1981. Mill operators have restricted its use to management of fluids, including process water, storm water, and water from groundwater pumping. The mill uses or reuses this water for its milling process. This cell has never received tailings.
- Cell 2: The NRC approved Cell 2 in May of 1980. When the DWMRC assumed regulatory authority over the mill in 2004, mill personnel had ceased placing tailings in this cell. Closure began when disposal of tailings ended. Water is currently being removed from the cell and installation of a final cover has begun. Installation of the platform fill and primary Radon barrier placed in 2016 have increased pore pressures in the tailings mass sufficiently that fluid available for extraction from the tailings mass has increased significantly. Available fluid must

continue to be extracted from the tailings prior to completion, installation and approval of final cover in order to prevent settlement that could open pathways for infiltration of precipitation into the tailings, and could decrease the effectiveness of the cover as a radon containment barrier.

Reclamation Plan Revision 5.1 is under consideration as part of the License renewal. Therefore, the public has an opportunity to review and comment on Reclamation Plan Revision 5.1 during the new comment period. This version of the design addresses the potential use of an evapotranspirative (ET) cover system instead of the previously-approved rock-armor and clay barrier system. The potential ET cover system is provisional, and a test cell constructed to the design specifications is installed on a portion of Cell 2, along with the lower two layers (platform fill/secondary Radon barrier and primary Radon barrier) on the entirety of Cell 2. The final design of the ET cover will be adjusted to incorporate data gathered in connection with the test cell, to maximize the cover's long-term performance. Should the test section perform in an unsatisfactory manner, the reclamation plan calls for reversion to the legacy rock-armor and clay barrier cover system previously approved in Reclamation Plan 3.2.B, specifications for which are also included in Reclamation Plan Revision 5.1.

- Cell 3: The NRC approved Cell 3 in September of 1982. Clean soil covers all but approximately seventeen acres of Cell 3. The uncovered portions of Cell 3 remain as one of the Mill's two operating cells. The cell has reached its capacity for tailings disposal, and no longer receives tailings. It currently accepts byproduct material such as in situ leach recovery [aka: 11e.(2)] waste for direct disposal, an activity authorized under the Mill's license. EFRI receives byproduct material for direct disposal in trucks rather than by slurry. A cell must have a sufficient depth of tailings prior to offloading trucks in the cell in order to protect the liner system, leak detection system, etc. Therefore, mill personnel have continued placing byproduct material in Cell 3 rather than moving that activity to Cell 4A. For that reason, and consistent with its License, Energy Fuels has indicated that it intends to continue to use Cell 3 for direct byproduct disposal until those materials can go into Cell 4A.
- Cell 4A: The NRC licensed Cell 4A as a uranium tailings disposal cell in 1990. EFRI either did not use Cell 4A, or used it only for temporary storage of vanadium raffinate until, pursuant to DWMRC requirements, it received a retrofit with a new liner and leak detection system. The DWMRC approved that retrofitting in September 2008. Cell 4A currently receives tailings for disposal.
- Cell 4B: The DWMRC licensed Cell 4B as a tailings cell in June of 2010. The mill uses this cell currently for management of process water. The cell has never received tailings.

Summary of Regulatory Activities at White Mesa Uranium Mill

The NRC originally licensed the White Mesa Mill in August, 1979. The NRC transferred regulatory authority for this license to the State of Utah in August, 2004, after Utah obtained Agreement State status for 11e.(2) byproduct material with the NRC.

Energy Fuels holds Radioactive Materials License No. UT1900479 (License) and Ground Water Discharge Permit No. UGW370004 (Permit)³ for the White Mesa Mill. Energy Fuels is also subject to a "Corrective Action Plan for Nitrate," dated December 12, 2012 and a "Corrective Action Plan for Chloroform," dated September 14, 2015.

Energy Fuels Resources must conduct various kinds of environmental monitoring at the White Mesa Mill. The DWMRC makes the reports for these sampling events available to the public on the DWMRC website (<http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm>).

The reports which are routinely placed on the DWMRC website are as follows:

- Quarterly Groundwater Monitoring Reports;
- Semi-Annual Effluent Monitoring Reports;
- Annual Tailings Wastewater Sampling Report;
- Annual Seeps and Springs Sampling Report;
- Quarterly Chloroform Monitoring Reports; and,
- Quarterly Nitrate Monitoring Reports.

Energy Fuels' ground water monitoring program is comprehensive. The mill currently contains 75 monitoring wells, screened in the shallow aquifer, which are routinely monitored. This includes 31 primary (MW-series monitoring wells) which are required to be sampled quarterly for a large suite of monitoring parameters including heavy metals, nutrients, general chemistry, radiologics, and volatile organic compounds (VOCs). EFRI addresses exceedances of Ground Water Compliance Limits according to source assessment studies and reporting requirements listed in the Permit.

The DWMRC began in May, 1999, prior to achieving Agreement State status, taking split samples during sampling events at the mill. Split sampling allows for a check on field sample collection procedures, laboratory analysis, and data quality assurance and quality control.

The DWMRC performs approximately 18 routine inspections at Energy Fuels each year, 14 more than required as an Agreement State and 17 more per year than the NRC did when it regulated the facility. Inspections cover areas of health physics, ground water protection, and engineering controls and design. The Director has issued and resolved 36 Notices of Violation since 2004. Additional inspections also occur as appropriate for reported incidents. Finally, the DAQ inspects the facility as a "minor source" approximately once every three years.

³ The Permit is issued under the authority of the Utah Water Quality Act, Utah Code Ann. § 19-5, but is issued by the Director of the DWMRC as provided by Utah Code Ann. § 19-5-102(6).

Radioactive Materials License and Ground Water Permit: How They Work Together and Their Renewals

Energy Fuels holds both a Radioactive Materials License and a Groundwater Discharge Permit for the White Mesa Mill. Although the reader should review the contents of the License and Permit for a detailed understanding, the following table provides a comparative summary of requirements

Table 1

Radioactive Materials License No. UT1900479 (License)	Ground Water Discharge Permit No. UGW370004 (Permit)
<ul style="list-style-type: none"> • Reclamation and decommissioning plans, including cell cover closure requirements. • Requirements for alternate feed materials. • Surety requirements. • Requirements for disposal of material and equipment. • Limitations on disposal of in-situ leach waste and other 11e.(2) disposal. • Environmental sampling and reporting requirements (incorporates ground water permit requirements by reference). • Leak detection program for all tailings and evaporation Cells. • Cell settlement monitoring • Production limitations 	<ul style="list-style-type: none"> • Ground water compliance limits. • Ground water monitoring requirements. • Seep and spring monitoring requirements. • Analytical procedures for samples. • Reporting requirements. • Cell, other impoundment and storage area groundwater-related performance and design standards. • Tailings wastewater sampling.

The NRC last renewed the License in March, 1997 for a period of ten years. Energy Fuels submitted a timely application for renewal on February 28, 2007. Under R313-22-36(1), with a timely application, the License continues in effect until the Director makes a final determination. The DWMRC issued a draft license renewal for public comment on October 14, 2011. After consideration of the comments submitted, the Director determined that this renewal required additional analysis and, to meet new statutory requirements for public comments associated with license challenges, commenters should have new opportunities for public comment. *See Utah Code Ann. § 19-1-301.5(4).*

The DWMRC originally issued the Ground Water Permit on March 8, 2005 for a period of five years. Energy Fuels submitted a timely application for renewal of the Permit on September 1, 2009. Under R317-6-6.7, with a timely application, the Permit has been administratively extended until the Director makes a final determination. A Statement of Basis and revised Permit are included as Attachment F of the Technical Evaluation and Environmental Assessment.

Introduction

The purpose of this document is to summarize public comments received between October 14 and December 21, 2011 by the DWMRC regarding the EFRI license renewal for License RML No. UT1900479. Seven letters containing written comments were received during the comment period. One individual also made oral comments at the public hearing held on November 10, 2011 at the Blanding Arts and Events Center in Blanding, Utah.

The topics addressed in public comments received by the DRC (including both oral and written comments) are summarized in Table 2. These represent the topics or general categories that the comments were organized into. Following Table 2, the DWMRC will provide its specific responses to these comments. The comments received entirely are contained in Attachment A of the PPS. Due to the large amount of comments, the DWMRC has numbered each comment for reference purposes.

Table 2. Summary of Topics Addressed in Comments Received by DWMRC

Topic	Commenter						
	David C. Frydenlund (EFRI)	Ute Mountain Ute Tribe	Sarah Fields	Colorado Environmental Coalition	Armond Winter	Bradley Angel	Steve Erikson
Written and Related Oral Comments Received							
Comment Topic #01: General Comments	X	X	X	X	X		
Comment Topic #02: Suggested Changes that were incorporated into the RML	X		X				
Comment Topic #03: Availability of Documents Associated with the Renewal			X			X	

Table 2. Summary of Topics Addressed in Comments Received by DWMRC

Topic	Commenter						
	David C. Frydenlund (EFRI)	Ute Mountain Ute Tribe	Sarah Fields	Colorado Environmental Coalition	Armond Winter	Bradley Angel	Steve Erikson
Comment Topic #04: The DWMRC Review Process and Documenting the Review in the SER.		X	X				
Comment Topic #05: Regulatory Authority of the DWMRC		X					
Comment Topic #06: Public Comment Process		X	X			X	
Comment Topic #07: Compliance History			X				
Comment Topic #08: Compliance with Regulatory Limits and the Atomic Energy Act		X	X				
Comment Topic #09: Lack of resources at the DWMRC and DEQ to adequately regulate the Mill		X					
Comment Topic #10: Environmental Assessment and MILDOS-AREA Modeling		X	X				
Comment Topic #11: Environmental Monitoring and Reporting		X	X			X	
Comment Topic #12: NEPA			X	X			
Comment Topic #13: Endangered Species			X				
Comment Topic #14: Traffic			X				
Comment Topic #15: Impacts to Cultural and Historical Sites							
Comment Topic #16: Fugitive Dust		X					

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Topic	Commenter						
	David C. Frydenlund (EFRI)	Ute Mountain Ute Tribe	Sarah Fields	Colorado Environmental Coalition	Armond Winter	Bradley Angel	Steve Erikson
Comment Topic #17: The Land Use Survey		X					
Comment Topic #18: The USGS Report		X	X				
Comment Topic #19: Approval of Reclamation Plan 5.1		X					
Comment Topic #20: Surety		X	X				
Comment Topic #21: Tailing Cell Construction and Liner Integrity		X	X				
Comment Topic #22: Cover Design (including Radon and ICTM)		X	X				
Comment Topic #23: Tailing Cell Leak Detection		X					
Comment Topic #24: DAQ and the Mills Air Approval Order		X					
Comment Topic #25: Compliance with NESHAPS		X	X				
Comment Topic #26: Groundwater (Including Chloroform and Nitrate plumes)		X	X				
Comment Topic #27: Stormwater Best Management Plan		X					
Comment Topic #28: Alternate Feed (Including Thorium)		X	X				X
Comment Topic #29: Alternate Feed Circuit			X	X			
Comment Topic #30: Alternate Feed Storage			X				

Table 2. Summary of Topics Addressed in Comments Received by DWMRC

Topic	Commenter						
	David C. Frydenlund (EFRI)	Ute Mountain Ute Tribe	Sarah Fields	Colorado Environmental Coalition	Armond Winter	Bradley Angel	Steve Erikson
Comment Topic #31: Radiation Safety Program			X				
Comment Topic #32: Occupational Air Monitoring and Derived Air Concentrations			X				
Comment Topic #33: 11e.(2) or ISL Disposal		X					

Before providing specific responses, the DWMRC would like to thank the commenting parties for their time and effort in connection with renewal of the Permit. The DWMRC recognizes that License and associated operations are subject to complex technical, permitting, and legal requirements and that operations at the Mill potentially impact various interests and stakeholders. The DWMRC’s goal is to ensure that operations under the License are conducted in compliance with all applicable legal and technical requirements.

Comment Topic #01: General Comments

Several commenters made comments that are in the nature of general observations rather than specific comments on the renewal permit that require a response in this Public Participation Summary. Therefore no changes were made to the RML based on these general observations nor are they addressed in detail here. Examples of these general comments include, but not limited to, suggested changes to the SER and RML by EFRI and comments supporting the addition of the Land Use Survey requirement.

Comments associated with this response are: #2; #7; #8; #9; #10; #22; #23; #24; #25; #48; #49; #50; #51; #52; #53; #56; #59; #70; #74; #79; #89; #137; #145; #153; #156; #157; #180; #199; #200; #212

Comment Topic #02: Suggested Changes that were incorporated into the RML

Several commenters found errors and made suggested changes in the identified License Conditions of the RML. Where appropriate, the DWMRC made the recommended changes to

the RML. Examples of these errors included, but are not limited to, the misspelling of Oklahoma and EFRI letting the DWMRC know they do not have a Corporate Radiation Safety Officer.

Comments associated with this response are: #1; #3; #4; #5; #6; #138; #140; #146; #152; #154; #155

Comment Topic #03: Availability of Documents Associated with the Renewal

A couple of the commenters mentioned that they felt that the documents associated with the White Mesa Uranium Mill RML Renewal were not readily available for public review. These comments are not accurate. All of the documents associated with the License Renewal were posted on the DWMRC website. In addition, other documents associated with the White Mesa Mill are available to the public on the DWMRC webpage that include compliance history, construction projects, groundwater sampling reports, and other required reports. NRC guidance documents are found on the NRC webpage. The DWMRC believes the information posted on the webpage allows a person to understand the activities that are going on at the mill. Based on the information that is present. Since the 2011 Public comment period, the Utah Department of Environmental Quality (DEQ) now has the “EZ Records Search” link on the web page to allow people to search for documents in DEQ’s electronic filing program. If there is other information a person seeks, they can still request it through the Utah Government Records Access and Management Act (GRAMA).

Comments associated with this response are: # 87; #88

Comment Topic #04: The DWMRC Review Process and Documenting the Review in the SER

A couple of the commenters made comments regarding the 2011 SER to the effect that it did not meet the requirements of the Atomic Energy Act and that it did not communicate clearly what was reviewed by the DWMRC. The SER was written after all the “open issues” were resolved to the Director’s satisfaction. Any shortcomings or “incomplete information” with the LRA submittal was documented in the three rounds of DWMRC Interrogatories dated November 24, 2008, July 2, 2009, and December 28, 2009 respectively. The three rounds of DWMRC Interrogatories can be found on the DWMRC website. The Interrogatories specified what criteria was being used (i.e. NRC Guidance) to determine whether the information provided was adequate to meet regulatory compliance. The draft license showed revisions to the RML as appropriate based on the review of the license renewal application and any unresolved issues, excluding groundwater, which was addressed during the Permit Renewal Application review

The DWMRC conducts regular inspections of the Mill regarding Radiological Safety, Groundwater and Engineering concerns. DWMRC Staff determines if EFRI keeps its commitments made in the Renewal Application, requirements found in State Rule and Federal Regulation and conditions in the radioactive material license during regular inspections of the

Mill. Some observations made during these inspections were also used in the decision process of renewing the RML.

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>

Comments associated with this response are: #89; #90; #91; #92, #93; #165; #204

Comment Topic #05: Regulatory Authority of the DWMRC

One commenter wanted the State to clearly define that it has regulatory authority over radioactive materials. The State of Utah maintains authority to regulate uranium mills within its borders. The State of Utah received regulatory authority as an agreement State from the NRC in 2004. NRC is authorized to enter into an agreement with the State of Utah in the Atomic Energy Act under section 274. The State of Utah's Legislature granted authority to regulate radioactive materials, including uranium mills, in the State of Utah's Radiation Control Act (Title 19, Chapter 3 Part1), in the Utah Administrative Code R313-12-2 and the RML's opening paragraph.

The same commenter also wanted the DWMRC to add a license condition to the RML that would allow the DWMRC to revoke an RML. The DWMRC already has rules regarding the ability to revoke a radioactive material license. Specifically, R313-14-15(3) allows the Director to issue an order revoking the license or other actions. Therefore, DWMRC does not need to add a provision in the RML at this time.

Comments associated with this response are: #11; #38; #49.

Comment Topic #06: Public Comment Process

Some commenters stated that the license renewal process denied the public full opportunity to provide public comment. In this matter, all legal requirements relating to the public comment process were satisfied. The DWMRC conducts Public Comment Periods in accordance with State of Utah Rules found in the Utah Administrative Code R313-17-2 *Administrative Procedures; Public Notice and Public Comment Period*, the Director is required to give public notice of major licensing actions. Major licensing actions are defined in R313-17-2(1)(a). Therefore, the public is guaranteed public comment periods allowing the opportunity to participate in important licensing actions regarding this particular radioactive material license.

In this matter, the Public Notice for the 2011 public comment period was published in the *Deseret News*, *Salt Lake Tribune*, and the *San Juan County Recorder*. In addition, the information was posted on the Division's web page and sent out through the Division's LISTSERV. In addition, any RML that is for uranium milling or 11e.(2) disposal also has to follow R313-17-4 *Special Procedures for Decisions Associated with Licenses for Uranium Mills*

and Disposal of Byproduct Material. This Rule was implemented after the 2011 Public Comment Period. The Rule outline for the public hearing process (42 USC § 2021(o)(3)(A)) that is required by the Atomic Energy Act for this type of licensee was therefore fully satisfied in this matter.

Comments associated with this response are: #14; #15; #84; #139; #213

Comment Topic #07: Compliance History

Several of the commenters stated that the compliance history of the White Mesa Mill was not fully reviewed and analyzed as part of the RML renewal review. This is not correct. The compliance history was reviewed during the DWMRC review of the license renewal application. For several years, the DWMRC has placed the compliance history for the White Mesa Uranium Mill on the Licensee's web page on the Utah DEQ website. This History documents all enforcement actions (i.e. Notices of Violation, Enforcement Discretion and etc.) for the Mill the DWMRC has issued since taking over regulatory jurisdiction in 2004.

Comments associated with this response are: #87; #96, #125, #166

Comment Topic #08: Compliance with Regulatory Limits and the Atomic Energy Act

One commenter stated that the DRC did not follow guidelines on being compliant with the AEA in doing an environmental assessment and holding a public meeting. In the renewal application, EFRI submitted Standard Operating Procedures (SOPs) which describe how the Mill is going to operate to maintain regulatory compliance. DWMRC 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 inspection and review of effluent and groundwater monitoring reports by DWMRC 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 DWMRC staff.

EFRI also submitted an Environmental Report and a MILDOS-AREA modeling analysis. DRC 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 style 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 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.

In a letter (DRC-2017-001282) dated February 22, 2017 to the DWMRC, 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 conducting 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."

A Public Hearing will also be included as part of the 2017 public comment period for the renewal of the RML and Ground Water Discharge Permit for the Mill.

Comments associated with this response are: #94; #95; #96; #97; #98; #99; #101; #102; #103; #104; #105; #106; #107; #136; #164; #167; #168; #172; #173; #194; #198; #205; #207; #208; #210

Comment Topic #09: Lack of resources at the DWMRC and DEQ to adequately regulate the Mill

One commenter expressed concern that the DWMRC does not have the adequate resources to appropriately regulate the Mill. The DWMRC refutes the claim that "DEQ fails to maintain a physical and inspection presence at the facility." The DWMRC committed to performing quarterly inspections throughout the year. This minimum inspection frequency has been followed since the fall of 2004. Furthermore, based on activities at the facility, DWMRC's physical presence has been more than once per quarter. Groundwater compliance/activities, Engineering compliance/activities and radiation safety inspections allows for reasonable and adequate physical presence at the site.

Currently the Uranium Mill Program has two Engineers, two Hydrogeologists, and one Health Physicist. This organizational structure will allow the DWMRC to review submittals in a timely manner and allow staff resources to be allocated to compliance and licensing actions for the regulatory oversight program. No change will be made to the License.

Comments associated with this response are: #12; #13; #17

Comment Topic #10: Environmental Assessment and MILDOS-AREA Modeling

One commenter stated that the DRC did not follow guidelines on being compliant with the AEA by not creating stand-alone analysis of the environmental report. This comment is incorrect. 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.

Even though the DWMRC is not required to do so under the AEA, after the 2011 Public Comment period, the DWMRC chose to perform an independent MILDOS assessment which is being made available for public comment and is included as Attachment A of the Technical Evaluation and Environmental Assessment. The DWMRC also included alternate feed materials in its MILDOS-AREA modeling.

Comments associated with this response are: #67; #114; #115; #116; #118; #126; #127; #172; #185; #186; #187; #190; #191; #195; #197

Comment Topic #11: Environmental Monitoring and Reporting

Several commenters had comments regarding the Mill's Environmental Monitoring program and the reporting of the environmental monitoring results. These comments are misplaced. The Mill's Semi-Annual Effluent Monitoring program is based on the NRC Regulatory Guide 4.14 RADIOLOGICAL EFFLUENT AND ENVIRONMENTAL MONITORING AT URANIUM MILLS. In Regulatory Guide 4.14, it states that this monitoring is done "To 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. These requirements are also found in State of Utah's UAC Title R313. No change will be made to the SER.

An example of the type of monitoring that is done at the Mill is with Thermoluminescent dosimeters. These dosimeters are used at the Mill's monitoring station to document gamma results and are reported in the Semi-Annual Effluent Monitoring Reports. The Semi-Annual Effluent Monitoring Reports are reviewed by the DWMRC when they are submitted. Below in Table 3 are the reported results from 2015 and 2016. As demonstrated below, the annual gamma exposure from the Mill is below the regulatory limit of 100 mrem/year (R313-15-301(1)(a)). The Semi-Annual monitoring reports are found on the DWMRC webpage at:

<http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm>

Table 3: Gamma Monitoring Results

Monitoring Stations	2015				2016			
	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th 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

*** Annual Limit for an individual member of the public is 100 mrem/year

Comments associated with this response are: #39; #125; #135; #190; #215;

Comment Topic #12: NEPA

Several commenters expressed their opinion that the review of the Mill’s renewal application did not conform to the National Environmental Policy Act. As stated in Title II Section 102 of the National Environmental Policy Act (NEPA), NEPA only applies to Federal Agencies.

Therefore, EFRI is not required to show compliance with NEPA because:

- a. The State of Utah has not adopted the NEPA regulations to demonstrate environmental compliance with uranium mills in UAC R313-24, nor are they required;
- b. The White Mesa Uranium Mill is not located on federally controlled lands;
- c. Federal funds are not being used to finance the White Mesa Uranium Mill operations; and
- d. The White Mesa Uranium Mill is not regulated by a federal agency.

In other words, NEPA applies to actions by “any Federal agency” having jurisdiction over a proposed “Federal or federally assisted undertaking.” As the “undertaking” at issue here is a License Renewal of the Uranium Mill that is a private entity and receives no federal assistance. Because the site is regulated by a State of Utah agency, NEPA is not applicable. However, the DWMRC did perform an environmental analysis as required by UAC R313-24-3(d)(3).

Comments associated with this response are: #100; #209; #211

Comment Topic #13: Endangered Species

One commenter expressed concerns with endangered species and if a review was completed as part of the license renewal application. In connection with its environmental analysis, the DWMRC did compare the original 1978 Environmental Report and the listed endangered and threatened species list for San Juan County, Utah dated January 6, 2012 found on the U.S. Fish and Wildlife Service website. This was included in the original License Renewal package that went out for public comment in October 2011.

Table 4

1978 Final Environmental Report		January 6, 2012	
Common Name	Scientific Name	Common Name	Scientific Name
Black-footed ferret	<i>Mustella nigripes</i>	Black-footed ferret	<i>Mustella nigripes</i>
Sheathed deathcamas	<i>Zigadenus vagintus</i>	Bonytail chub	<i>Gila elegans</i>
Spearleaf buckwheat	<i>Erigonum humivagans</i>	California condor	<i>Gymnogyps californianus</i>
Drab phacelia	<i>Phacelia indecora</i>	Colorado pikeminnow	<i>Ptychocheilus lucius</i>
Isely milkvetch	<i>Astragalus iselyi</i>	Greenback cutthroat trout	<i>Oncorhynchus clarkia stomias</i>
Cronquist milkvech	<i>Astragalus cronquistii</i>	Gunnison sage-grouse	<i>Centrocercus minimus</i>
Kachina daisy	<i>Erigeron kachinensis</i>	Humpback chub	<i>Gia cypha</i>
American peregrine falcon	<i>Falco peregrinus anatum</i>	Isely milkvetch	<i>Astragalus iselyi</i>
Spotted bat	<i>Euderma maculatum</i>	Mexican spotted owl	<i>Strix occidentalis</i>

			lucida
Abert's Squirrel	Sciurus aberti	Navajo sedge	Carex specuicola
		Razorback sucker	Xyrauchen texanus
		Southwest willow flycatcher	Empidonax traillii extimus
		Western yellow-billed cuckoo	Coccyzus americanus occidentalis

The Black-footed ferret and Isely milkvetch are the only two listed species on both lists. All of the other species listed in the 1978 Environmental Report are no longer listed as an endangered species or were only being considered in 1978 and were never added to the endangered species list. None of the Species listed as Endangered or Threatened in San Juan County are found in the immediate vicinity of the Mill and therefore are not a compliance issue. In EFRI's Environmental Report impact on wildlife a review of endangered species in the area was also evaluated.

Comments associated with this response are: #179

Comment Topic #14: Traffic

One commenter had comments regarding the impact traffic to and from the Mill has on the local community due to the Mill. In response to comments received, the DWMRC did compare the transportation numbers found in the original 1978 Environmental Report to current transportation numbers. The 1979 Final Environmental Statement assumed that ore shipments would first go to the two buying stations and then be transported to the Mill. While this assumption has not proven to be the practice, this change is immaterial because the truck routes have not changed. The report also assumed a 160 mile radius from each buying station and 22,670 trucks hauling 680,000 tons of ore per year to the Mill site. The 1991 LRA did not report transportation data. Transportation numbers are variable and therefore change from year to year. For example, transportation numbers from the Mill in 2010 were 8,060 loads of natural ore and 208 loads of alternate feed ore. These loads brought in 123,563 tons of natural ore and 7,644 tons of alternate feed ore in 2010. This is 36% of the number of truck loads and 19% of the total number of tons from original estimates from the Mill site projection in 1979. Therefore, the environmental impacts from transportation of ore have decreased over time. The U.S. Department of Transportation (DOT) has jurisdiction over transportation issues. The DWMRC does not have jurisdiction over ore shipments until the shipments enter the restricted area of the Mill. Yellowcake shipments become DOT jurisdiction when they leave the Mill's property.

Based on the foregoing, traffic impacts were adequately considered and do not require any changes to the License.

Comments associated with this response are: #174; #175; #176; #177

Comment Topic #15: Impacts to Cultural and Historical Sites

One commenter expressed concerns over protection of cultural and historical site on and adjacent to the Mill's property. The potential impact of adjacent cultural sites is adequately addressed. 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 addition, License Condition 9.7 specifies what must be done when a cultural or historical site is encountered. EFRI meets its obligations to cultural resources by meeting the requirements in License Condition 9.7.

One commenter expressed the concern that an archeological study was not done for the construction of Tailings Cell 1. The State of Utah obtained regulatory authority to administer the Uranium Mill program in Utah from the NRC in August 2004, and the DWMRC included the conditions previously approved by the NRC in the License. Tailings Cell 1 was constructed prior to the DWMRC receiving regulatory authority. Additionally, License Condition 9.7 is a remnant from the original NRC issued RML. The NEPA process, which applied during the time that the Mill was regulated by the NRC, requires that an archeological and historical investigation be performed. Therefore, the DWMRC understands that an appropriate survey was conducted for Tailings Cell 1 at that time. In any event, that is a question for the Nuclear Regulatory Commission, not the DWMRC. However, if new construction activities occur at the site (such as a tailings cell), License Condition 9.7 will require the licensee to administer a cultural resource inventory; similar to what was completed for Tailings Cell 4B.

Comments associated with this response are: #141; #142; #143; #144; #170; #201; #214

Comment Topic #16: Fugitive Dust

Many commenters voiced a concern about the potential of fugitive dust coming from the Mill's ore pad which has both native and alternate feed ore on it. The DWMRC reviewed the Mill's Standard Operating Procedure (SOP) on dust management during the License Renewal and found it to be adequate to meet legal requirements and to protect contiguous properties. No change will be made to the License. In addition, the DWMRC has reviewed the Semi Annual Effluent Monitoring Reports which includes particulate air sampling. The effluent releases for particulate air sampling have not exceeded the regulatory limits. Below in Table 5 are the monitoring results from 2016. For other sampling results from previous years, please see the Semi-Annual monitoring reports which are found on the DWMRC webpage at:

<http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm>

Table 5: White Mesa Mill Air Monitoring Station for Particulates

Results for Uranium-Natural						
Monitoring Station	1st Qtr, 2016 Result (uCi/ml)	2nd Qtr, 2016 Result (uCi/ml)	3rd Qtr, 2016 Result (uCi/ml)	4th Qtr, 2016 Result (uCi/ml)	2016 Average (uCi/ml)	Effluent Contraction Limit (uCi/ml)
BHV1	2.00E-16	1.10E-16	1.10E-15	9.80E-16	5.98E-16	9.00E-14
BHV2	7.00E-16	2.00E-16	4.20E-16	4.10E-16	4.33E-16	9.00E-14
BHV4	5.00E-16	2.90E-15	6.20E-15	4.10E-15	3.43E-15	9.00E-14
BHV5	1.40E-15	3.90E-15	7.10E-15	5.10E-15	4.38E-15	9.00E-14
BHV6	7.00E-16	1.20E-14	6.90E-15	8.90E-15	7.13E-15	9.00E-14
BHV7	8.00E-16	1.50E-15	2.60E-15	1.60E-15	1.63E-15	9.00E-14
BHV8	2.00E-16	1.10E-15	1.20E-15	1.20E-15	9.25E-16	9.00E-14
Results for Thorium-230						
Monitoring Station	1st Qtr, 2016 Result (uCi/ml)	2nd Qtr, 2016 Result (uCi/ml)	3rd Qtr, 2016 Result (uCi/ml)	4th Qtr, 2016 Result (uCi/ml)	2016 Average (uCi/ml)	Effluent Contraction Limit (uCi/ml)
BHV1	3.00E-17	7.00E-17	8.70E-17	7.80E-17	6.63E-17	2.00E-14
BHV2	6.00E-18	3.00E-17	6.90E-17	1.90E-17	3.10E-17	2.00E-14
BHV4	2.00E-17	5.00E-17	4.40E-16	3.00E-16	2.03E-16	2.00E-14
BHV5	6.00E-16	4.00E-16	7.60E-16	6.60E-16	6.05E-16	2.00E-14
BHV6	1.00E-16	1.00E-16	4.00E-16	3.30E-16	2.33E-16	2.00E-14
BHV7	1.00E-16	9.00E-17	1.70E-16	1.20E-16	1.20E-16	2.00E-14
BHV8	2.00E-17	1.00E-16	8.40E-17	6.00E-17	6.60E-17	2.00E-14
Results for Radium-226						
Monitoring Station	1st Qtr, 2016 Result (uCi/ml)	2nd Qtr, 2016 Result (uCi/ml)	3rd Qtr, 2016 Result (uCi/ml)	4th Qtr, 2016 Result (uCi/ml)	2016 Average (uCi/ml)	Effluent Contraction Limit (uCi/ml)
BHV1	3.00E-16	9.00E-16	1.80E-16	1.30E-16	3.78E-16	9.00E-13
BHV2	8.00E-17	3.00E-16	8.10E-17	5.00E-17	1.28E-16	9.00E-13
BHV4	5.00E-17	4.00E-16	2.20E-15	4.80E-16	7.83E-16	9.00E-13
BHV5	6.20E-15	6.00E-16	1.10E-15	9.60E-16	2.22E-15	9.00E-13
BHV6	9.00E-16	6.00E-15	7.20E-16	4.80E-16	2.03E-15	9.00E-13
BHV7	1.00E-15	9.00E-16	4.10E-16	2.50E-16	6.40E-16	9.00E-13
BHV8	3.00E-16	1.90E-15	3.30E-16	8.50E-17	6.54E-16	9.00E-13
Results for Lead-210						

Monitoring Station	1st Qtr, 2016 Result (uCi/ml)	2nd Qtr, 2016 Result (uCi/ml)	3rd Qtr, 2016 Result (uCi/ml)	4th Qtr, 2016 Result (uCi/ml)	2016 Average (uCi/ml)	Effluent Contration Limit (uCi/ml)
BHV1	1.40E-14	9.60E-15	1.20E-14	2.20E-14	1.44E-14	6.00E-13
BHV2	1.50E-14	1.30E-14	1.00E-14	2.10E-14	1.48E-14	6.00E-13
BHV4	1.70E-14	8.80E-15	3.40E-16	2.20E-14	1.20E-14	6.00E-13
BHV5	2.30E-14	1.50E-14	2.90E-16	2.10E-14	1.48E-14	6.00E-13
BHV6	1.70E-14	2.10E-14	3.20E-15	2.10E-14	1.56E-14	6.00E-13
BHV7	1.70E-14	1.50E-14	2.80E-15	1.50E-14	1.25E-14	6.00E-13
BHV8	1.60E-14	1.10E-14	7.60E-15	1.40E-14	1.22E-14	6.00E-13
Results for Thorium-232						
Monitoring Station	1st Qtr, 2016 Result (uCi/ml)	2nd Qtr, 2016 Result (uCi/ml)	3rd Qtr, 2016 Result (uCi/ml)	4th Qtr, 2016 Result (uCi/ml)	2016 Average (uCi/ml)	Effluent Contration Limit (uCi/ml)
BHV1	2.00E-18	3.00E-18	9.50E-18	4.80E-18	4.83E-18	2.00E-14
BHV2	4.00E-18	4.00E-18	5.20E-17	2.20E-18	1.56E-17	2.00E-14
BHV4	2.00E-18	5.00E-18	7.10E-18	4.50E-18	4.65E-18	2.00E-14
BHV5	6.00E-17	3.00E-18	3.00E-17	1.30E-17	2.65E-17	2.00E-14
BHV6	1.00E-17	4.00E-18	1.20E-17	9.50E-18	8.88E-18	2.00E-14
BHV7	5.00E-18	3.00E-18	5.50E-18	4.80E-18	4.58E-18	2.00E-14
BHV8	2.00E-18	2.00E-18	4.70E-18	3.20E-18	2.98E-18	2.00E-14

Comments associated with this response are: #39; #41; #63; #158; #159

Comment Topic #17: The Land Use Survey

Several commenters stated that the new License Condition 12.3, which will require the Mill to do a Land Use Survey, is inadequate. The purpose of the Land Use Survey Report is to document the changes to land use surrounding the Mill property. This survey will help EFRI identify potential routes of exposure to nearby residents. The DWMRC believes that License Condition 12.3 is adequate to meet the intended purpose, when implemented in connection with all other provisions of the License.

Comments associated with this response are: #34; #35; #51

Comment Topic #18: The USGS Report

Prior to the 2011 Public Comment Period for the renewal of the Mill's RML, the U.S. Geological Survey released a report on the White Mesa Uranium Mill. There were several comments

received regarding the 2011 U.S. Geological Survey Report (USGS Report). See <http://pubs.usgs.gov/sir/2011/5231/>. Following is a response to the most significant issues raised in that report.

Off-site Particulates: Regulatory Background

Many of the comments received assume that it is illegal or unsafe for any contaminants to blow from the Mill site to off-site areas. Completely eliminating blowing contaminants is not realistic for an industrial facility and complete elimination is not required by law. R313-15-301(1)(a) and (b) establish the standard:

(1) *Each licensee or registrant shall conduct operations so that:*

(a) *The total effective dose equivalent to individual members of the public from the licensed or registered operation does not exceed one mSv (0.1 rem) in a year, exclusive of the dose contributions from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released, under Rule R313-32 (incorporating 10 CFR 35.75 by reference), from voluntary participation in medical research programs, and from the licensee's or registrant's disposal of radioactive material into sanitary sewerage in accordance with Section R313-15-1003; and,*

(b) *The dose in any unrestricted area from external sources, exclusive of the dose contributions from patients administered radioactive material and released in accordance with Rule R313-32 (incorporating 10 CFR 35.75 by reference), does not exceed 0.02 mSv (0.002 rem) in any one hour*

In addition, off-site effluent standards are established as specified in R313-15-302. See especially R313-15-302(2)(b)(i):

(2) *A licensee or registrant shall show compliance with the annual dose limit in Section R313-15-301 by:*

. . .

(b) *Demonstrating that:*

(i) *The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in Table II of Appendix B of 10 CFR 20.1001 to 20.2402, (2010), which is incorporated by reference*

See <http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-appb.html> for the provisions of Table 6. See the DWMRC MILDOS-AREA modeling results found in Attachment A of the TEEA.

Sediment Results

The USGS Report identifies seven off-site sediment samples that have uranium concentrations that are in excess of local background concentrations determined by the USGS. All of those samples were taken in areas northeast of the Mill but still on EFRI property. (USGS Report, Figure 33.) Analytical results for uranium for those samples are listed in Table 6. As also indicated in Table 4, USGS performed statistical analyses on those sample results and determined that four of those samples could be attributed to "natural weathering" rather than "ore migration."

Table 6: Off-Site Sediment Samples that Exceed Highest Uranium Background Level*

Sample Site	Caused by "Ore Migration" or "Natural Weathering"***	U (ppm)***	V (ppm)***
MW2-S2A	Ore Migration	6.6	73
MW2-S3A	Ore Migration	5.9	73
MW2-S4A	Natural Weathering	5.7	71
MW2-S5A	Ore Migration	4.9	79
MW2-S7A	Natural Weathering	3.7	58
MW2-S8A	Natural Weathering	3.9	66
MW2-S9A	Natural Weathering	3.6	60

* See USGS Report, Figure 33. Highest background level is 3.6 ppm, from location WMS-32; see USGS Report, Figure 31 for map of location.

** See USGS Report, Figure 38.

*** Values are from USGS Report, Appendix 2, p. 110.

One other site with analytical results below background levels was also identified as having uranium that came from "ore migration" rather than "natural weathering." For that site, WM2-S10A, the analytical results show 2.6 ppm Uranium and 56 ppm Vanadium.

These results do show that additional sampling and analysis is appropriate to determine whether the requirements outlined in Part 2.1 are being met. That additional study should also address at least the following:

- Appropriate background levels. USGS's Study was similar to a screening study and three background samples are appropriate for that purpose. For regulatory purposes, we would generally require more background samples in order to ensure that the area has been appropriately characterized. The appropriate background level would have to be selected after considering the range and variation of the background sample results, and also after consideration of the relevance of background concentrations established during the National Uranium Resource Evaluation program.
- Additional sampling and analysis for better characterization. Where there is evidence of off-site contamination, seven samples would not ordinarily be considered a sufficient number of samples to characterize that contamination. Additionally, the nature of the uranium (e.g., whether it is present alone or with daughter products) will affect the analysis.
- Whether contamination is continuing. The nature of the regulatory response will vary depending on whether the contamination is from a continuing source. There are a number of potential sources for the contamination that would not be continuing: past practices at the Mill that have since been improved, potential historical sources, such as the ore-buying station at Shirttail Junction and ore trucks delivering to and exiting from that station. One way to determine whether the contamination is continuing is to collect particulates at air effluent sampling sites. That collection and analysis show that there is currently very little off-site migration of air effluent, suggesting that contamination may be from historical rather than current practices. Since 2011, the Mill has increased the number of soil samples to 52. A map of the soil sample locations can be found in Appendix I of 2nd Half 2015 Semi-annual Effluent Monitoring Report. Please refer to the following link below

<http://www.deq.utah.gov/businesses/E/energyfuels/docs/2016/03mar/SAER%20July%20-%20Dec%202015%20-%20Final.pdf>.

- The source of the contamination. To be effective, a regulatory response must address the source of contamination. If contamination is continuing from the Mill site, it could be from wind-blown particulates from the ore pad or the tailings cells, or from stack emissions. Practices at the Mill have changed since the site opened as an ore station in the late 1970's There were also historical sources of potential radionuclide contamination in the area that are no longer in operation: there was an ore buying station located south of Shirttail Junction, and there were also trucks of ore going to and from that station. In contamination investigations, it is necessary to establish causation. DWMRC would also

want to consider whether the USGS's determination that most of the exceedances over background resulted from "natural weathering" rather than "ore migration" continues to make sense in the light of additional sampling information.

- The actual and potential uses of the affected off-site area. Understanding use is an important component of evaluating risk. The risks have been compared to the EPA's residential risk screening levels, although there are no residents in that area.

In the meantime, DWMRC has evaluated sample results against guidance used by the EPA to determine whether additional, immediate action is warranted at this time. Specifically, it has looked at the following results from the USGS Report:

- The value of all of the uranium samples ranges from 2.6 ppm (WM2-S10A) to 6.6 ppm (MW2-S2A). This includes samples that are below background and samples that USGS determined were the result of "natural weathering" rather than "ore migration."
- The value of all of the vanadium samples ranges from 56 ppm (WM2-S10A) to 79 ppm (MW2-S5A).

Residential soil screening levels

The EPA has established screening levels for residential soils for hundreds of contaminants based on specified exposure assumptions that the EPA determined were reasonable for a residential scenario. Levels at or below EPA screening levels are considered to be "no action" levels -- levels where impacts are very unlikely to be seen. For cancer risks, levels between "no action" levels and 100 times "no action" levels are considered to warrant further study to determine whether the levels present result in a significant risk, based on site-specific considerations.⁴

For uranium, the EPA's no action level for a residential scenario is 2.07 ppm for cancer risks⁵, and 230 ppm for non-cancer risks⁶. For vanadium, EPA's no action level for a residential scenario is 390 ppm for non-cancer risks; there are no expected cancer risks from vanadium in its naturally-occurring form.

All of the off-site values in Table 3 are below screening levels except that all off-site samples exceed the "no action" level for uranium for cancer risks. DWMRC has determined that it is appropriate to gather additional site-specific data about the area rather than initiating an immediate response to address cancer risk for uranium for several reasons:

⁴ This statement is based on EPA's cancer risk range, which is 10⁻⁶ (one in one million excess cancer risk, the "no action" level), to 10⁻⁴ (one in 10,000), which is the level EPA uses for immediate action.

⁵ See http://epa-prgs.ornl.gov/radionuclides/download/res_soil_rad_prg_august_2010.pdf.

⁶ See http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/composite_sl_table_run_NOV2013.pdf.

- Although the analytical results in Table 3 above exceed EPA’s “no action” level, they are all substantially lower than 207 ppm, the level at which the EPA immediate action would be triggered.
- The assumptions behind the “residential” scenario for cancer risk evaluation are likely to be very conservative for this site. For example, a resident is assumed to be on site for 350 days per year, 24 hours per day, for 70 years, including six years as a child. Adults are assumed to ingest 100 mg of contaminated soil per day, and children are assumed to ingest 200 mg of contaminated soil per day as a child. All of these assumptions are conservative for the area where samples were collected, since the land in that area is uninhabited.
- The USGS data by itself is insufficient, for the reasons described above, to support denial of a license renewal.

Soil levels established to protect ground water

The EPA also establishes levels for soils to ensure that ground water is protected from soil contaminants. For uranium, that level is established at 14 ppm to ensure that the ground water meets MCLs (30 µg/L). All of the off-site values are below this level.

For vanadium, the level for soil contamination to protect ground water is established at 63 ppm⁷. Most of the samples taken by USGS are above this level. DWMRC has determined that it is appropriate to gather additional site-specific data about the area rather than initiating an immediate response to address risks to ground water from vanadium for several reasons:

- The levels found were very near the EPA soil level for protection of ground water. Just as for cancer risks, the EPA will not take immediate action at sites that are near that level, but will instead study a site further to determine what the site-specific risks are. The EPA does not take immediate action unless the levels present are significantly greater than the EPA soil level for protection of ground water.
- As for the residential scenario discussed above, EPA’s screening levels are based on generic inputs rather than site-specific ones. Some of the generic inputs are designed to be conservative. For example, the analysis assumes that the source of contaminants is infinite. The specific levels that would be protective of ground water east of the White Mesa site will have to be derived using site-specific values.

Sagebrush Results

The primary purpose of the sagebrush study was to determine where there were areas of eolian – wind-blown – transport of materials from the Mill site. (USGS Report, p. 57.) The sagebrush

⁷ *Id.*

study was not intended to, and cannot, provide compliance information that can be used in a regulatory context. However it did provide insight regarding the spatial distribution of wind-blown uranium and vanadium contaminants resulting from Mill operations. Samples taken in the northeast part of the study area did display elevated uranium and vanadium concentrations and that spatial pattern does correlate with the sediment uranium and vanadium concentrations. It should also be noted that of the 12 samples taken in the eight eastern sample grids, only one – Site 15-1 – was clearly elevated above samples taken in less affected areas.⁸ That area is near sediment samples taken at the location WM2-S2A; see Table 5 and associated text above.

Because the twigs and unwashed leaves of each of the sagebrush were reduced to ash and analyzed together (USGS Report, p. 7), there is no way to distinguish between contaminants from dust deposited on the leaf surface, which will be derived from wind-blown dust, and contaminants coming up through the root system. This information would be critical to determining the causal mechanism for the spatial concentration patterns observed, and how to respond as a regulator.

To be clear, these were not faults with the USGS sagebrush study. The Study was designed only to show the spatial patterns of contaminants in and on local vegetation.

In summary, the sagebrush study provides valuable information for the purpose for which it is intended: it shows where elevated uranium and vanadium vegetation concentrations exist that appear to coincide with elevated sediment concentrations. It is still unclear if this is due to wind distribution of contaminants onto plant tissue, root uptake from contaminated soils, or both.

Ground Water Sampling Results

The USGS sampled wells and springs in the area. The USGS Report concluded that the $^{234}\text{U}/^{238}\text{U}$ and $^{235}\text{U}/^{238}\text{U}$ activity ratio values at all well and spring sampling sites other than Entrance Spring are indicative of natural sources of uranium and are not evidence of offsite migration of uranium. USGS Report, Figure 45, p. 68.

The primary ground water concern raised by the USGS Study, then, was with respect to periodic elevated levels of uranium in Entrance Spring. Entrance Spring is a seep on the east side of Highway 191, offsite from the Mill's property. It is considered to be a surface expression of ground water.

Two of USGS's eight samples showed results that are greater than the maximum contaminant level of 30 ug/L.⁹ One of the last six Energy Fuels monitoring results also showed a level

⁸ Because the purpose of the study was to show wind-blown contaminant distribution, USGS did not identify and sample background areas.

⁹ See USGS Report, Appendix 1, at p. 99, Entrance Spring samples collected on 12/13/07 and 3/13/08.

elevated above 30 ug/L. As the USGS Report indicated, these results could be due to nearby sediment contamination that is concentrated in the arroyo where the spring is located, or it could be due to ground water contamination.

The DWMRC does not agree that this data suggest a need for corrective action at this time for a number of reasons:

- Both the USGS (USGS Report, p. 99) and Energy Fuels' results (http://www.radiationcontrol.utah.gov/Uranium_Mills/denison/seepsspringsampling_rpt.htm) have been temporally inconsistent, with a few samples above the drinking water standard but more of them below the standard. More monitoring is needed to determine whether there is a trend or an explanation for the inconsistent results.
- Spatial and temporal trends must be considered. As the first water elevation map in Attachment G shows, Entrance Spring was directly downgradient from the Wildlife Ponds in 2012. As described in General Response, Part 1.5, those ponds caused ground water mounding centered at the Wildlife Ponds, and at least 24 feet of new saturation. Two of the most likely explanations of contamination in Entrance Spring are that the new saturation of those previously unsaturated zones would increase the ground water and contaminant travel speed and would also cause leaching of previously unsaturated natural uranium into that ground water, or that contaminants in and around the wildlife ponds were mobilized and entered the ground water. Entrance Spring is nearly directly downgradient from the ground water mounding caused by the Wildlife Ponds. Because those ponds have recently been drained, the ground water elevation and direction has changed as seen in the second map in Attachment G, which is from the most recent report. A downward trend would be expected in the future if the saturation of previously unsaturated zones is the source; the length of time for that trend to be seen would depend on the speed of the ground water.
- The mechanism for contamination must be understood in order to ensure effective corrective action, if that becomes necessary. There are several mechanisms for contamination that should be considered if further monitoring demonstrates a problem; most of these were acknowledged by USGS:
 - The ground water could be contaminated from a source somewhere along its travel route, either from Mill activities, from natural uranium minerals in the vadose zone between the former location of the wildlife ponds and the spring, or from another source;
 - Contamination from particulates wind-blown from the Mill could be mobilized by precipitation and affecting the ground water, which later emerges at the spring; or,

- Contamination from particulates that were deposited on or near Highway 191 as a result of historical activities (e.g., ore trucks) could be moved by storm water to locations in the immediate vicinity of Entrance Spring, which could in turn affect the water after it emerges.
- More study is also necessary to determine whether the results are sufficient to have statistical confidence.
- Entrance Spring is up-gradient or cross-gradient from the tailings cells so contamination at Entrance Spring does not suggest leaking from tailings cells that would require more immediate action.

The results do not warrant additional corrective action at this time. In coming years, the DWMRC will collect split samples at the location to determine if there is any trend.

Comments associated with this response are: #43; #46; #47; #196

Comment Topic #19: Approval of Reclamation Plan 5.1

There were several comments regarding the Mill's Reclamation and Decommissioning plan. Specifically the cover design for the Mill's tailing cells and when the Mill would be required to place that cover. The DWMRC remains vitally interested in achieving final cover and decommissioning on all tailings cells whose available storage volume is exhausted. The DWMRC also recognizes that final cover cannot be placed until dewatering has progressed to the point that differential settlement within the tailings and cover materials will not compromise the cover's ability to exclude precipitation from infiltrating into the tailings mass, and carrying contaminants through any imperfections in the liner system to the soils below the cell. The pace of dewatering is largely dictated by natural processes that cannot be accelerated without potentially compromising the integrity of the liner. The DWMRC, in cooperation with EFRI, is taking an aggressive approach to accelerate the dewatering process in ways that will not jeopardize the liner system. This approach includes placing a Radon barrier on Cell 2 along with a test section of a more modern, evapotranspirative (ET) design for final cover than the traditional rock-armor erosion barrier. It is hoped that surcharging the tailings in this manner will accelerate the dewatering process, and provide a workable means of accelerating the covering of Cell 3 once its period of activity comes to a close. Early indications are encouraging; since installation of the primary Radon barrier on Cell 2, fluid available and the resulting pace of dewatering have increased markedly.

Details of the features of the new ET cover design have been made available for public inspection and comment on the Division webpage as part of the review process for Reclamation Plan Revision 5.1 and is also included as Attachment A of the Technical Evaluation and Environmental Assessment. Any future changes to design modifications of the Reclamation

Plan will require review and approval by the DWMRC Director. Except as noted above, no other changes will be made to the License.

Comments associated with this response are: #19; #30; #31; #32; #72; #73; #75; #76; #77; #78; #133; #134; #203; #204

Comment Topic #20: Surety

There were several comments regarding the amount and adequacy of the Mill's Surety fund. License Condition 9.5 (LC 9.5) addresses the Mill's surety. The surety is an amount of money set aside to cover the cost of final reclamation and closure in the event the Licensee is unable or unwilling to do so. The last paragraph of LC 9.5 outlines that the surety shall also include the cost of groundwater remediation. If EFRI happens to go out of business before the Mill is reclaimed and closed, the surety needs to have the appropriate amount of money to complete groundwater remediation. Therefore, the requirement shall remain as written in LC 9.5.

The surety is based on the approved Reclamation Plan and approved changes to the facility, and is reviewed and approved on an annual basis by the DWMRC (See L.C. 9.5 and L.C. 9.11). The existing Reclamation Plan will be replaced when Reclamation Plan 5.1 is approved. When the RML went to public comment in 2011, the DWMRC put restrictions on the Mill in the License until approval of Reclamation Plan 5.0 (see License Condition 9.1). Reclamation Plan 5.0 was made available to the public when it was put on the DWMRC website, and the Ute Mountain Ute Tribe (the Tribe) did provide comments regarding Reclamation Plan 5.0, as well as the related surety in part IV of the Tribe's comments.

Reclamation Plan Revision 5.1 retains much of Reclamation Plan 5.0, but has incorporated several improvements and refinements. The DWMRC is affording the Licensee an opportunity to perform an in-situ demonstration of the performance of the tailings cell cover system proposed in Reclamation Plan 5.1. The surety will reflect both the ET cover system proposed in the Reclamation Plan 5.1 and the rock armor cover system previously approved for use in the event the proposed cover system fails to perform as planned. Adjustments to the plan will be made to reflect deficiencies identified during the demonstration study. Comments regarding the Reclamation Plan 5.1 will be addressed concurrently with comments received during the license renewal comment period in 2017.

On November 2, 2016 the DWMRC approved the 2016 surety in the amount of \$22,580,768. The DWMRC considers the Tribe's comments regarding surety during surety reviews.

The surety estimate must be based on the work being done by a third party. The DWMRC routinely checks that quotes included in the surety submittals reflect market rate, and that they

comprise no more than 5% of the total of the surety amount. Any erroneous quotes, corresponding to “inside pricing,” only available to the mill, are investigated and corrected.

Ground water and any applicable change of windblown contamination cleanup costs will need to be part of the new Reclamation Plan and the corresponding surety estimate.

Pertaining to RRD Letter Table 3.6, twenty-five percent (25%) is the current minimum DWMRC acceptable surety estimate contingency (NUREG-1757, Volume 3 (2003) as adopted in R313-22-35(3)(h)). Based on available information, the 25% contingency factor is conservative and adequate.

Existing licensing, bonding, and UDEQ contract administration costs are based on median figures for such work as of in the 2016 edition of *Facilities Construction Cost Data* by R.S. Means, and the current existing approved reclamation plan design.

The long term care fund is a regulated exact figure, required and derived via 10CFR40 Appendix A, Criterion 10, as in effect and updated on March 4 annually.

Benchmarking of costs is not used by DWMRC as an acceptable method to determine surety estimates. It is not tailored to specific characteristics for each site.

Escalating of costs to a future date has not been a part of DWMRC practice, as surety cost estimates are required by rule to be updated annually, and the facility closure is not expected to take more than two years from the time decommissioning begins. However, the DWMRC is studying the issue of cost escalation and the most appropriate means of estimating escalation (which of the many escalation factors published in the industry) is most appropriate.

Comments associated with this response are: #2; #14, #43, #78; #80, #81, #82, #83, #85, #86

Comment Topic #21: Tailings Cell Construction and Liner Integrity

Several comments expressed concern on how the tailing cells were constructed and the ability of the liners to prevent leakage. Approved by the NRC, Impoundment Cells 1, 2, and 3 have a single polyvinyl chloride flexible membrane liner and an integral leak detection system. The leak detection technology used would not meet current Best Available Technology standards but did at the time of the original design. The NRC initially approved Cell 4A. The DWMRC required retrofit of Cell 4A, and approved Cell 4B were approved by the DWMRC. The design and construction of Cells 4A and 4B meet improved design and construction standards under Best Available Technology requirements for liners and leak detection as those standards existed at the time.

The leak detection systems in the older cells would not meet current Best Available Technology. However, leaks detected in June, 2010 in the Cell 1 liner demonstrated that the technology as employed does work. Plant personnel lowered the level of liquids in Cell 1, which holds process

and storm water liquids, to allow inspection and repair of the liner. Upon reintroducing liquid into the cell, the leak detection system again had fluids from the cell. A repeat repair, completed in the 2nd Quarter of 2012 succeeded, a conclusion that the DWMRC verified during an on-site inspection on June 6, 2013.

Comments associated with this response are: #19; 20; #21; #33; #60; #61; #62; #72; #73; #121

Comment Topic #22: Cover Design (including Radon and ICTM)

A few comments relate to the final cover design, suggesting that it is not adequate and that inactive (full) cells should be decommissioned and closed as soon as possible. The reclamation plan contains provision for placement of an engineered multi-layer cover system over every tailings cell and disposal area as each is filled and decommissioned. The purpose of the cover is to minimize both infiltration of water into the tailings mass below and emanation of Radon from the tailings to the atmosphere. A secondary benefit of the cover is to reduce “shine”, or release of radioactivity through shielding.

In lieu of the approved rock armor design, the Licensee has proposed to install a state-of-the-art evapotranspirative cover system (ET cover) over the tailings cells and disposal area upon closure of those elements. The design incorporates, from bottom to top, a layer of approximately 2.5 feet of platform fill/secondary Radon attenuation barrier, a four-foot layer of primary Radon attenuation barrier, a 3.5-foot layer for water storage/biointrusion prevention/ frost protection/ secondary Radon attenuation, and a 0.5-foot layer for erosion protection. Plant variety and target density have been provided in the Reclamation Plan. The design reflects infiltration and contaminant transport modeling, and was completed in consultation with recognized specialists in the field.

The DWMRC staff has not reached consensus with the Licensee on the design of the proposed ET cover system. The DWMRC staff has reservations about the success to expect in achieving the plant variety and density required to meet the objectives of the cover system. To answer the staff’s concerns, the Licensee has designed a test cell in which has been constructed the full cover system as designed. Instrumentation will allow monitoring of precipitation received and infiltration through the cover system, as well as facilitating observation of the success of plant growth and establishment. As the test section produces data, the design can be evaluated, and, if necessary, adjusted.

The infiltration and contaminant modeling focused on demonstrating the long-term ability of the cover to protect nearby groundwater quality. As a result, the ET cover is not part of the license renewal and there will be future opportunities for the public to review the data and provide comments on the ET cover proposal in the future, as new data becomes available.

Comments associated with this response are: #75; #132

Comment Topic #23: Tailings Cell Leak Detection

Several comments were made about the tailing cells potentially leaking and the ability of the leak detection systems in each tailings cell to detect leaks. The DWMRC expressed similar concerns in the DWMRC February 11, 1999 letter regarding groundwater contamination resulting from potential seepage from the tailings impoundments. These concerns were fully resolved with the 2008 University Report. This is documented in the referenced September 2009 Statement of Basis (pages 2 - 4).

When the State of Utah obtained Agreement State status from the NRC in August 2004 for the uranium mill regulatory program; tailings management system Cells 1, 2, and 3 were already constructed, as follows:

- Cell 2 was completed in May of 1980
- Cell 1, was completed in June 1981
- Cell 3, was completed in September, 1982

These cells consist of a single PVC FML liner and have limited leak detection systems (LDS). Although, it would be great if Cells 1, 2, and 3 had the same construction as Tailings Cells 4A and 4B, the DWMRC does not have the authority to mandate that EFRI retrofit existing facilities using Best Available Technology (BAT). Therefore, the Director was left with only one option and required EFRI to install eight new monitoring wells immediately adjacent to the tailings cells (September 2004 Statement of Basis (pages 27 and 28). Because the LDS at Cells 1, 2, and 3 are expected to be less sensitive to detect any potential cell leakage than current BAT, these monitoring wells can be the “first line of defense” to detect any cell leakage. These monitoring wells were installed in 2005 and are routinely sampled by EFRI. To date no evidence of cells leakage has appeared in any of the eight monitoring wells. See also Comment Topic #21: Tailing Cell Construction and Liner Integrity, regarding the repair of leaks that developed in the Cell 1 liner. Note that the leak detection system worked as designed.

Comments associated with this response are: #17; #18; #34; #121

Comment Topic #24: DAQ and the Mills Air Approval Order

Several commenters made comments about the White Mesa Mill’s regulatory oversight regarding its air approval order. The Mill’s Air Approval Order is not regulated by the DWMRC and is not part of this licensing action. However, the White Mesa Mill is a minor source under Utah Air Quality rules. The DAQ approval order establishes a number of requirements:

- It limits Energy Fuels to 720,720 tons of ore processing annually;
- Limits on fuel consumption for the two dryers of 267,960 MMBtu heat input;

- Limits on the superior boiler of 220,752 MMBtu heat input;
- Visible emission limitations on ore loading areas (15% opacity);
- Visible emission limitations on the vanadium circuit (15% opacity);
- Visible emission limitations on baghouses and boilers (10% opacity);
- Visible emission limitations on all other points (20% opacity);
- Stack testing limits for PM10 on the vanadium circuit scrubber stacks and the yellowcake dryer stacks;
- Requirements that Energy Fuels use only propane or liquid natural gas in the dryers, calciner, furnaces and boilers;
- Numerous requirements to minimize fugitive dust from unpaved operational areas, haul roads and storage piles;
- Requirements that the ore grizzly is be enclosed on 3 sides and have water sprays to minimize fugitive dust; and,
- Requirements for minimization of fugitive dust from the tailings retention areas.

The DAQ also oversees the application of NSPS Subpart Dc, which applies to Energy Fuels' boiler.

As one of approximately 1,300 "minor sources" in Utah, the DAQ is required pursuant to its EPA delegation under the Clean Air Act to inspect the White Mesa Mill once every five years. The DAQ has been able to inspect the facility once every three years.

The DWMRC does not rely on the Licensee's Air Approval Order regarding wind dispersal or fugitive dust. The Licensee has requirements it must adhere to under the RML and the Air Approval Order. Based on the DWMRC's review of the requirements we do not believe there are regulatory gaps. Environmental Air monitoring station results around the facility have demonstrated the Licensee is in compliance with effluent release limits. Furthermore, the majority of the alternate feed materials located at the Mill cannot be dispersed by wind, because they are stored in 55-gallon drums or Supersacks until they are processed through the Mill. The Mill staff conducts regular inspections of the drums to identify any leaking drums. If any leaking drums are identified, they are placed in over pack drums. The DWMRC inspectors also look for damaged or leaking drums when conducting inspections at the facility. DWMRC acknowledges there are two alternate feed materials that are not stored in drums that are stored on the ore pad. Again, analytical results of the air monitoring stations around the Mill facility document that there is very little radioactive material leaving the facility's boundary. Effluent

monitoring results are compared to Effluent Concentration Limits (ECL's) on a Semi-Annual basis and have been found well below the ECL's. In addition, the Mill does have a fugitive dust procedure and an alternate feed management procedure in place that is adequate to address this concern. The DWMRC addressed alternate feed management and dust control issues in the first two rounds of Health Physics Interrogatories for the License Renewal. A summary of these inquiries were addressed in the SER. All associated documents including the Licensee's responses are located on the DWMRC Web page and were made available to the public during the review process.

Comments associated with this response are: #11; #40; #41; #42; #52; #76

Comment Topic #25: Compliance with NESHAPS

A large number of comments were in regard to the Mill's compliance to NESHAP regulations. The DWMRC has no authority to enforce the requirements of Subpart W – NESHAP. Compliance with NESHAP is through DAQ and the EFRI Air Quality Approval Order. As a result, NESHAP compliance falls outside the scope of this permit renewal. Nevertheless, the DWMRC understands that the Mill is in compliance with NESHAP requirements, generally described below.

The NESHAPs regulation, Subpart W, limits a uranium mill to two tailings cells in operation at any given time. The White Mesa Mill has one evaporation cell and four cells licensed and permitted to receive tailings. However, only two of those cells are in "operation." This position is based on the definition of "operation" as found in 40 CFR 61.251(e):

"Operation means that 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."

Cell 1: This cell is currently used for liquid management and evaporation, and no tailings have been placed in the cell. It is therefore not considered operational under the definition of "operation."¹⁰

Cell 2: Tailing placement has ceased and a temporary cover has been placed over it. Final closure activities (dewatering) have begun and the cell is no longer active. This cell is also not in operation under the definition of that word.

Cell 3: This cell is active. Temporary cover placement has begun and when the cell is full and temporary cover has been placed over the cell, dewatering of the cell will begin.

¹⁰ In a separate NESHAPs rulemaking action regulating uranium mill tailings, EPA described uranium mill tailings: "Uranium mill tailings are sand-like wastes that result from the processing of uranium ore. Tailings are stored in large surface impoundments, called piles" Preamble for EPA's final rule action relating to 10 CFR Part 61, Subpart T, 59 FR 36280 (July 15, 1994). The use of the term "disposal" in 40 CFR 61.252 also suggests that the rule writers were not contemplating applying the rule to a surface impoundment.

Cell 4A: This cell is active and receiving tailings.

Cell 4B: This cell is currently used for liquid management and evaporation, and no tailings have been placed in the cell. It is therefore not considered to be in operation under the definition of that term.

Comments associated with this response are: #54; #55; #117; #128; #160; #161; #162; #163; #192

Comment Topic #26: Groundwater

There were several comments regarding various groundwater issues relating to the site, including, but not limited to, groundwater contamination, monitoring and reporting. The DWMRC believes that these comments have now been adequately addressed, as described more fully below. License Condition 9.12 requires the Licensee to have a valid Ground Water Quality Discharge Permit (Permit). Groundwater contamination issues are not addressed in the RML, but through the Permit. When the State of Utah applied for agreement state status, the State proposed to use the Utah Ground Water Quality Protection regulations (UAC R317-6) to regulate groundwater at the Mill. The NRC agreed with this proposal, which is documented in the August 27, 2003 Volume 68 of the Federal Register pages 51,516 through 51,518 and in the State of Utah's application to become an agreement State for 11e.(2) material.

Under the RML, the Permit, and the Corrective Action Plans, Energy Fuels has completed and monitors a total of 75 ground water monitoring wells, generally described as follows:

- 28 monitoring wells placed to detect any leaks from the tailings cells. The leak detection systems for Cells 1, 2, and 3 use older, less sophisticated technology, the DWMRC required installation of eight new wells adjacent to the tailings cells in 2005. These wells perform as a first line of defense to detect any tailings cell leakage. These supplemented the original seven the NRC required. When the DWMRC undertook oversight of the facility, it also began requiring Energy Fuels to sample on-site up-gradient and far down-gradient wells. The construction of Cells 4A and 4B led to installing additional wells.
- 38 monitoring wells associated with characterizing the chloroform groundwater contamination, as described below.
- 9 monitoring wells associated with characterizing the nitrate groundwater contamination, as described below.

This monitoring network has increased since the State of Utah took over regulatory responsibilities from the NRC from 16 to 75 monitoring wells. The DWMRC posts sampling results on-line, including maps of monitoring well locations in quarterly groundwater monitoring reports, found at:

<http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm>

The DWMRC evaluates the monitoring results for each well that is sampled for compliance with standards for 38 different constituents and for trends in the data that may show a need for further action.

Some of the commenters expressed concern about potential leakage from Cell 1, Cell 2, and Cell 3. There is no evidence of leakage from these cells. In addition to other lines of evidence, DWMRC staff look for increasing trends for four indicator parameters (chloride, uranium, fluoride, and sulfate). These indicators will appear in sample results at elevated and increasing levels if cell leakage has occurred. These constituents serve well as indicators because:

- The process water (tailings solution) contains significant concentrations of them;
- They are more mobile (non-reactive) indicators in groundwater and will show up at monitoring wells sooner than other available indicators; and
- Should demonstrate increasing concentrations and an upward trend in groundwater concentration.

Regional groundwater in the shallow aquifer moves across the Mill site to the south-southwest. To understand ground water movement at the White Mesa Mill site, one must also know about the Wildlife Ponds which EFRI constructed to lure wildlife away from tailings cells. EFRI constructed two of these unlined ponds in the early 1980s, and the third one in 1995. Piped water from Recapture Reservoir, North of Blanding city, was used to fill the ponds. In 2001, the DWMRC required Energy Fuels to place a series of piezometers around the site to learn more about rising ground water elevation observed in monitoring well MW-4. That well showed an increase in ground water elevation of 24 feet from 1995 to 2001. Water leaking from the unlined Wildlife Ponds, the only possible source of such a substantial amount of water, caused this increase. This increase in the water table would likely have leached and mobilized natural uranium and other constituents as a result of saturation of zones beneath the site that had previously been unsaturated. It could also have mobilized contaminants in and around the wildlife ponds themselves.

The ground water head elevation continued to rise in well MW-4 until the Mill drained and discontinued use of the two northern wildlife ponds during 2011.

Chloroform Plume Corrective Action

A DWMRC split sampling event occurred in May, 1999. Results from that event revealed excess chloroform concentrations in monitoring well MW-4, located along the eastern margin of the site. Because these concentrations exceeded the Utah Ground Water Quality Standard of 70 µg/L, the DWMRC issued a Ground Water Corrective Action Order against Energy Fuels on August 23, 1999. The Order required completion of: 1) a contaminant investigation report to

define boundaries for the contaminant plume, and 2) a groundwater corrective action plan to clean it up. EFRI installed twenty new monitoring wells (since increased to 38 wells) at the site as part of the investigation. Monitoring from this investigation identified the chloroform plume. These samples also revealed other VOC contaminants associated with chloroform.

A map showing the location of the chloroform plume, as determined by evaluating sampling results, and maps showing ground water direction, both current and recent past, are found at.

http://www.deq.utah.gov/businesses/E/energyfuels/reports/chloroform_rpt.htm

The Director ultimately agreed with Energy Fuels that the source of the contamination was most likely to be historic laboratory wastewater disposal activities. Historically, the mill sent laboratory waste to sewage leach fields. Since construction of Cell 1 in 1981, it has received all laboratory waste from the mill.

The Director based his determination that the chloroform plume originated from laboratory wastewater sent to sewage leach fields, and not leaking from tailings cells, on the following facts, among others:

- The location of the highest levels of chloroform contamination occurs at or near the sewage leach fields;
- The contaminant plume lies up-gradient or cross-gradient from the tailings cells;
- Monitoring wells down-gradient from the tailings cells do not show chloroform contamination; and,
- As described below, the remediation program has reduced contaminant concentrations, indicating that no continuous source, such as a leaking tailings cell, exists for the contaminants
- As with every ground water corrective action, assumptions about the source drive design of the corrective action plan (assumptions that in this case rely on the evidence cited above), and investigators test those assumptions with ground water monitoring as corrective action proceeds. Results of remediation that conflict with the assumptions will lead the DWMRC to evaluate whether to reopen the matter.

In this case, the monitoring results support the assumptions made about the source. Energy Fuels began in April, 2003 to pump contaminated groundwater and place it into Cell 1, for evaporation or reuse in the milling process. Groundwater monitoring results show this initial remediation effort was effective as shown in the table below.

Table 7

Chloroform Plume Monitoring Results				
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Chloroform plume monitoring well	Date of Sampling with Highest Concentration	Highest Chloroform Concentration, $\mu\text{g/L}$	Most Recent (10/16) Chloroform Concentration, $\mu\text{g/L}$	Percent Decrease from Highest to Current Chloroform Concentration
MW-4	05-Aug	3,500	1,470	58.00%
TW4-1	05-May	3,080	1,330	56.82%
TW4-4	05-Aug	3,200	1,430	55.31%
TW4-7	05-Aug	3,100	886	71.42%

Reduction of contaminant concentrations indicates that the pumping program works, and eliminates the probability of a continuous source, such as a leaking cell, contributing contaminants.

The Director approved the Corrective Action Plan for Chloroform following a public comment period, and incorporated it into a September 14, 2015, Stipulation and Consent Order, Docket Number UGW20-01-SCO. This approval carries conditions, stipulated penalties and timelines outlined in the Stipulation and Consent Order. The remediation plan requires Energy Fuels to pump the groundwater and treat it by evaporation and/or use as process water. The remediation strategy appears successful as shown in Table 7 above.

As with every ground water corrective action, assumptions about the source drive design of the corrective action plan (assumptions that in this case rely on the evidence cited above), and investigators test those assumptions with ground water monitoring as corrective action proceeds. Results of remediation that conflict with the assumptions will lead the DWMRC to evaluate whether to reopen the matter.

Nitrate Plume Corrective Action

During a review of the Energy Fuels April 30, 2008 New Wells Background Report and other Energy Fuels reports, the DWMRC noted results for five monitoring wells in the mill site area with Nitrate + Nitrite (as N) (hereafter Nitrate) concentrations above the Utah Ground Water Quality Standard (10 mg/L).

After identifying the Nitrate Plume and sharing the information with Energy Fuels, the Director and Energy Fuels entered into a January 28, 2009 Stipulated Consent Agreement that required Energy Fuels to complete a Contaminant Investigation Report to determine the potential sources

of the Nitrate contamination. EFRI installed nineteen additional wells to determine the extent of the contamination.

A map showing the location of the Nitrate Plume, as determined by evaluating sampling results, can be found at the following:

<http://www.deq.utah.gov/businesses/E/energyfuels/plans/nitrateCAP.htm>

Energy Fuels has submitted two reports to the DWMRC. The reports identify the extent of the Nitrate plume but Energy Fuels and the DWMRC disagreed about what the reports indicated about the likely source of the plume. Energy Fuels did not believe that the results adequately demonstrated an on-site source. The DWMRC believed that the reports provided sufficient evidence to conclude that the plume likely originated primarily from the Ammonium Sulfate Crystal tank on the Mill site. The Director reached this conclusion based on the following facts, among others:

- The location of the highest levels of contamination occurs at or down-gradient from the tanks; The contaminant plume occurs up-gradient or cross-gradient from the tailings cells, demonstrating that the tailings cells do not contribute to the contamination; and
- Monitoring wells downgradient from the tailings cells do show nitrate, but not in concentrations above standards or with increasing trends. Nitrate occurs naturally in ground water, so its presence in concentrations below standards does not indicate a problem.

Although Energy Fuels did not agree with that analysis, it did agree to implement a corrective action plan to clean up the plume. Energy Fuels completed and submitted the Nitrate Corrective Action Plan to the DWMRC on May 7, 2012. The Director approved the Corrective Action Plan following a public comment period, and incorporated it into a December 12, 2012, Stipulation and Consent Order, Docket Number UGW12-04. This approval carries conditions, stipulated penalties, and timelines outlined in the Stipulation and Consent Order. The remediation plan requires Energy Fuels to pump the groundwater and treat it by evaporation and/or use as process water. Pumping under the remediation plan began in January, 2013. It is too early in the remediation process to determine whether there are trends in ground water monitoring results that are responsive to the pumping.

As with every ground water corrective action, assumptions about the source drive design of the corrective action plan (assumptions that in this case rely on the evidence cited above), and investigators test those assumptions with ground water monitoring as corrective action proceeds. If remediation results conflict with the conclusions and assumptions upon which the corrective action is based, the DWMRC will evaluate whether to reopen the matter.

Monitoring Well MW-20 and MW-22

Monitoring wells MW-20 and MW-22 were installed in 1994 and are located at a distance of more than ¾ mile and one mile south of the tailings cells, respectively. When the State of Utah began oversight of the Mill in August 2004, no monitoring data for these wells existed. The DWMRC first required monitoring these wells in a March 17, 2008, Permit modification.

The Ute Mountain Ute Tribe has commented that these two wells should be treated as points of compliance. When a well is specified as a point of compliance, it means that if there is any exceedance of a compliance limit, the Licensee must perform an assessment of the sources, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain ground water quality to insure that Permit limits will not be exceeded at the compliance monitoring point.

In order to determine whether these two wells should be considered points of compliance, the DWMRC required Energy Fuels to submit a report with information about background groundwater quality for the wells and groundwater velocities in the vicinity of wells MW-20 and MW-22. Based on this report, submitted on June 1, 2012, the Director determined that there was not sufficient information to deem the monitoring wells as points of compliance. This determination was based on the following considerations, among others:

- The distance between monitoring wells MW-20 and MW-22 and 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.
- The calculated average linear groundwater velocities for MW-20 and MW-22 of 0.33 feet per year (ft/yr) and 0.43 ft/yr, respectively. Therefore, it would take several thousand years before wastewater from the tailings cells could impact wells MW-20 and MW-22. This also means that any exceedances in the two wells would likely be attributable to another source.
- The presence of one other far-downgradient monitoring wells (MW-3A) between MW-20 and the nearest tailings cell. Results from this monitoring well located near the tailings cells would show evidence of any leakage before MW-20 and MW-22.

Monitoring at MW-20 and MW-22 has shown some exceedance of standards, mostly for uranium. The DWMRC was concerned that these observations could be related to tailings cell leakage. The Study described in Part 1.5.5 of this General Response was conducted to answer this question; for the reasons described in that section, the evidence indicates that the tailings cells are not impacting the wells.

Monitoring at the wells demonstrates that there are constituents present at levels greater than standards. These results will continue to be monitored for concentrations and trends but the DWMRC is not requiring any further action at this time for the following reasons:

- The evidence shows that the increased concentrations of constituents are not the result of any potential tailings leakage (see General Response, Parts 1.5.5 and 1.5.6).
- The best explanations that fits the evidence are groundwater has become acidic as a result of pyrite leaching, or that the increased water table caused other constituents to leach and mobilize.
- Three out of the four indicator parameters show a decreasing trend, suggesting that the source of any contamination is not continuing.

University of Utah Study of Source of Elevated Metal Concentrations in Monitoring Wells

When the DWMRC began oversight of the Mill, it noted that ground water monitoring had showed elevated concentrations of metals, primarily uranium, in wells MW-3, MW-3A, MW-14, MW-15, and MW-22 on the Mill site. The DWMRC was concerned about whether the observations meant that tailings cells were leaking. To address its concerns, the DWMRC commissioned the University of Utah to investigate in July 2007. The University completed its study and published a report in May 2008 (2008 University Report), available here:

<http://www.deq.utah.gov/businesses/E/energyfuels/proposals/isotopicstudy.htm>

After review of the 2008 University Report, the DWMRC determined that downgradient wells with elevated total uranium concentrations (including well MW-22) were not being impacted by any potentially leaking tailings cells. This conclusion was based on at least three lines of isotopic evidence, as follows:

1. **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 of 0.3 Tritium Units (2008 University 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. This means that 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.
2. **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. The 2008 University Report results showed that wells MW-3, MW-3A, MW-14, MW-15, and MW-22, all downgradient wells with elevated uranium concentrations, had Deuterium and Oxygen-18 signatures that were almost twice as negative as any of the surface water results. (2008 University Report, p. 42.) This shows that groundwater in these downgradient wells had a different geochemical origin than the tailings cell wastewater.
3. **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. The evaluation 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. (2008 University Report p. 46.) This shows that the sulfate dissolved in the downgradient wells, with elevated uranium concentrations, has a different origin than the tailings wastewater.

In summary, the University 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 than 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 2008 University Report further theorized that the cause of the increasing contaminant concentrations on the site was artificial recharge from wildlife ponds constructed in the early 1980's and 1995, described in Part 1.5.1. This recharge likely leached and mobilized natural uranium and other constituents as a result of new saturation of zones beneath the site that had previously been unsaturated. The Mill drained the north wildlife ponds in March, 2012.

Decreased pH

The DWMRC's review of Energy Fuels' 2010 quarterly ground water monitoring data showed acidity (pH) in ground water at levels that were out of compliance for several monitoring wells. In May 2011, the DWMRC issued a Notice of Violation and Order requiring Energy Fuels to do a source assessment and submit revised statistics for those wells.

Energy Fuels responded initially by presenting additional information to the DWMRC showing that pH decreasing (more acidic) trends appeared to be a site-wide occurrence, observable in monitoring wells up gradient, down gradient, and cross gradient of the Mill. This showed that there was likely a regional root cause. It could also indicate that other ground water parameters that were out of compliance (e.g. metals) may be attributed to increased leaching as a result of decreases in pH, and thus also attributable to the root cause.

Based on this additional information, the DWMRC extended the time schedule for the pH statistical evaluation in order to allow Energy Fuels to include a plan to evaluate the root cause of the site-wide decreasing trends in pH. To date, Energy Fuels has submitted the following data:

- A Source Assessment Report, White Mesa Uranium Mill (October 10, 2012), prepared by Intera Geosciences & Engineering (Intera). This report provided source assessment study of parameter exceedances, not including pH. It provided statistical analysis of data.

- A pH Report, White Mesa Uranium Mill (November 9, 2012), prepared by Intera. This report provided source assessment study for monitoring wells that are out of compliance for pH.
- An Investigation of Pyrite in the Perched Zone White Mesa Uranium Mill Site (December 7, 2012), prepared by Hydro Geo Chem, Inc. This report provides findings of a study to support the regional geochemical process explaining decreasing pH trends at monitoring wells. The study analyzed quantities of iron pyrite (from monitoring well cores and cuttings) and models of dissolution in the Burro Canyon Formation.

Based on its review of the reports, the DWMRC agreed preliminarily that the evidence supported a conclusion that dissolution of pyrite is possibly a cause for area-wide pH decreasing trends.¹¹ Like all determinations about sources of ground water contamination, this explanation will continue to be evaluated through analysis of trends in ground water monitoring results. If results are obtained that are not consistent with this explanation, the DWMRC will review the data to determine whether the matter will be reopened.

The Director's preliminary determination will be subject to notice and comment during the Permit renewal, which includes increases in the affected ground water concentration limits.

Deep water supply well WW-2

Deep water supply well WW-2 is installed in the Navajo Sandstone aquifer. In the process of writing the original groundwater permit for the site, DWMRC staff reviewed well construction as-built drawing for the wells on site. DWMRC staff found that the construction of deep water supply well WW-2 appeared to be inadequate, in that it failed to show an annular seal that would isolate the deep confined aquifer from the shallow unconfined aquifer. Energy Fuels committed in January, 2010 to verify the well casing and annular seal integrity of well WW-2 and agreed to remediate the well construction if needed. On January 24, 2012 Energy Fuels submitted an investigation report for well WW-2. The DWMRC review determined that the findings of the report were inconclusive to prove that well WW-2's well casing and annular seal have physical and hydraulic integrity.

Because well WW-2 is a deep water supply well and the water in the well could be used for drinking water, the DWMRC met with Utah Division of Drinking Water (DDW). The DWMRC learned that the DDW requires Energy Fuels to sample the well and submit the results to the DDW. If any of these constituents sampled exceed a maximum contaminant level or if there is

¹¹ There is also another theory that was proposed by Energy Fuels that the DWMRC will consider as it reviews future monitoring results. Not long before the site-wide decreases in pH were seen, Energy Fuels redeveloped every well on the Mill property. Redevelopment pumping can introduce oxygen into the ground water, and oxygen will also decrease pH. The evidence that supports this theory is the short period between well redevelopment and the beginning of the decreasing trend for pH. Well development and pyrite leaching could both have been factors in creating the site-wide decreasing trend seen for pH.

any detectable concentrations of volatile organic compounds observed, the DDW will require Energy Fuels to implement remedial action.

The DWMRC Director determined that DWMRC would not pursue further action on WW-2. This determination was based on the following factors:

- Well WW-2 is located up-gradient of the tailings cells and the Chloroform and Nitrate plumes; therefore, it is unlikely groundwater in this well has been affected or will be affected by these potential sources.
- Well WW-2 currently provides the Mill with water for eye wash stations and showers, is pumped several times a day, and yields about 160 gallons per minute. The deeper confined aquifer is protected due to the artesian conditions in the confined aquifer and the repeated removal of water from well WW-2. This active pumping will deliver any potential contaminants back to the ground surface for use in the Mill operations.
- Well WW-2 is regulated by the DDW. Energy Fuels is required to sample the well and submit the results to the DDW. The DDW has informed the DWMRC that if any samples exceed standards for any constituent or if there is any detectable concentrations of VOCs observed, the DDW will enforce remedial action.

Surface Water

Finally, some of the comments relating to the groundwater topic raised concerns about the potential for surface water to impact groundwater. The DWMRC believes that the potential for surface water to impact groundwater has been adequately addressed. Energy Fuels is required by its Ground Water Discharge Permit to sample surface water locations (Ruin Spring, Westwater Seep, Cottonwood Spring, and Entrance Spring) near the White Mesa Mill on an annual basis. Sampling in these locations began in 2009 and sampling results for each location have been below Utah Drinking Water Standards, with the exception of the 2013 uranium sample in Entrance Spring. See General Response Number 2, Part 2.4 for more information.

There is essentially no surface water on the White Mesa Mill site itself, except storm water. A copy of a 2013 EPA inspection report is included as Attachment I. The Report notes "no significant findings" (violations), but does recommend that the "Stormwater Best Management Practices Plan be updated to include the sophisticated storm water diversion efforts made at the site to control storm water that has come into contact with ore materials as well as the clean storm water diversion practices on site." Therefore, the DWMRC has concluded that the Stormwater Best Management Practices Plan, addressed below in Comment Topic #27, is adequate to address the balance of the comments for the groundwater topic.

Comments associated with this response are: #12; #16; #18; #19; #20; #21; #24; #25; #26; #27; #28; #29; #33; #36; #37; #38; #69; #202

Comment Topic #27: Stormwater Best Management Plan

Several comments were about concerns that storm water is leaving the site and depositing radioactive material. The Stormwater Management Plan is designed to require management of all contact and non-contact storm water and to control and require clean-up of any contaminant spills at the facility. EFRI is required to ensure contact storm water does not leave the restricted area and does not accumulate and pool inside of the processing area. EFRI is also required to prevent non-contact storm water run on into the restricted area and uses ditches and berms to divert run on away from the facility. DWMRC staff have reviewed the plan in detail and EFRI's compliance with applicable requirements. The DWMRC has concluded that the plan and EFRI's compliance are adequate to address the comments on this topic.

Comments associated with this response are: #44; #45; #66

Comment Topic #28: Alternate Feed

There were several comments on Alternate Feed ores. These comments were in regard to a number of comments which include, but not limited to: why alternate feeds are allowed to be processed; how the DWMRC reviews alternate feed requests; and the need for public comment on alternate feed requests. The State of Utah was required to recognize alternate feed material as ore when it signed the agreement with the NRC to become an Agreement State to regulate uranium mills and 11e.(2) disposal facilities. EFRI is authorized to receive and process source material from the facilities listed in license conditions 10.6 through 10.20. These alternate feeds have already met the requirements of License Condition 10.1. Any new alternate feed material will be subject to review and approval including all radiological and chemical properties. The estimates that were supplied by EFRI when they requested a new alternate feed, were just estimates. EFRI is not bound by the number that was provided in each request. The only limit to the amount of alternate feed that the Mill can have onsite is found in License Condition 10.1.D. All alternate feed requests are major amendments and will be subject to independent public comment. There is no need to reevaluate the approved alternate feed materials. All alternate feed materials have been fully reviewed as part of the license amendment process and all went through a public comment period. According to NRC NUREG 1556 Volume 20 *Guidance About Administrative Licensing Procedures*, reviewers are to review new requests or anything outstanding that has not been previously reviewed in renewal applications. A renewal review is not to reevaluate everything that has been previously reviewed and approved. However, several Alternate Feeds are being removed from the License for details please see the TEEA.

The Atomic Energy Act of 1954, as amended, defined 11e.(2) material 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.” It does not state whether the ore is natural or native material. The State of Utah is required to recognize alternate feed as an ore as per the Agreement State documents from 2004.

In the NRC document “FINAL POSITION AND GUIDANCE ON THE USE OF URANIUM MILL FEED MATERIAL OTHER THAN NATURAL ORES” dated September 22, 1995 the NRC defines ore as follows: “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.” The NRC further explains “For the tailings and waste from the proposed processing to qualify as 11e.(2) byproduct material, the ore must be processed primarily for its source-material content.” In addition the NRC also states “If the proposed feed material contains hazardous waste, listed under subpart D §§ 261.30-33 of 40 CFR (or comparable RCRA authorized State regulations), it would be subject to EPA (or State) regulation under RCRA. To avoid the complexities of NRC/EPA dual regulation, such feed material will not be approved for processing at a licensed mill. If the licensee can show that the proposed feed material does not contain a listed hazardous waste, this issue is resolved. All of the alternate feeds have been reviewed by the NRC or the DWMRC during the amendment review process and have determined that the alternate feed meet the requirements to be considered an ore and do not contain any chemical compounds that are listed hazardous waste. The alternate feed ores are processed for their source material (Uranium) content and therefore qualify as 11e.(2) material.

On November 30, 2000 the NRC published RIS 00-023: *Recent Changes to Uranium Recovery Policy*. In attachment II the NRC revised its criteria for alternate feed stating “If the feed material contains hazardous waste, the licensee can process it only if it obtains EPA (or State) approval and provides the necessary documentation to that effect.”

Even though alternate feeds can have characteristics of hazardous waste in them, the current alternate feeds being accepted at the Mill do not have listed hazardous waste. Therefore adding chemical compounds to effluent air monitoring is not required. Alternate feed materials, by definition, are ores and are processed for source material (uranium); therefore, the MILDOS-AREA assessments are adequate. No change will be made to the License.

One commenter expressed concerns about alternate feeds that contained Th-232. Each alternate feed material that has a higher thorium concentration has its own Standard Operating Procedure (SOP). These specialized SOPs discuss monitoring requirements and the Personal Protective Equipment requirements for these alternate feed materials. In the second round of health physics interrogatories, these SOPs were requested and then reviewed by the DWMRC. The DWMRC found the procedures to be adequate and protective of Human Health and the environment. Therefore, the DWMRC did not have any concerns or further comment on the contents of these SOPs.

Comments associated with this response are: #57; #58; #64; #65; #68 #113; #118; #119; #122; #147; #148; #149; #150; #151; #217

Comment Topic #29: Alternate Feed Circuit

There were many comments regarding the Mill's alternate feed circuit. The commenters voiced the concern about the lack of regulatory review and oversight and there was no public comment or input prior to its construction. EFRI followed License Condition 9.4 which outlines the process that the Safety and Environmental Review Panel (SERP) shall evaluate changes to the Mill. The Director agreed with EFRI, that the SERP was appropriate to use in building the Alternate Feed Circuit for the following reasons:

- The processing of alternate feed materials is already approved at the Mill as documented in License Conditions 10.1 and 10.6 through 10.19;
- The alternate feed circuit uses the same historic extraction process currently approved at the Mill;
- The circuit was built within the existing footprint of the Mill facility.

EFRI does provide an evaluation of all of the decisions made by the SERP in an annual report, which is reviewed by the DWMRC. The DWMRC did evaluate the alternate feed circuit as part of the annual SERP Report and views the circuit as an improvement to health and safety at the Mill. Now the Mill can process alternate feed material at a quicker frequency, rather than waiting to stockpile large quantities of alternate feed material on the ore pad before it can be processed through the main Mill circuit.

Comments associated with this response are: #108; #109; #110; #111; #112

Comment Topic #30: Alternate Feed Storage

There were many comments associated with the storage of alternate feed materials and fugitive dust from alternate feed materials. In the first Interrogatory of the 2nd Round of Health Physics Interrogatories dated July 2, 2009 last sentence the DWMRC asked the following: "Demonstrate how mill workers and the General Public are protected from unnecessary inhalation exposure from alternate Feed Stocks that have 0.009 to 65% uranium content that are allowed to be exposed to the wind."

In response to this interrogatory the Mill restated the MILDOS modeling that was done for the Mill and submitted to the DWMRC in the 2007 LRA. In addition EFRI provided the following comments on alternate feed "The foregoing analysis for conventional ores sets the environmental envelope for Mill operations that can be performed without considering the need for further modeling. Alternate feed materials are handled so as not to allow potential exposures to the public to exceed the potential exposures from processing Arizona Strip ores at full capacity without further modeling and if further modeling is required without exceeding the applicable regulatory standards and ALARA goal specified in R313-15-101 R313-15-301 and 40 CFR 190. Similarly alternate feed materials are only handled in manner that ensures that occupational exposures are kept within the Mills ALARA goal of 1,250 mrem per year. To date all alternate

feed materials have fallen well within this envelope and no feed-specific modeling has been required.

In order to meet these requirements the following practices have been followed for alternate feed materials:

- High grade alternate feed materials typically with 1.0% U308 or greater are usually received at the Mill and stored in drums or other containers. This is the way that CaF₂, KOH, Rhone Poulenc, Cotter Concentrates and the Cameco KF, Calcined Regen and UF₄ alternate feed materials have been received and stored at the Mill;
- Alternate feed materials that are received in bulk and that have higher risk of public or occupational exposure than Arizona Strip ores such as may result from high radioactivity and/or fine dry particles relative to Arizona Strip ores have been covered by less radioactive materials while stored on the Mills ore pad. This is the way the Heritage alternate feed materials were handled on site; and
- Alternate feed materials that are received in bulk and that have lower risk of public or occupational exposure than Arizona Strip ores have been stored in bulk on the site in the same manner as conventional ores. This is the way the Ashland 1, Ashland 2 and Linde FUSRAP materials and the Cabot and FMRI materials have been handled on site.

Currently there are approximately 11,000 tons of FMRI alternate feed materials and 5,000 tons of Cabot alternate feed materials stored in bulk on the ore pad. The average uranium content of each of those materials is estimated to be less than 0.25% U308. The quantity and radioactivity of those materials is much less than the quantity and radioactivity of Arizona Strip ores assumed in the MILDOS AREA modeling to be stored in bulk on the ore pad (300,000 tons at grade of 0.64% U308). In addition the Cabot and FMRI alternate feed materials arrive at the site in moist state and harden into state that is if anything less dispersible by wind than conventional ores. As a result the same precautions to prevent windblown at the site for conventional ores periodic water sprays are considered adequate for those materials.

Based on the foregoing practices, DWMRC is satisfied that all alternate feed materials are handled at the Mill in a manner that ensures that exposures to the public and occupational exposures are kept within the environmental assumptions for the site and well within applicable regulatory standards and ALARA goals.

Comments associated with this response are: #120

Comment Topic #31: Radiation Safety Program

There were comments regarding the Mill's Radiation Safety Program. NRC Regulatory Guide 8.31 second paragraph of the introductions states, "Section 20.1101 of 10 CFR Part 20, "Standards for Protection Against Radiation," states that licensees must 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. Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable" (Ref. 1), sets forth the philosophy and general management policies and programs that licensees should follow to achieve this objective."

The radiation protection program required by R313-15-101 is to provide procedures and descriptions of engineering controls that the Mill uses to maintain all radiological requirements for both occupational and public dose requirements. The radiological program was submitted to the DWMRC and reviewed by staff. Staff concerns with the Mill's radiation protection program were addressed and documented through the interrogatory process. In the end, it was determined by DWMRC Staff that if followed and used the procedures and engineering controls will keep the Mill in compliance with all radiological rules and regulations and keep the Mill activities ALARA. The DWMRC follows up with the Mill by conducting inspections and reviewing monitoring data.

Comments associated with this response are: #124; #181, #182; #183; #184; #185; #186; #188; #189; #190; #193; #197

Comment Topic #32: Occupational Air Monitoring and Derived Air Concentrations

There were comments regarding the occupational air and derived air concentrations (DAC) for the employees employed at the Mill. DAC values are based off of occupational air monitoring results (Both general and breathing zone sampling) that is performed in different parts of the mill and is representative of the working conditions at the time the air samples are being collected. This means that both native ores and alternate feeds present in the areas that the air samples are accounted for in the DAC calculations. During the review of the 2007 renewal application the DWMRC staff reviewed the Mill's SOPs for determining DAC.

Comments associated with this response are: #129; #130; #131

Comment Topic #33: 11e.(2) or ISL Disposal

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. Waste from ISL facilities is considered to be uranium byproduct material as defined by the AEA. This activity does not impact any outstanding environmental contamination issue. No change will be made to the License.

The comment associated with this response is: #71

Public Comments

December 21, 2011: David C. Frydenlund (EFRI Vice President Regulatory Affairs and Counsel), written comments (Received via email on December 21, 2011)

December 16, 2011: Celene Hawkins (Associate General Counsel) and H. Michael Keller (Special Counsel) representing the Ute Mountain Ute Tribe, written comments (Received by mail on December 19, 2011)

December 21, 2011: Sarah Fields, representing Uranium Watch, Living Rivers, and Glen Canyon Group / Sierra Club, written comments (Received via email on December 21, 2011)

December 21, 2011: Colorado Environmental Coalition, Information Network for Responsible Mining, Center for Biological Diversity, Rocky Mountain Wild, and Sheep Mountain, written comments (Received via email on December 21, 2011 from Jennifer Thurston)

November 10, 2011 Transcript of Public Hearing, Blanding Utah, Verbal Comments from: Sara Fields representing Uranium Watch, Living Rivers, and Glen Canyon Group / Sierra Club; Bradley Angel representing Green Action for Health and Environmental Justice; and Armond Winter

December 15, 2011: Mr. Steve Erikson written comments (Received via email on December 15, 2011)

References

- Denison Mines (DUSA) Corp., January 24, 2012, “White Mesa Mill Evaluation of Deep Supply Well WW-2 Utah Groundwater Discharge Permit No. UGW370004,” 6 pp., 3 figures, and 2 appendices.
- Denison Mines (USA) Corp. (2008 through 2010), *Responses to DRC Health Physics and Engineering Interrogatories*, Denver, Co.
- Hurst, T.G. and D.K. Solomon, May, 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 Near Blanding Utah,” unpublished report by the University of Utah Department of Geology and Geophysics, 62 pp. [transmitted via 5/18/08 email from Kip Solomon to Loren Morton (DRC)].
- Utah Division of Air Quality, March 2, 2011, Approval Order No. DAQE-AN0112050018-11: “Approval Order Modification to Add a Baghouse, to Allow Alternate Fuel Usage and to Incorporate Work Practice Standards,” 12 pp.
- Utah Division of Radiation Control, December 1, 2004, “Statement of Basis for a Uranium Milling Facility at White Mesa, South of Blanding, Utah,” unpublished regulatory document, 57 pp., and 12 attachments.
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- Utah Division of Radiation Control (2008 through 2010), *Health Physics and Engineering Interrogatories, Rounds 1 through 3*, Salt Lake City, Utah.
- Utah Division of Radiation Control, October 2011, “Safety Evaluation Report For The Denison Mines White Mesa Mill 2007 License Renewal Application,” unpublished regulatory document, 46 pp., and 2 attachments.
- Utah Division of Radiation Control, Draft Radioactive Materials License No UT1900479 (Renewal), Denison Mines (USA) Corp., White Mesa Uranium Mill (Amendment 5)
- Utah Division of Radiation Control, December 29, 2011, “Re: Application by Denison Mines (USA) Corp. for an amendment to Utah License Materials License No. 1900479 for the White Mesa Uranium Mill to authorize processing of Sequoyoh Fuels Corporation, Inc. (SFC) alternate feed materials,” letter from Rusty Lundberg to David Frydenlund 1 pp.
- Utah Division of Radiation Control, October 13, 2011, “June 21, 2011 DUSA Response and Transmittal Letter regarding DRC Comment Letter of June 2, 2011: Settlement Monitoring Standard Operating Procedures [SOPs] 06/2011 Revision: DUSA-2; December 1, 2010 DUSA Original Transmittal Letter for Three Separate Draft SOPs; Contingent SOP Approval,” letter from Rusty Lundberg to Jo Ann Tischler 1 pp.
- Utah Division of Radiation Control, November 3, 2011, “November 1, 2011 DUSA Response Letter and Transmittal of Movement (Displacement) Monitoring Standard Operating Procedures [SOPs], 11/2011 Revision: DUSA-2.1; October 17, 2011 DRC Request for Information Letter; December 1, 2010 DUSA Transmittal Letter of Draft Movement

Monitoring SOPs; Approval of Movement (Displacement) Monitoring SOP,” letter from Craig W. Jones to Jo Ann Tischler 1 pp.

Utah Division of Radiation Control, December 6, 2011, “Approval of 11e.(2) Byproduct Disposal Operating Procedures (SOPs),” letter from Rusty Lundberg to Jo Ann Tischler 1 pp.

Utah Division of Water Quality, July 14, 2011, Ground Water Discharge Permit, DUSA, Permit No. UGW370004

Utah State Historic Preservation Office, December 17, 2009, Letter “RE: "A Research Design for Archaeological Data Recovery on Ten Sites in the White Mesa Mill Cell 4B Project Area, San Juan County, Utah," letter from Lori Hunsaker to Dane Finerfrock 1 pp.

Attachment 1

Written and Oral Comments

