



Denison Mines (USA) Corp.  
1050 17th Street, Suite 950  
Denver, CO 80265  
USA

Tel : 303 628-7798  
Fax : 303 389-4125

[www.denisonmines.com](http://www.denisonmines.com)

## VIA PDF AND FEDERAL EXPRESS

January 22, 2010

Mr. Dane Finerfrock, Executive Secretary  
Utah Radiation Control Board  
Utah Department of Environmental Quality  
168 North 1950 West  
P.O. Box 144810  
Salt Lake City, UT 84114-4810

Dear Mr. Finerfrock:

### **Re: White Mesa Uranium Mill – First Round of Interrogatories From Review of License Amendment Request and Environmental Report For Cell 4B – Supplemental Response**

This letter is a supplemental response to the document entitled *Utah Division of Radiation Control, Denison Mines (USA) Corp, Interrogatories From Review of License Amendment Request and Environmental Report for Cell 4B, Under UAC R313-24 and UAC R317-6, Interrogatories – Round 1*, dated October 29, 2009, prepared by URS Corporation (“URS”) on behalf of the State of Utah Department of Environmental Quality (“UDEQ”), Division of Radiation Control (“DRC”) (the “Interrogatories”). Denison Mines (USA) Corp. (“Denison”) provided its initial response to the Interrogatories by a letter dated December 23, 2009 (the “December 23, 2009 Response Letter”) to the Executive Secretary (the “Executive Secretary”) of the State of Utah Radiation Control Board.

A number of Interrogatories in the October 29, 2009 UDEQ letter were not posed as questions or requests for information, but were labeled as “To be Determined.” In the December 23, 2009 Response Letter, Denison addressed each of these “To be Determined” Interrogatories” with the comment “No Comment at this time” because a response was not requested. Upon subsequent discussions between UDEQ staff, URS and Denison, it was determined that, for the sake of making a complete record, Denison would provide responses to these “To be Determined” Interrogatories.

## **1. INTRODUCTION**

### **1.1 Background**

Denison operates the White Mesa Uranium Mill (the “Mill”), located approximately 6 miles south of Blanding Utah, under State of Utah Radioactive Materials License No. UT1900479 (the

“License”), State of Utah Ground Water Discharge Permit No. UGW370004 (the “GWDP”) and State of Utah Air Quality Approval Order DAQE-AN1205005-06 (the “Air Approval Order”).

By letters to the Executive Secretary dated June 11, 2008 (the “License Amendment Request”) and June 16, 2008 (the “GWDP Amendment Request” and together with the License Amendment Request, the “Amendment Request”), Denison requested amendments to the License and GWDP, respectively, to construct, operate and (when operations are complete) reclaim a proposed new tailings Cell 4B for the Mill.

In support of the Amendment Request, Denison had also previously submitted to the Executive Secretary a report entitled *Cell 4B Design Report, White Mesa Mill Blanding Utah*, prepared by Geosyntec Consultants (the “Design Report”) on December 8, 2007, which sets out the proposed design specifications for Cell 4B, and an *Environmental Report In Support of Construction of Cell 4B, White Mesa Uranium Mill Blanding Utah* (the “Original 2008 Environmental Report”) on April 30, 2008.

The Original 2008 Environmental Report was replaced with a revised version (the “2008 ER”) on September 11, 2009.

## **1.2 Documents Incorporated by Reference**

This letter incorporates by reference information previously submitted in previous environmental analyses performed at the Mill, as described below.

- the *Final Environmental Statement Related to Operation of White Mesa Uranium Project, Energy Fuels Nuclear, Inc.*, May, 1979, Docket No. 40-8681 (the “FES”), prepared by the United States Nuclear Regulatory Commission (“NRC”) for the original License application in May 1979;
- The *Environmental Report, White Mesa Uranium Project San Juan County, Utah*, dated January 1978, prepared by Dames & Moore (the “1978 ER”), which formed the basis for the FES;
- the *Statement of Basis* that was prepared in December 2004 by DRC in connection with the issuance of the GWDP (the “2004 Statement of Basis”);
- the *White Mesa Uranium Mill, License Renewal Application, State of Utah Radioactive Materials License No. UT1900479*, February 28, 2007 (the “2007 License Renewal Application”);
- the *Environmental Report in Support of the License Renewal Application, State of Utah Radioactive Materials License No. UT1900479*, February 28, 2007 (the “2007 ER”);
- the *Revised Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.’s White Mesa Mill Site, San Juan County, Utah*, October 2007, prepared by INTERA, Inc. (the “Existing Well Background Report”);
- the *Revised Addendum: -- Evaluation of Available Pre-Operational and Regional Background Data, Background Groundwater Quality Report: Existing Wells For Denison Mines (USA) Corp.’s White Mesa Mill Site, San Juan County, Utah*, November 16, 2007, prepared by INTERA, Inc. (the “Regional Background Report”);

- the *Revised Addendum: -- Background Groundwater Quality Report: New Wells For Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County, Utah*, April 30, 2008, prepared by INTERA, Inc. (the "New Well Background Report", and together with the Existing Well Background Report and the Regional Background Report, the "Background Reports");
- *White Mesa Uranium Mill, Renewal Application, State of Utah Ground Water Discharge Permit No. UGW370004*, September 1, 2009, prepared by Denison (the "2009 GWDP Renewal Application");
- the *Statement of Basis for a Uranium Milling Facility South of Blanding, Utah, Owned and Operated by Denison Mines (USA) Corp.*, dated September 2009, prepared by DRC in support of proposed modifications to the GWDP (the "2009 Statement of Basis"); and
- the *Reclamation Plan, White Mesa Mill Blanding Utah, Radioactive Materials License No. UT1900479, Revision 4.0*, November 2009 (the "Reclamation Plan, Rev. 4.0").

## **2. RESPONSES TO INTERROGATORIES**

Each Interrogatory is shown in italics below, followed by Denison's response to the question and/or request for information. The Interrogatories below are referred to by the same numbers they were referred to in the December 23, 2009 Response Letter.

Reference is made to the general comments set out in Section 2 of the December 23, 2009 Response Letter, which apply to all Interrogatories, including those addressed in this letter.

### **2.5 INTERROGATORY WHITE MESA CELL 4B 10CFR40.26(C)(2)-02/01: GENERAL LICENSE**

#### **REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40.26(c)(2): The general license in paragraph (a) of this section is subject to the documentation of daily inspections of tailings or waste retention systems and the immediate notification of the Executive Secretary, of any failure in a tailings or waste retention system that results in a release of tailings or waste into unrestricted areas, or of any unusual conditions (conditions not contemplated in the design of the retention system) that if not corrected could lead to failure of the system and result in a release of tailings or waste into unrestricted areas; and any additional requirements the Executive Secretary may by order deem necessary. The licensee shall retain this documentation of each daily inspection as a record for three years after each inspection is documented.*

#### **INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The Mill currently has an extensive monitoring and reporting system, including the requirement to conduct and document daily inspections of tailings and waste retention systems and the immediate notification of the Executive Secretary of any failure in a tailings or waste retention system that results in a release of tailings or waste into unrestricted areas. See Section 2.3 of the Reclamation Plan Rev. 4.0 for a summary of these requirements. See also Part I.G.3 of the GWDP and the Mill's Emergency Response Plan. Documentation of each daily inspection is retained as a record for at least three years after each inspection is documented.

These monitoring, inspection and record keeping requirements will apply to Cell 4B upon construction and operation.

**2.6 INTERROGATORY WHITE MESA CELL 4B 10CFR40.31(H)-03/01: APPLICATION FOR SPECIFIC LICENSES**

**REGULATORY BASIS:**

UAC R313-24-4 invokes the following requirement from 10CFR40.31(h): *An application for a license to receive, possess, and use source material for uranium or thorium milling or byproduct material, as defined in 10CFR40, at sites formerly associated with such milling shall contain proposed written specifications relating to milling operations and the disposition of the byproduct material to achieve the requirements and objectives set forth in Appendix A of 10CFR40. Each application must clearly demonstrate how the requirements and objectives set forth in Appendix A of 10CFR40 have been addressed. Failure to clearly demonstrate how the requirements and objectives in Appendix A have been addressed shall be grounds for refusing to accept an application.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The original application for the License and each renewal, including the 2007 License Renewal Application, contain written specifications relating to milling operations and the disposition of the resulting byproduct material to achieve the requirements and objectives set forth in Appendix A of 10 CFR Part 40. Each such application clearly demonstrates how the requirements and objectives set forth in Appendix A of 10 CFR Part 40 have been addressed. Issuance of the License in 1980 and renewals in 1985 and 1997 by NRC attest to the fact that such requirements have been satisfied.

**2.7 INTERROGATORY WHITE MESA CELL 4B 10CFR40.61-06/01: RECORDS**

**REGULATORY BASIS:**

UAC R313-24-4 invokes the following requirement from 10CFR40.61:

*(a) Each person who receives source or byproduct material pursuant to a license issued pursuant to the regulations in 10CFR40 shall keep records showing the receipt, transfer, and disposal of this source or byproduct material as follows:*

*(1) The licensee shall retain each record of receipt of source or byproduct material as long as the material is possessed and for three years following transfer or disposition of the source or byproduct material.*

*(2) The licensee who transferred the material shall retain each record of transfer of source or byproduct material until the Executive Secretary terminates each license that authorizes the activity that is subject to the recordkeeping requirement.*

*(3) The licensee shall retain each record of disposal of source or byproduct material until the Executive Secretary terminates each license that authorizes the activity that is subject to the recordkeeping requirement.*

*(4) If source or byproduct material is combined or mixed with other licensed material and subsequently treated in a manner that makes direct correlation of a receipt record with a transfer, export, or disposition record impossible, the licensee may use evaluative techniques (such as first-in-first-out), to make the records that are required by 10CFR40 account for 100 percent of the material received.:*

*(b) The licensee shall retain each record that is required by the regulations in 10CFR40 or by license condition for the period specified by the appropriate regulation or license condition. If a retention period is not otherwise specified by regulation or license condition, each record must be maintained until the Executive Secretary terminates the license that authorizes the activity that is subject to the recordkeeping requirement.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The Mill has been operating since 1980 subject to and in compliance with the requirements of 10 CFR 40.61. The construction and operation of Cell 4B will not affect the application of these requirements to the Mill, which requirements will continue to be met.

**2.9 INTERROGATORY WHITE MESA CELL 4B 10CFR40. INTRODUCTION-08/01: CAPACITY OF TAILINGS OR WASTE SYSTEMS OVER THE LIFETIME OF MILL OPERATIONS**

**REGULATORY BASIS:**

UAC R313-24-4 invokes the following requirement from 10CFR40. Appendix A, Introduction: *The specifications must be developed considering the expected full capacity of tailings or waste systems and the lifetime of mill operations. Where later expansions of systems or operations may be likely (for example, where large quantities of ore now marginally uneconomical may be stockpiled), the amenability of the disposal system to accommodate increased capacities without degradation in long-term stability and other performance factors must be evaluated.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

While proposed Cell 4B has not yet been constructed, it was contemplated, described and assessed previously, being a critical component of the initial FES and original licensing of the facility. These initial environmental analyses and the License contemplated six tailings cells that would contain approximately 11 million tons of tailings solids, which would be the tailings resulting from 15 years of Mill operations at full capacity (see Section 3.2.4.7 of the FES and Section 3.4 and Appendices H and I of the 1978 ER). These are evaporation pond Cell 1-I (now referred to as Cell 1), a second evaporation pond (Cell 1-E), which has not been constructed, and a series of 80-acre cells, of which Cells 2 and 3 and half of Cell 4 (Cell 4A) have been constructed to date. 80-acre Cells 4 and 5 have been specifically contemplated and included in the License (see Figure 3.4 of the FES). With the construction of Cell 4A (40 acres), Cell 4B will consume the second 40 acres of the previously authorized 80 acre Cell 4.

**2.10 INTERROGATORY WHITE MESA CELL 4B 10CFR40 APPENDIX A, INTRODUCTION-09/01: ALTERNATIVE REQUIREMENTS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40. Appendix A, Introduction: ... Licensees or applicants may propose alternatives to the specific requirements in this appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Executive Secretary may find that the proposed alternatives meet the Executive Secretary's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Utah Administrative Code, Rule R317-6, Ground Water Quality Protection.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Proposed Cell 4B has been designed and will be constructed and operated in accordance with all applicable regulations, permits and licenses. No alternatives to the specific requirements in 10 CFR Part 40, Appendix A have been proposed by Denison in the design, construction or operation of Cell 4B other than as required by more specific regulations and permit or license conditions imposed by the State of Utah.

**2.12 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 2-11/01: PROLIFERATION**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40 Appendix A, Criterion 2: To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations must be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The Mill's tailings system has been designed as a large permanent waste disposal site, which can help to reduce proliferation of small sites and thereby reduce perpetual surveillance obligations by accepting for permanent disposal byproduct material from in situ extraction operations. License condition 10.5 permits the Mill to dispose of byproduct material generated at licensed in situ leach facilities, subject to specified conditions. The Mill has historically and currently disposes of such byproduct material in accordance with License condition 10.5.

**2.13 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 3-12/01: PLACEMENT BELOW GRADE**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 3: The "prime option" for disposal of tailings is placement below grade, either in mines or specially excavated pits (that is, where the need for any specially constructed retention structure is eliminated). The evaluation of alternative sites and disposal methods performed by mill operators in support of their proposed tailings disposal program (provided in applicants' environmental reports) must reflect serious consideration of this disposal mode. In some instances, below grade disposal may not be the most environmentally sound approach, such as might be the case if a ground-water formation is relatively close to the surface or not very well isolated by overlying soils and rock. Also, geologic and topographic conditions might make full below grade burial impracticable: For example, bedrock may be sufficiently near the surface that blasting would be required to excavate a disposal pit at excessive cost, and more suitable alternative sites are not available. Where full below grade burial is not practicable, the size of retention structures, and size and steepness of slopes associated exposed embankments must be minimized by excavation to the maximum extent reasonably achievable or appropriate given the geologic and hydrologic conditions at a site. In these cases, it must be*

*demonstrated that an above grade disposal program will provide reasonably equivalent isolation of the tailings from natural erosional forces.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Cell 4B will be excavated and constructed in a similar manner as existing Cells 1, 2, 3 and 4A, which are mainly below grade, as dictated by the topography and bedrock conditions at the site. All tailings cells at the site are situated in a natural swale, and are excavated to and partially within bedrock. This results in the north and east dikes of the cells being at surface grade. The southern dike of the southern-most cell has an above-grade dike. Similarly, the western dike of Cell 4B will be partially above grade. Geologic and topographic conditions make full below grade burial impracticable for two reasons. First, bedrock is sufficiently near the surface that blasting would be required to fully excavate a cell at excessive cost. Second, because of the natural topography, surface grade burial at the southwest corners of the cells would require sub-grade burial at the northeast corners. More suitable alternative sites are not available. However, the size and steepness of the slopes associated with the exposed embankments of existing cells are, and Cell 4B will be, minimized by excavation to the maximum extent reasonably achievable or appropriate depth given the geologic and hydrologic conditions at the site. As required by 10 CFR Part 40, Appendix A, Criterion 6, the cells, including Cell 4B have been designed to provide reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years.

**2.15 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(1)-14/01: GROUND-WATER PROTECTION STANDARDS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 5A(1): The primary ground-water protection standard is a design standard for surface impoundments used to manage uranium and thorium byproduct material. Unless exempted under paragraph 5A(3) of this criterion, surface impoundments (except for an existing portion) must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, ground water, or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil, ground water, or surface water) during the active life of the facility, provided that impoundment closure includes removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate. For impoundments that will be closed with the liner material left in place, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Cell 4B has been designed with a multiple synthetic and geosynthetic clay liner system, using Best Available Technology (“BAT”), that will prevent any migration of wastes out of Cell 4B to the adjacent subsurface soil, ground water, or surface water at any time during the active life (including closure period) of the cell. Cell 4B has been designed to be closed with the liner system left in place. As a result, the liner system will be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility. See the Design Report for Cell 4B design criteria.

**2.16 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(2)-15/01: LINER**

**REGULATORY BASIS:**

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 5A(2):  
*The liner required by paragraph 5A(1) above must be:*

*(a) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;*

*(b) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and*

*(c) Installed to cover all surrounding earth likely to be in contact with the wastes or leachate.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Cell 4B has been designed to utilize BAT, as approved by the Executive Secretary. This means that Cell 4B will be constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation.

Further, the Cell 4B liner system will be placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression or uplift.

Finally, the Cell 4B liner system will cover all surrounding earth likely to be in contact with the wastes or leachate.

The Cell 4B liner system will be virtually identical to the Cell 4A liner system, which has previously been reviewed and approved by the Executive Secretary. The physical, chemical and radiological nature of the tailings to be disposed of in Cell 4B will not be significantly different from the tailings to be disposed of in Cell 4A.

See the Design Report for Cell 4B design criteria.

## **2.17 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(4)-17/01: PREVENT OVERTOPPING**

### **REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 5A(4): A surface impoundment must be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions, rainfall, or run-on; from malfunctions of level controllers, alarms, and other equipment; and from human error.*

### **INTERROGATORY STATEMENT:**

*To Be Determined.*

### Denison Response

Parts I.D.2 and I.D.6 of the GWDP provide that under no circumstances shall the freeboard be less than 3 feet in tailings cells 1, 3 and 4A. Cell 2 is filled with tailings solids, has an interim cover and does not contain a pool area. In addition, freeboard limits, which have been calculated with an adequate level of protection against overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions, rainfall, or run-on, and from malfunctions of level controllers, alarms, and other equipment and from human error are set out in License condition 10.3 and in the Cell 4A BAT Operations and Maintenance Plan. Further, License Condition Part I.D.3 (c) of the GWDP provides that upon closure of any tailings cell, the Permittee shall ensure that the maximum elevation of the tailings waste solids does not exceed the top of the flexible membrane liner in the cell. See also the letter dated September 11, 2009 from Denison to UDEQ, which addresses questions relating to the Design Report and the freeboard calculations for Cell 4B.

## **2.18 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(5)-18/01: DIKES**

### **REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 5A(5): When dikes are used to form the surface impoundment, the dikes must be designed, constructed, and maintained with sufficient structural integrity to prevent massive failure of the dikes. In*

*ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the impoundment.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

All dikes used to form Cell 4B have been designed and will be constructed and maintained with sufficient structural integrity to prevent massive failure of the dikes, even assuming liner failure. See the Design Report.

**2.20 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(2)-20/01: VERIFY EFFECTIVENESS OF FINAL RADON BARRIER**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(2): As soon as reasonably achievable after emplacement of the final cover to limit releases of radon-222 from uranium byproduct material and prior to placement of erosion protection barriers or other features necessary for long-term control of the tailings, the licensee shall verify through appropriate testing and analysis that the design and construction of the final radon barrier is effective in limiting releases of radon-222 to a level not exceeding 20 pCi/m<sup>2</sup>s averaged over the entire pile or impoundment using the procedures described in 40 CFR part 61, appendix B, Method 115, or another method of verification approved by the Executive Secretary as being at least as effective in demonstrating the effectiveness of the final radon barrier.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

As discussed in Section 2.4.1 of the December 23, 2009 Response Letter, the Reclamation Plan, Rev. 4.0 presents the plan for reclamation of the site as it exists today, prior to the construction of Cell 4B. The Reclamation Plan will be further revised to incorporate the addition of Cell 4B prior to acceptance and authorization for use by DRC. As one of several conditions in the GWDP, an infiltration analysis (the "Infiltration Analysis") of the tailings cover and re-design of the cover for better performance is in progress.

The current tailings cover design, included as Appendix D to the Reclamation Plan, Rev. 4.0, includes an analysis of radon attenuation characteristics of the currently approved cover, which has been designed to satisfy all radon emission standards. See Section 3.3.2.1 of the Reclamation Plan, Rev. 4.0, which describes the modeling that was performed to demonstrate that the current tailings cover design will meet these regulatory criteria. The re-designed cover, to be approved by the Executive

Secretary as part of the Infiltration Analysis, will also be designed to satisfy all radon emission standards, and will include an updated analysis of radon attenuation characteristics.

As required by UAC R313-24-4 (10 CFR Part 40, Appendix A, Criterion 6(2)), as soon as reasonably achievable after emplacement of the final cover over Cell 4B, and prior to placement of erosion protection barriers or other features necessary for long-term control of the tailings, the Mill will verify through appropriate testing and analysis that the design and construction of the final radon barrier is effective in limiting releases of radon-222 to a level not exceeding 20 pCi/m<sup>2</sup>s averaged over the entire pile or impoundment using the procedures described in 40 CFR Part 61, appendix B, Method 115, or another method of verification approved by the Executive Secretary as being at least as effective in demonstrating the effectiveness of the final radon barrier.

**2.22 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(4)-22/01: REPORT RADON BARRIER EFFECTIVENESS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(4): Within ninety days of the completion of all testing and analysis relevant to the required verification in paragraphs (2) and (3) of 10CFR40, Appendix A, Criterion 6, the uranium mill licensee shall report to the Executive Secretary the results detailing the actions taken to verify that levels of release of radon-222 do not exceed 20 pCi/m<sup>2</sup>s when averaged over the entire pile or impoundment. The licensee shall maintain records until termination of the license documenting the source of input parameters including the results of all measurements on which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine compliance. These records shall be kept in a form suitable for transfer to the custodial agency at the time of transfer of the site to DOE or a State for long-term care if requested*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

As required by UAC R313-24-4 (10 CFR Part 40, Appendix A, Criterion 6(4)), within ninety days of the completion of all testing and analysis relevant to the required verification in paragraphs (2) and (3) of 10 CFR Part 40, Appendix A, Criterion 6, Denison will report to the Executive Secretary the results detailing the actions taken to verify that levels of release of radon-222 do not exceed 20 pCi/m<sup>2</sup>s when averaged over the entire pile or impoundment. Denison will maintain records until termination of the License documenting the source of input parameters including the results of all measurements on which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine compliance. These records will be kept in a form suitable for transfer to the custodial agency at the time of transfer of the site to the United States Department of Energy (“DOE”) or a State for long-term care, if requested.

**2.24 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(6)-24/01: CONCENTRATIONS OF RADIONUCLIDES OTHER THAN RADIUM IN SOIL**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(6): The design requirements in this criterion for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material, does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface.*

*Byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at levels which are as low as is reasonably achievable. If more than one residual radionuclide is present in the same 100-square-meter area, the sum of the ratios for each radionuclide of concentration present to the concentration limit will not exceed "1" (unity). A calculation of the potential peak annual TEDE within 1000 years to the average member of the critical group that would result from applying the radium standard (not including radon) on the site must be submitted for approval. The use of decommissioning plans with benchmark doses which exceed 100 mrem/yr, before application of ALARA, requires the approval of the Executive Secretary after consideration of the recommendation of the staff of the Executive Secretary. This requirement for dose criteria does not apply to sites that have decommissioning plans for soil and structures approved before June 11, 1999.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Section 3.3.3 of Attachment A to the Reclamation Plan, Rev. 4.0 requires that all areas contaminated through process activities or windblown contamination from the tailings areas must be remediated to meet applicable cleanup criteria for Ra-226, Th-230 and natural uranium. Section 3.3.3 further provides that contaminated areas will be remediated such that the residual radionuclides remaining on the site, that are distinguishable from background, will not result in a dose that is greater than that which would result from the radium soil standard, as required by UAC R313-24-4 (10 CFR Part 40, Appendix A, Criterion 6(6)). The procedures to be followed in taking the required surveys, including final surveys within specific 10 meter by 10 meter grids, are set out in Sections 3.3.3, 3.3.4 and 3.3.5 of Attachment A to the Reclamation Plan, Rev. 4.0.

At the time of site closure, a calculation of the potential peak annual total effective dose equivalent ("TEDE") within 1,000 years to the average member of the critical group that would result from

applying the radium standard (not including radon) on the site will be submitted to the Executive Secretary for approval, as required by UAC R313-24-4 (10 CFR Part 40, Appendix A, Criterion 6(6)).

These final site closure standards and procedures do not apply directly to any of the tailings cells, including proposed Cell 4B, because they will be capped in place. However, these standards and procedures apply to all areas impacted by the tailings cells, including Cell 4B.

**2.25 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(7)-25/01: NONRADIOLOGICAL HAZARDS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(7): The licensee shall also address the nonradiological hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that disposal areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control, minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The liner system for proposed Cell 4B is virtually identical to the liner system for Cell 4A, which has previously been approved by the Executive Secretary, and which has been designed to hold all tailings, including all nonradiological constituents. In the event of failure in the liner system, the GWDP addresses the radiological and nonradiological hazards associated with the Mill tailings to be disposed of in the tailings cells, including proposed Cell 4B.

There are no nonradiological emissions of any significance from the tailings cells when in operation. Therefore, there will be no nonradiological emissions of any significance after placement of the final cover on the tailings cells.

**2.27 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 7-29/01: PREOPERATIONAL AND OPERATIONAL MONITORING PROGRAMS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 7: At least one full year prior to any major site construction, a preoperational monitoring program must be conducted to provide complete baseline data on a milling site and its environs. Throughout the construction and operating phases of the mill, an operational monitoring program must be conducted to measure or evaluate compliance with applicable standards and*

*regulations; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

An extensive preoperational monitoring program was performed at the Mill site prior to initial construction and licensing of the Mill, in order to provide complete baseline data on the Mill site and its environs, as required by 10 CFR Part 40, Appendix A, Criterion 7. The results of this preoperational monitoring program are described in detail in the 1978 ER and the FES.

Operational monitoring programs have been conducted at the Mill throughout the construction and operating phases of the Mill, to measure or evaluate compliance with applicable standards and regulations; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects. The Mill's operational monitoring programs are described in Section 2.3 of the Reclamation Plan, Rev. 4.0. Monitoring results are reported in the Mill's Semi Annual Effluent Reports and Quarterly Groundwater Monitoring Reports and other reports filed with the Executive Secretary.

Baseline data for any new groundwater monitoring wells installed in connection with the construction of Cell 4B will be obtained over the first eight quarters after installation of the wells. Because any such monitoring wells will likely be installed in one or more of the Cell 4B dikes, being the downgradient locations closest to the cell, it will not be possible to install and monitor such wells prior to construction of Cell 4B. However, Cell 4B will have a state of the art leak detection system that will be monitored regularly upon commencement of operations of the cell. As a result, there will be adequate assurance that the groundwater at any newly installed wells will not have been impacted by Cell 4B operations during the eight-quarter baseline sampling period.

**2.29 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 8A-31/01: DAILY INSPECTIONS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 8A: Daily inspections of tailings or waste retention systems must be conducted by a qualified engineer or scientist and documented. The licensee shall retain the documentation for each daily inspection as a record for three years after the documentation is made. The Executive Secretary must be immediately notified of any failure in a tailings or waste retention system that results in a release of tailings or waste into unrestricted areas, or of any unusual conditions (conditions not contemplated in the design of the retention system) that is not corrected could indicate the potential or lead to failure of the system and result in a release of tailings or waste into unrestricted areas.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

See the response to Interrogatory 2.5 above.

**2.30 INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 9-32/01: FINANCIAL SURETY ARRANGEMENTS**

**REGULATORY BASIS:**

*UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 9: Financial surety arrangements must be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements must be based on Executive Secretary-approved cost estimates in a Executive Secretary-approved plan for (1) decontamination and decommissioning of mill buildings and the milling site to levels which allow unrestricted use of these areas upon decommissioning, and (2) the reclamation of tailings and/or waste areas in accordance with technical criteria delineated in Section I of this Appendix. The licensee shall submit this plan in conjunction with an environmental report that addresses the expected environmental impacts of the milling operation, decommissioning and tailings reclamation, and evaluates alternatives for mitigating these impacts. The surety must also cover the payment of the charge for long-term surveillance and control required by Criterion 10. In establishing specific surety arrangements, the licensee's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the decommissioning and reclamation work. In order to avoid unnecessary duplication and expense, the Executive Secretary may accept financial sureties that have been consolidated with financial or surety arrangements established to meet requirements of other Federal or state agencies and/or local governing bodies for such decommissioning, decontamination, reclamation, and long-term site surveillance and control, provided such arrangements are considered adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning and reclamation of the mill, mill tailings site and associated areas, and the long-term funding charge is clearly identified and committed for use in accomplishing these activities. The licensee's surety mechanism will be reviewed annually by the Executive Secretary to assure, that sufficient funds would be available for completion of the reclamation plan if the work had to be performed by an independent contractor. The amount of surety liability should be adjusted to recognize any increases or decreases resulting from inflation, changes in engineering plans, activities performed, and any other conditions affecting costs. Regardless of whether reclamation is phased through the life of the operation or takes place at the end of operations, an appropriate portion of surety liability must be retained until final compliance with the reclamation plan is determined.*

*This will yield a surety that is at least sufficient at all times to cover the costs of decommissioning and reclamation of the areas that are expected to be disturbed before the next*

*license renewal. The term of the surety mechanism must be open ended, unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance would be provided with a surety instrument which is written for a specified period of time (e.g., 5 years) yet which must be automatically renewed unless the surety notifies the beneficiary (the Executive Secretary) and the principal (the licensee) some reasonable time (e.g., 90 days) prior to the renewal date of their intention not to renew. In such a situation the surety requirement still exists and the licensee would be required to submit an acceptable replacement surety within a brief period of time to allow at least 60 days for the regulatory agency to collect.*

*Proof of forfeiture must not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open-ended, and must be agreed to by all parties. Financial surety arrangements generally acceptable to the Executive Secretary are:*

*(a) Surety bonds;*

*(b) Cash deposits;*

*(c) Certificates of deposits;*

*(d) Deposits of government securities;*

*(e) Irrevocable letters or lines of credit; and*

*(f) Combinations of the above or such other types of arrangements as may be approved by the Executive Secretary. However, self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or Federal agency), will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements.*

#### **INTERROGATORY STATEMENT:**

*To Be Determined.*

#### Denison Response

As required by License condition 9.5, the Mill has deposited a surety bond with the Executive Secretary, consistent with UAC R313-24-4 (10 CFR Part 40, Appendix A, Criteria 9 and 10), adequate to cover the estimated costs, accomplished by a third party, for decommissioning and decontamination of the Mill and Mill site, reclamation of the Mill's tailings or waste disposal areas, ground-water restoration as warranted and the long-term surveillance fee.

The amount of the surety bond is currently \$15,807,429. Annual updates to the surety amount, required by UAC R313-24-4 (10 CFR Part 40, Appendix A, Criteria 9 and 10) are submitted for Executive Secretary for approval by March 4 of each year.

Prior to operation of Cell 4B, the reclamation cost estimate will be updated to reflect the eventual closure of Cell 4B, and the surety bond will be updated accordingly. The amended License and GWDP will contain conditions to that effect. If the Infiltration Analysis has been completed and a re-

designed cover system has been approved by the Executive Secretary at that time, then the revised reclamation cost estimate and surety will be based on the re-designed cover system. Otherwise, the revised reclamation cost estimate and surety will be based on the application of the currently approved cover design to Cell 4B, and will be updated subsequently to reflect the re-designed cover once it has been approved by the Executive Secretary.

**2.35 INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.10-38/01: BACKGROUND WATER QUALITY DETERMINATION**

**REGULATORY BASIS:**

UAC R313-24-4 invokes UAC R317-6-6.10 in lieu of comparable requirements in 10CFR40:

A. Background water quality contaminant concentrations shall be determined and specified in the ground water discharge permit. The determination of background concentration shall take into account any degradation.

B. Background water quality contaminant concentrations may be determined from existing information or from data collected by the permit applicant. Existing information shall be used, if the permit applicant demonstrates that the quality of the information and its means of collection are adequate to determine background water quality. If existing information is not adequate to determine background water quality, the permit applicant shall submit a plan to determine background water quality to the Executive Secretary for approval prior to data collection. One or more up-gradient, lateral hydraulically equivalent point, or other monitoring wells as approved by the Executive Secretary may be required for each potential discharge site.

C. After a permit has been issued, permittee shall continue to monitor background water quality contaminant concentrations in order to determine natural fluctuations in concentrations. Applicable up-gradient, and on-site ground water monitoring data shall be included in the ground water quality permit monitoring report.

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Background ground water quality at the site has been determined by the Executive Secretary, based on a review of the Background Reports and other analyses, and is set out in the 2009 Statement of Basis. Such background ground water quality is currently in the process of being incorporated into a revised GWDP.

Under the GWDP, water quality at the site is monitored on a continued basis.

**2.38 INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.13-41/01: REPORTING OF MECHANICAL PROBLEMS OR DISCHARGE SYSTEM FAILURES**

**REGULATORY BASIS:**

UAC R313-24-4 invokes UAC R317-6-6.13 in lieu of comparable requirements in 10CFR40:

*The permittee shall notify the Executive Secretary within 24 hours of the discovery of any mechanical or discharge system failures that could affect the chemical characteristics or volume of the discharge. A written statement confirming the oral report shall be submitted to the Executive Secretary within five days of the failure.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The GWDP requires such notices to be given in the event of failure to maintain discharge minimization technology (“DMT”) or BAT standards required under the GWDP (Part I.G.3) and if the facility is otherwise out of compliance (Part I.G.4 and Part II.I).

**2.39 INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.10-42/01: CORRECTION OF ADVERSE EFFECTS**

**REGULATORY BASIS:**

UAC R313-24-4 invokes UAC R317-6-6.14 in lieu of comparable requirements in 10CFR40:

*A. If monitoring or testing indicates that the permit conditions may be or are being violated by ground water discharge operations or the facility is otherwise in an out-of-compliance status, the permittee shall promptly make corrections to the system to correct all violations of the discharge permit.*

*B. The permittee, operator, or owner may be required to take corrective action as described in*

*Refer to Appendix A for relevant NRC regulatory guidance.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

Part I.G.4 of the GWDP specifies the actions that must be taken by Denison in the event of a violation of a condition of the GWDP.

**2.40 INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.10-43/01: OUT-OF-COMPLIANCE STATUS**

**REGULATORY BASIS:**

UAC R313-24-4 invokes UAC R317-6-6.16 in lieu of comparable requirements in 10CFR40:

*A. Accelerated Monitoring for Probable Out-of-Compliance Status*

*If the value of a single analysis of any compliance parameter in any compliance monitoring sample exceeds an applicable permit limit, the facility shall:*

1. Notify the Executive Secretary in writing within 30 days of receipt of data;
2. Immediately initiate monthly sampling if the value exceeds both the background concentration of the pollutant by two standard deviations and an applicable permit limit, unless the Executive Secretary determines that other periodic sampling is appropriate, for a period of two months or until the compliance status of the facility can be determined.

**B. Violation of Permit Limits**

*Out-of-compliance status exists when:*

1. The value for two consecutive samples from a compliance monitoring point exceeds:
  - a. one or more permit limits; and
  - b. the background concentration for that pollutant by two standard deviations (the standard deviation and background (mean) being calculated using values for the ground water pollutant at that compliance monitoring point) unless the existing permit limit was derived from the background pollutant concentration plus two standard deviations; or
2. The concentration value of any pollutant in two or more consecutive samples is statistically significantly higher than the applicable permit limit. The statistical significance shall be determined using the statistical methods described in *Statistical Methods for Evaluating Ground Water Monitoring Data from Hazardous Waste Facilities*, Vol. 53, No. 196 of the Federal Register, Oct. 11, 1988 and supplemental guidance in *Guidance For Data Quality Assessment (EPA/600/R-96/084 January 1998)*.

**C. Failure to Maintain Best Available Technology Required by Permit**

**1. Permittee to Provide Information**

*In the event that the permittee fails to maintain best available technology or otherwise fails to meet best available technology standards as required by the permit, the permittee shall submit to the Executive Secretary a notification and description of the failure according to R317-6-6.13. Notification shall be given orally within 24 hours of the permittee's discovery of the failure of best available technology, and shall be followed up by written notification, including the information necessary to make a determination under R317-6-6.16.C.2, within five days of the permittee's discovery of the failure of best available technology.*

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The determination of when the Mill is in out of compliance status and the procedures to be followed once the facility is determined to be out of compliance are set out in Part G of the GWDP, which incorporates the requirements of UAC R317-6-6.16. See also the response to Interrogatory 2.38 above.

**2.41 INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.10-44/01: PROCEDURE WHEN A FACILITY IS OUT-OF-COMPLIANCE**

**REGULATORY BASIS:**

UAC R313-24-4 invokes UAC R317-6-6.17 in lieu of comparable requirements in 10CFR40:

A. If a facility is out of compliance the following is required:

1. The permittee shall notify the Executive Secretary of the out of compliance status within 24 hours after detection of that status, followed by a written notice within 5 days of the detection.
2. The permittee shall initiate monthly sampling, unless the Executive Secretary determines that other periodic sampling is appropriate, until the facility is brought into compliance.
3. The permittee shall prepare and submit within 30 days to the Executive Secretary a plan and time schedule for assessment of the source, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain ground water quality and insure that permit limits will not be exceeded at the compliance monitoring point and best available technology will be reestablished.
4. The Executive Secretary may require immediate implementation of the contingency plan submitted with the original ground water discharge permit in order to regain and maintain compliance with the permit limit standards at the compliance monitoring point or to reestablish best available technology as defined in the permit.
5. Where it is infeasible to re-establish BAT as defined in the permit, the permittee may propose an alternative BAT for approval by the Executive Secretary.

**INTERROGATORY STATEMENT:**

*To Be Determined.*

Denison Response

The determination of when the Mill is in out of compliance status and the procedures to be followed once the facility is determined to be out of compliance are set out in Part G of the GWDP, which incorporates the requirements of UAC R317-6-6.17.

If you should have any questions or require additional information, please contact the undersigned.

Yours very truly,

**DENISON MINES (USA) CORP.**

By:

David C. Frydenlund  
Vice President, Regulatory Affairs and Counsel

cc: Robert D. Baird, URS  
Ron F. Hochstein  
Harold R. Roberts  
Steven D. Landau  
David E. Turk

