

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 2

JANUARY 28, 2010

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ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
ASTM	American Society for Testing and Materials
BAT	Best Available Technology
Cell 4B ER	Environmental Report submitted in support of the Cell 4B License Amendment Request.
CFR	Code of Federal Regulations
CL, CH and CL-ML	Soil classes under Unified Soil Classification System
cm	centimeter
DCGL	Derived concentration guideline
DG	Draft Regulatory Guide (NRC)
Division	Utah Radiation Control Division
DOE	U.S. Department of Energy
DQO	Data quality objective
DUSA	Denison Mines (USA) Corporation
D&M	Dames & Moore, Inc.
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
FES	Final Environmental Statement
FWPCA	Federal Water Pollution Control Act
g	gram
gpd, gal/day	gallons per day
gpm	gallons per minute
GW and GP	Soil classes under Unified Soil Classification System
GWDP	Groundwater Discharge Permit
IUC	International Uranium Corporation
kg	kilogram

km	kilometer; 1000 meters
lb	pound (16 ounces)
m	meter
mg/l	milligram per liter
mi	mile
millirem	one thousandth of one Roentgen Equivalent Man
mm	millimeter, 0.001 meter
m ² s	square meter second; used as a measure of radon flux, e.g., pCi/m ² s
NRC	U.S. Nuclear Regulatory Commission
NUREG	Series of reports prepared and issued by staff of USNRC
pCi	picocurie; 10 ⁻¹² curie
RCRA	Resource Conservation and Recovery Act
rem	Roentgen Equivalent Man
RG	Regulatory Guide (NRC)
s	second
SC, SP, and SW	Soil classes under Unified Soil Classification System
TDS	total dissolved solids
TEDE	Total Effective Dose Equivalent
UAC	Utah Administrative Code
UMETCO	UMETCO Minerals Corporation
URS	URS Corporation, including Washington Division
USGS	US Geological Survey
yd, yd ²	yard, square yards
5h:1v	five horizontal units (5h) to one vertical unit (1v); represents slope or steepness

**INTERROGATORY WHITE MESA CELL 4B UAC R313-24-3-01A/02:
ENVIRONMENTAL ANALYSIS - RADIOLOGICAL AND NONRADIOLOGICAL
IMPACTS**

REGULATORY BASIS:

UAC R313-24-3:

(1) Each new license application, renewal, or major amendment shall contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected. The environmental report shall present a discussion of the following:

- (a) An assessment of the radiological and nonradiological impacts to the public health from the activities to be conducted pursuant to the license or amendment;

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response Section 2.1.3: Please provide MILDOS input and output files from which the results presented in the “2008 MILDOS Evaluation” (Appendix C of Environmental Report for Cell 4B, Revised September 11, 2009) were summarized.

Compare the operational doses projected by MILDOS modeling to doses inferred from air monitoring results (operational). Demonstrate that the inferred operational doses corroborate MILDOS results and provide confidence that applicable regulations will be satisfied during operations and following closure, reclamation, and decommissioning.

Follow up to DUSA Response Section 2.1.9: Provide a sensitivity analysis to demonstrate whether reasonable variations in MILDOS input parameters (related to Cell 4B performance) due to uncertainty will change the conclusion of these analyses (i.e., that projected doses are less than regulatory limits).

Follow up to DUSA Response Section 2.1.12: Describe the training program developed and implemented to prepare facility workers to implement the procedures defined in Appendices G, H, and I Revision 2 of the Emergency Response Plan (dated April 20, 2009). Please describe document trainings conducted in the last two to five years under this training program.

BASIS FOR ROUND 2 INTERROGATORY:

Responses provided in Sections 2.1.1, 2.1.2, 2.1.4 through 2.1.8, 2.1.10, and 2.1.11 of DUSA’s Round 1 Responses appear to be acceptable. However, although responses to Round 1

interrogatories adequately address most issues, some matters require minor additional elaboration and details to allow the division to substantiate the conclusions, as requested in the foregoing.

REFERENCES:

DUSA 2009 Denison Mines (USA) Corp, “RE: White Mesa Uranium Mill - First Round of Interrogatories From Review of License Amendment Request and Environmental Report For Cell 4B”, Letter with attachments to Dane Finerfrock of Utah Division of Radiation Control, December 23, 2009.

**INTERROGATORY WHITE MESA CELL 4B UAC R313-24-3-01B/02:
ENVIRONMENTAL ANALYSIS - IMPACT ON WATERWAYS AND GROUNDWATER**

REGULATORY BASIS:

UAC R313-24-3:

(1) Each new license application, renewal, or major amendment shall contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected. The environmental report shall present a discussion of the following:

- (b) An assessment of any impact on waterways and groundwater resulting from the activities conducted pursuant to the license or amendment;

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.2.2: Please provide the following:

- *Copies of drillers' logs (well logs) for private wells located within one mile of the site that are not owned or operated by the Mill (required by Utah R317-6-6) or describe previous investigations that concluded that no such well logs existed*
- *Information regarding the existence or lack of pending water rights within a 5-mile radius of the Mill Site; and*
- *Information regarding projected future changes in surface water and groundwater use within a 5-mile radius of the Mill Site, or, alternatively, justification that no changes in such uses are projected to occur together with information justifying that such changes in the vicinity of the Mill Site during the operational period are unlikely.*

BASIS FOR ROUND 2 INTERROGATORY:

Responses provided in Sections 2.2.1, 2.2.3, and 2.2.4 of DUSA Round 1 Responses are acceptable.

Regulatory Guide 3.8 Rev 2 indicates that "present **and projected** groundwater uses" within ten miles of the Site should be identified/characterized.

R317-6-6 (6.3.E) requires "Geologic, hydrologic, and agricultural description of the geographic area **within a one-mile radius of the point of discharge**, including soil types, aquifers, ground water flow direction, ground water quality, aquifer material, **and well logs**."

REFERENCES:

- DUSA 2008. Denison Mines USA Corporation. Environmental Report In Support of Construction Tailings Cell 4B, White Mesa Uranium Mill, Blanding, Utah, April 30, 2008.
- IUC 2000 International Uranium Corp., Reclamation Plan White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Revision 3.0. July 2000.
- RG 3.8 U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.

**INTERROGATORY WHITE MESA CELL 4B UAC R313-24-3-01C/02:
ENVIRONMENTAL ANALYSIS – ALTERNATIVES**

REGULATORY BASIS:

UAC R313-24-3:

(1) Each new license application, renewal, or major amendment shall contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected. The environmental report shall present a discussion of the following:

- (c) Consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to the license or amendment; and

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The responses are acceptable.

REFERENCES:

RG 3.8	U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.
D&M 1978	Dames & Moore, "White Mesa Uranium Project, San Juan County, Utah" Environmental Report prepared for Energy Fuels Nuclear, Inc., January 30, 1978.
NRC 1997	U.S. Nuclear Regulatory Commission 1997, "Environmental Assessment for Renewal of Source Materials License No. SUA-1358", prepared by USNRC in support of license renewal application, Docket No. 40-8681, February 1997.

**INTERROGATORY WHITE MESA CELL 4B UAC R313-24-3-01D/02:
ENVIRONMENTAL ANALYSIS – LONG-TERM IMPACTS**

REGULATORY BASIS:

UAC R313-24-3:

(1) Each new license application, renewal, or major amendment shall contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected. The environmental report shall present a discussion of the following:

- (d) Consideration of the long-term impacts including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to the license or amendment.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.4.1 through 2.4.10:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Prior to the Division's acceptance and authorization for use of Cell 4B, revise the Reclamation Plan to address the addition of Cell 4B and all related or affected topics and account for revised design criteria (such as design basis seismic forces). The revision should address and resolve the following issues:

- *Tailings compressibility and rate of consolidation.*
- *Tailings shear strength, including, for sensitive soils, possible loss of shear strength.*
- *Tailings swelling and shrinkage.*
- *The use of these two cells for disposal, which will directly impact the length of slopes, precipitation runoff rates and volumes, design of the top cap, and design of the cap side slopes including rock sizing and fill depth.*
- *Liquefaction of the tailings and settlement within the tailings according to guidance of NUREG-1620.*
- *Final cover and long-term stabilization design for the facility according to guidance of NUREG-1620.*
- *Radiation protection design (for radon and gamma radiation attenuation).*
- *Potential for clay layer cracking and desiccation.*
- *Long-term moisture content for radon barrier material.*

- *Ability of the cover system to respond without damage to whatever settlement and differential settlement may occur following construction of the cover.*
- *Stability against intermixing of cover layers with different size gradations.*
- *Protection provided clay layers from freeze-thaw damage and desiccation.*
- *Protection provided against wind and water erosion.*
- *Protection provided of the radon barrier against biointrusion by deep-rooted plants and burrowing animals.*
- *Costs of constructing the cover system.*
- *Estimate decontamination criteria derived concentration guidelines (DCGLs) for primary radionuclides.*
- *State data quality objectives (DQOs) for radiological surveys and sampling.*
- *Provide final verification (status survey) plans and procedures.*
- *Present details (including sketches) of the disposal cell cover termination at boundaries, with any considerations for safely accommodating subsurface water flows.*
- *Evaluate potential degradation of components of the liner system; potential degradation of the final cover system layers/components; and the effects of such degradation on long-term infiltration rates through the final cover system, and on long-term infiltration rates through the liner systems in the cells (including Cell 4B) and on the potential for accumulation of water within the disposal cells, including Cell 4B.*

BASIS FOR ROUND 2 INTERROGATORY:

The Division will incorporate new license and permit conditions to ensure that the promised revisions to the cover design and Reclamation Plan are provided and approved before Cell 4B is placed into service.

REFERENCES:

- DUSA 2008. Denison Mines USA Corporation. Environmental Report In Support of Construction Tailings Cell 4B, White Mesa Uranium Mill, Blanding, Utah, April 30, 2008.
- IUC 2000 International Uranium Corp., Reclamation Plan White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Revision 3.0. July 2000.
- NUREG-1748 U.S. Nuclear Regulatory Commission, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." Washington, DC, 2001.
- NUREG-1620 U.S. Nuclear Regulatory Commission, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978." Washington DC, June 2003.

- 10 CFR 40 Appendix A to Part 40 – Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content.
- DG-3024 U.S. Nuclear Regulatory Commission, “Standard Format and Content Of License Applications for Conventional Uranium Mills,” Draft Regulatory Guide DG-3024, May, 2008.
- RG 3.8 U.S. Nuclear Regulatory Commission, “Regulatory Guide 3.8; Preparation of Environmental Reports for Uranium Mills”, Washington DC, October 1982.

INTERROGATORY WHITE MESA CELL 4B 10CFR40.26(C)(2)-02/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.5: Please identify the NRC's licensing action in which the proposed system for inspecting, reporting, and retaining documents was accepted.

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the NRC's previous licensing reviews have accepted the system of inspections, reporting, and retaining documents currently used at the White Mesa mill facility.

No actions are required that are unique to Cell 4B and no related conditions exist that are influenced by construction of Cell 4B.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40.31(H)-03/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.6: Please identify the NRC's licensing action in which the written procedures were accepted.

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the NRC's previous licensing reviews have accepted the written White Mesa specifications relating to milling operations and the disposition of the resulting byproduct material prepared to achieve the requirements and objectives set forth in Appendix A of 10 CFR Part 40.

No actions are required that are unique to Cell 4B and no related conditions exist that are influenced by construction of Cell 4B.

REFERENCES:

DG-3024 U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008.

INTERROGATORY WHITE MESA CELL 4B 10CFR40.61-06/02: 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 or 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.7: Please identify the NRC's licensing action in which the proposed system for creating records and managing, retaining, and transferring them was accepted.

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the NRC's previous licensing reviews have accepted the current system for creating records and managing, retaining, and transferring them.

No actions are required that are unique to Cell 4B and no related conditions exist that are influenced by construction of Cell 4B.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40.65(A)(1)-07/02: EFFLUENT MONITORING REPORTING REQUIREMENTS.

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40.65(a)(1): Each licensee authorized to possess and use source material in uranium milling ... shall . . . within 60 days after January 1 and July 1 of each year thereafter, submit a report to the Executive Secretary; which report must specify the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in gaseous effluents during the previous six months of operation, and such other information as the Executive Secretary may require the licensee to estimate maximum potential annual radiation doses to the public resulting from effluent releases. If quantities of radioactive materials released during the reporting period are significantly above the licensee's design objectives previously reviewed as part of the licensing action, the report shall cover this specifically. On the basis of such reports and any additional information the Executive Secretary may obtain from the licensee or others, the Executive Secretary may from time to time require the licensee to take such action as the Executive Secretary deems appropriate.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The response is acceptable.

REFERENCES:

- | | |
|------------|---|
| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| NUREG-1620 | U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003. |
| RG 1.23 | U.S. Nuclear Regulatory Commission, "Regulatory Guide 1.23 (Safety Guide 23); Onsite Meteorological Programs", Washington, DC, February 1972. |

RG 3.8

U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.

**INTERROGATORY WHITE MESA CELL 4B 10CFR40.INTRODUCTION-08/02:
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 .

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The NRC's previous licensing reviews have considered the expected full capacity of tailings or waste systems and the lifetime of mill operations as shown in conceptual White Mesa engineering plans. Such concepts included two disposal cells south of existing Cell 3; one of which is where Cell 4A is and the proposed Cell 4B will be located. A second conceptual cell shown on these plans appears to correspond to an area where another set of disposal cells, not yet proposed, may reside, i.e., Cells 5A and 5B. As a result of these conceptual designs, the amendment request does not involve an expansion from this initially stated tailings capacity. The response is acceptable.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

**INTERROGATORY WHITE MESA CELL 4B 10CFR40 APPENDIX A,
INTRODUCTION-09/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

Since the amendment request does not propose alternatives to specific requirements, this requirement is not applicable. The response is acceptable.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40 APPENDIX A, CRITERION 1-10/02: PERMANENT ISOLATION WITHOUT ONGOING MAINTENANCE

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40 Appendix A, Criterion 1: The general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance. For practical reasons, specific siting decisions and design standards must involve finite times (e.g., the longevity design standard in Criterion 6). The following site features which will contribute to such a goal or objective must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites:

- Remoteness from populated areas;
- Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from ground-water sources; and
- Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long term.

The site selection process must be an optimization to the maximum extent reasonably achievable in terms of these features.

In the selection of disposal sites, primary emphasis must be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration must be given to siting features given the long-term nature of the tailings hazards.

Tailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response Section 2.11.1 and 2.11.2: Demonstrate that the need for active maintenance will be minimal following facility closure, reclamation, and stabilization (Refer to Interrogatory White Mesa Cell 4B UAC R313-24-3-01D/02, found above)

BASIS FOR ROUND 2 INTERROGATORY:

Minimizing the need for active maintenance following facility closure, reclamation, and stabilization depends on several factors, including: stability within the tailings placed within the Cell; ability of the cover system to respond without damage to whatever settlement and differential settlement may occur following construction of the cover; stability against intermixing of cover layers with different size gradations; protection provided clay layers from freeze-thaw damage and desiccation; protection provided against wind and water erosion; and radon barrier protection provided against biointrusion by deep-rooted plants and burrowing animals. While most of these issues can only be addressed once the cover design is revised, stability of tailings placed within the cell, including dewatering, must be addressed as a part of the Reclamation Plan review and approval.

The information requested in Interrogatory White Mesa Cell 4B UAC R313-24-3-01D/02 also addresses these issues.

REFERENCES:

- | | |
|------------|---|
| IUC 2000 | International Uranium Corp., Reclamation Plan White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Revision 3.0. July 2000. |
| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| NUREG-1620 | U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003. |
| RG 3.8 | U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992. |

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 2-11/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The continued operation of the White Mesa mill under conditions envisioned in the original application assists in avoiding proliferation of small waste disposal sites and in reducing perpetual surveillance obligations. The response is acceptable.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 3-12/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.13: Please identify the NRC's licensing action in which the proposed and existing system for managing and disposing of tailings was accepted.

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the NRC's previous licensing reviews have accepted the proposed and actually constructed system of tailing management facilities involving placement both below-grade and above-grade.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 4-13/02: LOCATION AND DESIGN REQUIREMENTS

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 4: The following site and design criteria must be adhered to whether tailings or wastes are disposed of above or below grade.

- (a) Upstream rainfall catchment areas must be minimized to decrease erosion potential and the size of the floods which could erode or wash out sections of the tailings disposal area.
- (b) Topographic features should provide good wind protection.
- (c) Embankment and cover slopes must be relatively flat after final stabilization to minimize erosion potential and to provide conservative factors of safety assuring long-term stability. The broad objective should be to contour final slopes to grades which are as close as possible to those which would be provided if tailings were disposed of below grade; this could, for example, lead to slopes of about 10 horizontal to 1 vertical (10h:1v) or less steep. In general, slopes should not be steeper than about 5h:1v. Where steeper slopes are proposed, reasons why a slope less steep than 5h:1v would be impracticable should be provided, and compensating factors and conditions which make such slopes acceptable should be identified.
- (d) A full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels.

Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover must be employed on slopes of the impoundment system. The Executive Secretary will consider relaxing this requirement for extremely gentle slopes such as those which may exist on the top of the pile.

The following factors must be considered in establishing the final rock cover design to avoid displacement of rock particles by human and animal traffic or by natural process, and to preclude undercutting and piping:

- Shape, size, composition, and gradation of rock particles (excepting bedding material average particles size must be at least cobble size or greater);
- Rock cover thickness and zoning of particles by size; and
- Steepness of underlying slopes.

Individual rock fragments must be dense, sound, and resistant to abrasion, and must be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions. Weak, friable, or laminated aggregate may not be used.

Rock covering of slopes may be unnecessary where top covers are very thick (or less); bulk cover materials have inherently favorable erosion resistance characteristics; and, there is negligible drainage catchment area upstream of the pile and good wind protection as described in points (a) and (b) of this Criterion.

Furthermore, all impoundment surfaces must be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes, areas toward which surface runoff might be directed must be well protected with substantial rock cover (rip rap). In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.

(e) The impoundment may not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand. As used in this criterion, the term "capable fault" has the same meaning as defined in section III(g) of Appendix A of 10 CFR Part 100. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.

(f) The impoundment, where feasible, should be designed to incorporate features which will promote deposition. For example, design features which promote deposition of sediment suspended in any runoff which flows into the impoundment area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response Section 2.14, All Topics: *Through reference made to local and regional demographics, economics, and similar data and projections used by others for planning, please explain and justify the assertion that conditions near the facility addressed in this response have not changed.*

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.14.8:

- *Please provide an updated seismic hazard evaluation to support the final closure design of Cell 4B.*
- *Please clarify whether the updated seismic hazard analysis is a deterministic or probabilistic analysis and provide information justifying selection of that method.*
- *Please incorporate and reference information from the most recent USGS National Seismic Hazard Maps information (HSHM) in the updated evaluation as appropriate (USGS 2008 and 2009).*
- *Please estimate and describe any soil amplification effects, if applicable, that will be considered in the final closure design of Cell4B.*

- *Justify that seismic ground motions for the final cell closure designs have been developed for a 10,000 year recurrence (as opposed to a shorter recurrence period used for evaluating the seismic hazard analysis for the operational phase).*
- *Consider and incorporate appropriate/updated ground motion attenuation relationships in the evaluation, as appropriate.*
- *Consider other potentially relevant information in the updated estimation of seismic ground motions, such as Wong and Humphrey 1989; Frankel 1995; Wong et al. 1996; SSHAC 1997; USGS 2002; Brumbaugh (2005); and NRC (2007).*
- *Incorporate most recent data on seismic events in the region and address impact of revised data, seismic hazard assessment, and updated ground motion estimates on the final closure design criteria.*

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.14.19 through 2.14.25:

Issues not fully addressed by DUSA Response Sections 2.14.19 through 2.14.25 are pursued in Interrogatory White Mesa Cell 4B UAC R313-24-3-01D/02 stated above.

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.14.26:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Please include information as appropriate to reflect updated criteria contained in NUREG-1623 (NRC 2002) regarding acceptability of rock for use in areas that the NRC may classify as “frequently saturated areas”, including rock toe apron areas at the toes of the closed cell outcrops, to be addressed in the final closure design. Specifically, indicate that rock from the Brown Canyon Site borrow site would be rejected from use in the rock toe apron areas at the base of the toes of cell outcrops in the final closure design.

BASIS FOR ROUND 2 INTERROGATORY:

Responses provided in Response Sections 2.14.1 through 2.14.7 and 2.14.9 through 2.14.18 are acceptable.

Basis for Follow up to Response Section 2.14.8: Based on review of the Cell 4B Design Report, DUSA’s Responses to the Round 1 Interrogatories submitted on the Cell 4B Design Report, and the seismic hazard evaluation information presented in the Reclamation Plan, Rev. 4, additional information needs to be provided to demonstrate the adequacy (and currency) of the determination of an appropriate maximum predicted horizontal ground acceleration (MHGA) for the site for the final closure design of the White Mesa disposal cells, including Cell 4B. Specifically, information needs to be provided to demonstrate that the proposed MHGA value used for final cell closure design reflects the most current information available.

The Reclamation Plan Rev. 4.0 states “The evaluations made by LLNL were conservative to account for tectonically active regions that exist, for example, near Moab, Utah”. The

probabilistic seismic hazard analysis is used to estimate the mean hazard at the site, and, if properly performed, need not be conservative or unconservative.

Attachment C to Exhibit B to DUSA's Responses to the Rd 1 Interrogatories (MFG, Inc. 2006) submitted on the Cell 4 B Design Report (DUSA 2009) does not address updated information developed in 2007 regarding attenuation relationships which are applicable to the estimation of ground motions for use in the long-term closure design for the disposal cells at the site, including Cell 4B. More recent/updated information is currently available that was not available at the time (2006) a seismic evaluation study completed to support the design of Cell 4A (MFG, Inc. 2006). The primary purpose of the 2006 seismic evaluation study (MFG, Inc. 2006) was to evaluate seismic hazards that need to be considered for the operation of what was designated in that report as "Cell 4" at the White Mesa Mill Site.

The Pacific Earthquake Engineering Research (PEER) Center Next Generation Attenuation (NGA) relationships were released in 2007 (Abrahamson and Silva 2007). Additionally, a model presented by Campbell and Bozorgnia in 2003 was modified in a subsequent 2007 study (Campbell and Bozorgnia 2007).

Additionally, calculations of peak ground acceleration (PGA), presented in Attachment C to Exhibit B in DUSA's Response to the Round 1 Interrogatories for the Cell 4B Design Report, referenced and used a 2002 USGS NSHM for peak ground and special acceleration. A more recent set of USGS NSHM maps (USGS 2008 and 2009) are available and should be considered, and the updated information incorporated and referenced in the updated analysis as appropriate. NRC Regulatory Guide 1.208 (NRC 2007) also provides relevant updated guidance for developing site-specific seismic ground motion estimates.

Attachment E to the Cell 4B Reclamation Plan Rev. 4 includes and references a 1999 Probabilistic Seismic Risk Assessment Memo (Knight Piesold 1999) as part of the basis for estimating the MHGA. That older evaluation does not reflect more recent information that is relevant for such an evaluation, and needs to be revised.

To support an assessment of the adequacy of the final closure design for the tailings disposal cells, the seismic hazard evaluation and estimation of long-term ground motions need to be updated to reflect more recent relevant and applicable information, and address the occurrence and magnitude of estimated seismic ground motions over a 10,000-year recurrence period (e.g., NRC Regulatory Guide 1.208 2007; MFG, Inc 2006, p. 2) The updated seismic ground motion estimate should describe whether deterministic or probabilistic methodologies were used to derive the estimated MHGA value, and provide information to support the use of the methodology employed. The updated evaluations should incorporate, as appropriate, more recent information that is directly pertinent to such an evaluation.

Basis for Follow up to Response Section 2.14.26 Regarding Rock Cover: Guidance contained in Section 7.2 of Appendix D of NUREG-1623 (NRC 2002), issued after the NRC's review of the 2000 version (Rev 3.0) of the Reclamation Plan (IUC 2000), indicates that, because (critical) areas that are frequently saturated are generally more vulnerable to weathering than occasionally saturated areas where freeze/thaw and wet/dry cycles occur less frequently, rocks that have an aggregated rock quality score of less than 65% should be rejected for use in such areas.

According to information presented in Attachment H to the Reclamation Plan (Rev 4.0), rock tested from the Brown Canyon Site borrow site score less than 65% and so would be rejected from use in the rock toe apron areas at the base of the toes of cell out slopes in the final closure design (Section 3.3.5 of Reclamation Plan, Rev 4.0; and Section 6.0 and Figure A-5.1-4 of Attachment A to that Reclamation Plan). The Reclamation Plan and Plans and Specifications for Reclamation do not present this information/finding, and are therefore lacking.

Implementing the final closure design, if found acceptable, depends on availability of adequate quantities of suitable materials. Should insufficient quantities of suitably acceptable rock for use in frequently saturated areas be reasonably and practically available, the viability of the final closure design for these components of the final closure design would be called into question. Demonstration must be provided that adequate quantities are reasonably and practically available.

The issues regarding rock quality raised under Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 6(5)-23/02 below are addressed in this interrogatory.

REFERENCES:

- Abrahamson, N.A. and Silva, W.J., 2007, *NGA Ground Motion Relations for the Geometric Mean Horizontal Component of Peak and Spectra Ground Motion Parameters*: Pacific Earthquake Engineering Research Center Report 2007.
- Brumbaugh, D.S. (2005) *Active Faulting and Seismicity in a Prefractured Terrain*: Grand Canyon, Arizona. *Bulletin of the Seismological Society of America* 95: 1561-1566.
- Campbell, K.W. (2002) *Prediction of Strong Ground Motion Using The Hybrid Empirical Method: Example Application to Eastern North America*, Submitted to *Bulletin of the Seismological Society of America*.
- Campbell, K.W., and Bozorgnia, Y. (2003) *Updated near-Source Ground-Motion (Attenuation) Relations for the Horizontal and Vertical Components of Peak Ground Acceleration and Acceleration Response Spectra*. *Bulletin of the Seismological Society of America* 93(1): 314-331.
- Campbell, K.W. and Bozorgnia, Y. (2007) *NGA Ground Motion Relations for the Geometric Mean Horizontal Component of Peak and Spectra Ground Motion Parameters*. Pacific Earthquake Engineering Research Center Report 2007/02, 246 p.
- Denison Mines (USA) Corp (DUSA). 2009. "Cell 4B Lining System Design Report, Response to Division of Radiation Control ("DRC") Request for Additional Information – Round 1 Interrogatory, Cell 4B Design", Letter dated January 9, 2009, from Harold R. Roberts to Dane Finerfrock, Division of Radiation Control.
- DOE (U.S. Department of Energy) (1989) *Technical Approach Document: Revision II, Uranium Mill Tailings Remedial Action Project*. Washington D.C.

- Frankel, A. (1995) *Mapping Seismic Hazard in the Central and Eastern United States*, Seismological Research Letters 66(4): 8-21.
- Frankel, A., Mueller, C., Barnard, T., Perkins, D., Leyendecker, E., Dickman, N., Hanson, S., and Hopper, M, (1996) *National Seismic Hazard Maps – Documentation June 1996*. USGS Open-File Report 96-532.
- Knight Piesold 1999. *Probabilistic Seismic Hazard Assessment*. Memorandum to Harold R. Roberts, by Knight Piesold dated April 23, 1999.
- MFG, Inc. 2006. *White Mesa Uranium Facility Cell 4B Seismic Study, Blanding, Utah*. Letter Report to Harold R. Roberts, by MFG, Inc. dated November 27, 2006.
- NRC (1994). Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility, NUREG-1200 Rev. 3, April 1994.
- NRC (2007). *A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion*. Regulatory Guide 1.208. March 2007.
- Senior Seismic Hazard Analysis Committee (SSHAC) 1997, Recommendations for Probabilistic Seismic hazard Analysis-Guidance on Uncertainty and Use of Experts: U.S. Nuclear Regulatory Commission NUREG/CR-6327, variously paginated.
- U.S. Geological Survey (USGS) 2002 . Interactive Deaggregation, 2002. URL: <http://earthquake.usgs.gov/research/hazmaps/interactive/index.php>
- (USGS) 2008 and 2009. *Earthquake Hazards Program: United States National Seismic Hazard Maps*. May 2008 and July 2009 Updates; URL: <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>
- Wong, I.G. and Humphrey, J.R., 1989, *Contemporary Seismicity, Faulting, and the State of Stress in the Colorado Plateau*: Geological Society of America Bulletin, v. 101, p. 1127-1146.
- Wong, I.G., Olig, S.S., and Bott, J.D.J., 1996, *Earthquake potential and seismic hazards in the Paradox Basin, southeastern Utah*, in *Geology and Resources of the Paradox Basin*, 1996 Special Symposium, A.C. Huffman, W.R. Lund, and L.H. Godwin (eds.), Utah Geological Association and Four Corners Geological Society Guidebook 25, p. 241-250.
- IUC 2000. International Uranium (USA) Corporation (IUC): Reclamation Plan – White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Rev. 3, July 2000.
- NRC 2002. U.S. Nuclear Regulatory Commission, “Design of Erosion Protection for Long-Term Stability”, NUREG-1623, September 2002

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(1)-14/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.15: Please identify the previous NRC's licensing action in which the designs of liners and other components of existing impoundments were reviewed and accepted by NRC and/or the Division.

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the liners 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 are acceptable to the NRC and the Division.

REFERENCES:

NUREG-1620 U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(2)-15/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.16: Please identify documents that demonstrate the NRC's and Division's acceptance of equivalent design, for other impoundments, of the liner materials, placement, and installation that are proposed for Cell 4B.

BASIS FOR ROUND 2 INTERROGATORY:

Independent evidence is required to document that the NRC's previous licensing reviews and the Division's permitting and Cell 4B design review activities have resulted in accepting the proposed liner system.

REFERENCES:

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| 10 CFR 40 | Appendix A to Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content. |
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INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(4)-17/02: 5A(4)-17/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

***Follow up to DUSA Response to Round 1 Interrogatories, Section 2.17:** Please identify documents that demonstrate the NRC's and Division's acceptance of equivalent engineering design, operation, and maintenance, for other impoundments, of the approach to providing protection against overtopping that is proposed for Cell 4B.*

BASIS FOR ROUND 2 INTERROGATORY:

Independent evidence is required to document that the NRC's previous licensing reviews and the Division's permitting and Cell 4B design review activities have accepted the proposed surface impoundment and concluded that it satisfies all applicable requirements.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 5A(5)-18/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.18: Please identify documents that demonstrate the NRC's and Division's acceptance, for other impoundments, of the design, construction, and maintenance of dikes similar to those proposed for Cell 4B.

BASIS FOR ROUND 2 INTERROGATORY:

Independent evidence is required to document that the NRC's previous licensing reviews and the Division's permitting and Cell 4B design review activities have accepted the dikes proposed for similar surface impoundments are acceptable.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating To The Operation Of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction Or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(1)-19/02: COVER AND CLOSURE AT END OF MILLING OPERATIONS

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(1): In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of

radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m²s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion. In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances may not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer may not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed as cover materials, it must be demonstrated that these materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term intervals.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.19.1:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Please provide the information requested in Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 4-13/02: Location and Design Requirements (DUSA Section 2.14.26) above, in future updates to current Reclamation Plan (Rev 4.0) and the Specifications for Reclamation, attached to that Reclamation Plan.

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.19.2:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending the development of a license condition that will be included in the amendment for Cell 4B construction. Deferral of these issues is needed because they are related to both the Reclamation Plan and the on-going disposal cell infiltration / contaminant transport model, that are to be submitted shortly. During recent discussions with DUSA, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

The forthcoming license condition will require that DUSA provide the Division with the revised cover design, a calculation of long-term radon emission rates for the final cover system. This future license condition will specify that the calculation include assumptions and present and describe analysis methodologies used, including:

- *Information indicating the specific soil moisture data used, where the clay borrow material soil samples tested are located in relation to the Mill Site, information on the clay soil sampling depths;*

- Information regarding the laboratory test method used for determining the long-term moisture content of the clay soil samples tested;
- Information regarding any adjustments, if any, that were to account (adjust) for differences in site conditions at the borrow site(s) compared to the Mill Site, with information supporting any adjustments; and
- Information justifying that the long-term moisture content selected for the radon barrier layer for use on the radon emission calculation is conservative (e.g., relative to guidance provided in NRC Regulatory Guide 3.64 [NRC 1989] and Technical Approach Document, Rev 2, 1989, UMTRA-DOE/AL 050425.0002, DOE 1989, Section 7).

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.19.3:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending the development of a license condition that will be included in the amendment for Cell 4B construction. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Refer to Interrogatory White Mesa Cell 4B UAC R313-24-3-01D/02 regarding radiation protection in terms of radon and gamma attenuation.

BASIS FOR ROUND 2 INTERROGATORY:

Basis for Followup to Response Section 2.19.1: As described in *Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 4-13/02: Location And Design Requirements* above, guidance contained in NRC NUREG-1623 (NRC 2002) indicates that rock tested from the Brown Canyon Site borrow site scored less than 65% and so would be rejected from use in the rock toe apron areas at the base of the toes of cell out slopes in the final closure design (see Section 3.3.5 of Reclamation Plan, Rev 4.0; and Section 6.0 and Figure A-5.1-4 of Attachment A to that Reclamation Plan). The Reclamation Plan and Plans and Specifications for Reclamation do not present this information/finding, and are therefore lacking.

Regarding DUSA Response 2.19.2: Attachment F of the Reclamation Plan Rev. 4, Table 1 (“Selected Model Input Data”), lists water content percentages for the radon barrier layer from locations listed as Clay (Site #1), Clay (Site #2), and Clay (UT-1). However, no information has been provided as to where these two samples were collected at the borrow area, or the depths from which they were collected. Also, in Attachment F of the Reclamation Plan Rev. 4.0, Table 1, the footnote given for the 14.1 % moisture content value listed states that this percentage was selected based on an “average of two tests”. No laboratory analysis results/data or information on types of soil test methodologies used was included. Likewise, no information was provided regarding any adjustments that were made, if any, to the laboratory soil testing results to account for differences in soil conditions between the borrow site(s) and the Mill Site.

NRC Regulatory Guide 3.64 specifies that information on the location of the clay borrow site(s) proposed for supplying clay soils for the clay radon barrier layer in final disposal cell covers needs to be provided with adjustments made, as appropriate, to account for any differences in conditions between the borrow site(s) and the disposal site as necessary. Also, it is recommended that samples of the clay soil materials be obtained from depths between 120 and

500 cm. In the information provided by DUSA (e.g., Table 1 in Attachment F of the Reclamation Plan Rev. 4.0), the submittal suggests that the long-term soil moisture content value selected for use in a previous radon barrier emission calculation was estimated from an “average of two tests”. That approach does not appear to be conservative with respect to guidance contained in Section 7.1.1 of DOE 1989, which states that “all design parameters, except moisture content, are average values; (however) moisture content is conservatively estimated.” DOE 1989, Section 7.1.3, describes ASTM laboratory soil test methods considered acceptable for determining long-term moisture contents. As an acceptable alternative, a conservative long-term moisture content for the radon barrier layer for radon emissions calculations can be determined using a relationship such as the one described in NRC Regulatory Guide 3.64 developed by Rawls and Brakensiek (1982).

REFERENCES:

NUREG-1620 U.S. Nuclear Regulatory Commission, “Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act”, NUREG-1620, June, 2003.

NRC 2002. U.S. Nuclear Regulatory Commission, “Design of Erosion Protection for Long-Term Stability”, NUREG-1623, September 2002.

DOE (United States Department of Energy) 1989. “Technical Approach Document, Revision II. UMTRA-DOE/AL 050425.0002.

Rawls, W.J., and Brakensiek, D.L., (1982). "Estimating Soil Water Retention From Soil Properties," Journal of the Irrigation and Drainage Division, American Society of Civil Engineers, Vol. 108, No. IR2, pp. 166-171.

US Nuclear Regulatory Commission (NRC) 1989. Regulatory Guide 3.64 (Task WM 503-4) - Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers. June 1989.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(2)-20/02: 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/m²s 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.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The requirement to verify effectiveness of the cover system's radon barrier can only be satisfied once it is constructed, which is not at question in this amendment request for construction of Cell 4B. Reasonable assurances have been provided in previous analyses that effective radon barriers can be constructed and commitments made to construct and verify effectiveness of such a barrier. Nothing done or left undone at this stage of Cell 4B life will preclude satisfying this requirement. However, during discussion with DUSA, it was agreed that resolution of the cover system design issues identified would be completed before any Division authorization to use Cell 4B. Therefore, on this basis the DUSA response is acceptable.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(3)-21/02: PHASED EMPLACEMENT OF FINAL RADON BARRIER

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(3): When phased emplacement of the final radon barrier is included in the applicable reclamation plan, the verification of radon-222 release rates required in paragraph (2) of this criterion must be conducted for each portion of the pile or impoundment as the final radon barrier for that portion is emplaced.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.21:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Provide a generalized schedule for stabilizing the closed tailings cell. State the sequence and approximate durations of activities required to stabilize Cell 4B from the time it is removed from active service to the time that the cover system is finally constructed.

BASIS FOR ROUND 2 INTERROGATORY:

The schedule provided in Section 2.21 of DUSA Cell 4B Round 1 responses is more a description of the closure process than a schedule. General sequencing and durations of activities will provide much more useful information.

REFERENCES:

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|-----------|---|
| IUC 2000 | International Uranium (USA) Corporation (IUC): Reclamation Plan – White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Rev. 3, July 2000. |
| 10 CFR 40 | Appendix A to Part 40 – Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content. |

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(4)-22/02: 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/m²s 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

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The requirement to report the effectiveness of the radon barrier can only be satisfied once it is constructed and its effectiveness measured, which is not at question in this amendment request for construction of Cell 4B. Reasonable assurances have been provided in previous analyses that effective radon barriers can be constructed and commitments made to report the measured effectiveness of such a barrier. Nothing done or left undone at this stage of Cell 4B life will preclude satisfying this requirement. The response is acceptable.

REFERENCES:

10 CFR 40 Appendix A To Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(5)-23/02: ELEVATED RADIUM CONCENTRATIONS IN COVER MATERIALS

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6(5): Near surface cover materials (i.e., within the top three meters) may not include waste or rock that contains elevated levels of radium; soils used for near surface cover must be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils. This is to ensure that surface radon exhalation is not significantly above background because of the cover material itself.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.23.1:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Please clarify in future updates to the Reclamation Plan, and the Specifications for Reclamation, attached to that Reclamation Plan, that rock from the potential Brown Canyon rock borrow site would not be suitable for use in areas that the NRC may classify as “frequently saturated areas”, including the rock toe apron areas at the toes of the closed cell out slopes, to be addressed in the final closure design. Please also provide information demonstrating that adequate amounts of suitable rock are available elsewhere for obtaining rock for use in these areas.

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.23.2:

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the current Reclamation Plan (Rev 4.0), and the Specifications for Reclamation, attached to that Reclamation Plan. Further, it was agreed that resolution of the issues identified would be completed before any Division authorization to use Cell 4B.

Provide evidence or identify where such evidence is provided that radium concentrations of earthen materials planned to be used in constructing the Cell 4B cover system do not and/or will not exceed background levels for the vicinity of the White Mesa facility.

BASIS FOR ROUND 2 INTERROGATORY:

As described in Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 413/02: Location And Design Requirements above, guidance contained in NRC NUREG-1623 (NRC 2002) indicates that rock tested from the Brown Canyon Site borrow site score less than 65% and so would be rejected from use in the rock toe apron areas at the base of the toes of cell out slopes in the final closure design (Section 3.3.5 of Reclamation Plan, Rev 4.0; and Section 6.0 and Figure A-5.1-4 of Attachment A to that Reclamation Plan). The Reclamation Plan and Plans and Specifications for Reclamation do not present this information/finding.

Implementing the final closure design, if found acceptable, depends on availability of adequate quantities of suitable materials. Demonstration must be provided that adequate quantities are reasonably and practically available.

The issues regarding rock quality are addressed in Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 4-13/02 above.

REFERENCES:

NRC 2002. U.S. Nuclear Regulatory Commission, "Design of Erosion Protection for Long-Term Stability", NUREG-1623, September 2002.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(6)-24/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.24: Please identify documents that show the NRC's acceptance of equivalent non-radium soil concentration requirements in previous approved versions of the Reclamation Plan.

BASIS FOR ROUND 2 INTERROGATORY:

Independence evidence is required that the NRC has accepted the proposed approach to decommissioning and demonstrating that doses arising from residual concentrations or radionuclides other than radium will satisfy existing requirements.

REFERENCES:

RG 3.8 U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6(7)-25/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The Division has approved a liner system for Cell 4A that is similar in general design as that proposed for Cell 4B, as documented in a June 25, 2007 conditional approval, and a subsequent September 28, 2007 approval. However, these design approvals did not address control of non-radiological hazards during disposal cell closure or post-closure. These activities must be provided for Division review and approval, and may be submitted with the upcoming revision to the Reclamation Plan, if not sooner.

Minimizing the need for further maintenance following facility closure is addressed in Interrogatory White Mesa Cell 4B 10CFR40 Appendix A, Criterion 1-10/02.

This response is acceptable.

REFERENCES:

RG 3.8 U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 6A(1)-26/02: COMPLETION OF FINAL RADON BARRIER

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 6A(1): For impoundments containing uranium byproduct materials, the final radon barrier must be completed *as expeditiously as practicable considering technological feasibility* after the pile or impoundment ceases operation in accordance with a written, Executive Secretary-approved reclamation plan. (The term *as expeditiously as practicable considering technological feasibility* as specifically defined in the Introduction of this appendix includes factors beyond the control of the licensee.) Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Executive Secretary-approved reclamation plan.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.26: Refer to Interrogatory White Mesa Cell 4B 10CFR40, Appendix A, Criterion 6(3)-21/02.

BASIS FOR ROUND 2 INTERROGATORY:

The schedule provided in Section 2.21 of DUSA Cell 4B Round 1 responses is a very generalized description of the closure process. It is not a schedule. General sequencing and durations of activities need to be provided.

REFERENCES:

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|-----------|---|
| IUC 2000 | International Uranium (USA) Corporation (IUC): Reclamation Plan – White Mesa Mill, Blanding, Utah. Source Material Reference No. SUA-1358. Docket No. 40-8681. Rev. 3, July 2000. |
| 10 CFR 40 | Appendix A to Part 40 – Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content. |

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 7-29/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.27: Please document the NRC's acceptance of the pre-operational environmental monitoring program.

BASIS FOR ROUND 2 INTERROGATORY:

Although the response identifies the fact that preoperational environmental monitoring was conducted as required and that operational environmental monitoring continues as required, documentation is required of the NRC's acceptance of the pre-operational environmental monitoring program

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating to The Operation Of Uranium Mills and The Disposition of Tailings or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 8-30/02: EFFLUENT CONTROL DURING OPERATIONS

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 8: Milling operations must be conducted so that all airborne effluent releases are reduced to levels as low as is reasonably achievable. The primary means of accomplishing this must be by means of emission controls. Institutional controls, such as extending the site boundary and exclusion

area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid site contamination. The greatest potential sources of offsite radiation exposure (aside from radon exposure) are dusting from dry surfaces of the tailings disposal area not covered by tailings solution and emissions from yellowcake drying and packaging operations. During operations and prior to closure, radiation doses from radon emissions from surface impoundments of uranium or thorium byproduct materials must be kept as low as is reasonably achievable.

Checks must be made and logged hourly of all parameters (e.g., differential pressures and scrubber water flow rates) that determine the efficiency of yellowcake stack emission control equipment operation. The licensee shall retain each log as a record for three years after the last entry in the log is made. It must be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency; corrective action must be taken when performance is outside of prescribed ranges. Effluent control devices must be operative at all times during drying and packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging operations must terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions must be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging operations must cease as soon as practicable. Operations may not be restarted after cessation due to off-normal performance until needed corrective actions have been identified and implemented. All these cessations, corrective actions, and restarts must be reported to the Executive Secretary, in writing, within ten days of the subsequent restart.

To control dusting from tailings, that portion not covered by standing liquids must be wetted or chemically stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where they are disposed of below grade and the tailings surface is not exposed to wind. Consideration must be given in planning tailings disposal programs to methods which would allow phased covering and reclamation of tailings impoundments because this will help in controlling particulate and radon emissions during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic controls do not apply, operators shall develop written operating procedures specifying the methods of control which will be utilized.

Milling operations producing or involving thorium byproduct material must be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment.

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

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.28.4 and 2.28.5: Refer to Interrogatory White Mesa Cell 4B UAC R317-6-6.4-36/02 below.

BASIS FOR ROUND 2 INTERROGATORY:

Responses provided in Sections 2.28.1 through 2.28.3 of DUSA Round 1 Responses are acceptable.

REFERENCES:

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| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| RG 3.8 | U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992. |

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 8A-31/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

Refer to Interrogatory White Mesa Cell 4B 10CFR40.26(C)(2)-02/02

BASIS FOR ROUND 2 INTERROGATORY:

Documents are required to provide independent evidence that the NRC's previous reviews have accepted the system of inspections, reporting, and retaining documents currently implemented at the White Mesa mill facility.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings Or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 9-32/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The response is acceptable.

NOTE: Based on discussions with DUSA, this interrogatory item will remain an open item, pending revision of the financial surety DUSA submits in compliance with related regulatory requirements. Further, it was agreed that resolution of the issues identified would be completed and evidence of adequate surety provided before any Division authorization to use Cell 4B.

Prior to the Division's authorization for Cell 4B to be used in operations, DUSA will revise and update its estimates of costs to decontaminate, decommission, reclaim, and close the facility and will post revised financial assurances to cover the costs of such activities.

REFERENCES:

- DG-3024 U.S. Nuclear Regulatory Commission, “Standard Format and Content Of License Applications for Conventional Uranium Mills,” Draft Regulatory Guide DG-3024, May, 2008.
- NRC 1988 U.S. Nuclear Regulatory Commission, “Technical Position on Financial Assurances for Restoration, Decommissioning, and Long-Term Surveillance and Control of Uranium Recovery Facilities”, Washington DC, 1988.
- NUREG-1620 U.S. Nuclear Regulatory Commission, “Standard Review Plan (NUREG–1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act”, NUREG-1620, June, 2003.
- RG 3.8 U.S. Nuclear Regulatory Commission, “Preparation of Environmental Reports for Uranium Mills,” Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B 10CFR40, APPENDIX A, CRITERION 10-33/02: COSTS OF LONG-TERM SURVEILLANCE

REGULATORY BASIS:

UAC R313-24-4 invokes the following requirement from 10CFR40, Appendix A, Criterion 10: A minimum charge of [\$855,000 (2008 dollars)] to cover the costs of long-term surveillance must be paid by each mill operator to the general treasury of the United States or to an appropriate State agency prior to the termination of a uranium or thorium mill license.

If site surveillance or control requirements at a particular site are determined, on the basis of a site-specific evaluation, to be significantly greater than those specified in Criterion 12 (e.g., if fencing is determined to be necessary), variance in funding requirements may be specified by the Executive Secretary. In any case, the total charge to cover the costs of long-term surveillance must be such that, with an assumed 1 percent annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of site surveillance. The total charge will be adjusted annually prior to actual payment to recognize inflation. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The response is acceptable.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating To The Operation of Uranium Mills and The Disposition of Tailings or Wastes Produced By The Extraction or Concentration of Source Material From Ores Processed Primarily For Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.3-35/02: GROUND WATER DISCHARGE PERMIT APPLICATION

REGULATORY BASIS:

UAC R313-24-4 invokes UAC R317-6 in lieu of 10CFR40 Appendix A, Criterion 5B(1) thru 5H, Criterion 7A, and Criterion 13. In turn, UAC R317-6-6.3 outlines the content requirements of a State Ground Water Discharge Permit (Permit) application.

Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information:

- A. The name and address of the applicant and the name and address of the owner of the facility if different than the applicant. A corporate application must be signed by an officer of the corporation. The name and address of the contact, if different than above, and telephone numbers for all listed names shall be included.
- B. The legal location of the facility by county, quarter-quarter section, township, and range.
- C. The name of the facility and the type of facility, including the expected facility life.
- D. A plat map showing all water wells, including the status and use of each well, Drinking Water source protection zones, topography, springs, water bodies, drainages, and man-made structures within a one-mile radius of the discharge. The plat map must also show the location and depth of existing or proposed wells to be used for monitoring ground water quality. Identify any applicable Drinking Water source protection ordinances and their impacts on the proposed permit.
- E. Geologic, hydrologic, and agricultural description of the geographic area within a one-mile radius of the point of discharge, including soil types, aquifers, ground water flow direction, ground water quality, aquifer material, and well logs.
- F. The type, source, and chemical, physical, radiological, and toxic characteristics of the effluent or leachate to be discharged; the average and maximum daily amount of effluent or leachate discharged (gpd), the discharge rate (gpm), and the expected concentrations of any pollutant (mg/l) in each discharge or combination of discharges. If more than one discharge point is used, information for each point must be given separately.
- G. Information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the applicable class TDS limits, ground water quality standards, class protection levels or an alternate concentration limit proposed by the facility.
- H. For areas where the ground water has not been classified by the Board, information on the quality of the receiving ground water sufficient to determine the applicable protection levels.

I. A proposed sampling and analysis monitoring plan which conforms to EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5 (EPA/600/R-98/028, February 1998) and includes a description, where appropriate, of the following:

1. ground water monitoring to determine ground water flow direction and gradient, background quality at the site, and the quality of ground water at the compliance monitoring point;
2. installation, use and maintenance of monitoring devices;
3. description of the compliance monitoring area defined by the compliance monitoring points including the dimensions and hydrologic and geologic data used to determine the dimensions;
4. monitoring of the vadose zone;
5. measures to prevent ground water contamination after the cessation of operation, including post-operational monitoring;
6. monitoring well construction and ground water sampling which conform where applicable to the Handbook of Suggested Practices for Design and Installation of Ground-Water Monitoring Wells (EPA/600/4-89/034, March 1991), ASTM Standards on Ground Water and Vadose Investigations (1996), Practical Guide for Ground Water Sampling EPA/600/2-85/104, (November 1985) and RCRA Ground Water Monitoring Technical Enforcement Guidance Document (1986), unless otherwise specified by the Executive Secretary;
7. description and justification of parameters to be monitored;
8. quality assurance and control provisions for monitoring data.

J. The plans and specifications relating to construction, modification, and operation of discharge systems.

K. The description of the ground water most likely to be affected by the discharge, including water quality information of the receiving ground water prior to discharge, a description of the aquifer in which the ground water occurs, the depth to the ground water, the saturated thickness, flow direction, porosity, hydraulic conductivity, and flow systems characteristics.

L. The compliance sampling plan which in addition to the information specified in the above item I includes, where appropriate, provisions for sampling of effluent and for flow monitoring in order to determine the volume and chemistry of the discharge onto or below the surface of the ground and a plan for sampling compliance monitoring points and appropriate nearby water wells. Sampling and analytical methods proposed in the application must conform with the most appropriate methods specified in the following references unless otherwise specified by the Executive Secretary:

1. Standard Methods for the Examination of Water and Wastewater, twentieth edition, 1998; Library of Congress catalogue number: ISBN: 0-87553-235-7.

2. E.P.A. Methods, Methods for Chemical Analysis of Water and Wastes, 1983; Stock Number EPA-600/4-79-020.
3. Techniques of Water Resource Investigations of the U.S. Geological Survey, (1998); Book 9.
4. Monitoring requirements in 40 CFR parts 141 and 142, 2000 ed., Primary Drinking Water Regulations and 40 CFR parts 264 and 270, 2000 ed.
5. National Handbook of Recommended Methods for Water-Data Acquisition, GSA-GS edition; Book 85 AD-2777, U.S. Government Printing Office Stock Number 024-001-03489-1.

M. A description of the flooding potential of the discharge site, including the 100-year flood plain, and any applicable flood protection measures.

N. Contingency plan for regaining and maintaining compliance with the permit limits and for reestablishing best available technology as defined in the permit.

O. Methods and procedures for inspections of the facility operations and for detecting failure of the system.

P. For any existing facility, a corrective action plan or identification of other response measures to be taken to remedy any violation of applicable ground water quality standards, class TDS limits or permit limit established under R317-6-6.4E. which has resulted from discharges occurring prior to issuance of a ground water discharge permit.

Q. Other information required by the Executive Secretary.

R. All applications for a groundwater discharge permit must be performed under the direction, and bear the seal, of a professional engineer or professional geologist.

S. A closure and post closure management plan demonstrating measures to prevent ground water contamination during the closure and post closure phases of an operation.

Reference can be made to DG-3024 (e.g., Sections 3.1 through 3.3), NUREG-1620 (e.g., Sections 2.6.3 and 2.7.3), and RG 3.8 (e.g., Sections 1, 3.3, and 4.1) as appropriate for additional guidance on topics listed above.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.32.1: Please provide geologic cross sections depicting the three-dimensional configuration of the contact between the Brushy Basin and the Burro Canyon formations representing the area beneath and downgradient of the Cell 4B footprint (refer to Interrogatory White Mesa Cell 4B UAC R317-6-6.4-36/02: Issuance of Discharge Permit Interrogatory Statement for additional details). Please include information on the locations and distribution of any conglomerate zones and/or lenses that may exist beneath the Cell 4B area that might influence groundwater flow paths beneath Cell 4B.

Please include the inferred lateral and vertical extent of the elevated portion of the top surface of the Brushy Basin formation in said cross section.

In addition, please provide all supporting core logs, boring logs, including copies of any vertical or angled subsurface boring logs used for developing the geologic cross sections for the Cell 4B area, including a map depicting the locations and survey coordinates of all borings and wells completed or drilled in the vicinity of Cell 4B and adjacent areas covered in the cross sections. Please include bring and coring logs for any vertical and angled borings, and /or wells drilled in the early-mid 1990s in the vicinity of Cells 3 and 4A in a response to a request made by the US EPA, and provide any other documentation associated with those borings and/or wells. . Please provide information from any vadose zone or aquifer permeability testing, and/or other laboratory and visual observation of core samples that would suggest any primary structures, depositional features, or weathering that may have an anisotropic significance to properties pertinent to groundwater flow.

Please explain and justify how such conglomeratic zones at shallow unsaturated depths would not cause contaminants to bypass the screened interval of the proposed monitoring wells, or alternatively provide a mechanism to detect potential contaminant pathways. Please also, provide a map of the anticipated groundwater flow directions that could result from the structural “ridge” in the upper Brushy Basin Formation upper contact beneath and near Cell 4B.

Please explain and justify how the proposed new compliance groundwater monitoring well locations, spacing intervals, and the screened (perforated) intervals in these proposed wells, will be adequate to provide early warning of a leachate release from Cell 4B, based on compilation and synthesis of the geologic information.

Refer also to Interrogatory White Mesa Cell 4B UAC R317-6-6.4-36/02.

BASIS FOR ROUND 2 INTERROGATORY:

Responses provided in Sections 2.32.3, 2.32.6 and 2.32.7 of DUSA Round 1 Responses are acceptable.

Section 2.5 of U.S. N.R.C. Regulatory Guide 3.8 (NRC 1982) specifies that detailed geological data at building sites and in the vicinity of tailings or other effluent impoundments, sanitary landfills, spoil disposal areas, and sewage disposal facilities should be included in licensing submittals related to license applications/license amendment requests. This guide specifies that these geologic data should include strike and dip and lateral and vertical distribution of permeable layers, shales, and clays, and data on any fault, fracture, or joint pattern that may exist. This guide also specifies that locations of local outcroppings where seepage from landfills, dumps, impoundments, and sewage facilities is likely to occur should be noted.

U.S. N.R.C. NUREG-1200 Rev. 3 (NRC 1994), specifies that geologic cross sections need to show the locations of borings along with the boring log data that is used to develop the rock layering. U.S. NRC NUREG-0902 (NRC 1986) provides additional applicable guidance on the types of geologic features/geologic information that should be provided in the geologic characterization of the subsurface strata underlying the proposed Cell 4B footprint.

U.S. N.R.C. Regulatory Draft Guidance DG-3024 (NRC 2008), Section 2.4.1, specifies that geologic aspects of the site need to be described in licensing submittals related to license applications/license amendment requests. This guidance document also specifies that the broad features and general characteristics of the site and environs, including stratigraphy and structural geology should be noted and documented, and characteristics of the subsurface soil or rock, including identification and evaluation of zones of deformation that might act as conduits for contaminants, be described.

The presence and distribution of conglomeratic zones in the Dakota Formation (e.g., as indicated by results of recent nitrate migration investigations completed in the eastern portion of the White Mesa Mill Site) and the location and 3-dimensional extent of the elevated portion of the upper contact surface of the Brushy Basin Formation (a structurally elevated surface) need to be fully examined in that they could locally influence groundwater flow patterns in the perched water zone beneath the Cell 4B area. These features should be clearly delineated and the resulting information evaluated for its impact on the design of the proposed groundwater detection monitoring network for Cell 4B (see also Interrogatory White Mesa Cell 4B UAC R317-6-6.4-36/02: Issuance of Discharge Permit Interrogatory Statement [DUSA Section 2.33] below).

REFERENCES:

NRC 1986. U.S. Nuclear Regulatory Commission, "Site Suitability, Selection and Characterization", NUREG-0902, July 1986.

NRC 1994. U.S. Nuclear Regulatory Commission, "Standard Review Plan for the review of a license application for a Low-Level Radioactive Waste Disposal Facility", NUREG-1200 Rev. 3, April 1994.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.4-36/02: ISSUANCE OF DISCHARGE PERMIT

REGULATORY BASIS:

UAC R313-24-4 invokes UAC R317-6-6.4 in lieu of comparable requirements in 10CFR40:

- A. The Executive Secretary may issue a ground water discharge permit for a new facility if the Executive Secretary determines, after reviewing the information provided under R317-6-6.3, that:
1. the applicant demonstrates that the applicable class TDS limits, ground water quality standards protection levels, and permit limits established under R317-6-6.4E will be met;
 2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;
 3. the applicant is using best available technology to minimize the discharge of any pollutant; and
 4. there is no impairment of present and future beneficial uses of the ground water.
- B. The Board may approve an alternate concentration limit for a new facility if:
1. The applicant submits a petition for an alternate concentration limit showing the extent to which the discharge will exceed the applicable class TDS limits, ground water standards or applicable protection levels and demonstrates that:
 - a. the facility is to be located in an area of Class III ground water;
 - b. the discharge plan incorporates the use of best available technology;
 - c. the alternate concentration limit is justified based on substantial overriding social and economic benefits; and,
 - d. the discharge would pose no threat to human health and the environment.
 2. One or more public hearings have been held by the Board in nearby communities to solicit comment.
- C. The Executive Secretary may issue a ground water discharge permit for an existing facility provided:
1. the applicant demonstrates that the applicable class TDS limits, ground water quality standards and protection levels will be met;
 2. the monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;

3. the applicant utilizes treatment and discharge minimization technology commensurate with plant process design capability and similar or equivalent to that utilized by facilities that produce similar products or services with similar production process technology; and,
 4. there is no current or anticipated impairment of present and future beneficial uses of the ground water.
- D. The Board may approve an alternate concentration limit for a pollutant in ground water at an existing facility or facility permitted by rule under R317-6-6.2 if the applicant for a ground water discharge permit shows the extent the discharge exceeds the applicable class TDS limits, ground water quality standards and applicable protection levels that correspond to the otherwise applicable ground water quality standards and demonstrates that:
1. steps are being taken to correct the source of contamination, including a program and timetable for completion;
 2. the pollution poses no threat to human health and the environment; and
 3. the alternate concentration limit is justified based on overriding social and economic benefits.
- E. An alternate concentration limit, once adopted by the Board under R317-6-6.4B or R317-6-6.4D, shall be the pertinent permit limit.
- F. A facility permitted under this provision shall meet applicable class TDS limits, ground water quality standards, protection levels and permit limits.
- G. The Board may modify a permit for a new facility to reflect standards adopted as part of corrective action.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.33: *In order to complete the application to amend the Utah Ground Water Discharge Permit (Permit), please provide additional information to demonstrate that the number and placement of the proposed new groundwater monitoring wells are adequate to permit detection of any potential future releases from the disposal cell areas, including Cell 4B, for the purpose of determining compliance with applicable requirements contained in R317-6. Include information regarding the inferred distribution of conglomeratic zones and/or other geologic features within the Dakota Formation, and the inferred vertical extent (relief) and areal extent of the elevated portion of the top surface of the Brushy Basin Formation on geologic cross sections that span the Cell 4B footprint area (see also Interrogatory White Mesa Cell 4B UAC R317-6-6.3-35/02: Ground Water Discharge Permit Application Interrogatory Statement, above). Provide a discussion of how these features could locally influence groundwater flow patterns beneath Cell 4B, as this relates to the number and placement of proposed new monitoring wells downgradient of Cell 4B and their ability to allow detection of any potential future releases from the disposal cell areas, including Cell 4B.*

BASIS FOR ROUND 2 INTERROGATORY:

Figure 2 of a report (prepared by Hydro Geo Chem Inc.) dated December 29, 2009, presents a structural contour map which indicates that a portion of the upper contact surface of the Brushy Basin Formation beneath the Cell 4B footprint is elevated, in the form of an elongated elevated “nose” or “prong” of higher topographic (structural) relief than other areas beneath the Cell 4B footprint. The apex of this prong-like feature appears to extend in a south- southwesterly direction beneath the Cell 4B footprint. This feature may locally influence (e.g., bifurcate) subsurface flow paths of potential future releases from the disposal cell areas, including Cell 4B. Information presented in the December 29, 2009 Hydro Geo Chem Inc. report also indicates that conglomeratic zones within the Dakota Formation can exert an influence on groundwater flow underlying other portions of the White Mesa Mill Site.

U.S. N.R.C. Regulatory Guide 1200, Rev. 3 (NRC 1994), specifies that adequate information is needed to evaluate the presence of perched conditions, and groundwater movement. Also, as specified in NUREG-0902 (NRC 1986), characterization of the site should include all significant hydrogeologic units that underlie the site.

REFERENCES:

NRC 1986. U.S. Nuclear Regulatory Commission, “Site Suitability, Selection and Characterization”, NUREG-0902, July 1986.

NRC 1994. U.S. Nuclear Regulatory Commission, “Standard Review Plan for the Review of a License Application for a Low-Level Radioactive Waste Disposal Facility”, NUREG-1200 Rev. 3, April 1994.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.9-37/02: PERMIT COMPLIANCE MONITORING

REGULATORY BASIS:

UAC R313-24-4 invokes UAC R317-6-6.9 in lieu of comparable requirements in 10CFR40:

A. Ground Water Monitoring

The Executive Secretary may include in a ground water discharge permit requirements for ground water monitoring, and may specify compliance monitoring points where the applicable class TDS limits, ground water quality standards, protection levels or other permit limits are to be met.

The Executive Secretary will determine the location of the compliance monitoring point based upon the hydrology, type of pollutants, and other factors that may affect the ground water quality. The distance to the compliance monitoring points must be as close as practicable to the point of discharge. The compliance monitoring point shall not be beyond the property boundaries of the permitted facility without written agreement of the affected property owners and approval by the Executive Secretary.

B. Performance Monitoring

The Executive Secretary may include in a ground water discharge permit requirements for monitoring performance of best available technology standards.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.34: *Refer to Interrogatory White Mesa Cell 4B UAC R317-6-6.4-36/02 and Interrogatory White Mesa Cell 4B UAC R317-6-6.3-35/02, both above*

BASIS FOR ROUND 2 INTERROGATORY:

Additional information and justification is required to demonstrate the adequacy of proposed plan for installing additional downgradient groundwater monitoring wells in connection with the construction of Cell 4B. Before the Division can accept the proposal, these interrogatories must be resolved

REFERENCES:

DUSA 2008. Denison Mines USA Corporation. Environmental Report In Support of Construction Tailings Cell 4B, White Mesa Uranium Mill, Blanding, Utah, April 30, 2008.

- DG-3024 U.S. Nuclear Regulatory Commission, “Standard Format and Content Of License Applications for Conventional Uranium Mills,” Draft Regulatory Guide DG-3024, May, 2008.
- NUREG-1620 U.S. Nuclear Regulatory Commission, “Standard Review Plan (NUREG–1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act”, NUREG-1620, June, 2003.
- RG 3.8 U.S. Nuclear Regulatory Commission, “Preparation of Environmental Reports for Uranium Mills,” Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.10-38/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

Follow up to DUSA Response to Round 1 Interrogatories, Section 2.35: Please identify specific documents that state the bases for determining background ground water quality and form the basis for the Division's acceptance of background ground water quality.

BASIS FOR ROUND 2 INTERROGATORY:

Independent evidence, in addition to the 2009 Statement of Basis, is required to document accepted background ground water quality. Please include references to the DUSA submittals / reports, upon which the Statement of Basis was founded.

REFERENCES:

DG-3024 U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008.

- NUREG-1620 U.S. Nuclear Regulatory Commission, “Standard Review Plan (NUREG–1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act”, NUREG-1620, June, 2003.
- RG 3.8 U.S. Nuclear Regulatory Commission, “Preparation of Environmental Reports for Uranium Mills,” Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.12-40/02: SUBMISSION OF DATA

REGULATORY BASIS:

UAC R313-24-4 invokes UAC R317-6-6.12 in lieu of comparable requirements in 10CFR40:

A. Laboratory Analyses

All laboratory analysis of samples collected to determine compliance with these regulations shall be performed in accordance with standard procedures by the Utah Division of Laboratory Services or by a laboratory certified by the Utah Department of Health.

B. Field Analyses

All field analyses to determine compliance with these regulations shall be conducted in accordance with standard procedures specified in R317-6-6.3.L.

C. Periodic Submission of Monitoring Reports

Results obtained pursuant to any monitoring requirements in the discharge permit and the methods used to obtain these results shall be periodically reported to the Executive Secretary according to the schedule specified in the ground water discharge permit.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The response is acceptable.

REFERENCES:

- | | |
|------------|---|
| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| NUREG-1620 | U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003. |

RG 3.8

U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.13-41/02: 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.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

No additional information is required at this time. Reporting requirements for these items will be included in the GWDP.

REFERENCES:

10 CFR 40 Appendix A to Part 40 – Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content.

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.14-42/02: 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 UAC R317-6-6.15 if a pollutant concentration has exceeded a permit limit.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

Although the Permit requirements cited for responding to Out-of-Compliance Status differ slightly from those stated in UAC R317-6-6.14, the process required by the Permit including those in the entirety of Permit Section 1.G accomplishes the same objectives. The response is acceptable.

REFERENCES:

- | | |
|------------|---|
| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| NUREG-1620 | U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003. |
| RG 3.8 | U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992. |

INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.16-43/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The Permit requirements for identifying and responding to Out-of-Compliance Status closely parallel those stated in UAC R317-6-6.14. The response is acceptable.

REFERENCES:

- | | |
|------------|---|
| DG-3024 | U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008. |
| NUREG-1620 | U.S. Nuclear Regulatory Commission, "Standard Review Plan (NUREG-1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act", NUREG-1620, June, 2003. |
| RG 3.8 | U.S. Nuclear Regulatory Commission, "Preparation of Environmental Reports for Uranium Mills," Regulatory Guide 3.8, October, 1992. |

**INTERROGATORY WHITE MESA CELL 4B UAC R317-6-6.17-44/02: 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.

Refer to Appendix A of Round 1 Interrogatories for relevant NRC regulatory guidance.

ROUND 2 INTERROGATORY STATEMENT:

None.

BASIS FOR ROUND 2 INTERROGATORY:

The Permit requirements for identifying and responding to Out-of-Compliance Status closely parallel those stated in UAC R317-6-6.17. The response is acceptable.

REFERENCES:

DG-3024 U.S. Nuclear Regulatory Commission, "Standard Format and Content Of License Applications for Conventional Uranium Mills," Draft Regulatory Guide DG-3024, May, 2008.

- NUREG-1620 U.S. Nuclear Regulatory Commission, “Standard Review Plan (NUREG–1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of The Uranium Mill Tailings Radiation Control Act”, NUREG-1620, June, 2003.
- RG 3.8 U.S. Nuclear Regulatory Commission, “Preparation of Environmental Reports for Uranium Mills,” Regulatory Guide 3.8, October, 1992.