Department of Energy
Washington, DC 20585

June 3, 2016

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Deputy Director
Mail Stop T8-F5
Washington, DC 20555-0001

Subject: Durango, CO, UMTRCA Title I Disposal Site: U.S. Nuclear Regulatory Commission Staff Comments on U.S Department of Energy Draft Report Titled *Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents*, Dated February 2016 (Docket No. WM-00048)

To Whom It May Concern:

In reference to the U.S. Nuclear Regulatory Commission's (NRC's) letter dated April 18, 2016, regarding "U.S. Nuclear Regulatory Commission Staff Comments on U.S Department of Energy Draft Report Titled *Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents*," (WM-00048), the U.S. Department of Energy (DOE) Office of Legacy Management (LM) is providing the following responses to NRC's comments.

In support of these comment responses, the following documents are enclosed:

- U.S. Nuclear Regulatory Commission Staff Comments on U.S Department of Energy Draft Report Titled *Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents*, dated April 2016
- *Draft Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents*, May 2016
- *U.S. Department of Energy Office of Legacy Management Categorical Exclusion Determination Form*
- *U.S. Department of Energy Office (DOE) Office of Legacy Management (LM) National Environmental Policy Act (NEPA) Environmental Checklist*

Upon acceptance by NRC, LM will submit a revised Long-Term Surveillance Plan (LTSP) for the Durango, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Disposal Site to include the plan as an appendix.

NMSS20

Cover Letter

NRC Comment 1:
As discussed in our August 10, 2015, letter to the DOE, the NRC staff determined that 10 CFR 40.27(e) applies to the project, and the DOE would need to describe how it will comply with the requirements of 10 CFR Parts 19, 20, and 21. . . . Please provide the references (i.e., title or Order number) to the applicable DOE Orders and DOE-LM policies and procedures.

DOE Response:
To ensure compliance with the applicable requirements of 10 *Code of Federal Regulations* (CFR) Parts 19, 20, and 21, the LM contractor (also known as the Legacy Management Support [LMS] contractor) shall comply with the corresponding policies, procedures, and other requirements for planning and executing work from the following:

- 29 CFR 1910 - *Occupational Safety and Health Standards*
- 29 CFR 1926 - *Safety and Health Regulations for Construction*
- 10 CFR 851 - *Worker Safety and Health Program*
- 10 CFR 835 - *Occupational Radiation Protection*
- DOE Order 232.2 - *Occurrence Reporting and Processing of Operations Information*
- DOE Order 151.1C - *Comprehensive Emergency Management System*
- DOE Order 460 - *Packaging and Transportation Safety*
- DOE Order 5400.5 - *Radiation Protection of the Public and the Environment*
- LMS - *Incident Reporting and Fact-Finding Meeting Procedure*
- LMS - *Radiological Control Manual*
- LMS - *Health and Safety Procedures Manual*
- Price-Anderson Amendments Act

NRC Comment 2:
The DOE should describe the "threshold" to "re-open" the drainage system and put it back in service. In addition, the DOE should also clarify how the system is expected to respond to a major rain event, should one occur in the future given that the transient drainage system is closed. The threshold for re-opening the transient drainage system should be included in the revised Long-Term Surveillance Plan (LTSP).

DOE Response:
The disposal cell was constructed with a drainage layer and vegetative cover designed to limit flux through the cover from precipitation, even during major rain events. The declining water surface elevation within the cell demonstrates that transient drainage seeping through the cell clay liner occurs at a rate greater than that of infiltration through the cell cover, as intended by

the original design. It is expected that the cover design will continue to be effective in limiting flux through the cover, even during major rain events (see the *Long-Term Surveillance Plan for the Durango, Colorado, Disposal Cell,* April 2015, for details of the disposal cell cover design). Upon completion of the Durango Transient Drainage System Closure and Evaporation Pond Removal, LM will monitor water levels at MW-1 and P7 annually. If water levels exceed 7054 feet above mean sea level, LM will further evaluate the situation and act in accordance with Section 3.5 of the LTSP to evaluate the need for reopening the transient drainage system.

Road Improvements and Evaporation Pond Removal Work Instructions

Section 3, Evaporation Pond Removal

NRC Comment 1:
Does the DOE intend to evaluate the project pursuant to the National Environmental Policy Act (NEPA), and if so, will the NRC be able to review the draft NEPA documents the DOE develops?

DOE Response:
NEPA documentation for the scope of activities associated with the transient drainage system closure and pond removal activities has been completed and is enclosed.

DOE Response for NRC Comments 2 and 3 (Section 3):
Responses to NRC comments 2 and 3 (for Section 3) have been incorporated within revisions to the Road Improvements and Evaporation Pond Removal Work Instructions. The response to comment 2 was incorporated into the first three paragraphs of Section 4.0. The response to comment 3 was incorporated into line 15 of Section 4.3.

Section 4, Evaporation Pond Detailed Work Plan

NRC Comment 1:
Please clarify the DOE's intended actions with respect to the transient drainage system line.

DOE Response:
The transient drainage system will remain in place within the disposal cell and will not be modified from its current condition. LM will remove the vent pipe and valves from the terminal end of the pipeline outside of the disposal cell. The terminal end of the line outside of the cell will then be plugged with 10 feet of bentonite, capped, and buried 3 feet below grade for protection.

DOE Response for NRC Comments 2, 4, and 6 (Section 4):
Responses for NRC comments 2 and 4 (for Section 4) have been incorporated within revisions to the Road Improvements and Evaporation Pond Removal Work Instructions. The response for comment 2 was incorporated into line 7 of Section 4.3. The response for comment 4 was incorporated into lines 16, 17, 18, and 19 of Section 4.3.

The response for NRC comment 6 (for Section 4) has been incorporated within revisions to the Radioactive Waste Management Procedures, in Section 3.0.

NRC Comment 3:
Please clarify if the transportation containers (bags) will be stacked.

DOE Response:
The transportation bags will not be stacked during storage in the staging area or during transportation.

NRC Comment 5:
Please clarify if the DOE is referring to the section entitled "Radioactive Waste Management Procedures" or provide this additional plan.

DOE Response:
LM was referring to the section titled Radioactive Waste Management Procedures.

Radioactive Waste Management Procedures

DOE Response for NRC Comments 1, 2, 3, and 4:
The Radioactive Waste Management Procedures have been revised to indicate that this material will be transported as unregulated shipments of residual radioactive material based on the calculations in 49 CFR 173.433(d)(7). The response for comment 1 was incorporated into Sections 3.3.4, Section 3.4, Section 3.4.1.2, and Section 3.4.2.2. The response for comment 2 was incorporated into Sections 3.1 and 3.3.1. The response for comment 3 was incorporated into Section 3.3.4 and Section 3.4. The response for comment 4 was incorporated into Sections 3.0 and 3.2.

Cleanup Criteria and Verification Sampling Plan

NRC Comment 1:
It is not clear from the discussion in this section if the DOE has characterized the pond sludge and surrounding area to determine the radiological inventory and volume of the waste material. If so, please provide this information to the NRC as it is important in evaluating the health and safety measures discussed in the plans as well as the waste management activities.

DOE Response:
Samples of the pond sediment and pond water were collected in April of 2015, and the volumes of water and sediment in the evaporation pond were determined in March of 2016. This information is included in Attachment C of the revised Radioactive Waste Management Procedures.

DOE Response for Comments 2, 3, and 4:
Responses for NRC comments 2, 3, and 4 have been incorporated within revisions to the Cleanup Criteria and Verification Sampling Plan. The response for comment 2 was incorporated into Section 1.3, Section 3.5, and Section 4.0. The response for comment 3 was incorporated into Section 2.1. The response for comment 4 was incorporated into Sections 1.3 and 3.0.

NRC Comment 5:
Section 3.4, on page 9 discusses the use of SC-132 crutch scintillometers. Please describe the basis for the selection of these instruments. This section also has an equation for converting SC-132 readings to gamma exposure rates. Please describe the rationale for the use of this equation.

DOE Response:
The use of SC-132 crutch scintillometers is based on DOE's extensive experience with the effectiveness of these particular instruments in providing data for use in guiding excavation limits on UMTRCA remediation projects, the ability of the instrument to detect gamma radiation from the Bi-214 and Pb-214 progeny of Ra-226, and the relatively well understood correlation between the instrument's range of gamma measurements and Ra-226 concentrations in soil.

Sections 2.1 and 3.3 of the Cleanup Criteria and Verification Sampling Plan have been revised to reference the conversion of scintillometer gamma readings to activity concentrations and the collection of exposure rates using a dose rate meter.

Please call me at (970) 248-6016 if you have any questions. Please address any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,

Jalena Dayvault
Site Manager

Enclosures

cc w/enclosures:
M. Cosby, CDPHE
W. Naugle, CDPHE
R. Bush, DOE-LM (e)
A. Gil, DOE-LM (e)
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File: DUR 0410.02 (rc-grand.junction)

Sites\Durango\6-1-16 Durango Response to Planning Documents Comments (NRC)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 18, 2016

Ms. Jalena Dayvault, Site Manager
U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION STAFF COMMENTS ON U.S. DEPARTMENT OF ENERGY DRAFT REPORT ENTITLED "DURANGO TRANSIENT DRAINAGE SYSTEM CLOSURE AND EVAPORATION POND REMOVAL PLANNING DOCUMENTS" DATED FEBRUARY 2016 (DOCKET NO. WM-00048)

Dear Ms. Dayvault:

I am writing in response to your letter dated February 17, 2016, providing the U.S. Nuclear Regulatory Commission (NRC) staff with the draft Technical Memorandum entitled "Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents" dated February 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML16053A013). Your letter and the draft technical memorandum provided responses to our comments in a letter dated August 10, 2015, regarding the U.S. Department of Energy's intent to remove the transient drainage system at the Durango, Colorado Uranium Mill Tailings Radiation Control Act site (ML15202A466). The NRC staff has reviewed your letter and the documents in the draft technical memorandum and has several comments on both. The staff's comments are enclosed.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions concerning this letter, please contact me at 301-415-6749 or by email at Dominick.Orlando@nrc.gov.

Sincerely,

Dominick A. Orlando, Senior Project Manager
Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Enclosure:
NRC Staff Comments on DOE Letter
and draft Technical Memorandum

U.S. Nuclear Regulatory Commission Staff Comments
on the U.S. Department of Energy draft "Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents" dated February 2016

Cover Letter

1. In the response to the U.S. Nuclear Regulatory Commission's (NRC's) comment regarding the applicability of the requirements of 10 CFR 40.27 ("**Regulatory Applicability**"), the U.S. Department of Energy (DOE) letter states that it is the DOE's understanding that the regulations do not apply to the project because of the limited scope of the proposed action. As discussed in our August 10, 2015, letter to the DOE, the NRC staff determined that 10 CFR 40.27(e) applies to the project, and the DOE would need to describe how it will comply with the requirements of 10 CFR Parts 19, 20, and 21. The DOE's letter dated February 17, 2016, discussed how it will comply with 10 CFR Part 19. However, the letter does not discuss how the DOE will comply with the notification requirements in 10 CFR Part 21 or the health and safety requirements of 10 CFR Part 20 although the letter does indicate that these activities will be conducted pursuant to DOE's Office of Legacy Management (LM) policies and procedures and DOE Orders. Please provide the references (i.e., title or Order number) to the applicable DOE Orders and DOE-LM policies and procedures. Complete copies of the documents are not necessary as long as they are available for inspection or are otherwise publically available.

2. In response to the NRC staff's comment regarding the impact of the removal of the transient drainage system ("**Final Comment**"), the DOE letter states that the transient drainage system will be capped and left in place. The "Engineering Evaluation" in the Technical Memorandum discusses the DOE's intention to maintain the transient drainage system in a way that maintains the flexibility to restore the system to service if necessary. The DOE should describe the "threshold" to "re-open" the drainage system and put it back in service. In addition, the DOE should also clarify how the system is expected to respond to a major rain event, should one occur in the future given that the transient drainage system is closed. The threshold for re-opening the transient drainage system should be included in the revised Long-Term Surveillance Plan (LTSP), rather than an appendix to the LTSP, in order to ensure that it is readily available if the transient drainage system needs to be re-opened

Draft Technical Memorandum

Road Improvements and Evaporation Pond Work Instructions

Section 3 – Evaporation Pond Removal

1. Given the scope of the activities under this plan, and the waste management and pond removal activities, does the DOE intend to evaluate the project pursuant to the National Environmental Policy Act (NEPA), and if so, will the NRC be able to review the draft NEPA documents the DOE develops?

2. The first bullet on page 4 indicates that the DOE will "remove" any evaporation pond water prior to the start of construction. It is not clear how the DOE will remove this potentially contaminated water and how the water will be managed and/or disposed. Please provide a description of how the pond water will be managed.

3. It is not clear from the description of the activities on page 4, 13th and 14th bullets, if the DOE will coordinate the removal of the pond with the NRC so as to allow the NRC to perform a confirmatory survey of the pond area prior to its release. Please clarify if and how the activities will be coordinated with the NRC.

Section 4 – Evaporation Pond Removal Detailed Work Plan

1. Item 5, on page 6 states that, "The cell transient drainage system line and vent shall be located removed and controlled..." This appears to be inconsistent with the statements provided in the cover letter and the DOE's responses to the NRC staff's comments in August 2015 that the transient drainage system will remain in place. Please clarify the DOE's intended actions with respect to the transient drainage system line.

2. Item 7, on page 6 discusses the mixing or blending of contaminated and non-contaminated materials (soils). It is not clear how these soils will be blended or mixed or where at the site this will occur. Please clarify the DOE's procedures for blending the soils.

3. Please clarify if the transportation containers (bags) will be stacked.

4. Item 16, on page 6 discusses the decontamination of equipment used during the project. It is not clear from the discussion where this decontamination will occur or what criteria will be used to determine that the equipment can be released for unrestricted use. Please clarify where the decontamination will occur, how the DOE will manage the material that is removed during decontamination, and what release unrestricted release criteria will be used to ensure that contaminated equipment is not released.

5. Item 1, in "Loading and Transport of the Bags to the GJDS" on page 7 states that the DOE will "Follow all requirements of the Transportation/Shipping Plan." A Transportation/Shipping Plan was not included in the Technical Memorandum. Please clarify if the DOE is referring to the section entitled "Radioactive Waste Management Procedures" or provide this additional plan.

6. Item 13, on page 8 indicates that the truck will be released without a final radiological survey. Please clarify if a survey of the truck will be performed, and if not, why the DOE does not believe this survey is necessary. Note this appears to be discussed on page 3 of the section entitled "Radioactive Waste Management Procedures" but it is unclear if the Radiological Control Technician or the driver is responsible for performing the radiological survey of the truck and its contents.

Radioactive Waste Management Procedures

1. It is not clear how the actions of the individuals involved in the Incident Reporting and Emergency Response are coordinated by, or reported to the DOE project manager(s). For example, Section 3.3 discusses the responsibilities of the radiological control manager, but it is not clear if this individual is a DOE employee, a contractor employee, or a subcontractor employee. The section also assigns responsibility for incident response to an incident commander, who would be the senior representative of a law enforcement or hazardous materials response authority, but it is not clear how the DOE will ensure that this individual

will assume responsibility for the incident and how the DOE will coordinate the incident response.

2. It is not clear that other workers besides drivers will require DOT training including the individual signing the shipping papers. Please clarify that workers other than drivers will get the required DOT training, including the individual signing the shipping papers.

3. The section is unclear with respect to who will contact the NRC in the event of an incident.

4. Section 3.2, on page 3 discusses waste container labeling. If the materials to be shipped to Grand Junction are DOT Class 7, the hazard ID would be "Radioactive 7" and the packages would also have to be labeled "Radioactive White-1" for surface radiation levels not exceeding 0.5 millirem per hour (mrem/hr). If the materials exceed 0.5 mrem/hr, the package would have to be labeled "Radioactive Yellow-2." The package should also include the UN ID shipping number for the material. It is not clear from the discussion here and in Section 3.5 of the "Clean-up Criteria and Verification Sampling Plan" if the DOE will include these labels on the shipping packages. Please clarify the labeling requirements on the shipping packages.

Clean-up Criteria and Verification Sampling Plan

1. It is not clear from the discussion in this section if the DOE has characterized the pond sludge and surrounding area to determine the radiological inventory and volume of the waste material. If so, please provide this information to the NRC as it is important in evaluating the health and safety measures discussed in the plans as well as the waste management activities.

2. Section 1.3 on pages 4-5 discusses the clean-up criteria that will be used by the DOE at the site and states that the DOE will use the U.S. Environmental Protection Agency's risk-based uranium level in soil for migration to ground water. The Durango site is subject to Title I of the Uranium Mill Tailings Radiation Control Act. Therefore, it is not clear why the DOE is not using the criteria in 40 CFR Part 192. Note that the NRC has developed guidance in Appendix H of NUREG-1620, revision 1, "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," which discusses using the radium benchmark dose approach. The radium benchmark dose approach may be used to determine the appropriate clean-up criteria for radionuclides other than radium.

3. Item 8[b] indicates that the background gamma exposure rate is 15.7 microroentgens per hour, which was the background exposure rate in 1983. It is not clear why this exposure rate was used rather than one that is more current.

4. Section 3.0, on page 6 discusses the use of Visual Sampling Plan computer code to ensure verification samples are defensible and representative of site conditions. The verification sampling will be based on 17.5 foot (ft) x 17.5 ft grids. Please identify the basis of the 17.5 ft grids and having a single sample aliquot taken from the center of each grid.

5. Section 3.4, on page 9 discusses the use of SC-132 crutch scintillometers. Please describe the basis for the selection of these instruments. This section also has an equation for

converting SC-132 readings to gamma exposure rates. Please describe the rationale for the use of this equation.

Draft

Durango Transient Drainage System Closure and Evaporation Pond Removal Planning Documents

- Road Improvements and Evaporation Pond Removal Work Instructions
- Radioactive Waste Management Procedures
- Cleanup Criteria and Verification Sampling Plan
- Engineering Evaluation

Durango, Colorado, Disposal Site

May 2016

U.S. DEPARTMENT OF ENERGY | Legacy Management

LMS/DUD/S13810

Draft
Road Improvements and Evaporation Pond Removal Work Instructions Durango, Colorado, Disposal Site

U.S. DEPARTMENT OF ENERGY | Legacy Management

Contents

Abbreviations

CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
GJDS	Grand Junction, Colorado, Disposal Site
LM	Office of Legacy Management
NRC	U.S. Nuclear Regulatory Commission
PRB	permeable reactive barrier
RCT	radiological control technician
RWP	Radiological Work Permit

1.0 Purpose and Scope

The U.S Department of Energy Office of Legacy Management (LM) road improvement and evaporation pond removal project at the Durango, Colorado, Disposal Site involves improving the road and loading areas; removal and offsite disposal of the evaporation pond contents, plastic and clay liners, and leachate collection system; verification sampling and analyses; backfilling the pond area and grading to previous land contours; implementing erosion controls; and revegetating the former pond area. All waste materials will be transported to the Grand Junction, Colorado, Disposal Site (GJDS) for disposal.

2.0 Road Improvements

Prior to mobilizing for removal of the evaporation pond, the county and site roads will be resurfaced to allow safe access to and from the site by heavy equipment and tractor-trailers, which will be used to excavate, containerize, and load residual radioactive materials for offsite shipment.

The work includes, but is not limited to:

- Mobilizing workers and equipment at the site.
- Establishing project area controls and access parameters for roadway work and the temporary staging areas and points in between. This includes the temporary relocation of existing concrete barriers at the entrance to the site and replacing the barriers after shipping activities are complete.
- Establishing a traffic control plan and maintaining traffic controls to ensure that all work is conducted in a manner that is protective of workers and the public during operations.
- Receiving materials.
- Placing and compacting materials, in accordance with the engineering drawings and specifications, at County Road 212, directly adjacent to the main site access gate to protect the existing roadway and to allow for safe access and egress by equipment and haul trucks. This will include the placement of geotextile stabilization materials and compaction testing as required. When shipping is complete, touch-up grading may be required.
- Placing and compacting materials as needed along the primary and secondary site roadways and staging areas to allow for safe truck turnaround and for staging and loading of materials. This includes removing vegetation only as needed to provide a safe turning radius for haul trucks.
- Adjusting surfaces and placing and compacting materials as needed to allow for safe access and egress for pond-area work activities.
- Demobilizing workers and equipment not needed for evaporation pond work activities.

3.0 Evaporation Pond Removal

The evaporation pond was used to collect and evaporate water from the Durango disposal cell and previously from the decommissioned permeable reactive barrier (PRB) treatment system (DOE 1995). The process will include adjusting area access controls and establishing radiological control areas; constructing and extending an excavation platform at the pond area; removing, capping, and marking water transfer lines; excavating, blending, and loading contaminated soils into transport containers; reducing the size of contaminated pond liners, piping, and components and loading them into transport containers; relocating, staging, and managing transport containers; loading waste for shipment to the GJDS; and backfilling, recontouring, and revegetating excavated and surrounding areas. A State of Colorado licensed professional engineer (PE) will develop engineering plans and oversee the construction activities.

This work includes, but is not limited to (listed in no specific order):

- Removing evaporation pond water prior to start of construction, and during construction, if needed.
- Mobilizing workers and equipment.
- Receiving materials.
- Establishing project area access and perimeter controls for the evaporation pond work zone, temporary staging areas, and points in between. Removing fences and components as needed.
- Establishing and installing project area storm water controls.
- Receiving and placing materials to construct a temporary excavation platform within the evaporation pond footprint. Incorporating evaporation pond-bottom soils and vegetation.
- Excavating and removing soils, vegetation, liner materials, piping, and miscellaneous items.
- Loading and packaging materials into lined PacTec LiftPac soft-sided shipping bags. Blending soil materials to reduce moisture content as needed for transport. Sizing other materials to fit into the LiftPac bags with the blended soil materials.
- Weighing and numbering loaded LiftPac bags prior to transport for staging.
- Transporting loaded bags to the Durango site temporary staging location for load-out and shipment to the GJDS.
- Coordinating the shipping schedule with the contractor's certified shipper, the transportation services vendor, and the GJDS.
- Loading staged materials onto flatbed trucks for shipment to the GJDS.
- Shipping materials to the GJDS per the *Radioactive Waste Management Procedures* (DOE 2016).
- Sampling the excavation for radiological contamination as outlined in the *Clean-up Criteria and Verification Sampling Plan, Durango, Colorado* (DOE 2016) to determine if the excavation can be released for backfill.
- Adjusting access controls as needed upon release of excavated areas for backfill.

- Backfilling, recontouring, and compacting the released areas and adjacent areas in accordance with the engineering drawings.
- Performing compaction testing.
- Establishing and installing run-on and run-off controls in accordance with the engineering drawings.
- Revegetating areas as shown on the engineering drawings.
- Performing housekeeping of the project site and redressing internal site roadways and staging areas as needed.
- Demobilizing workers, materials, and equipment.
- Performing as-built topographic surveys.

4.0 Evaporation Pond Removal Detailed Work Plan

LM has installed an enhanced solar-powered evaporation system at the evaporation pond, which continuously recirculates the pond water down the side slopes of the pond liner, in an effort to reduce the amount of water in the pond prior to construction. The plan accounts for some water to remain in the pond at the time construction begins.

The water that remains within the pond will be absorbed with clean soil that will be mixed with the pond sediments at a ratio of about 1:6, placed in lined bags containing an absorbing product, and transported to the GJDS. Sediment and clean soil will be mixed until all free water is absorbed. If the volume of water is greater than can be absorbed during the mixing process, additional clean soil will be brought onsite for the mixing process. The resulting soil mixture will not be regulated by U.S. Department of Transportation (DOT) during transport (according to 49 *Code of Federal Regulations* [CFR] 173.433(d)(7)). The mixing calculations are documented as part of the *Radioactive Waste Management Procedures* (DOE 2016).

LM has empty tanks at the Durango site that will be used to containerize any free water that cannot be addressed by the process described above. Any water stored in the tanks during the construction process that cannot be evaporated will be transported to the GJDS as an unregulated shipment of residual radioactive material, according to 49 CFR 173.433(d)(7), and with approval of the LM site manager for the GJDS. The final disposition for all miscellaneous materials at the Durango site will be at GJDS, as allowed for Uranium Mill Tailings Radiation Control Act Title I sites.

4.1 Mobilization

Crews will:

[1] Travel to the Durango site.

[2] Perform a preconstruction conference, Job Safety Analysis briefing, Radiological Work Permit (RWP) briefing, training, and work plan briefing. This includes performing a project walkdown.

[3] Perform initial equipment inspections and photo document the as-received condition of the heavy equipment.

[4] Install construction and project controls.

[5] Set up staging areas, chemical toilets, hand-wash stations, project trailer, etc.

[6] Remove fencing and components from pond berm and shoulders.

4.2 Receive Supplies and Materials

Crews will:

[1] Receive and inspect the LiftPac bags, lifting frames, and loading frames.

[2] Collect supplies and materials from local vendors.

[3] Receive and inspect absorbent materials.

[4] Receive materials for the excavation platform.

4.3 Excavation and Removal of Evaporation Pond Materials

Crews will:

[1] Construct an excavation platform with the oversight of a State of Colorado licensed PE within the evaporation pond area footprint to reach all areas requiring excavation, prior to excavation. Extend the platform toward the evaporation pond staging area as needed for safe access to the pond and safe access for loading, handling, and transporting bagged materials.

[2] Construct the excavation platform using imported materials blended with onsite materials as available for lower lifts. Only imported materials will be used on the upper lifts to avoid contaminating equipment.

[3] Excavate non-contaminated materials from evaporation pond shoulders and berms prior to contaminated material excavation to expose and release the pond liner anchoring sections. These materials may be used for constructing lower lifts of the excavation platform or placed into the evaporation pond bottom for blending.

[4] Install wattles and silt fence as needed.

[5] Locate, remove, control, and mark the cell transient drainage system line and vent as shown on engineering drawings.

[6] **Hold Point:** Prior to excavation, establish and verify radiologic controls, review the RWP, and review and adjust load-out, handling, and transport processes.

[7] Excavate soils from the evaporation pond bottom using the excavator, then mix or blend the pond-bottom saturated soils and free water with surrounding soils from pond shoulders and from the excavation platform to remove materials above the liner. A ratio of 4 parts clean to 1 part contaminated sediments are required to ensure that the resulting contaminated material will be classified as unregulated for DOT shipping purposes. Based on a conservative estimate of the total volume of clean fill needed to absorb 3 inches of water and saturated sediments in the pond, the mixing ratio is about 6 parts clean to 1 part water/saturated sediments. The mixing of the pond materials (water and sediment) with clean soils will be conducted within the confines of the pond. Clean soil will be brought onsite and placed in the pond for staging the excavator on a clean fill ramp and for absorbing free water. Clean soil will be thoroughly mixed with contaminated sediments at the 6 parts clean to 1 part water/saturated sediments ratio prior

to loading in bags in order to achieve a moisture content of the mixture that will pass the EPA *SW-846 Test Method 9095B: Paint Filter Liquids Test* (EPA 2004). The ratio is based upon the amount of material necessary to create the pad and also the amount of material necessary to ensure that the loaded material has no free liquid. In order to ensure that the activity concentration of the mixed material is below the DOT limits, the material will be measured with field detectors prior to being loaded in bags. All mixed sediment will be loaded into the bags staged on the ramp within the pond.

[8] Place excavated/blended soils into the LiftPac bags for staging. Add water-absorbing product as needed to assure compliance with shipping requirements.

[9] Remove the primary and secondary liners and the geo-drainage mesh. Blend and size the evaporation pond materials and place them into load-out bags for disposal. Size transient drainage system piping and vent piping and any debris encountered while excavating the pond bottom.

[10] Place a layer of soil in the bottom of the bag using the excavator, place sized materials in the bag, and place additional soil into the bag using the excavator. Sized materials shall be 4 feet in length or less and no larger than 12 inches in diameter when rolled and shall not be more than one-third of the total bag volume. If piping or debris has sharp edges, tape sharp edges prior to loading and covering.

[11] Patch the liner if it is breached during excavation, using tape, bentonite clay, or a combination as appropriate.


Note

A spotter should be used to ensure that the liner is not damaged by the excavator during removal of evaporation pond-bottom materials.

[12] Size and remove the liner from the evaporation pond and place the liner into LiftPac bags.

[13] Determine if additional (spot) soil removal is required on the basis of observation and consultation with project radiological verification personnel. Spot removal may also include the removal of water transfer lines from the previously remediated PRB unit. Cap the lines if removal is not required.

[14] Load any additional soils into bags with liner materials.

[15] **Hold Point:** Allow U.S. Nuclear Regulatory Commission (NRC) and project personnel to perform radiological sampling activities, including data analysis and verification, prior to backfilling and recontouring.


Note

The LMS Durango site lead will keep the LM Durango site manager informed on the progress of work activities. The LM Durango site manager or the assigned contractor representative will coordinate with NRC for scheduling NRC verification activities.

[16] Decontaminate equipment as needed per the direction of the radiological control technician (RCT) upon completion of excavation activities. Decontamination will occur on the clean fill ramp. Dry decontamination methods will be used for release prior to

implementing wet decontamination measures. The RCT will verify and document all decontaminated equipment for unrestricted release. Decontamination water and wipe cloths will be absorbed with clean soil or absorbent material and placed in a bag to bring to GJDS for disposal.

[17] Check any equipment that is used in a contamination area prior to release to ensure total and removal contamination values do not exceed the limits listed in 10 CFR 835 Appendix D.

[18] Measure the outer surfaces of the packages (LiftPac) for removable contamination to ensure that the packages can be released for unrestricted use.

[19] Measure the contamination area/buffer area boundaries at the Durango site periodically to ensure that there is no loss of contamination control.

4.4 Packaging and Staging of Evaporation Pond Materials

Note *Perform the following steps in accordance with the LiftPac vendor-supplied operating instructions.*

Crews will:

[1] Assemble and position the bag-loading frames for packaging of the evaporation pond materials.

[2] Place the LiftPac bag and liner in the frame per the vendor instructions.

[3] Fill bags with blended soils, liner materials, and debris.

[4] Close the LiftPac bags in accordance with the manufacturer's closure instructions after filling them.

[5] Weigh the bags by performing the following steps in accordance with the approved lift plan:

- Attach the dynamometer to the lifting eye on the excavator.
- Attach the dynamometer to the lifting straps on the LiftPac bag.
- Slowly lift the bag until it is suspended from the ground with no interference.
- Record the weight of the bag on the bag log sheet.
- Permanently mark the bag's identification number and the weight on the exterior surface.

[6] **Hold Point:** Contractor RCTs will perform radiological surveys to release the bags from the contamination area. Do not transport the bags to the staging area without RCT approval.

[7] Transport the bags to the staging area. Due to limited visibility, a spotter will be stationed to ensure the equipment moving the bags is clear to proceed in areas of poor visibility.

4.5 Staging of Bags

Crews will:

[1] Place bags at the staging area for future transport. When placing bags, make sure there is space between bags and ensure that straps from adjacent bags are clear from bag placement.

[2] Inspect the bags in the staging area daily to ensure that they are not tampered with and their integrity is maintained.

Note

Bag integrity is not a major concern unless vandalism becomes an issue at the project site.

4.6 Loading and Transport of the Bags to the GJDS

Crews will:

[1] Follow all requirements of the *Radioactive Waste Management Procedures* (DOE 2016).

[2] Ensure the construction site supervisor and contractor-certified shipper coordinate shipping dates and the quantity of tractor-trailer(s) with the transportation services vendor and the GJDS site lead.

[3] Direct the tractor-trailer to the appropriate area within the staging area.

[4] Ensure that the tractor-trailer is relatively level and that its wheels are chocked prior to loading.

[5] Perform a daily briefing with transportation services vendor personnel.

[6] Perform inspections of drivers' qualifications (i.e., current commercial driver's license) and review daily DOT equipment inspections.

[7] Attach the lifting frame to the lifting straps on the LiftPac bag.

[8] Slowly lift the bag, and use a spotter to place the bag on the trailer. The transportation services driver will provide direction on placement of the load on the trailer.

[9] Place all the bags on the trailer (4 to 5 bags per shipment). The driver will then secure the load by strapping each bag and then tarping the entire load.

[10] Continue loading the remaining tractor-trailer(s) per steps 3 through 9.

[11] **Hold Point:** The contractor-certified shipper will confirm driver identity and qualifications and perform driver briefings of the shipping documentation and emergency response requirements contained in the *Radioactive Waste Management Procedures* (DOE 2016).

[12] Sign the shipping documents.

[13] Release the trucks and trailers for transport to the GJDS.

[14] Depost the staging area after all bags have been shipped.

4.7 Backfill and Recontour

Crews will backfill and recontour the disturbed areas in accordance with the engineering drawings approved by a State of Colorado licensed PE, using equipment that has been documented by the RCT as having met the unrestricted release criteria.

4.8 Seed Mixture

Crews will obtain seed mixture from contractor environmental and horticulture personnel and work with them to place the seed mixture.

4.9 Housekeeping

Crews will perform housekeeping at the project site on a daily basis and ensure that erosion controls are in place.

5.0 References

DOE (U.S Department of Energy), 1995. *Durango, Colorado, Final Completion Report,* DOE Albuquerque Operation Office, Albuquerque, New Mexico, August.

DOE (U.S Department of Energy), 2016. *Radioactive Waste Management Procedures, Durango, Colorado,* LMS/DUD/S13841, Office of Legacy Management.

DOE (U.S Department of Energy), 2016. *Clean-up Criteria and Verification Sampling Plan, Durango, Colorado,* LMS/DUD/S13841, Office of Legacy Management.

EPA (U.S. Environmental Protection Agency), 2004. *SW-846 Test Method 9095B: Paint Filter Liquids Test*

LMS/DUD/S13842

Draft Radioactive Waste Management Procedures Durango, Colorado, Disposal Site

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Contents

Figures

Attachments

Abbreviations

BMP	best management practice
CDL	commercial driver's license
CFR	*Code of Federal Regulations*
CVSA	Commercial Vehicle Safety Alliance
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
GJDS	Grand Junction, Colorado, Disposal Site
LM	Office of Legacy Management
LMS	Legacy Management Support
RCT	radiological control technician
RRM	residual radioactive material
UMTRCA	Uranium Mill Tailings Radiation Control Act

Definitions

Hazardous material: A substance or material that could pose an unreasonable risk to health, safety, and property when transported in commerce. Hazardous materials are regulated by DOT and are defined in Title 49 *Code of Federal Regulations* Part 171.8 (49 CFR 171.8).

Hazardous substance: For the purposes of the DOT hazardous-material regulations, a hazardous substance is a material, including its mixtures and solutions, that (1) is listed in Appendix A to 49 CFR 172.101, (2) is in a quantity in one package that equals or exceeds the reportable quantity listed in Appendix A to 49 CFR 172.101, and (3) when in a mixture or solution meets the criteria for mixtures or solutions specified at the definition for "hazardous substance" listed in 49 CFR 171.8.

Release: Any spill, leak, emission, discharge, or escape from a container, vehicle, or process onto land or into groundwater or surface water.

Reportable quantity: A quantity of a hazardous substance that, if released into the environment during transportation, must be reported to the U.S. National Coast Guard National Response Center. Hazardous materials that are also hazardous substances, and their reportable quantities, are listed in Table 1 in Appendix A to 49 CFR 172.101. Hazardous substances are also listed in 40 CFR 302.4.

RRM (residual radioactive materials): Materials that have been contaminated with radionuclides as a result of uranium milling activities at an UMTRCA Title I site. The Durango Disposal Site is an UMTRCA Title I site.

Spill: An accidental release of material during transportation as a result of the vehicle turning on its side, a breach of the dump bed, the tailgate opening, material leaking from a container, material container falling off vehicle, etc.

Transportation incident: Any spill, release, accident, medical incident, or other adverse situation that may occur while transporting materials in a vehicle on public roadways.

1.0 Purpose and Scope

These procedures describe how the U.S. Department of Energy (DOE) Office of Legacy Management (LM) will transport residual radioactive material (RRM) from the LM Durango, Colorado, Disposal Site, located approximately 3.5 miles southwest of Durango, Colorado. The Durango site is a Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I site, and the radioactive material is categorized as RRM, not low-level radioactive waste. The radioactive material will be transported to the LM Grand Junction, Colorado, Disposal Site (GJDS), located 18 miles southeast of Grand Junction, Colorado. The GJDS is approved for the disposal of RRM from UMTRCA Title I sites. The locations of the Durango site and GJDS are shown in Figures 1 through 5 at the end of these procedures.

These procedures provide a general description of operations and guide LM, its Legacy Management Support (LMS) Contractor (Navarro Research and Engineering), and the transportation subcontractor through planning, prevention, and response actions for breakdowns, material spills, accidents, and other emergencies and unforeseen incidents (including traffic stops or delays) that may occur during transport. These procedures also provide inspection criteria for vehicles and drivers used to transport the radioactive material. Properly maintained transport vehicles that meet inspection criteria and effective management of transportation incidents will minimize the potential for accidents and help protect the safety and health of workers, the public, and the environment.

The RRM will consist of sediment, soil, vegetation, absorbent polymer, plastic sheeting and netting, piping, and other miscellaneous construction materials resulting from evaporation pond decommissioning activities. Although the RRM is not U.S. Department of Transportation (DOT) regulated material, the RRM will be packaged and transported in accordance with applicable DOT regulations (including applicable Federal Motor Carrier regulations), LM requirements, and best management practices (BMPs) necessary to ensure the safe and compliant delivery of the RRM to the GJDS.

2.0 General Description of Operations

The pond removal entails the following planning and operations:

1. Finalizing work plans and documents, including radiological controls, materials management, transportation and disposal, and erosion controls.
2. Awarding subcontracts.
3. Mobilizing to the site.
4. Staging supplies, bags loading equipment, excavator, borrow soils, etc.
5. Preparing for operations, such as continuous water evaporation, building the clean ramp, setting up radiological areas, and establishing vehicle communications and controls on the access road.
6. Beginning operations by mixing clean fill with water and sediments until resulting mixture does not contain free water.

Item 6 is most pertinent to the offsite shipment of the RRM and the subject of this plan and will require close oversight by the LMS site construction manager to ensure the RRM can be managed in compliance with these procedures.

Attachment C contains the calculations pertaining to the determination that the RRM is not DOT regulated during packaging and transportation. However, under DOE Order 435.1, it is required to be disposed in a facility that is either owned by DOE or licensed by the U.S. Nuclear Regulatory Commission (NRC) to receive the material.

The determination to ship the RRM as an unregulated shipment was based on the following criteria:

- Water remaining in the pond following an intensive evaporation process will be absorbed with clean soil and mixed with pond sediments at a ratio of about 1 part water/sediments to 6 parts clean fill. Calculations indicate that a 1:4 mixture ratio results in an unregulated shipment for transportation purposes.
- According to DOT 49 CFR 173.433(d)(7), the resulting soil mixture will not be regulated by DOT during transport. DOT calculations are provided in Attachment C.
- Sediment and clean soil will be mixed until all free water is absorbed. If the volume of water is greater than can be absorbed during the mixing process, additional clean soil will be brought on site for the mixing process.
- The mixture will be placed in lined bags containing an absorbent product for added protection against leakage during transport.
- The lined bags will be closed, decontaminated, scanned, weighed and placed in Staging Area 2, prior to moving individually to Staging Area 1 (See Figure 2).
- The packages will be numbered and have their weight and LM contact information marked on them.
- Each package will weigh about 8,000 pounds. A maximum of five packages will be loaded onto a flatbed trailer and transported to GJDS via designated haul routes, provided in Figure 6.

As a contingency, LM has placed empty tanks at the Durango site that will be used to containerize any free water that cannot be addressed by the process described above. Any water stored in the tanks during the construction process that cannot be evaporated will be transported to the GJDS as an unregulated shipment of RRM according to DOT 49 CFR 173.433(d)(7) and with the approval of the LM site manager for the GJDS. The final disposition for all miscellaneous materials at the Durango site will be disposal at the GJDS as allowed for UMTRCA Title I sites (see Figures 4 and 5).

3.0 DOT Requirements/BMPs

The radioactive material being transported does not qualify as a DOT Class 7 radioactive material. A detailed waste description will be provided to the receiving facility on Form LMS 8002GJ, "Grand Junction Disposal Site Waste Profile and Disposal Approval" (see example in Attachment A). Therefore, it will be shipped as Residual Radioactive Material using

an internal shipping document, Form LMS 1935, known as a "Material Movement Manifest" (see sample in Attachment A). The radioactive material does not meet the activity concentration for a radioactive waste under 49 CFR 173.426. Documentation of shipping determinations using 49 CFR 173.433(d)(7) calculations are provided in Attachment C.

Because the RRM is not regulated by DOT, applicable DOT hazardous-material requirements specified at 49 CFR Parts 100–185 that include training, packaging, marking and labeling, shipping documents, release surveys of trucks, incident reporting, and emergency response are not required. However, best management practices are employed to ensure adequate protection of the worker, the public and the environment. The following sections describe LM procedures addressing these requirements.

3.1 Training Requirements

LMS will provide a certified DOT hazardous-material shipper to ensure that the radioactive material is transported in compliance with applicable DOT carrier requirements. Each transport vehicle driver shall have a current commercial driver's license (CDL) and a current medical certificate verifying fitness for duty.

Each transport vehicle driver must comply with applicable requirements specified in 49 CFR 177.800–177.823, such as those related (but not limited) to inspections, compliance with federal motor-carrier safety regulations, driver training, and the movement of vehicles in emergency situations.

The transportation subcontractor shall inspect transport vehicles and equipment before arriving at the Durango site to ensure that these items are in complete working order, clean, and meet manufacturer's specifications. After arriving at the Durango site, transport vehicles will be inspected by an LMS employee who is a trained DOT shipper prior to the first shipment of RRM from the site in accordance with the requirements in these procedures and in the associated subcontract documents. Details of truck inspection criteria are provided in Attachment B.

Upon arrival at the GJDS, vehicle drivers must adhere to GJDS procedures and Contractor directions for onsite travel, unloading radioactive material, and decontaminating transport vehicles prior to leaving the GJDS.

3.2 Packaging, Marking, and Management of Containers

LMS will have the radioactive material placed into soft-sided industrial strength packages, which have a capacity of up to 16,000 pounds. These packages are approved for the transport of residual radioactive material and meet the criteria for shipping DOT low-specific-activity waste. Each bag will contain a liner and be filled using loading equipment and a steel support frame to hold the bag in place. The bags will be loaded to about 50% of capacity, about 8,000 pounds. This will allow five bags per consignment.

The LMS hazardous-material shipper will:

- Place appropriate markings on packages to include the owner information, package number, and gross weight of each package.
- Ensure that the exterior of each package has been cleaned of any loose dirt and properly surveyed for radioactivity as a BMP prior to moving the package to the staging area.
- At the time the packages are being loaded onto the transport vehicle, the LMS hazardous-material shipper will:
  - — Inspect the packages for leakage prior to loading.
  - — Inspect each transport vehicle.
  - — Inspect each driver's CDL and medical card.
- Provide the carrier with completed shipping papers as listed in the next section.
- Conduct random scans of packages periodically as control checks to ensure against any release of loose contamination.

3.3 Shipping Documents, Communication, Safety Briefings, and Responsibilities

3.3.1 Document Availability

The following documents and information shall be completed and supplied to each transport vehicle driven by the DOT-trained and certified shippers and carried in the cab of each vehicle transporting the RRM from the Durango site to the GJDS:

- Completed and signed bills of lading, material movement manifest, and copy of appropriate emergency-response guide pages from the *North American Emergency Response Guidebook*
- Other documents describing the shipment if the documents differ or are supplemental to the materials movement manifest
- A copy of these procedures, which includes a haul routes map(Figure 6), applicable incident/emergency-response actions, and contact information (see Section 2.5)
- Completed and signed "Safety and Release to Transport Checklist" (see Attachment B of these procedures)
- The transportation subcontractor's Hazardous Materials Certificate of Registration (required only if the transport vehicle has a capacity of greater than 17.3 cubic yards)

3.3.2 Two-Way Communication

All drivers shall carry a two-way communication device, such as a cell phone. These devices must be capable of communicating with external response organizations, LMS and subcontractor management, and the Grand Junction office security guard, and their working order shall be established before the vehicle enters a public road.

3.3.3 Pre-Transport Activity Safety Briefing

Before loading vehicles, the driver and other involved personnel shall participate in a pre-transport activity safety briefing to review these procedures, other pertinent project documents, the sequence of planned activities, route information, incident/emergency-response requirements, and health, safety, and security requirements.

3.3.4 Responsibilities

The personnel described in this section may be assigned to manage and direct various incident response operations and involved personnel.

Driver: The subcontractor driver shall function as the initial on-scene coordinator in the event of an incident during transportation and is responsible for directing immediate response actions, contacting subcontractor management and the LMS radiological control manager, as soon as practical, depending on the severity of the incident. Section 2.4 of these procedures describes the driver's responsibilities in detail.

LMS radiological control manager: The LMS radiological control manager or his designee coordinates radiological protection for those involved in cleaning up spills of radioactive material. He or she establishes and/or directs the radiological control requirements during all phases of incident operations and ensures that adequate equipment and resources are available to monitor the incident scene and respond to any injured personnel. In the event of a spill of radioactive material, the radiological control manager or his designee shall ensure that the cleanup activities are accomplished in accordance with established procedures.

LMS Radiological control technicians (RCTs): The RCTs shall travel to any spill of radioactive material to perform their functions in accordance with established procedures and follow any additional instructions from the radiological control manager. For releases or spills, the RCTs shall direct the cleanup, assist response personnel, or assist with the disposition of the truck if a breakdown occurs. If at all possible, cleanup should be delayed until the RCT is present.

Grand Junction office security guard: If notified of a transportation incident, the security guard on duty shall immediately initiate the emergency-contact protocol established for Security personnel, which requires direct communication with the LM Durango site manager and the LMS Durango site lead in the event of a vehicle accident.

LMS Environmental compliance manager: The environmental compliance manager, or his or her designee, shall immediately contact the LM environmental compliance manager and provide technical assistance related to spill reporting in accordance with LM requirements, internal procedures, and as required under federal, state, tribal, and local ordinances.

LMS Durango site lead: The LMS Durango site lead will provide notification for incidents or accidents to LM and appropriate regulatory agencies as required.

3.4 Incident Reporting and Emergency Response

Note 1 *There is no imminent radiation hazard from the radioactive materials being transported from the Durango site for this project.*

Note 2 *The radiological control manager and RCTs will coordinate with medical responders regarding the decontamination of injured persons.*

The emergency-response actions required by the transportation subcontractor, LMS, and LM in response to various types of potential incidents during transportation of RRM to the GJDS are described below. The LM Durango site manager or assigned Contractor representative will be responsible for notifying the NRC of any emergencies or incidents that occur at the Durango site or during transport of material from the site to the GJDS.

If, while en route to the GJDS, the truck breaks down, the truck is involved in an accident, radioactive material is spilled, or another type of emergency or unforeseen incident occurs that prevents transportation from continuing, the driver and LMS shall initiate the emergency-response actions described below.

3.4.1 Breakdown or Another Type of Nonemergency or Unforeseen Incident Occurs That Prevents Transportation from Continuing

3.4.1.1 Driver

If the truck breaks down or other nonemergency incident occurs, perform the following steps:

[1] If safe and practical, pull the truck off the road and out of the way of traffic.

[2] Before getting out of the truck and proceeding with the response actions, observe the situation, and consider your safety and the safety of others.

[3] Put on your high-visibility traffic safety vest, and set out the DOT-required warning reflectors and other necessary safety equipment.

[4] Do not try to physically control the movement or direction of traffic. Doing so could put you in danger.

[5] Call the subcontractor manager and the LMS radiological control manager, using the phone numbers in Section 2.5 of these procedures, in the order they are given, until you reach someone.

[6] Inform the LMS radiological control manager of the nature of the incident. If necessary, declare:

- What happened (i.e., describe the incident).
- The location of the incident (e.g., an address, a mile marker, a nearby place or landmark).
- The direction of travel (north, south, east, or west).
- If applicable, road conditions that are preventing or affecting travel.

- If applicable, the number of people needing assistance, the type of assistance needed, and the condition of any people needing assistance.
- If assistance is being provided or is on the way.
- Any other noteworthy information about the incident.

[7] Follow the LMS radiological control manager's directions while making your safety and health, as well as the safety and health of all responding personnel, your first priority.

3.4.1.2 LMS Radiological Control Manager

Contact the LMS Durango site lead who will in turn notify the LM Durango site manager.

3.4.2 Material Spill

3.4.2.1 Driver

If radioactive material is spilled, perform the following steps:

[1] If safe and practical, pull the truck off the road and out of the way of traffic.

[2] Before getting out of the truck and proceeding with the response actions, observe the situation, and consider your safety and the safety of others.

[3] Put on your high-visibility traffic safety vest, and set out the DOT-required warning reflectors and other necessary safety equipment.

[4] Do not try to physically control the movement or direction of traffic. Doing so could put you in danger.

[5] If possible, stop or secure the cause of the spill.

[6] If possible, isolate the affected spill area and establish control boundaries to minimize individual exposure and the spread of the spilled material.

[7] If practical, move personnel upwind, upstream, and upgrade of the spill to minimize individual exposure to the spilled material.

[8] Call the subcontractor manager and LMS radiological control manager, using the phone numbers in Section 2.5 of these procedures, in the order they are given, until you reach someone. Declare:

- What happened (e.g., the type and severity of the spill, the quantity of material spilled, if the spill occurred on land or into water).
- The location of the spill (e.g., an address, a mile marker, a nearby place or landmark).
- The direction of travel (north, south, east, or west).
- What immediate response has taken place.
- To the best of your knowledge, what equipment and support will be required to clean up the spill.

[9] Follow the LMS radiological control manager's directions while making your safety and health, as well as the safety and health of all responding personnel, your first priority.

3.4.2.2 LMS Radiological Control Manager

Immediately call the LMS Durango site lead and inform him or her of the nature of the incident, and direct his or her immediate response. The LMS Durango site lead will in turn contact the LM Durango site manager.

3.4.3 Accident

3.4.3.1 Driver

If you are involved in an accident, dial 911.

[1] If safe and practical, pull the truck off the road and out of the way of traffic.

[2] Before getting out of the truck and proceeding with the response actions, observe the situation, and consider your safety and the safety of others.

[3] Put on your high-visibility traffic safety vest, and set out the DOT-required warning reflectors and other necessary safety equipment.

[4] If it is safe and practical to do so, leave the truck where it is unless a response provider instructs you otherwise.

[5] Do not try to physically control the movement or direction of traffic. Doing so could put you in danger.

[6] Dial 911 and:

[a] Declare:

- What happened (e.g., the type and severity of the accident).
- The location of the accident (e.g., an address, a mile marker, a nearby place or landmark).
- The direction you are traveling (north, south, east, or west).
- How many people are injured, the type of injuries, and the condition of any injured people.
- If help or care is being provided.
- To the best of your knowledge, what services you need (e.g., firefighters, police, paramedics, an ambulance, material spill support).

[b] Answer all questions that the 911 operator and responders ask.

[c] Stay on the line as long as the 911 operator and responders require.

[7] If you are not injured, call the subcontractor manager and the LMS radiological control manager, using the phone numbers in Section 2.5 of these procedures, in the order they are given, until you reach someone.

[8] Give the LMS radiological control manager the same information that you gave the 911 operator.

3.4.3.2 LMS Radiological Control Manager

Immediately respond as required to the accident and call the LMS Durango site lead, inform him or her of the nature of the incident. The LMS Durango site lead will initiate Emergency Response notification protocols for LMS management and LM management notifications and response actions.

3.5 Emergency-Response Phone Numbers for Transportation Incidents

The emergency-response phone numbers to call in the event of a transportation incident are provided for the transportation subcontractor below. The hazardous-material shipping papers also will provide the subcontractor with an emergency-response phone number.

If a transportation incident occurs as described in Section 2.4 of these procedures, the driver shall call the following LMS phone numbers in the order given until someone answers:

1. Radiological Control Manager: Brian Saunders,[1] (970) 248-6150 or (210) 464-7221
2. LMS Durango Site Lead: David Miller,[1] (970) 248-6652 or (970) 270-9546
3. RCT: Scott Ficklin,[1] (970) 210-5536; or Anthony Martinez,[1] (970) 589-2715
4. Environmental Compliance: Darlene DePinho,[1] (970) 248-6576 or (970) 985-8804; Paul Wetherstein,[1] (970) 248-6645 or (970) 250 4105

If no one answers at any of the numbers listed above, call the following numbers, in the order they are given, to reach the Grand Junction office security guard:

1. (877) 695-5322 (toll free)
2. (970) 248-6070
3. (970) 248-6000
4. (970) 210-7448

[1] Upon receiving notification from the driver about a transportation incident, these individuals may be responsible for making additional internal notifications to other LMS staff, such as to comply with the LMS Incident Reporting process.

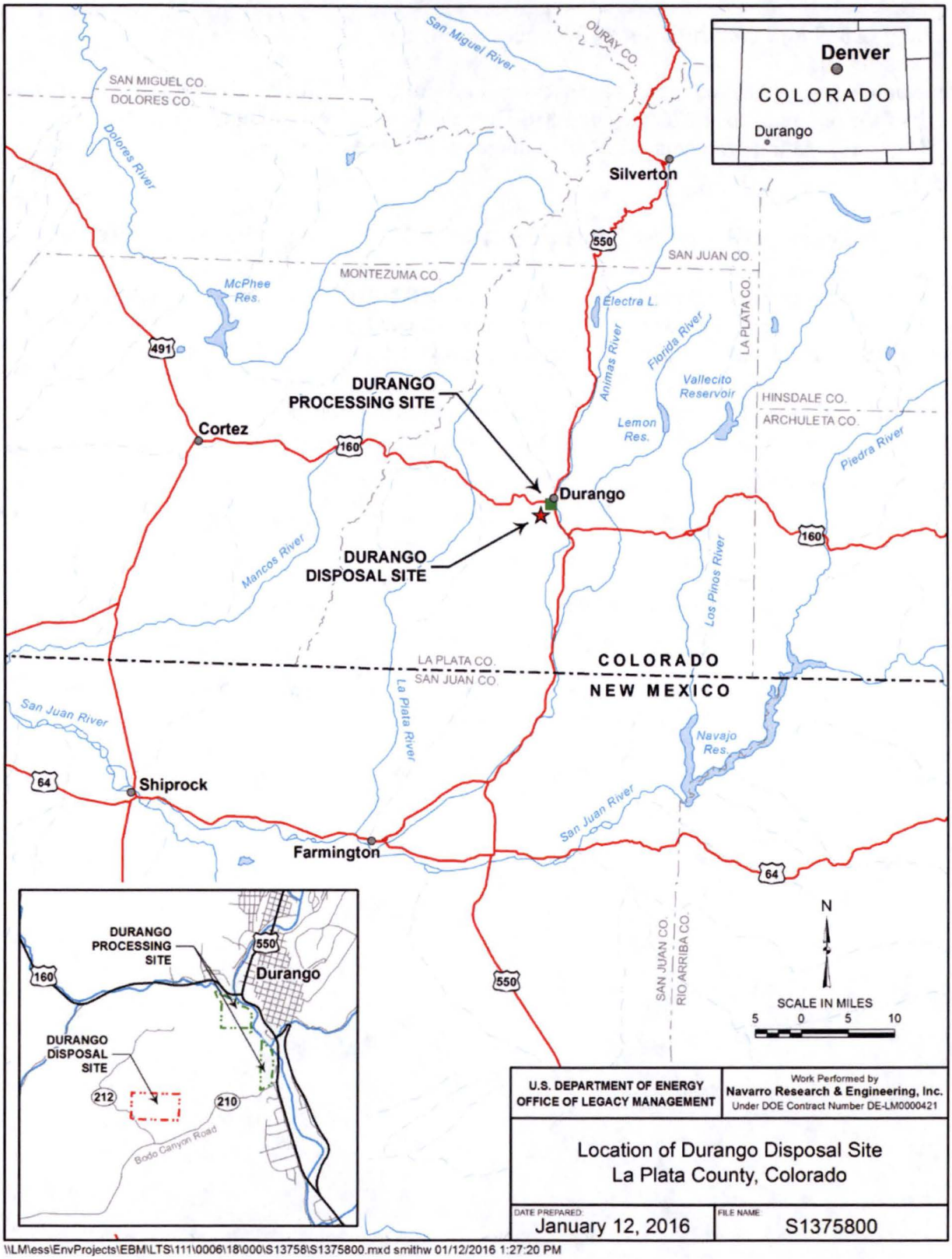

Figure 1. Location of Durango, Colorado, Disposal Site

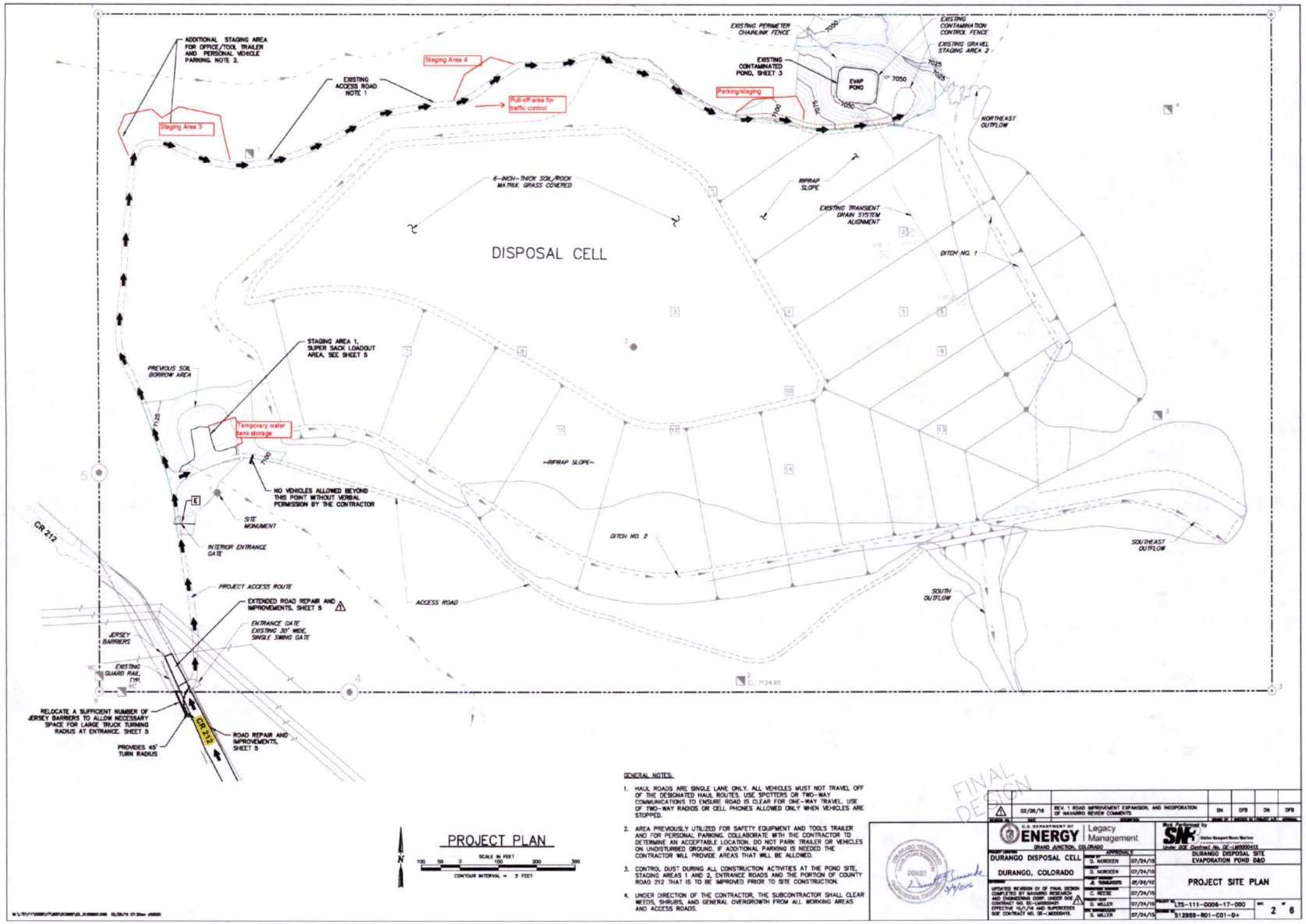

Figure 2. Durango, Colorado, Disposal Site Operations Detail

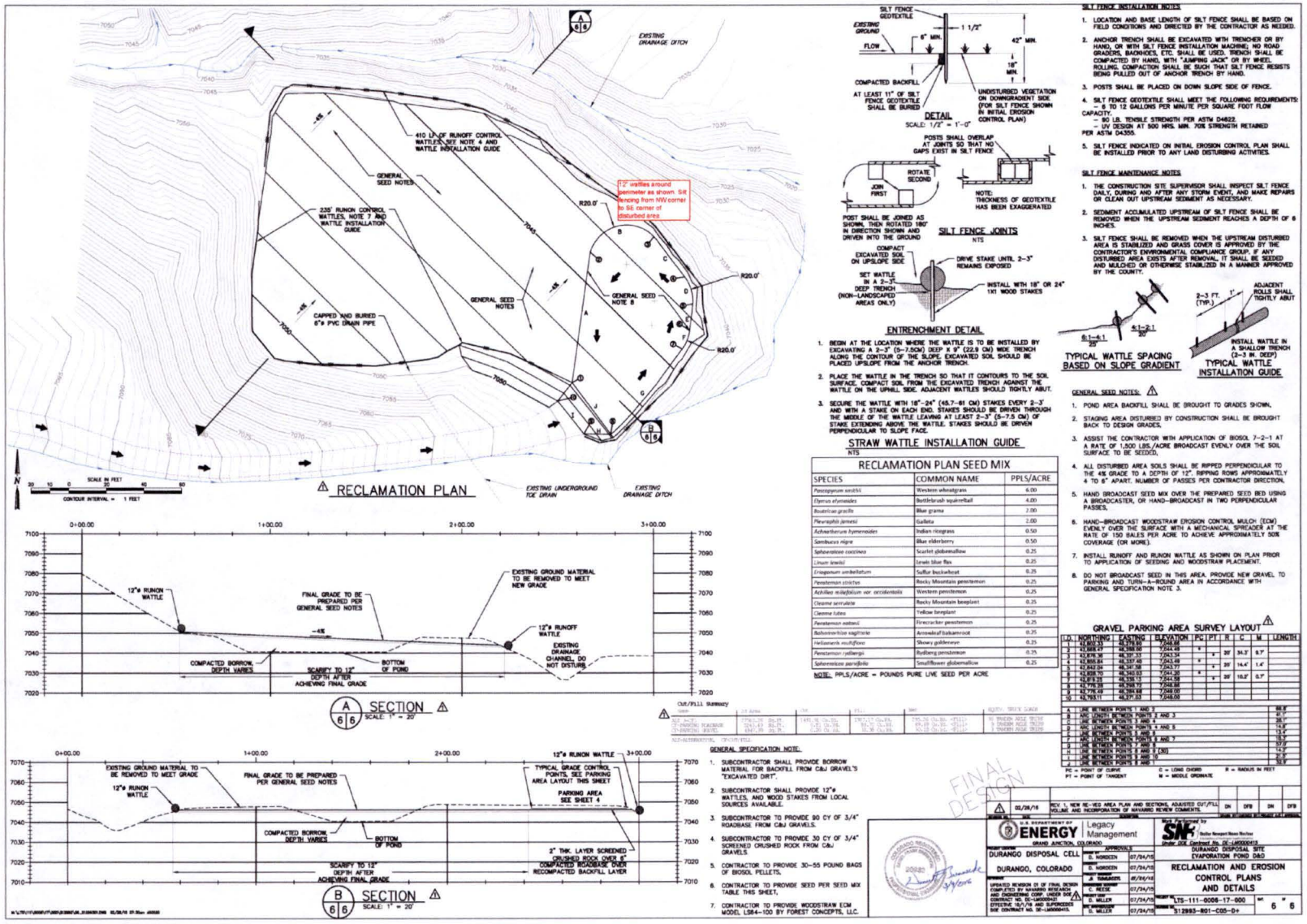

Figure 3. Reclamation and Erosion Control Details

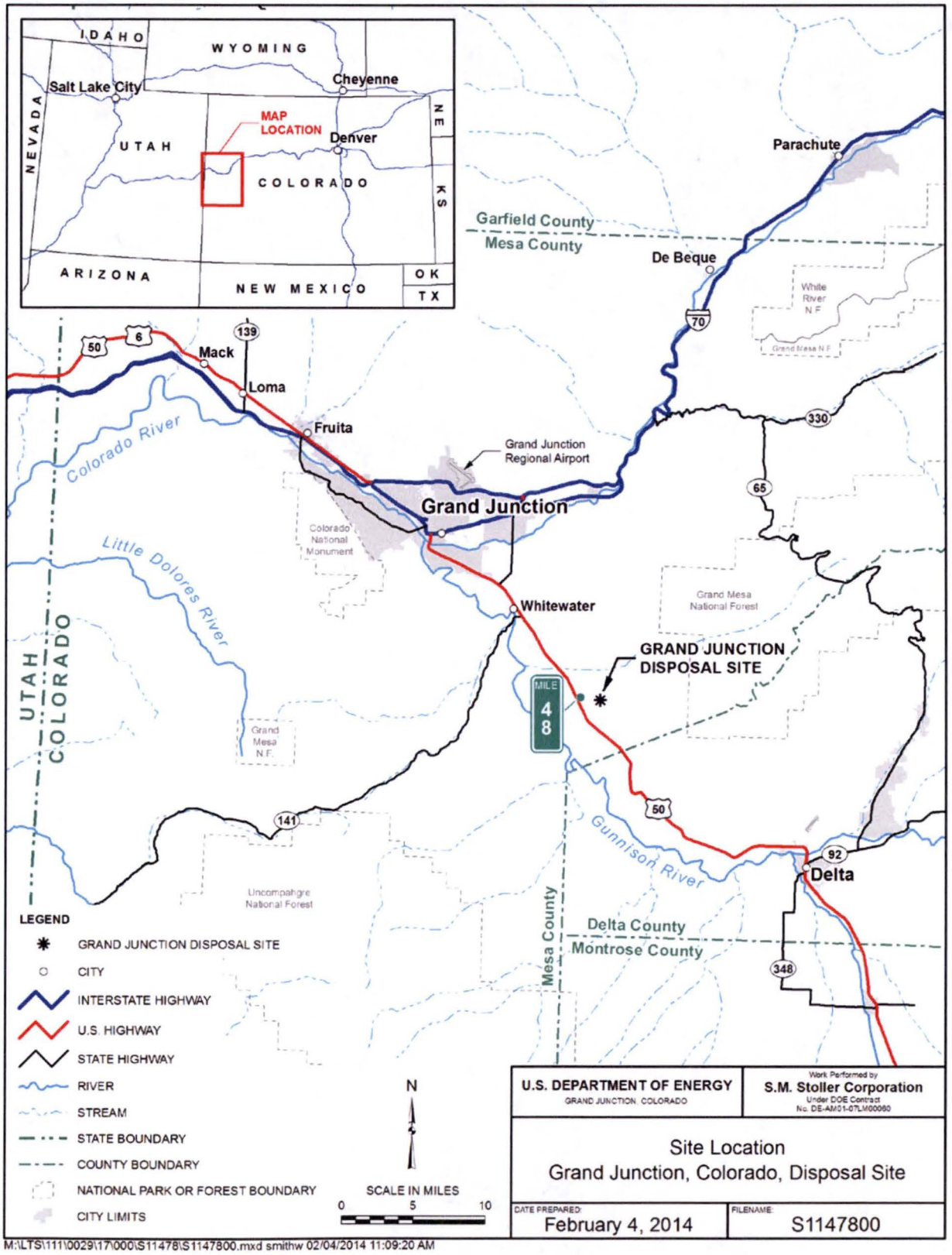

Figure 4. Site Location, Grand Junction, Colorado, Disposal Site

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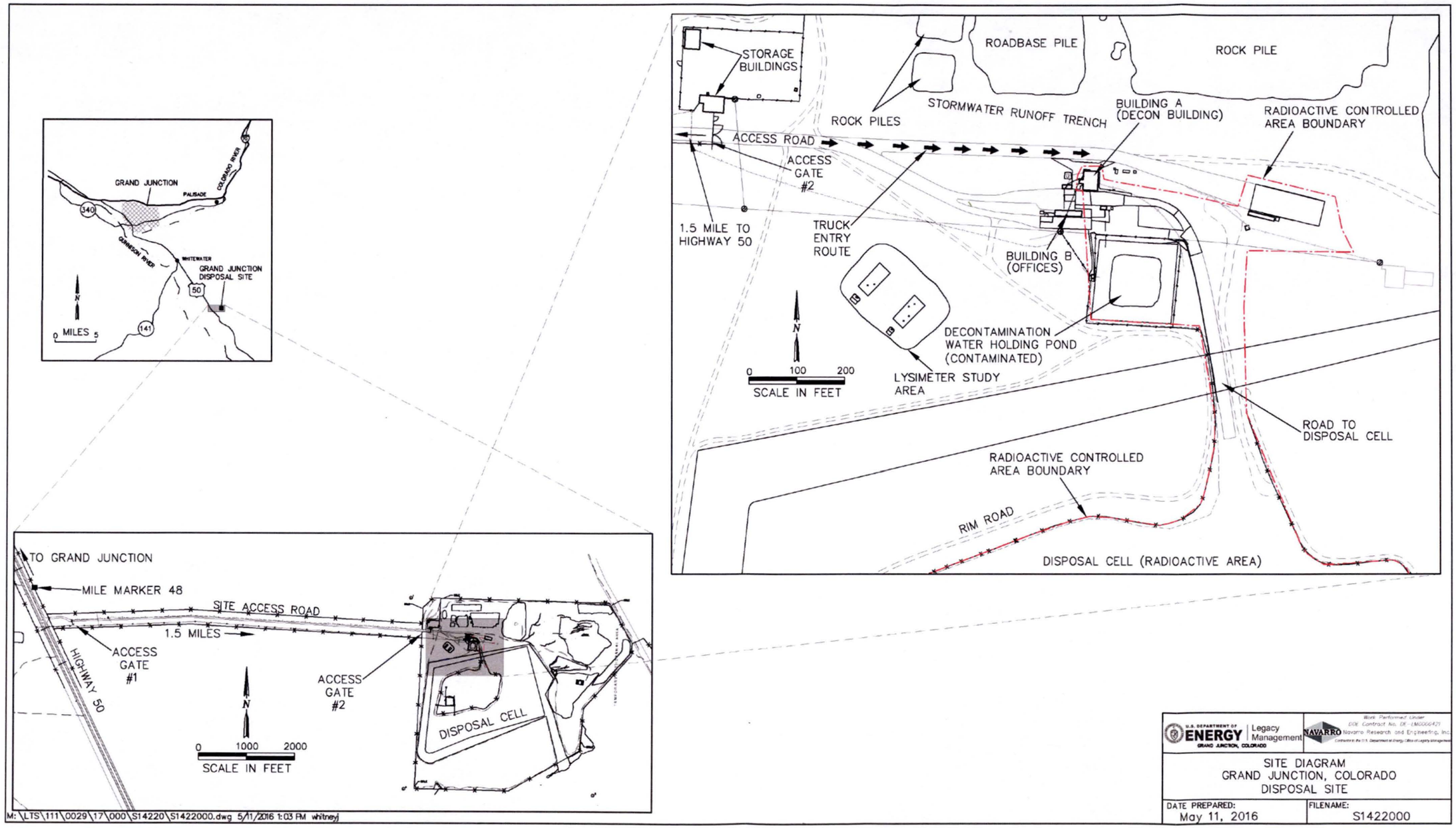

Figure 5. Site Diagram, Grand Junction, Colorado, Disposal Site

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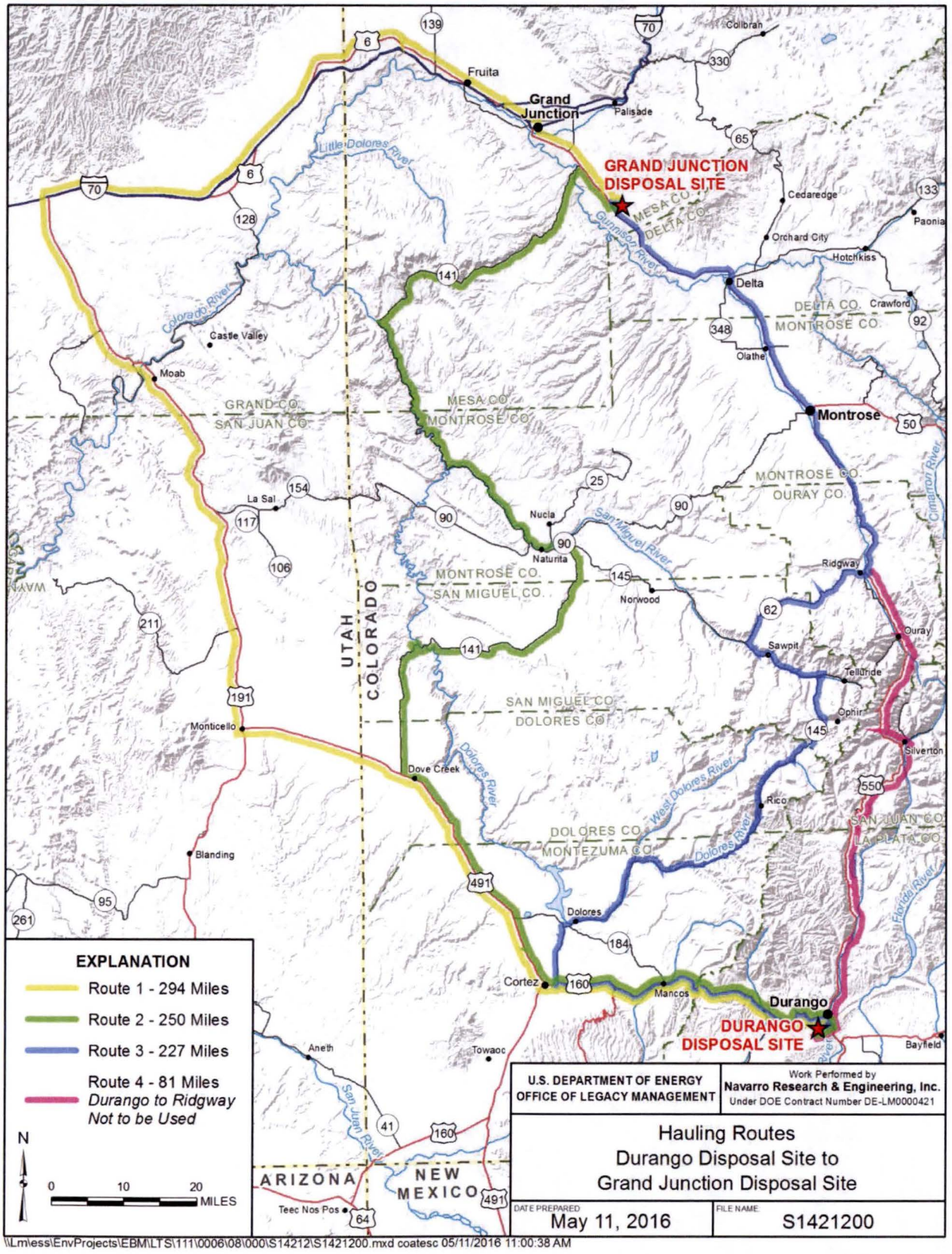

Figure 6. Haul Routes

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Attachment A

Waste Profile and Disposal Approval and Materials Movement Manifest

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U.S. Department of Energy Office of Legacy Management

Grand Junction Disposal Site Waste Profile and Disposal Approval

Date: _____

By completing and signing this form, you are confirming that your waste conforms to the characteristics and conditions presented below. These characteristics and conditions comply with the waste acceptance criteria and other requirements specified in the *Grand Junction Disposal Site* (GJDS) *Waste Acceptance Criteria* (WAC). Waste that does not comply with the GJDS WAC in terms of both the (1) waste type and (2) transportation and receiving requirements, will not be approved for disposal at the GJDS, other than specific exceptions that are documented and approved within this document. The U.S. Department of Energy (DOE) Office of Legacy Management (LM) and the LM contractor reserve the right to require the waste generator and/or transporter to remove any waste that it transports to or disposes at the GJDS that does not comply with the GJDS WAC.

Waste Profile

Site where waste originated: _____

Site description/use/history (check one, provide additional site information as needed):

☐ Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Site

☐ UMTRCA Title I Site Vicinity Property (describe pertinent historical and current site activities)

Additional Site Information: _____

Process or activity that created the waste: _____

Physical properties of the waste (material type, shape, color, odor, consistency, etc.):

_____

Estimated quantity of waste (weight, volume, etc.): _____

Your waste must conform to the following characteristics and conditions:

- Waste is radioactive or presumed to be radioactive and is related to the uranium milling process
- Waste does not meet the definition of high-level waste, transuranic waste, or low level waste specified in DOE *Radioactive Waste Management Manual 435.1-1*
- Waste has a measurable, penetrating dose of less than 5 millirem per hour at a distance of 1 foot or less from the source
- Waste does not contain hazardous chemicals
- Waste does not contain petroleum products
- Waste does not contain hazardous waste as defined in Title 40 *Code of Federal Regulations Part 261 (40 CFR 261)* or Volume 6 *Code of Colorado Regulations 1007-3 Part 261 (6 CCR 1007-3 Part 261)*
- Waste does not contain polychlorinated biphenyls (PCBs)
- Waste does not contain asbestos
- Waste does not contain other hazardous constituents or materials (e.g., electronic waste, batteries, gases, drilling fluids, or sewage)
- Waste does not contain liquid
- Discarded containers that are included with the waste are empty and crushed
- Waste meets GJDS sizing and configuration requirements:
  - The maximum volume of any piece of material does not exceed 1 cubic yard.
  - The maximum dimension of any piece of material (e.g., pipe, wood, concrete) does not exceed the width of the bed of the transport vehicle.
  - Pipe, culvert, etc. that cannot be adequately crushed is split in half radially (along the long axis) and nested together

Primary radiological constituents: _____

Radiological survey measurements (include unit of measurement): _____

Describe any safety hazard, significant inconvenience, or unusual conditions that the waste may pose to workers at the GJDS (e.g., sharp objects, nauseous odor, powdery material):

_____

Source of the waste profile information above (check all that apply):

☐ Process knowledge (describe in Additional Waste Profile Comments section as needed)

☐ Interview with waste generator or other person knowledgeable about the waste (describe in Additional Waste Profile Comments section as needed)

☐ Physical inspection Inspector's name and organization: _____

☐ Laboratory analysis Are laboratory analytical results attached? ☐ Yes ☐ No

Additional Waste Profile comments:

Grand Junction Disposal Site Waste Profile and Disposal Approval (continued)

Transportation and Receiving

Type of vehicle used to transport waste (check all that apply):

☐ Tandem dump truck ☐ Tandem dump truck with pup ☐ End dump truck ☐ Side dump truck

Type of container used to hold waste if not just the transport vehicle (describe):

Was transport vehicle and/or waste container previously used for radioactive material shipments to or from sites other than the GJDS? ☐ Yes ☐ No

If Yes, the waste generator or transporter must provide the LM contractor with a written description of the type of radioactive material, name of the site or facility where the truck and/or waste container was used, and a copy of radiological survey release data for the truck and/or waste container.

Does waste qualify as a U.S. Department of Transportation (DOT) hazardous material? ☐ Yes ☐ No

If Yes, transporter must provide a copy of the DOT hazardous material shipping paper to the LM contractor upon arrival at the GJDS.

Additional Transportation and Receiving Comments:

Describe any waste that does not comply with the GJDS WAC that is being approved for disposal at the GJDS:

Waste Generator or Investigator Declaration and Signature

I hereby declare that, to the best of my knowledge, the information documented herein is accurate and complete. I understand and agree to the requirements specified in the GJDS WAC, and I certify that the waste described within this document complies with the GJDS WAC in terms of (1) waste type and (2) transportation and receiving requirements, apart from those exceptions documented and agreed to.

Print name	Signature	Date

Affiliation (e.g., company or agency)

Disposal Approval Declaration and Signature

I concur that the waste described within this document complies with the requirements specified in the GJDS WAC in terms of (1) waste type and (2) transportation and receiving requirements, apart from those exceptions documented and agreed to. I approve the disposal of the waste described within this document at the GJDS.

Check one: ☐ LM ☐ Contractor to LM

Print name	Signature	Date

Approval comments:

Contractor to U.S. Department of Energy Office of Legacy Management

Material Movement Manifest

Emergency Telephone: (970) 248-6070

Date: _____

Originating location: _____ **Project:** _____

Item No.	Quantity	Description of Material	Received

This is to certify that the above-named materials are properly classified and are not regulated as hazardous materials according to the U.S. Department of Transportation. If material has been evaluated as a "class," provide the document number of the evaluation in lieu of the HMAT shipper's signature.

Certified HMAT Shipper

Signature: _____ **Date:** _____

This is to certify that the above-named materials are properly described, packaged, labeled, and marked and are in proper condition for movement according to the requirements of the Health and Safety Procedures Manual *(LMS/PROL/S04337-0.0)*

Radiological Control Technician

Signature: _____ **Date:** _____

Name of Material Custodian: _____

(RCT or RW-II and Material Custodian Training)

Destination location: _____

Remarks: _____

Receiving Technician: _____ **Date:** _____

Supervisory Review: _____ **Date:** _____

Material Movement Manifest (continued)

Statement of Material Content

This material contains low levels of radioactive contamination that is not regulated by the U.S. Department of Transportation (DOT) as a hazardous commodity and is not subject to the requirements of Title 49 *Code of Federal Regulations* (CFR) for hazardous materials. The material does not pose a significant transportation hazard under any circumstances. The controls imposed on the movement of this material represent U.S. Department of Energy (DOE) efforts to maintain strict control beyond what is required by law.

Limitations

The provisions of this movement do not apply to DOE-regulated radioactive materials that are subject to the DOT regulations contained in Title 49 CFR.

A certified hazardous materials shipper must assess all DOE-related material to be moved outside of posted "Controlled Areas" and over property that is available for public access to determine whether the material is subject to DOT regulations.

Only individuals having either Radiological Control Technician (RCT) qualification or DOE Radiological Worker training may move the material.

Only individuals with General Employee Radiological Training (GERT) may accompany the movement of radioactive material.

The Material Movement Manifest and a copy of the applicable Radiological Survey Map(s) must accompany the movement.

Instructions to Material Custodian

Lock the cargo area of the vehicle carrying the material when you are not in visual contact with the cargo.

Move the material from the originating "Controlled Area" to the destination "Controlled Area" without unnecessary delays. Do not use the provisions of this procedure to store the radioactive material. ***Normally, materials should be moved to an approved "Radioactive Materials Area" within one shift.***

The material in your custody may not be left unattended.

When you arrive at the destination "Controlled Area," contact an RCT to assist you in completing the movement of the material. You are responsible for this material until it is turned over to an RCT.

In the Event of Emergency

Show this manifest to the authorities who may become involved in an emergency response associated with this material.

Immediately notify the Safety and Health and the Security organizations by calling the DOE Office of Legacy Management Grand Junction security office at **(970) 248–6070**.

Do not prevent or hinder the emergency response actions by authorities because of the nature of the material being transported. There is no significant risk involved in the handling of or exposure to the materials being transported.

Attachment B

Safety and Release to Transport Checklist and Instructions

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Attachment B

1.0 Requirements for Trucks and Drivers Prior to the Start of the First Day of Transport

Before the first day of transport, the transportation services vendor shall perform the following tasks:

- Have a qualified inspector award the transport trucks Commercial Vehicle Safety Alliance (CVSA) or U.S. Department of Transportation (DOT) certification. CVSA or DOT inspection stickers that are expired shall be removed from the trucks. If the trucks do not have current CVSA or DOT certifications, they shall not be used until a certified inspection is completed.
- Ensure that the trucks will pass the inspection criteria in Section 2.0 below.

2.0 Truck Inspection Criteria for Safety and Release to Transport on Public Highways

Before a truck can be released to transport materials to the Grand Junction Disposal Site (GJDS), the "Safety and Release to Transport Checklist"—an example of which is provided at the end of this appendix—must be filled out. The "Safety and Release to Transport Checklist" is divided into three sections: (1) a general-information section, (2) a safety checklist, and (3) a place for signatures.

Note

It is the driver and the LMS representative responsibility to ensure that the "Safety and Release to Transport Checklist" is completed.

2.1 General Information

To begin filling out the "Safety and Release to Transport Checklist," the driver shall provide the following information:

- Site name
- Project name
- Date of inspection
- Time in to load
- Time out to the GJDS
- Contractor representative
- Subcontract or purchase order number
- Name of the driver's company
- Driver's designated management contact

- Driver's name
- Vehicle license number
- Type of vehicle

2.2 Safety Checklist

The driver shall ensure that any required daily DOT vehicle inspections are performed before the truck is loaded. A driver with a current commercial driver's license shall perform the inspection.

Each item on the safety checklist must be marked "pass" or "fail." If an item fails, the driver shall write comments in the field to the right of the checkboxes, addressing corrective action taken. If any failed items are mechanically related, a qualified mechanic shall make the necessary repairs before the truck is used for transport.


Note

LMS shall oversee and sign off on all inspections.

Before loading begins, the driver shall inspect the following items and note his or her findings on the "Safety and Release to Transport Checklist":

- **Current Vehicle Registration**—Driver shall ensure that the vehicle registration is current, that the license plates are current and match the registration, and that the registration documents are in the cab of the truck.
- **Exterior Clean of Suspect Residual Radiological Materials (RRM)**—The driver shall ensure that no materials suspected to be RRM are on or in the truck (inside the cab and bed) prior to transport. The truck shall be properly cleaned before it is used for transport.
- **Current DOT or CVSA Truck Inspection**—Truck shall be inspected and certified by a qualified inspector. If the CVSA or DOT inspection stickers are expired, they shall be removed from the truck. If a truck's DOT or CVSA certification is not current, the truck shall not be used for transport until it undergoes a DOT or CVSA inspection, as appropriate.
- **Current DOT Daily Inspection**—Driver shall complete a DOT inspection form documenting the truck inspection for each day's transport.
- **DOT Safety Equipment and Fire Extinguisher**—Driver shall ensure that the truck is carrying all DOT-required safety equipment. For regulated shipments, a minimum of three warning reflector triangles and high-visibility traffic safety vests shall be kept in the cab of the truck. A fire extinguisher that is of the correct type, charged, and up to date on its inspections shall be included in the truck.
- **Condition of Straps**—Driver shall ensure that straps are inspected. If the straps show signs wear or deterioration that do not comply with DOT , the driver shall replace them.
- **Transportation Plan**—Copy of this document shall be in the cab of the truck. The driver shall have received training on the contents and procedures of this document before the truck is loaded.
- **Training (if applicable)**—If specific training is required, ensure that the required training has been attended and the completion criteria met.

- **Commercial Driver's License (Endorsements)**—Driver shall have a current commercial driver's license in his or her possession. All applicable endorsements shall be on the license.
- **DOT Medical Card**—Driver shall have a current DOT medical card and the driver shall comply with any medical limitations.
- **Backup Alarm**—Driver shall ensure that the backup alarm is operable and audible per the manufacturer's specification.
- **Fluid Leaks**—Prior to loading, driver shall check for leaks by looking under the vehicle to observe any obvious problems. The driver shall not get under the vehicle. If the driver sees a leak, he or she shall notify the designated management contact, and a qualified mechanic shall investigate and repair the leak.
- **Tires and Wheels**—Driver shall manually check to ensure that the tires are inflated and have legal tread. DOT specifications require 2/32 inch of tread depth on the rear tires and 4/32 inch of tread depth on the steering tires. The driver shall replace tires found to be out of compliance with DOT specifications. The driver shall also ensure that no rocks are wedged between the duals; that there are no cracks, bulges, or tears in the tires; that lug nuts are tight and not missing; and that there are no cracks in the wheels.
- **Lights**—Driver shall check the headlights, taillights, running lights, brake lights, turn signals, and reverse lights for correct operation. While in route to the GJDS, the truck shall operate with lights on at all times.


Note

If any item fails this inspection, the truck shall not be loaded.

Once loading is complete, the driver shall inspect the following items and note his or her findings on the "Safety and Release to Transport Checklist":

- **Load Proper Weight and Height**—Driver shall monitor the loading of the truck to ensure that the truck is not overloaded (overweight). If the driver sees that the load exceeds the proper weight and height, the load shall not leave the property until the weight and height fall within established limits.
- **Load Properly Tarped (if applicable)**—Driver shall inspect the truck's tarps and ensure that they are usable. The tarps shall completely cover the load, be securely fastened in place when covering the load, and be free of holes and tears. The driver shall also ensure that the tarp does not cover taillights, turn signals, or any DOT-required shipping markings, labels, or placards.
- **DOT Transport Labels (if applicable)**—If DOT regulations require shipping markings, labels, or placards, the driver shall ensure that all of them are applied, secured to the truck so that they will not fall off in transit, and positioned as directed by the Contractor.
- **DOT and Other Shipping Papers and Documents**—Driver shall ensure that the DOT shipping papers or other shipping documents are in the cab of the truck. The driver shall have received training on the documents.


Note

The driver is responsible for ensuring that all safety checks are completed and that all failed items are corrected before transport activities begin.

2.3 Signatures

When the driver and LMS have completed the inspection and the safety checklist, the driver and LMS shall sign the "Safety and Release to Transport Checklist." The original copy shall be given to LMS.

SAFETY AND RELEASE TO TRANSPORT CHECKLIST

Site: _____ Project Name: _____

Date: _____ Time In: _____ Time Out: _____

Contractor Representative: _____ Subcontract or Purchase Order No.: _____

Driver's Company Name: _____

Driver's Designated Management Contact: _____

Driver's Name: _____ Vehicle License No.: _____

Type of Vehicle: _____

SAFETY CHECKLIST:	Pass	Fail	COMMENTS
Prior to Loading:			
Current Vehicle Registration	☐	☐	_____
Exterior Clean of Suspect RRM	☐	☐	_____
Current DOT or CVSA Truck Inspection	☐	☐	_____
Current DOT Daily Inspection	☐	☐	_____
DOT Safety Equipment & Fire Extinguisher	☐	☐	_____
Condition of Flat Bed	☐	☐	_____
Condition of Straps and Tarps	☐	☐	_____
Transport Plan in Cab	☐	☐	_____
Training (if applicable)	☐	☐	_____
Commercial Driver's License (Endorsements)	☐	☐	_____
DOT Medical Card	☐	☐	_____
Backup Alarm	☐	☐	_____
Fluid Leaks	☐	☐	_____
Tires and Wheels	☐	☐	_____
Lights	☐	☐	_____
After Loading:			
Load Proper Weight & Height	☐	☐	_____
Load Properly Tarped	☐	☐	_____
DOT Transport Labels (if applicable)	☐	☐	_____
Shipping Papers and Documents	☐	☐	_____

Note: If any item fails this inspection, the truck shall not be loaded and allowed to transport. The driver is responsible for ensuring that all safety checks are completed and that all failed items are corrected before hauling begins.

RELEASED FOR TRANSPORT:

(Signatures) **Contractor** **Driver**

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Attachment C

Durango RRM Unregulated Shipment Calculations and Analytical Data

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DOT Calculations Verifying that the Durango Pond Materials will be Unregulated Shipments to the GJDS

Nuclide	Activity Concentration (AC)			Max Qty per Pkg	Max Qty per Pkg	Total Activity per Pkg	Total Activity per Pkg	RQ Values (Table 2)	
	Actual AC	Exempt AC	AC Ratio	(lbs)	(g)	(pCi)	(Ci)	(Ci)	RQ Ratio
	(pCi/g)	(pCi/g)							
U-238	89	270	0.328	16000	7264000	6.44E+08	6.44E-04	0.1	0.0064
U-235	3.99	270	0.015	16000	7264000	2.90E+07	2.90E-05	0.1	0.0003
U-234	89	270	0.328	16000	7264000	6.44E+08	6.44E-04	0.1	0.0064
Ra-226	1.68	270	0.006	16000	7264000	1.22E+07	1.22E-05	0.1	0.0001
Th-232	0.807	270	0.003	16000	7264000	5.86E+06	5.86E-06	0.001	0.0059
		SOR	0.680					SOR	0.0191

Summary

Because the Durango evaporation pond materials being shipped have a Sum of Ratios (SOR) for Activity Concentration for the mixture of pertinent radionuclides that is < 1, the materials do not qualify as a DOT-regulated Class 7 radioactive material for shipping purposes.

Footnotes

The mass from the liquid fraction of the pond was not included in the total mass for the shipment. This is because the water will be evaporated or absorbed with clean fill prior to shipment. However, the radionuclide activity associated with the calculated liquid mass in the pond was included in the total activity for the shipment.

The limits for RQ are calculated by individual package. If the maximum capacity of each bag (16,000 lbs) is used for the RQ determination, no single package qualifies as an RQ. In actuality, the shipments of soft-sided bags will weigh no more than 7,000 to 8,000 pounds each, at a maximum load of 4-5 bags per vehicle. Therefore, no single package will exceed the RQ for any radionuclide.

Thorium-232 Calculations for Durango Shipment

Activity of thorium-232 in sediment[1]

											Activity Conc. (pCi/g)
0.298	~~pCi Th-232~~	90	~~cu yd~~	2970	~~lb~~	454	~~g~~	=	3.62E+07	pCi Th-232	Sediment 2.98E-01
1	~~g sed~~	1		1	~~cu yd~~	1	~~lb~~				

Total mass of the sediment

2.67E+05	~~lb~~	454	g	=	1.21E+08	g of sediment
1		1	~~lb~~			

Activity of thorium-232 in liquid[2]

0.406	~~pCi Th-232~~	76316	~~gal~~	3.79	~~L~~	=	1.17E+05	pCi Th-232	Liquid 4.06E-04
1	~~L~~	1		1	~~gal~~				

Total mass of the liquid

6.36E+05	~~lb~~	454	g	=	2.89E+08	g of liquid
1		1	~~lb~~			

Activity of thorium-232 in clean fill[3]

0.9	~~pCi Th-232~~	525	~~cu soil~~	2790	~~lb~~	454	~~g~~	=	5.98E+08	pCi Th-232	Clean Fill 9.00E-01
1	~~g fill~~	1		1	~~cu yd~~	1	~~lb~~				

Total mass of the clean fill

1.46E+06	~~lb~~	454	g	=	6.65E+08	g of fill
1		1	~~lb~~			

Total activity of thorium-232 in all material (pCi)

Sediment	3.62E+07	pCi
Liquid	1.17E+05	
Clean fill	5.98E+08	
Total all material	6.35E+08	pCi

Total mass of all material (g)		
Sediment	1.21E+08	g
Liquid	0.00E+00	Liquid will be evaporated or absorbed and is not included in total mass of material.
Clean fill	6.65E+08	
Total all material	7.86E+08	g

Activity concentration of thorium-232 in all material

$$0.807 \ \frac{\text{pCi Th-232}}{\text{g}}$$

Footnotes

[1] a. Activity of Th-232 in sediment (0.298 pCi/g) obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915.

b. Volume of sediment in Durango evaporation pond (90 yd3) based on an estimated average depth of 6 inches of sediment in bottom of pond.

c. Sediment weight (2970 lb/yd3) obtained from Handbook for Stabilization/Solidification of Hazardous Wastes, June 1986, Table A-2 Specific Weights for Common Materials at Remedial Action Sites. Material selected as representative of Durango evaporation pond sediment listed in the book as "Mud, wet (moderately packed)" ("Weight in bank" category).

[2] a. Activity of Th-232 in liquid (0.406 pCi/l) is assumed to equal activity of Ra-228 in liquid, which was obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915. Ra-228 is the immediate progeny of Th-232, so the activity of both can be considered in equilibrium. The activity of Th-232 can be considered in equilibrium with all 12 of its progeny nuclides, which is a conservative assumption.

b. Volume of liquid in Durango evaporation pond (76316 gallons) based on an estimated average depth of 24 inches of liquid in bottom of pond.

c. Liquid weight calculated using 1 gallon water = 8.337 lbs

[3] a. Activity of Th-232 in clean fill (0.9 pCi/g) obtained from *Radiological Survey of the Inactive Uranium Mill Tailings at Durango, Colorado* (ORNL-5451), March 1980, Table 1 **Background External Gamma-Ray Exposure Rate and Background Concentration of Radionuclides in Surface Soil Near Durango, Colorado.**

b. Volume of clean fill that will be mixed with sediment in Durango evaporation pond (525 yd3) based on the estimated volume of clean fill that must be mixed with 76316 gallons of liquid in the pond (see footnote number 3 above) to ensure the combined materials are dry enough for shipment.

c. Clean fill weight (2790 lb/yd3) obtained from *Handbook for Stabilization/Solidification of Hazardous Wastes* , June 1986, Table A-2 **Specific Weights for Common Materials at Remedial Action Sites**. Material selected as representative of clean fill listed in the book as "Earth, w/sand and gravel" ("Loose weight" category).

Radium-226 Calculations for Durango Shipment

Activity of radium-226 in sediment[1]

3.19	~~pCi Ra-226~~	90	~~cu yd~~	2970	~~lb~~	454	g	=	3.87E+08	pCi Ra-226
1	~~g sed~~	1		1	~~cu yd~~	1	~~lb~~			

Total mass of the sediment

2.67E+05	~~lb~~	454	g	=	1.21E+08	g of sediment
1		1	~~lb~~			

Activity of radium-226 in liquid[2]

0.291	~~pCi Ra-226~~	76316	~~gal~~	3.79	~~L~~	=	8.41E+04	pCi Ra-226
1	~~L~~	1		1	~~gal~~			

Total mass of the liquid

6.36E+05	~~lb~~	454	g	=	2.89E+08	g of liquid
1		1	~~lb~~			

Activity of radium-226 in clean fill[3]

1.4	~~pCi Ra-226~~	525	~~cu soil~~	2790	~~lb~~	454	g	=	9.31E+08	pCi Ra-226
1	~~g fill~~	1		1	~~cu yd~~	1	~~lb~~			

Total mass of the clean fill

1.46E+06	~~lb~~	454	g	=	6.65E+08	g of fill
1		1	~~lb~~			

	Activity Conc. (pCi/g)
Sediment	3.19E+00
Liquid	2.91E-04
Clean Fill	1.40E+00

Total activity of radium-226 in all material (pCi)

Sediment	3.87E+08	pCi
Liquid	8.41E+04	
Clean fill	9.31E+08	
Total all material	1.32E+09	pCi

Total mass of all material (g)		
Sediment	1.21E+08	g
Liquid	0.00E+00	Liquid will be evaporated or absorbed and is not included in total mass of material.
Clean fill	6.65E+08	
Total all material	7.86E+08	g

Activity concentration of radium-226 in all material

$$1.68 \quad \frac{\text{pCi Ra-226}}{\text{g}}$$

Footnotes

[1] a. Activity of Ra-226 in sediment (3.19 pCi/g) obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915.

b. Volume of sediment in Durango evaporation pond (90 yd3) based on an estimated average depth of 6 inches of sediment in bottom of pond.

c. Sediment weight (2970 lb/yd3) obtained from *Handbook for Stabilization/Solidification of Hazardous Wastes* , June 1986, Table A-2 **Specific Weights for Common Materials at Remedial Action Sites**. Material selected as representative of Durango evaporation pond sediment listed in the book as "Mud, wet (moderately packed)" ("Weight in bank" category).

[2] a. Activity of Ra-226 in liquid (0.291 pCi/l) obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915.

b. Volume of liquid in Durango evaporation pond (76316 gallons) based on an estimated average depth of 24 inches of liquid in bottom of pond.

c. Liquid weight calculated using 1 gallon water = 8.337 lbs

[3] a. Activity of Ra-226 in clean fill (1.4 pCi/g) obtained from *Radiological Survey of the Inactive Uranium Mill Tailings at Durango, Colorado* (ORNL-5451), March 1980, Table 1 **Background External Gamma-Ray Exposure Rate and Background Concentration of Radionuclides in Surface Soil Near Durango, Colorado.**

b. Volume of clean fill that will be mixed with sediment in Durango evaporation pond (525 yd3) based on the estimated volume of clean fill that must be mixed with 76316 gallons of liquid in the pond (see footnote number 3 above) to ensure the combined materials are dry enough for shipment.

c. Clean fill weight (2790 lb/yd3) obtained from *Handbook for Stabilization/Solidification of Hazardous Wastes* , June 1986, Table A-2 **Specific Weights for Common Materials at Remedial Action Sites**. Material selected as representative of clean fill listed in the book as "Earth, w/sand and gravel" ("Loose weight" category).

Uranium Calculations for the Durango Shipment

Conversion of mass concentration to activity concentration of natural uranium in sediment [1, 2]

1700	ug nat U	90	cu yd	0.68	pCi nat U	2970	lb	454	g	=	1.40E+11 pCi nat U
1	g sed	1		1	ug nat U	1	cu yd	1	lb		

Total mass of the sediment

2.67E+05	lb	454	g	=	1.21E+08 g of sediment
1		1	lb		

Conversion of mass concentration to activity concentration of natural uranium in liquid [2, 3]

4200	ug	76316	gal	3.79	L	0.68	pCi	=	8.25E+08 pCi nat U
1	L	1		1	gal	1	ug		

Total mass of the liquid

6.36E+05	lb	454	g	=	2.89E+08 g of liquid
1		1	lb		

Conversion of mass concentration to activity concentration of natural uranium in clean fill [2, 4]

3	ug nat U	525	cu soil	0.68	pCi nat U	2790	lb	454	g	=	1.36E+09 pCi nat U
1	g fill	1		1	ug nat U	1	cu yd	1	lb		

Total mass of the clean fill

1.46E+06	lb	454	g	=	6.65E+08 g of fill
1		1	lb		

	Activity Conc. (pCi/g)
sediment	1.16E+03
water	2.86E+00
clean fill	2.04E+00

Total activity of natural uranium in all material (pCi)

Sediment	1.40E+11	pCi
Liquid	8.25E+08	
Clean fill	1.36E+09	
Total all material	1.42E+11	

Total mass of all material (g)

Sediment	1.21E+08	g
Liquid	0.00E+00	Liquid will be evaporated or absorbed and is not included in the total mass of material
Clean fill	6.65E+08	
Total all material	7.86E+08	

Activity concentration of natural uranium in all material

181 $\frac{\text{pCi nat U}}{\text{g}}$

Activity concentration of nuclides of natural uranium[5]

U-238

$$\frac{181\ \frac{\text{pCi Nat U}}{\text{g}} \times 0.489\ \frac{\text{pCi U-238}}{\text{pCi Nat U}}}{1} = 89\ \frac{\text{pCi U-238}}{\text{g}}$$

U-235

$$\frac{181\ \frac{\text{pCi Nat U}}{\text{g}} \times 0.022\ \frac{\text{pCi U-235}}{\text{pCi Nat U}}}{1} = 3.99\ \frac{\text{pCi U-238}}{\text{g}}$$

U-234

$$\frac{181\ \frac{\text{pCi Nat U}}{\text{g}} \times 0.489\ \frac{\text{pCi U-234}}{\text{pCi Nat U}}}{1} = 89\ \frac{\text{pCi U-234}}{\text{g}}$$

Footnotes

[1] a. Mass concentration of uranium in sediment (1700 ug/g) obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915.

b. Volume of sediment in Durango evaporation pond (90 yd3) based on an estimated average depth of 6 inches of sediment in bottom of pond.

c. Sediment weight (2970 lb/yd3) was obtained from *Handbook for Stabilization/Solidification of Hazardous Wastes*, June 1986, Table A-2 **Specific Weights for Common Materials at Remedial Action Sites.** Material selected as representative of Durango evaporation pond sediment listed in the book as "Mud, wet (moderately packed)" ("Weight in bank" category).

[2] a. 1 ug of uranium (i.e. Unat) = 0.68 pCi of activity as shown below. Uranium is assumed to be in secular equilibrium for calculations.

b. Per http://www.wise-uranium.org/rup.html , 1 g of Unat = 25,280 Bq of activity, as shown in table below.

Isotopic Composition of Natural Uranium

	U-234	U-235	U-238	Total
atom %	0.0054%	0.72%	99.275%	100%
weight %	0.0053%	0.711%	99.284%	100%
activity %	48.9%	2.2%	48.9%	100%
activity in 1 g U_{nat}	12,356 Bq	568 Bq	12,356 Bq	25,280 Bq

c. 25,280 Bq of activity in 1 g of Unat = 0.68 pCi of activity in 1 ug of Unat, as follows

$$\frac{25{,}280\ \text{Bq}}{\cancel{1\text{ g Unat}}\ 1{,}000\text{ ug}} = \frac{0.025280\ \text{Bq}}{1\text{ ug Unat}} \rightarrow \frac{0.025280\ \cancel{\text{Bq}} \times 27\ \text{pCi}}{1\text{ ug Una}\ \cancel{\text{Bq}}} = \frac{0.68\ \text{pCi}}{1\text{ ug Unat}}$$

[3] a. Mass concentration of uranium in liquid (4200 ug/l) obtained from Durango evaporation pond sampling completed in April 2015, analytical report RIN 15046915.

b. Volume of liquid in Durango evaporation pond (76316 gallons) based on an estimated average depth of 24 inches of liquid in bottom of pond.

c. Liquid weight calculated using 1 gallon water = 8.337 lbs

[4] a. Mass concentration of uranium in clean fill (3 ug/g) based on average concentration of 3 ppm of uranium in the earth's crust, per http://www.wise-uranium.org/rup.html .

b. Volume of clean fill that will be mixed with sediment in Durango evaporation pond (525 yd3) based on the estimated volume of clean fill that must be mixed with 76316 gallons of liquid in the pond (see footnote number 3 above) to ensure the combined materials are dry enough for shipment.

c. Clean fill weight (2790 lb/yd3) was obtained from *Handbook for Stabilization/Solidification of Hazardous Wastes*, June 1986, Table A-2 **Specific Weights for Common Materials at Remedial Action Sites.** Material selected as representative of clean fill listed in the book as "Earth, w/sand and gravel" ("Loose weight" category).

[5] a. For the purposes of determining the percentages of activity contributions for U-238, U-235, and U-234, see the activity percentages for U-238 (48.9% = 0.489), U-235 (2.2% = 0.022) and U-234 (48.9% = 0.489) shown in the table in footnote number 2 above.

PRELIMINARY RESULTS REPORT
RIN: 15046915
Site: Durango Construction
Site Code: DUR03 Location: 0689
Ticket Number: NFV 083
Report Date: 05/26/2015

Parameter	Units	Date Sampled	Date Analyzed	Result	Qualifier(s)	Uncertainty	Detection Limit	Method
Radium-226	pCi/L	04/15/2015	05/13/2015	0.291		0.214	0.23	724R11
Radium-228	pCi/L	04/15/2015	05/04/2015	0.406	U	0.388	0.61	724R11
Mercury	UG/L	04/15/2015	05/05/2015	0.0029	U		0.0029	SW7470
Arsenic	UG/L	04/15/2015	05/09/2015	19			3.9	SW6010
Beryllium	UG/L	04/15/2015	05/09/2015	0.18	U		0.18	SW6010
Chromium	UG/L	04/15/2015	05/09/2015	0.51	U		0.51	SW6010
Cadmium	UG/L	04/15/2015	05/12/2015	0.12	U		0.12	SW6020
Lead	UG/L	04/15/2015	05/12/2015	0.98			0.068	SW6020
Molybdenum	UG/L	04/15/2015	05/12/2015	500			0.32	SW6020
Selenium	UG/L	04/15/2015	05/12/2015	6.9			0.32	SW6020
Vanadium	UG/L	04/15/2015	05/12/2015	260			0.15	SW6020
Uranium	UG/L	04/15/2015	05/12/2015	4200			0.29	SW6020
Uranium-235	pCi/L	04/15/2015	05/12/2015	65				Calculated
Uranium-238	pCi/L	04/15/2015	05/12/2015	1400				Calculated

PRELIMINARY RESULTS REPORT
RIN: 15046915
Site: Durango Construction
Site Code: DUR03 Location: 0689
Ticket Number: NFV 084
Report Date: 05/26/2015

Parameter	Units	Date Sampled	Date Analyzed	Result	Qualifier(s)	Uncertainty	Detection Limit	Method
Radium-226	pCi/g	04/15/2015	05/19/2015	3.19		0.465	0.54	713R13
Cesium-137	pCi/g	04/15/2015	05/19/2015	0.069	U	0.0999	0.17	713R13
Potassium-40	pCi/g	04/15/2015	05/19/2015	1.16	U	1.44	2.4	713R13
Thorium-232	pCi/g	04/15/2015	05/19/2015	0.298	U	0.38	0.62	713R13
Mercury	UG/KG	04/15/2015	04/27/2015	34	J		1	SW7471
Arsenic	UG/KG	04/15/2015	05/07/2015	110000			31	SW6020
Beryllium	UG/KG	04/15/2015	05/07/2015	130			16	SW6020
Cadmium	UG/KG	04/15/2015	05/07/2015	5000			24	SW6020
Chromium	UG/KG	04/15/2015	05/07/2015	5600			70	SW6020
Lead	UG/KG	04/15/2015	05/07/2015	18000	*		14	SW6020
Molybdenum	UG/KG	04/15/2015	05/07/2015	240000			66	SW6020
Selenium	UG/KG	04/15/2015	05/07/2015	63000			68	SW6020
Uranium	UG/KG	04/15/2015	05/07/2015	1700000			59	SW6020
Uranium-235	pCi/g	04/15/2015	05/07/2015	26				Calculated
Uranium-238	pCi/g	04/15/2015	05/07/2015	572				Calculated
Vanadium	UG/KG	04/15/2015	05/07/2015	3000000			310	SW6020

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LMS/DUD/S13841

Draft
Cleanup Criteria and Verification Sampling Plan Durango, Colorado, Disposal Site

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Contents

Figures

Table

Abbreviations

CFR	*Code of Federal Regulations*
cps	counts per second
DOE	U.S. Department of Energy
ft	feet
LM	Office of Legacy Management
LTSP	Long-Term Surveillance Plan
m^2	square meters
OCS	Opposed Crystal System
pCi/g	picocuries per gram
Ra-226	radium-226

1.0 Introduction

1.1 Purpose and Scope

The purpose of this document is to describe the standards and procedures that the U.S. Department of Energy (DOE) Office of Legacy Management (LM) will follow to conduct excavation control and verification sampling following decommissioning of the evaporation pond[1] at the Durango, Colorado, Disposal Site (Figure 1).

The processes and sampling criteria in this plan will be followed to ensure that soil beneath the evaporation pond (Figure 2) that remains after removal is protective of human health and the environment based on the requirements of 40 *Code of Federal Regulations* (CFR) 192.12.

1.2 Background

During construction of the Durango disposal cell, seepage appeared on the slope of the cell. It was determined that a transient drainage system and water management system were needed to manage transient drainage from the uranium mill tailings within the cell. The transient drain system was installed on the east side of the cell in 1989. Operation of the transient drainage system enabled the cell closure to proceed by allowing placement of the compacted clay radon/infiltration barrier on unsaturated tailings in the region of the observed seepage. The use of the transient drainage system also prevented hydrostatic pressure from developing beneath the radon/infiltration barrier on the east-side slope. Criteria were established to determine when internal disposal cell conditions were right to allow for the permanent closure (sealing) of the transient drainage system. It was determined that when the prescribed conditions were met, the seepage would not reappear and no unacceptable pore pressure would develop on the slope of the disposal cell (Brennecke 2016).

The original water management system gathered transient drainage water at the transient drainage system and conveyed it to a double-lined evaporation pond. A permeable reactive barrier facility was constructed in 1995 to treat the water before it was conveyed to the evaporation pond. The permeable reactive barrier facility was removed in October 2010 (DOE 2011).

The processes for operating and closing the transient drainage system and the evaporation pond were identified in the initial *Long-Term Surveillance Plan for the Bodo Canyon Disposal Site, Durango, Colorado* (DOE 1996). The original Long-Term Surveillance Plan (LTSP) has been revised several times since 1996; however, the transient drainage system and evaporation pond closure criteria were not included in the most recent version of the LTSP (2015). LM has conducted an engineering evaluation of the assumptions, modeling, and calculations that were the basis of the guidance provided in the 1996 and has incorporated that guidance and criteria into the engineering design and verification sampling criteria in this document.

[1] In previous documents, the term "holding pond" has been used to describe this feature; however, from here on it will be referenced and referred to as the evaporation pond.

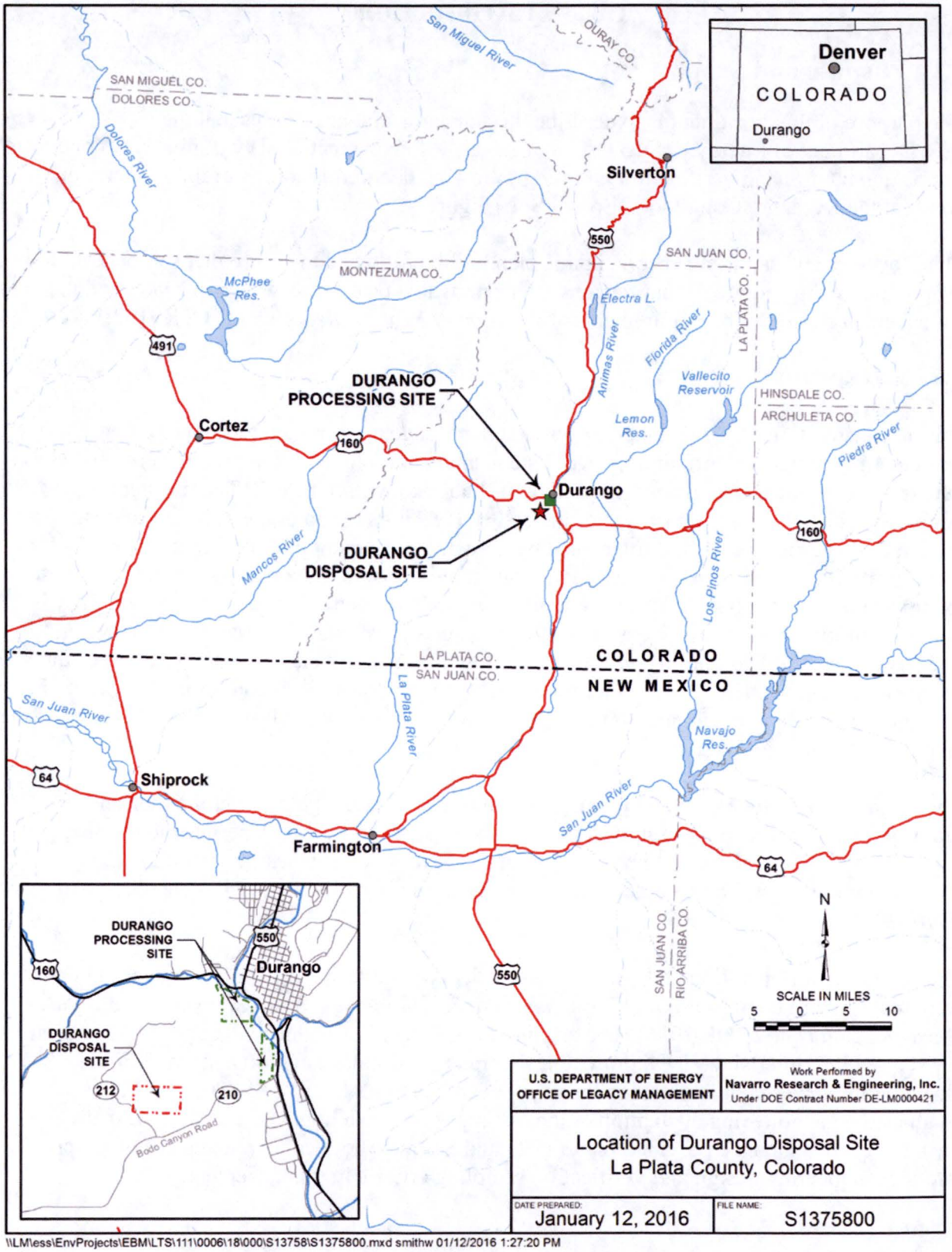

Figure 1. Durango, CO, Disposal Site Cell Overview

Figure 2. Durango, CO, Disposal Site Cell Evaporation Pond Overview

The closure plan for the transient drainage system presented in the LTSP required that the transient drainage system be temporarily closed for 2 years so that the water levels within the cell could be monitored at 6-month intervals to ensure that long-term equilibrium of the phreatic surface has been reached at an elevation that will not cause surface seepage from the transient drainage system of the cell. The maximum elevation to be attained was established as 7,055 feet (ft) above mean sea level.

Pressure transducer data loggers were installed in three monitoring wells. Monitoring well MW-1 is located within the disposal cell, approximately 130 ft upgradient of the transient drainage system. Monitoring well P7 is located approximately 40 ft immediately upgradient of the transient drainage system; it reflects water levels near the downgradient edge of the disposal cell. Monitoring well NVP is located at the transient drainage system valve immediately before the outfall to the evaporation pond.

The transient drainage system valve was temporarily closed on June 4, 2004, initiating the 2-year monitoring period. Water levels have been monitored and recorded more or less continuously at the three pressure transducer locations. All levels are below the threshold elevation of 7,055 ft. Based on disposal cell water levels (as determined by pressure transducers placed within the cell) LM has determined that sufficient water has drained from the interior of the cell so that (1) the transient drainage system can be permanently closed (sealed), (2) sludge accumulated in the evaporation pond can be disposed of, and (3) the evaporation pond area can be regraded and protected from erosion in a fashion compatible with the erosion protection of the adjacent disposal cell.

1.3 Cleanup Criteria

The limits for verifying the completion of remediation for areas beneath the evaporation pond liner are based on the U.S. Environmental Protection Agency Uranium Mill Tailings Radiation Control Act standards for radium-226 (Ra-226) at mill sites and vicinity properties specified in 40 CFR 192. The standards require cleanup to 5 picocuries per gram (pCi/g) average concentration of Ra-226 above background for surface areas, and 15 pCi/g of Ra-226 above background for subsurface areas. Surface is defined as the top 15-centimeter (6-inch) layer averaged over 100 square meters (m^2). Subsurface is defined as any 15-centimeter layer below the surface averaged over 100 m^2.

2.0 Excavation Process

2.1 Background Values

Prior to the start of excavation activities, background values for the Durango site area will be determined. A minimum of three upgradient locations, within the Durango site boundary and beyond the influence of the evaporation pond and disposal cell, will be selected for the measurement of background values. At these locations, gamma readings in counts per second (cps) will be collected using Mount Sopris SC-132 crutch scintillometers; exposure rates will be measured using a Thermo Scientific BICRON Micro Rem/Sievert Tissue-Equivalent Survey Meter; soil samples will be collected for Ra-226 determination using an Opposed Crystal System

(OCS); and, soil samples will be collected for analytical laboratory analysis of Ra-226 concentrations. The background locations will be recorded on the verification map.

Typically, the scintillometer background reading is approximately 120 cps at the surface and 200 cps subsurface (greater than 15-centimeters or 6-inches). Historical characterization of the Durango site determined the regional background exposure rate to be 15.7 microroentgens per hour.

2.2 Liner Removal

The evaporation pond measures 90 ft × 110 ft across the surface and can hold up to approximately 320,000 gallons. The evaporation pond is lined with a 2-ft-thick compacted clay liner and two 40-millimeter-thick high-density polyethylene liners, with drainage nets placed in between the liners.

The removal of the evaporation pond liner will be conducted in a manner that ensures that the bottom high-density polyethylene liner will not be damaged before all of the contaminated materials above the liner are removed and before the condition of the liner can be documented. Once the top liner has been exposed, the following steps are to be taken:

[1] Carefully cut the top liner and peel it back, exposing the drainage net and water collection system.

[2] Dismantle and remove the drainage net and water collection system.

[3] Carefully remove any water or solid material remaining on the surface of the second liner.

[4] Visually inspect the second liner for integrity.

- [a] If a visual inspection of the liner indicates that the liner is intact, and if there is no sign that it has been breached, proceed to step 5.
- [b] If a visual inspection indicates that the liner has been breached, photograph and document the breach locations, and proceed to step 5.

[5] Carefully cut the liner and peel it back, exposing the underlying clay layer.

2.3 Pre-excavation Supplemental Soil Sampling

[1] Inspect the clay beneath the liner for indications of wetness, discoloration, or salt deposits.

- [a] If no wetness, discoloration, or salt deposits are present, photograph and document this condition. Collect soil samples as described in Section 3.5. Following supplemental soil sampling proceed with the verification survey and sampling protocol as described in Section 3.0.
- [b] If wetness, discoloration, or salt deposits are present, photograph and document this condition and proceed to soil excavation.

2.4 Soil Excavation

[1] Overexcavate areas of wetness, discoloration, or salt deposits based on visual observation.

[2] Following excavation based on visual observation, the excavation will be scanned using gamma scintillometers.

[a] Scintillometers and exposure rate meters used for gamma-scan surveys shall have a current calibration and daily operational check performed.

[b] The gamma background activity will be the average of site-specific values determined per Section 2.1 above.

[c] Elevated areas (defined as those with measurements that are 30 percent above background) will be further excavated. Guidance for continued excavation will be based on the relative gamma readings within the excavation, or the OCS soil sample result, or both.

[d] After excavation is complete proceed to verification survey and sampling requirements as described in Section 3.0.

3.0 Verification Survey and Sampling Protocol

Following the completion of excavation, verification surveys shall be performed in remediated areas to verify that excavated areas meet the soil standards specified in 40 CFR 192.12. Gamma scanning, exposure rates, and soil samples will be used to document the post-remediation radiological condition of the property. Verification surveys and the sampling process are based on the protocols used for the Durango vicinity property remediation activities.

3.1 Verification Definitions

Verification definitions are given below.

- ***Aliquots***: Aliquots are individual samples collected from a grid block within a V-area.
- ***Standard verification***: Standard verification is a soil verification method based on subdividing a V-area of approximately 100 m^2 into 3.3 m × 3.3 m grid blocks. An aliquot is taken from the center of each grid block and one to nine aliquots are combined to form the verification samples (Figure 2).
- ***Sample identification number***: Samples will be identified and labeled to identify the V-area grid location from which they were collected, as shown in Figure 3.
- ***V-areas***: V-areas are verification areas documented on the verification maps as V-1 through V-n ("n" represents the integer identifying the last V-area). The excavated portions of the property are divided into approximately 100 m^2 areas and numbered appropriately. Verification soil samples are then collected from the V-areas, as required.
- ***Verification soil samples***: Verification soil samples are collected to demonstrate compliance with the appropriate soil standards.

3.2 Verification Method

A 100 m^2 V-area will be subdivided into nine 3.3 m × 3.3 m grids (Figure 3). Each 100 m^2 V-area shall be gamma scanned, and the range and average of scintillometer readings shall be recorded on the verification field map. The gamma range of the excavated area is determined by observing the high and low gamma scintillometer readings; the average is the gamma reading most commonly observed during the scan of the excavation. Composite soil samples will be taken from the V-area to verify compliance with soil remediation goals.

3.3 Gamma Scintillometer Scans and Exposure Rate Measurements

Scintillometers and exposure rate meters used for gamma-scan surveys will have a current calibration and daily operational check performed. The excavated area shall be gamma scanned using hand-held Mount Sopris SC-132 crutch scintillometers. The range and average of scintillometer readings shall be recorded on the verification map. The exposure rate for the location where each soil aliquot is collected will be measured and recorded on the verification map.

An average count rate in the excavation will be determined by hand scanning the excavated area and recording the low and high gamma readings observed in the excavation on the verification map. The most commonly observed gamma reading in the excavation will be considered the excavation's average gamma reading. Excavation considerations may be required, taking into account various site conditions, such as excavation geometry and shine.

3.4 Verification Soil Sampling Protocol

For each V-area, a composite sample will be collected consisting of one aliquot from each grid block. Aliquots will be taken from the approximate geometric center of each 3.3 m × 3.3 m cell. The aliquots shall be of equal volume and represent a 6-inch (15-centimeter) depth interval. Verification soil samples will be analyzed for Ra-226 concentrations using the OCS. If the sample exceeds the applicable soil standard, additional excavation will be performed and the area will be resampled. All of the samples sent to the analytical laboratory will be submitted for gamma spectrometry analysis for Ra-226. Supplemental soil samples will be collected once the contaminant concentration is below the applicable Ra-226 standard.

3.5 Supplemental Soil Sampling

Pre-excavation supplemental soil samples will be collected as grab samples (not composited) from five locations. For post-excavation supplemental soil sampling, composite samples will be collected consisting of one aliquot from each grid block based on the V-areas. Aliquots will be taken from the approximate geometric center of each 3.3 m × 3.3 m cell. The samples shall be of equal volume and represent a 6-inch (15 cm) depth interval. Supplemental soil samples will be analyzed for molybdenum, radium 226/228, selenium, thorium-230/232, uranium-234/235/238, and vanadium. All locations where soil samples were collected will be documented on the verification map.

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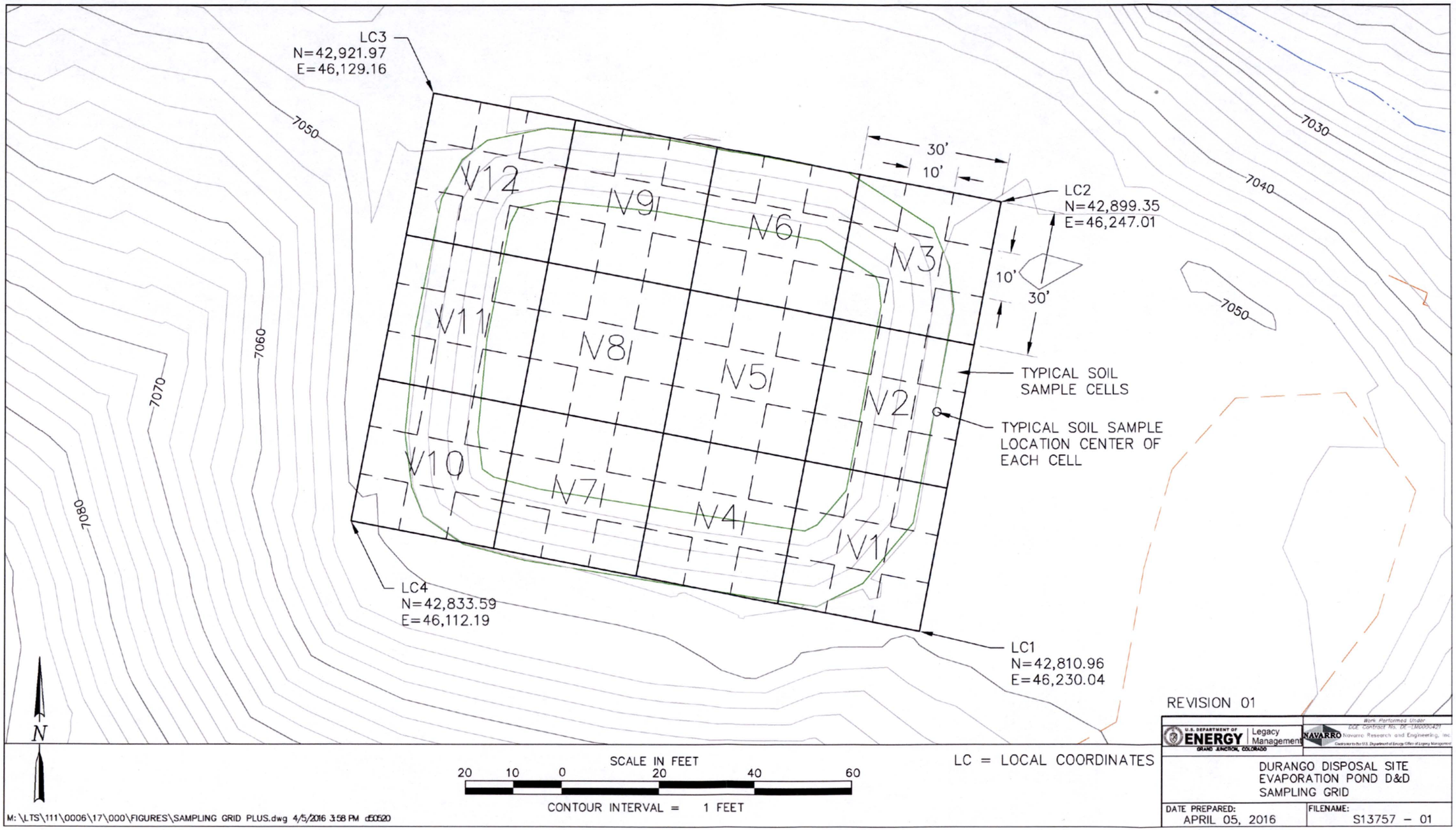

Figure 3. Durango Site Sample Grid Location Map.

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All soil collection equipment is identified in Table 1.

Table 1. Soil Sample Equipment List

Equipment
250 mL high-density polyethylene bottles (wide mouthed)—no preservative is required.
Bottle labels
Stainless steel collection spoons
Disposable mixing trays
Deionized water
Tape measure
Paper towels
Large plastic trash bags
Gallon-sized Ziploc plastic bags
Flags—same colors
Sharpie permanent marker
Camera
Cooler—no ice is required
GPS unit
Sampling and Analysis Plan
PPE as required by the *Safety and Health Manual*

Abbreviations:
mL = milliliters
PPE = personal protective equipment

Samples will be homogenized by mixing the soil within the tray, making sure that clumps are broken up and that the soil is thoroughly mixed. Vegetation and rocks should be removed from the mixture. Loosely pack the homogenized sample into a wide-mouthed 250-milliliter high-density polyethylene bottle until the bottle is full. No sample preservative is required. Verify that the sample bottle is appropriately labeled. Place each bottle inside an individual gallon-sized Ziploc bag. This process will be replicated at each location area using a dedicated spoon and mixing tray.

General sampling protocols specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351) will be used to guide the sampling effort. Protocols in this Sampling and Analysis Plan that are applicable to this project include pre-trip planning, chain-of-custody, sample identification and handling, sample shipping, analytical program requirements, container standards, equipment decontamination, and documentation.

All non-disposable items will be decontaminated between sample locations as necessary by brushing off any visible soil and rinsing them with deionized water. Spoons will be rinsed prior to demobilizing.

3.6 Waste Management

All disposable sampling equipment (e.g., mixing trays, paper towels, flagging), excess soil sample material, and personal protective equipment (e.g., gloves) used during this sampling is considered part of the waste generated from the project and will be disposed of along with all other waste material generated with this project.

3.7 Safety and Health

Sampling will be conducted according to the current job safety analysis for the project. The main hazards associated with this work are addressed in this job safety analysis. Additionally, all monitoring and sampling activities will comply with the requirements of the *Radiological Work Permit* (form LMS 1588) for the project.

4.0 Data Evaluation

Soil samples collected for Ra-226 analysis will be sent to an offsite laboratory for analysis. Once results are received from the laboratory, a verification report will be prepared summarizing the results of the analysis and documenting the Ra-226 concentrations in comparison to the 40 CFR 192 Ra-226 standard.

The results of the supplemental soil samples will be reported in comparison to applicable risk-based criteria, such as the EPA risk-based values for soil to groundwater migration and the U.S. Nuclear Regulatory Commission guidance for cleanup criteria for radionuclides other than radium (radium benchmark dose approach) (NRC 2003).

5.0 References

DOE (U.S. Department of Energy), 1996. *Long-Term Surveillance Plan for the Bodo Canyon Disposal Site, Durango, Colorado,* DOE/AL/62350-77, Rev. 2, U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico, September.

DOE (U.S. Department of Energy), 2011. *Treatment System Removal Excavation Control and Verification Report, Durango, Colorado,* LMS/DUD/S07230, Office of Legacy Management, January.

Brennecke, 2016. Daniel F. Brennecke, PE, Engineering Manager, Office of Legacy Management, U.S. Department of Energy, letter (about Durango (Bodo Canyon) Disposal Cell – Existing Transient Drainage System Engineering Evaluation, Document Number S13755) to Dave Miller, Durango Site Manager, Office of Legacy Management, U.S. Department of Energy, January 27.

NRC (U.S. Nuclear Regulatory Commission), 2003. *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*, Rev. 1, NUREG-1620, Appendix H, June.

Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites, LMS/PRO/S04351, continually updated, prepared by Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

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Memorandum

DATE: February 10, 2016

TO: Dave Miller

FROM: Daniel F. Brennecke, P.E.

SUBJECT: Durango (Bodo Canyon) Disposal Cell Existing Transient Drainage System Collection System Engineering Evaluation, Document Number S13755, Revision 1

The existing transient drainage system at the Bodo Canyon Disposal Cell was installed September 1989 to collect extensive seepage water that appeared on the eastern slope of the disposal cell during the Fall 1988 tailings placement. Construction of the transient drainage system allowed cell closure to proceed by allowing correct placement of the clay cover over stable unsaturated tailings in the area where the seep appeared. The transient drainage system also allowed for continued drainage of the transient drainage within the cell: preventing hydrostatic pressures from building up against the inside surface of the cell clean fill dike, and preventing reappearance of the seep.

In 1994 the Technical Assistance Contractor (TAC), Jacobs Engineering Group, Inc., prepared calculations evaluating the maximum height that the transient drainage within the cell could rise without causing seeps from the cell to reappear and without affecting slope stability. The calculations concluded that a perched water elevation of 7055 feet above mean sea level would be acceptable.

Using the results of the TAC calculations, criteria for permanent closure of the transient drainage system were established and presented in the *Long Term Surveillance Plan (LTSP) For The Bodo Canyon Disposal Site, Durango, Colorado.* The closure criteria established that when the phreatic surface of the pore water within the cell was determined to be below the 7055 foot elevation and water elevation measurements showed a steady-state or declining trend for a period of two years, the transient drainage system could be permanently closed.

An engineering evaluation of the historical data and past engineering calculations has been performed to determine if permanent closure of the transient drainage system is appropriate. The following lines of evidence were determined:

- The top elevation of the 2 foot thick clay liner, over the clean fill dike on the eastern side of the disposal cell, is 7052 feet.

- The water elevations were measured on 4/15/2015 after the transient drainage system valve had been closed for a period of 4 years (4/1/2011 through 4/15/2015). The 4/15/2015 measurements, at the following locations were:

  — 7049.91 feet, MW-1

  — 7047.19 feet, P7

  — 7048.19 feet, North Vent Pipe (NVP)

- Water elevations measured at MW-1, P7, and NVP are below the 7052 top elevation of the 2 foot thick clay liner over the clean fill dike on the eastern side of the disposal cell.
- Data logger hydrographs for water level measuring locations MW-1, P7, and NVP for the period from August 1999 through April 2015 show that water levels have dropped approximately 4 feet during this period.
- Data logger hydrographs for water level measuring locations MW-1, P7, and NVP for the 2 year period from 6/1/2004 through 6/1/2006 when the drain valve was closed show water elevations have decreased approximately 0.2 to 0.3 foot at MW-1 and NVP respectively. P7 showed no noticeable decline during this period.
- Data logger hydrographs for water level measuring locations MW-1, P7, and NVP for the 4 year period from 4/1/2011 through 4/1/2015 when the drain valve was closed show water elevations have decreased approximately 0.9 foot at MW-1 and P7. Water levels at NVP decreased approximately 0.2 foot during this period.
- TAC calculation DUR-09-94-03-01 dated September 1994 demonstrates slope stability with a phreatic surface elevation of 7055 which is approximately 5 feet above the actual water surface elevation measured at MW-1 on 4/15/2015 after the drain valve had been closed for 4 years.

On 4/15/2015, without the benefit of a flow meter installed at the end of the transient drainage system, an attempt was made to approximate the volume of drainage from the transient drainage system. Approximately 240 gallons of water drained from the transient drainage system over a period of 5 hours. After 5 hours, the pipe continued to drain at an eighth to a quarter gallon/minute with a continued decrease in flow. Comparing the as-built transient drainage system flowline elevations with the measured water elevation at P7, and ignoring the higher water elevation measured at NVP, it would be expected that something less than 150 gallons would have initially drained out of the transient drainage system after the drain valve was opened. The hydraulic gradient between MW-1 and P7 (the water elevation measured in MW-1 on 4/15/2015 was 2.7 feet higher than that measured at P7), likely had some influence on the higher than expected amount of water that drained from the transient drainage system after the drain valve was opened. In addition, the water surface elevations measured at P7 and at the NVP have been somewhat erratic over time due to data logger failures and the reliability of the NVP datum elevation is questionable making the measured water elevations at the NVP subject to question regarding their accuracy when compared to the water elevations measured at MW-1 and P7. Despite these observations, the decreasing water surface elevations at MW-1 combined with the other supporting lines of evidence; strongly support permanent closure of the transient drainage system. The declining water surface in MW-1, even when the transient drainage system is closed, suggests that transient drainage within the cell is dissipating as seepage through the cell

clay liner as intended per the original design and that flux through the cell cover due to precipitation is not occurring at a rate greater than flux through the cell clay liner.

While the lines of evidence strongly support permanent closure of the transient drainage system: a more conservative approach would be to close the transient drainage system in a manner that would allow the transient drainage system to be put back in service if it becomes necessary, due to changing site conditions. The strong declining water surface trends suggest that the probability of needing to restore the transient drainage system service is remote; however, maintaining the flexibility to restore the drain line service in the future if necessary would not be detrimental to the long term performance of the cell. The drain line can still be permanently closed at some time in the future after water elevations within the cell further decline. Calculations indicate that a 10 foot long bentonite plug with a concrete cap would be adequate to resist any hydrostatic pressures that would build up against the plug: assuming the water surface elevations associated with the 4/15/2015 measurements at MW-1.

Based on our engineering evaluation, I recommend the following:

- Close the transient drainage system during the 2016 construction season with a minimum 10 foot long bentonite clay plug with a concrete cap located outside the cell cover toe, maintaining the flexibility to restore the transient drainage system service, if it becomes necessary.
- Leave the transient drainage system south vent pipe in place until it is determined that the transient drainage system will be closed permanently.
- When it is determined that the transient drainage system can be permanently closed, the permanent plug should extend a minimum of 10 feet into the cell past the clay liner. The LTSP should be revised to identify the final closure criteria for the transient drainage system.
- Remove the NVP and the drain valve during the 2016 construction season.
- Decommission the evaporation pond during the 2016 construction season by removing the entire pond with the intent that there will not be any future evaporation needs and regrade the pond area to restore natural drainage patterns.
- Validate top of casing elevations for MW-1 and P7.
- Continue monitoring water elevations in MW-1 and P7 after closure of the transient drainage system and decommissioning of the evaporation pond.

Supporting Attachments:

- Dewatering Trench System Plan, drawing number DUR-DS-10-0342 As-Built
- Dewatering Trench System Profile and Sections, drawing number DUR-DS-10-0343 As-Built
- Dewatering Trench System Details and Sections, drawing number DUR-DS-10-0344 As-Built
- Wells MW-1 and P7 Water Levels Cross Section, drawing number E13756-R00-C01-D+

- Durango Disposal Site - MW-1, P7, and NVP Data Logger Hydrograph
- Durango Disposal Site - Transient Drainage System Closed 6/1/04 – 6/1/06 P7 and MW-1 Data Logger Hydrograph
- Durango Disposal Site – Transient Drainage System Closed 6/1/2004 – 6/1/2006 NVP Data Logger Hydrograph
- Durango Disposal Site – Transient Drainage System Closed 4/1/2011 – 4/1/2015 Wells P7 and MW-1 Data Logger Hydrograph
- Durango Disposal Site – Transient Drainage System Closed 4/1/2011 – 4/1/2015 NVP Data Logger Hydrograph
- Calculation DUR-09-94-03-01 Slope Stability Analysis with Phreatic Surface at 7055.0 (without computer runs)
- Geo-Smith Engineering independent review of calculation DUR-09-94-03-01, letter dated January 14, 2016
- Determination of Transient Drainage System Plug Size calculation
- Durango CO, UMTRA Site "White Paper" transmittal dated March 23, 1998

U.S. Department of Energy
Office of Legacy Management
Categorical Exclusion Determination Form

Program or Field Office:	Office of Legacy Management
Project Title and I.D. No.:	Evaporation Pond Removal and Verification and Associated Road Maintenance, Durango, Colorado, Disposal Site
Location:	Durango, Colorado

Proposed Action or Project Description:

LM proposes to remove an evaporation pond that is no longer required, conduct verification sampling of the pond area, and perform the associated road maintenance necessary to facilitate removal and offsite transportation of the pond waste material. The Durango site is a Title I site that is managed in accordance with the Uranium Mill Tailings Radiation Control Act of 1978.

The evaporation pond was installed as part of an engineered transient drainage system to manage liquids removed from the disposal cell during the naturally occurring compaction of the cell materials. The liquid discharge has declined to the point that the drain can be sealed in place and the pond can be removed. The road maintenance is needed to facilitate the movement of trucks loaded with material for offsite disposal at the Grand Junction, Colorado, Disposal Site.

Road improvement work is needed to provide access and turning distances for the trucks that would be hauling the containerized waste offsite. The road improvement work is located on County Road 212 adjacent to the site entrance gate, and includes maintenance and regrading to facilitate access for transport trucks.

Categorical Exclusion(s) Applied:

B1.3, Routine maintenance - for road maintenance and repair
B6.1, Small-scale, short-term cleanup actions . . . . less than approximately 10 million dollars in cost - for evaporation pond decontamination and removal

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

☒The proposal fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D

To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

☒There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal.

☒The proposal has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

Tracy A. Ribeiro

Tracy Ribeiro
2016.05.09 12:26:26 -04'00'

NEPA Compliance Officer: **Date Determined:**

U.S. Department of Energy (DOE) Office of Legacy Management (LM) National Environmental Policy Act (NEPA) Environmental Checklist

Project/Activity: Evaporation Pond Removal and Verification and Associated Road Maintenance, Durango, Colorado, Disposal Site

A. Brief Project/Activity Description

LM proposes to remove an evaporation pond that is no longer required, conduct verification sampling of the pond area, and perform the associated road maintenance necessary to facilitate removal and offsite transportation of the pond waste material. The Durango site is a Title I site that is managed in accordance with the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978.

The evaporation pond was installed as part of an engineered transient drainage system to manage liquids removed from the disposal cell during the naturally occurring compaction of the cell materials. The liquid discharge has declined to the point that the drain can be sealed in place and the pond can be removed. The road maintenance is needed to facilitate the movement of trucks loaded with material for offsite disposal at the Grand Junction Disposal site.

The evaporation pond measures 90 feet by 110 feet across the surface and can hold up to approximately 320,000 gallons. This pond is lined with a 2-foot-thick compacted clay liner and two 40-millimeter-thick high-density polyethylene liners. Drainage nets were placed between the liners.

Road improvement work is needed to provide access and turning distances for the trucks that would be hauling the containerized waste offsite. The road improvement work is located on County Road 212 adjacent to the site entrance gate, and includes maintenance and regrading to facilitate access for transport trucks.

The excavation of the holding pond would be conducted in a manner to ensure that the bottom high-density polyethylene liner would not be damaged before all of the contaminated materials above the liner are removed and before the condition of the liner can be documented. Once the top liner has been exposed, project personnel would take the following steps:

1. Carefully cut the top liner and peel it back, exposing the drainage net and water collection system.
2. Dismantle and remove the drainage net and water collection system.
3. Carefully remove any water or solid material remaining on the surface of the second liner.
4. Visually inspect the second liner for integrity.
    a. If a visual inspection of the liner indicates that the liner is intact, and if there is no sign that it has been breached, personnel would proceed to step 5.
    b. If a visual inspection indicates that the liner has been breached, personnel would photograph and document the breach locations and proceed to step 5.
5. Carefully cut the liner and peel it back, exposing the underlying clay layer.
6. Inspect the clay beneath the liner for indications of wetness, discoloration, or salt deposits.
    a. If no wetness, discoloration, or salt deposits are present, personnel would photograph and document this condition and proceed to step 8.

b. If wetness, discoloration, or salt deposits are present, personnel would photograph and document this condition and proceed to step 7.

7. Over-excavate areas of wetness, discoloration, or salt deposits based on visual observation.

8. Perform gamma scans on the excavation using scintillometers, based on visual observation.

   a. Scintillometers and exposure rate meters used for gamma-scan surveys shall have a current calibration and daily operational check performed.

   b. Elevated areas (defined as those with measurements that are 30 percent above background) would be further excavated.

   c. Verification soils samples would be collected to document the final site conditions.

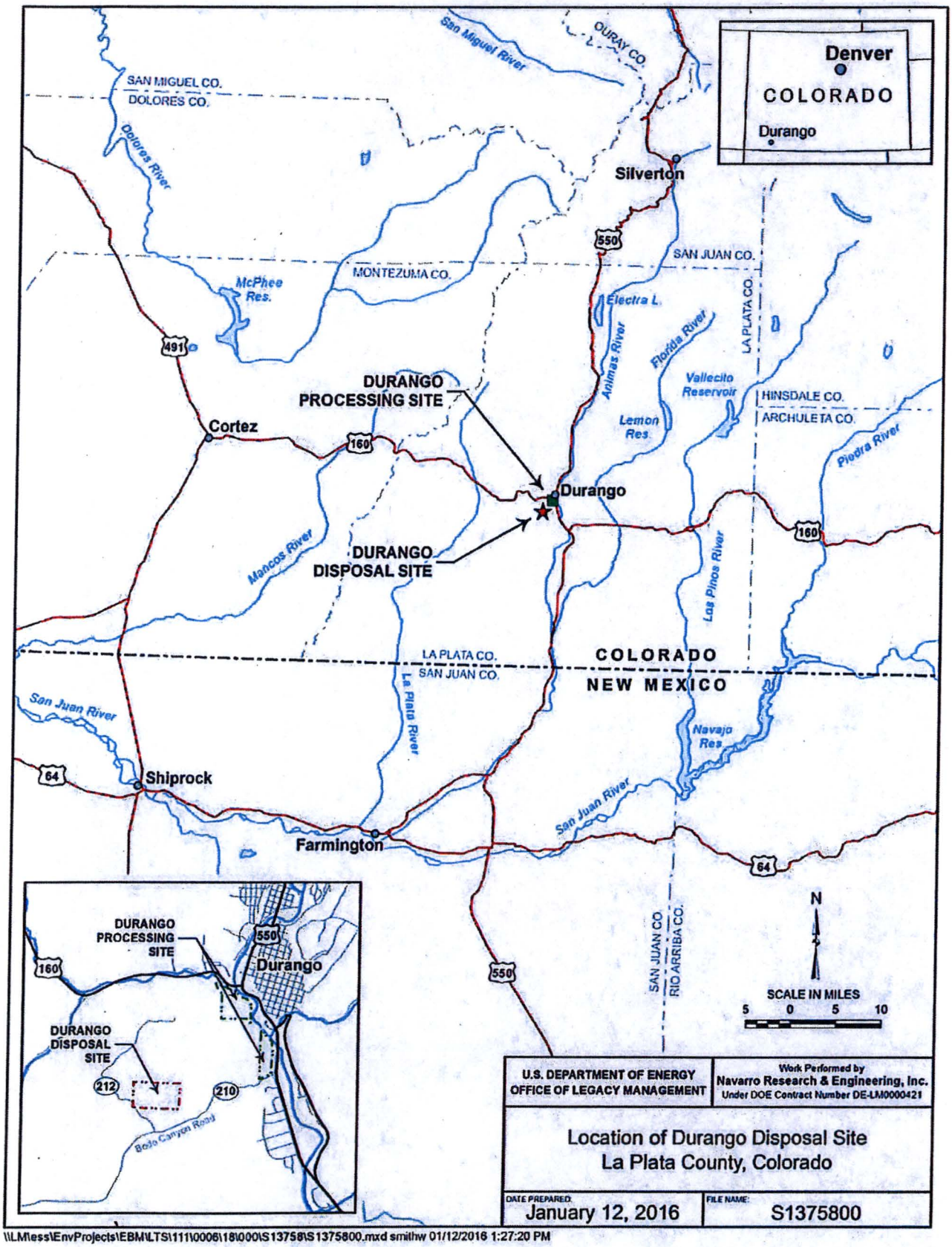
Once the pond has been removed, the area would be regraded to restore natural drainage patterns.

B. Environmental Concerns

If the proposed action could result in potential sources of impacts, or could result in an affect on the environmental and human health considerations listed in Table 1 below, the "Yes" column is checked and an explanation is provided as to the physical, chemical and radiological sources or impacts (qualified or quantified when possible). An item checked "Yes" does not necessarily mean that an adverse impact would occur. However, it does indicate that DOE believes an explanation is warranted, including actions DOE would implement to minimize or eliminate the potential impact, and actions to comply with Federal, state and tribal regulations. If the "No" column is checked, no explanation is identified as generally necessary.

Table 1. Potential Sources of Impacts, and Environmental and Human Health Considerations

Element	Yes	No	Element	Yes	No
Air, Noise, and Human Protection			**Natural and Cultural Resources**		
Air emissions/air quality	☒	☐	Wetland/floodplain impacted	☐	☒
Noise	☒	☐	Endangered Species Act consultation	☐	☒
Exposure/impacts to public or workers	☒	☐	State or Tribe listed or protected species	☐	☒
Waste and Materials Handling			Migratory birds breeding or nesting	☐	☒
Solid waste generation	☒	☐	Cultural/archaeological resources present	☐	☒
Mixed waste management	☐	☒	**Soil and Water**		
Chemical storage on site	☐	☒	Radioactive materials/soils	☒	☐
Toxic substances management	☐	☒	Surface water use/quality/contamination	☐	☒
Regulated quantities of petroleum used or stored on site	☐	☒	Groundwater use/quality/contamination	☐	☒
Pesticide/herbicide use	☐	☒	Surface (ground) disturbance	☒	☐
Other					
Access to/use of DOE property	☒	☐			



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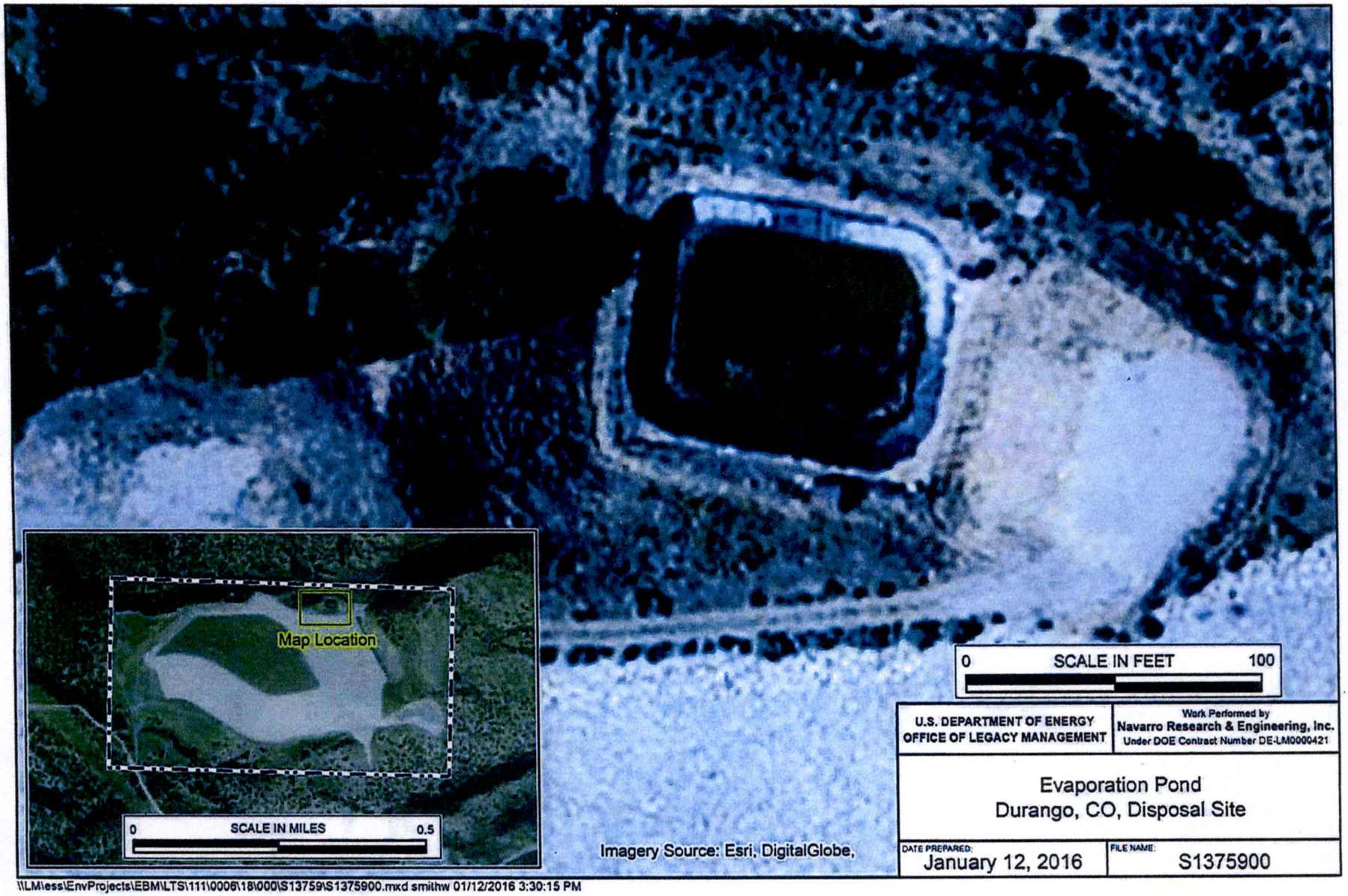

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C. Explanation and Qualification of All "Yes" Responses

Air Emissions/Air Quality: Use of a backhoe or other mechanical equipment would likely result in temporary and short-term increases in fugitive dust. This is typical for this type of construction project. Dust abatement using a water truck would be conducted as needed.

Noise: Noise levels during use of construction equipment would exceed background noise levels. Noise associated with these activities would be temporary, short-term, and limited to the immediate area around each work location. If 80 decibels is approached, the site safety supervisor would require hearing protection per internal Safety & Health procedures.

Exposure/impacts to public or workers: Radiological control technicians would conduct radiological monitoring for worker protection during the removal activity. Personnel will follow established protocol and wear the necessary personal protective equipment and their potential for exposure would be monitored.

Solid Waste Generation: Small amounts of solid waste would be generated during the proposed work. Solid waste would be retained and disposed of offsite in accordance with applicable regulations.

Radioactive Materials/Soils: Radioactive materials and soil would be handled in accordance with the requirements of the LMS Radiation Protection Plan (LMS/POL/S0437) and the LMS Radiological Control Manual (LMS/POL/S04322-2.0). Radioactive materials would be transported to the Grand Junction, Colorado, Disposal Site.

Surface (Ground) Disturbance: It is estimated that ground disturbance from the proposed road maintenance and evaporation pond removal would total less than 1 acre.

D. Eligibility/Conditions

DOE has determined that certain classes of actions do not individually or cumulatively have a significant effect on the human environment (see "categorical exclusions" in 10 *Code of Federal Regulations* (CFR) 1021.410). The list of these actions is available in Appendix A or B to Subpart D of 10 CFR 1021. The DOE determination is based on verification that the proposed action (1) has no extraordinary circumstances (e.g., scientific controversy of the effects of the action, uncertain effects, unresolved issues) that may affect the significance of the environmental effects of the proposed action, (2) has not been segmented into smaller actions to meet the definition of a categorical exclusion and is not "connected" to other actions with potentially significant impacts, and (3) is not related to other proposed actions with cumulatively significant impacts and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

Additionally, if proposed actions fall within the actions listed in 10 CFR 1021, Appendix B of Subpart D, the proposed actions must be evaluated for additional conditions. The proposed actions must not:

- Violate applicable statutory, regulatory, or permit requirements for the environment, safety, and health, including DOE requirements and Executive Orders.
- Require siting and construction or a major expansion of waste-storage, disposal, recovery, or treatment facilities (including incinerators and facilities for treating wastewater, surface water, and groundwater), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities.

- Disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act–excluded petroleum and natural gas products that preexist in the environment, such that the action would result in uncontrolled or unpermitted releases.
- Adversely affect environmentally and culturally sensitive resources, including those listed in paragraph B(4) of 10 CFR 1021, Subpart D, Appendix B. An action may be categorically excluded if, although sensitive resources are present on a site, the action would not adversely affect those resources.
- Involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR 1021, Subpart D, Appendix B.

E. Recommendation and Project Concurrences

The appropriate contractor personnel should sign below (but not check any boxes) if they agree with the statements and agree that the actions meet the criteria. The LM Site Manager should check the boxes applicable to the manager's own evaluation and sign below.

The information provided in Sections A through C of this Environmental Checklist reasonably represents the scope of the proposed actions and is described in sufficient detail to allow a reasonable determination of the potential environmental impacts.

☒ Agree ☐ Disagree

Additionally, none of the special circumstances and conditions listed in Section D of this Environmental Checklist are expected to occur.

☒ Agree ☐ Disagree ☐ Unsure

JRT Joseph R. Trnka 2016.04.21 10:45:43 -06'00'

Joe Trnka, AICP, CEP — Date
LMS Contractor NEPA Coordinator

Darlene M DePinho Darlene Depinho 2016.04.21 10:58:44 -06'00'

Darlene DePinho — Date
LMS Contractor Environmental Compliance Site Point of Contact

David E. Miller 2016.04.21 11:07:56 -06'00'

David Miller — Date
LMS Contractor Site Lead

April 28, 2016

Jalena Dayvault — Date
LM Site Manager

F. NEPA Determination

The proposed actions identified in this Environmental Checklist fit within the class of actions identified in 10 CFR 1021, Appendixes A and B to Subpart D. The proposed actions would fit within the categories:

For road maintenance and repair:

- B1.3, Routine maintenance

For evaporation pond decontamination and removal:

- B6.1, Small-scale, short-term cleanup actions . . . . less than approximately 10 million dollars in cost

Based on my review of the proposed actions, as the NEPA Compliance Officer (as authorized under DOE Order 451.1B), the following has been determined:

☒ The proposed actions meet the criteria for categorical exclusion and are excluded from further NEPA review.

☐ The proposed actions do not meet the criteria for categorical exclusion; therefore, I recommend that the LM NEPA Planning Board be convened based on my recommendation (see attached rationale) to complete:

☐ an Interim Action. ☐ an Environmental Assessment.

☐ an Environmental Impact Statement. ☐ a Supplemental Analysis.

Tracy A. Ribeiro

Tracy Ribeiro
2016.05.09 12:21:13 -04'00'

Tracy A. Ribeiro — Date
LM NEPA Compliance Officer

Distribution upon signature:
All signatories

Scott Osborn, Navarro
Dana Ravelojaona, Navarro
rc-grand.junction