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Contents

Abbreviations ................................................................................................................................. iv

1.0 Introduction ................................................................................................................................. 1
  1.1 Purpose ................................................................................................................................. 1
  1.2 Responsibilities ....................................................................................................................... 2
  1.3 Monticello LTS&M Plan Organization ................................................................................. 2
  1.4 Location and Property Ownership ....................................................................................... 3
  1.5 Site History ............................................................................................................................ 3
  1.6 Regulatory Requirements ...................................................................................................... 8
    1.6.1 General Regulatory Requirements for Disposal Site Operations and Maintenance Activities ................................................................................................................................. 8
    1.6.2 General Regulatory Requirements for Soil Cleanup ...................................................... 9
    1.6.3 General Regulatory Requirements for Surface Water and Groundwater .................. 9
    1.6.4 General Regulatory Requirements for Institutional Controls and Five-Year Reviews ................................................................. 11

2.0 Site Conditions ........................................................................................................................... 12
  2.1 Site Description ...................................................................................................................... 12
    2.1.1 DOE-Owned Properties (MMTS OU I and OU II) ....................................................... 12
    2.1.1.1 Disposal Cell and Pond 4 Design Summary .......................................................... 13
    2.1.1.2 Temporary Storage Facility ...................................................................................... 14
    2.1.2 Non-DOE-Owned Properties with Residual Soil Contamination (MMTS OU II and MVP) ................................................................................................................................. 20
    2.1.3 MMTS OU III—Groundwater and Surface Water ....................................................... 22
      2.1.3.1 Hydrogeological Setting ......................................................................................... 22
      2.1.3.2 OU III Groundwater Treatment System ........................................................... 23
      2.1.3.3 Extent of Contamination ....................................................................................... 23
  2.2 Institutional Controls .............................................................................................................. 28
    2.2.1 ICs on Properties Transferred from DOE to the City of Monticello ......................... 29
    2.2.2 ICs on Public Roads and Utilities .................................................................................. 30
    2.2.3 ICs as Zoning Restrictions ............................................................................................ 30
    2.2.4 ICs on Private Properties Within the Montezuma Creek Restrictive Easement Area ................................................................................................................................. 31
    2.2.5 ICs in the Groundwater Restricted Area ..................................................................... 31
    2.2.6 DOE-Owned Property .................................................................................................... 31

3.0 LTS&M Administrative Framework .......................................................................................... 32
  3.1 Community Involvement ........................................................................................................ 32
  3.2 Records Management and Document Control Process ....................................................... 32
    3.2.1 Administrative Record and Information Repository .................................................. 32
    3.2.2 Document Control ......................................................................................................... 33
      3.2.2.1 LTS&M Record Books .......................................................................................... 34
      3.2.2.2 Contractor Documents Used in Implementing Portions of the LTS&M Plan ........ 34
    3.2.3 Key Project Documents .................................................................................................. 34
  3.3 Safety and Health .................................................................................................................... 35
  3.4 Training .................................................................................................................................. 35
    3.4.1 Monticello Contractor Operations Lead Minimum Requirements ............................ 35
    3.4.2 Environmental Compliance Representative Minimum Requirements .................... 36
  3.5 Quality Assurance ................................................................................................................... 36
4.0 Operations and Maintenance Requirements ................................................................. 36
  4.1 Disposal Site ............................................................................................................. 40
    4.1.1 Disposal Cell and Pond 4 LCRS and LDS Operation ..................................... 40
    4.1.2 TSF Operations ............................................................................................... 41
  4.2 Control Residual Soils at Non-DOE Owned Properties ........................................... 41
  4.3 MMTS OU III ......................................................................................................... 42
    4.3.1 GRO System Operation and Monitoring .................................................... 42
    4.3.2 Routine Water Quality Monitoring .............................................................. 44
  4.4 Institutional Controls ............................................................................................. 45
  4.5 Annual Inspections ................................................................................................. 46
  4.6 Reporting .............................................................................................................. 46

5.0 References ................................................................................................................. 49

Figures

Figure 1. Monticello MMTS and MVP Sites Locations and Features ................................. 5
Figure 2. Monticello, Utah, Repository Base Map .............................................................. 15
Figure 3. Schematic of Disposal Cell Cover Design ....................................................... 17
Figure 4. Disposal Cell and Pond 4 Liner Sections .......................................................... 18
Figure 5. Schematic of Disposal Cell Liquid Extraction System ..................................... 19
Figure 6. MMTS OU III Study Area and Features .......................................................... 25
Figure 7. Plan View of the MMTS OU III Groundwater Remedy Optimization System .... 27
Figure 8. MMTS OU III Area of Attainment Monitoring Locations ................................. 43
Figure 9. Monticello Sites Routine Monitoring Network .................................................. 47

Tables

Table 1. Soil Cleanup Standards for MVP and MMTS OU I and OU II ................................. 10
Table 2. OU III Contaminants of Concern (COC) and Water Quality Remediation Goals .... 11
Table 3. Characteristics of MMTS and MVP Properties with Residual Soil Contamination 20
Table 4. Summary of Current MMTS and MVP Institutional Controls ............................ 28
Table 5. Contractor Key Documents for LM Sites ........................................................... 34
Table 6. Monticello O&M Responsibilities ..................................................................... 37
Table 7. Routine Groundwater Monitoring Requirements ............................................... 44

Plates

Plate 1 MMTS and MVP Supplemental Standards Areas Excluding Montezuma Creek
Supplemental Standards Areas
Plate 2 Upper Montezuma Creek Supplemental Standards Areas
Plate 3 Middle and Lower Montezuma Creek Supplemental Standards Areas
Plate 4 MMTS OU III Water Quality Monitoring Locations
Appendixes

Appendix A  Monticello LTS&M Project Organization, Site Chronology, and Key Documents
Appendix B  Document Control and Records Management
Appendix C  Emergency Information
Appendix D  LTS&M Procedures for DOE-Owned Property
Appendix E  LTS&M Procedures for Non-DOE-Owned Property
Appendix F  Radiological Survey Procedures
Appendix G  Procedures for the Transportation of Radioactive Materials
Appendix H  Annual Inspection and Checklist
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AEC</td>
<td>U.S. Atomic Energy Commission</td>
</tr>
<tr>
<td>AOA</td>
<td>area of attainment</td>
</tr>
<tr>
<td>AR</td>
<td>Administrative Record</td>
</tr>
<tr>
<td>ARARs</td>
<td>applicable or relevant and appropriate requirements</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</td>
</tr>
<tr>
<td>CFR</td>
<td><em>Code of Federal Regulations</em></td>
</tr>
<tr>
<td>cm</td>
<td>centimeters</td>
</tr>
<tr>
<td>COC</td>
<td>contaminant of concern</td>
</tr>
<tr>
<td>DOE</td>
<td>U.S. Department of Energy</td>
</tr>
<tr>
<td>DOT</td>
<td>U.S. Department of Transportation</td>
</tr>
<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>ESD</td>
<td>Explanation of Significant Difference</td>
</tr>
<tr>
<td>FFA</td>
<td>Federal Facilities Agreement</td>
</tr>
<tr>
<td>FS</td>
<td>Feasibility Study</td>
</tr>
<tr>
<td>ft</td>
<td>feet</td>
</tr>
<tr>
<td>gpm</td>
<td>gallons per minute</td>
</tr>
<tr>
<td>GRO</td>
<td>groundwater remedy optimization</td>
</tr>
<tr>
<td>GWRA</td>
<td>groundwater restricted area</td>
</tr>
<tr>
<td>HDPE</td>
<td>high-density polyethylene</td>
</tr>
<tr>
<td>ICs</td>
<td>institutional controls</td>
</tr>
<tr>
<td>IR</td>
<td>Information Repository</td>
</tr>
<tr>
<td>JSA</td>
<td>Job Safety Analysis</td>
</tr>
<tr>
<td>LCRS</td>
<td>leachate collection/removal system</td>
</tr>
<tr>
<td>LDS</td>
<td>leak detection system</td>
</tr>
<tr>
<td>LM</td>
<td>Office of Legacy Management</td>
</tr>
<tr>
<td>LMS</td>
<td>Legacy Management Support</td>
</tr>
<tr>
<td>LTS&amp;M</td>
<td>long-term surveillance and maintenance</td>
</tr>
<tr>
<td>LTS&amp;M Plan</td>
<td><em>Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites</em></td>
</tr>
<tr>
<td>m²</td>
<td>square meters</td>
</tr>
<tr>
<td>µg/L</td>
<td>micrograms per liter</td>
</tr>
<tr>
<td>MMTS</td>
<td>Monticello Mill Tailings Site</td>
</tr>
<tr>
<td>MNA</td>
<td>monitored natural attenuation</td>
</tr>
<tr>
<td>MRAP</td>
<td>Monticello Remedial Action Project</td>
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</table>
1.0 Introduction

The U.S. Department of Energy (DOE), under a Federal Facilities Agreement (FFA) with the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ), conducted remedial actions at its National Priorities List (NPL) sites in Monticello, Utah. Remediation was conducted in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The NPL sites include:

- The Monticello Mill Tailings Site (MMTS), consisting of:
  - Operable Unit (OU) I, the property where a former uranium- and vanadium-processing mill was located, as well as the repository where the mill tailings and contaminated materials from OU II and the Monticello Radioactively Contaminated Properties (Monticello Vicinity Properties [MVP]) were permanently disposed
  - OU II, peripheral properties near or adjacent to the former mill that were contaminated by windblown materials or waterborne sediment
  - OU III, contaminated groundwater and surface water associated with the former mill
- MVP
  - Consisted of 424 private and publicly owned properties, in and near the City of Monticello, to which mill tailings were transported for use in construction and landscaping
  - The MVP sites were removed from the NPL in February 2000.

Most of the surface area constituting the Monticello NPL sites was remediated to allow for unlimited use and unrestricted exposure (UU/UE), but there are contaminated materials in DOE’s disposal cell, and there are low-level radioactive materials in some areas where alternate cleanup standards have been applied. Supplemental standards were applied at most of these properties (known as the “supplemental standards properties”), and property-specific cleanup standards were applied at two additional properties. All of these areas require long-term surveillance and maintenance (LTS&M).

The primary LTS&M activities at the MVP and MMTS are conducted to (1) operate and maintain the mill tailings disposal site, (2) provide radiological control at properties where residual soil contamination from mill tailings remains in place (e.g., supplemental standards properties), (3) operate the OU III pump-and-treat groundwater remedy optimization (GRO) system and monitor water quality restoration progress, and (4) ensure that institutional controls (ICs) restricting the use of land and water remain effective.

1.1 Purpose

DOE is the lead agency for the MMTS and MVP and is responsible for Operations and Maintenance (O&M) activities. The MMTS and MVP are both in the O&M stage and are expected to remain so indefinitely because contaminated materials that require management are contained within portions of the sites (the disposal cell and supplemental standards properties).
O&M activities will be required at MMTS OU III until remedial action objectives related to groundwater and surface water are met, at which time O&M for OU III may be terminated.

Under the FFA, DOE, EPA, and UDEQ established LTS&M requirements for the Monticello NPL sites after construction was complete in 2001. Between 2001 and 2003, LTS&M at the Monticello NPL sites was managed by the DOE Grand Junction office in Colorado. After its formation in 2003, DOE Office of Legacy Management (LM) assumed responsibility for LTS&M at the sites. In 2007, LM developed a comprehensive plan to incorporate the elements of both its LTS&M program and a CERCLA O&M plan for the Monticello NPL sites (DOE 2007b). This plan (i.e., this document, which will be referred to as the “LTS&M Plan” or the/this plan,” throughout) supersedes the 2007 plan. A summary of regulatory documents and the sites’ regulatory history are provided in Appendix A.

This LTS&M Plan, is also based on guidance developed by LM for LTS&M plans for other uranium mill tailings disposal sites (DOE 2012). Although the guidance was developed primarily to comply with the requirements of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), the guidance may also be used to develop LTS&M plans for disposal sites under DOE custody that were remediated under other authorities. The guidance document details many of DOE’s standard practices and procedures for conducting LTS&M activities at LM sites.

1.2 Responsibilities

This LTS&M Plan is effective upon acceptance by EPA and UDEQ pursuant to the consultation provisions of the FFA (DOE 1988). DOE is responsible for ensuring that all LTS&M activities described in this plan are fully implemented. As part of the CERCLA process, DOE will continue to monitor the sites, with oversight provided by EPA Region VIII and UDEQ.

DOE, through various contractors, is committed to carrying out the procedures identified in this LTS&M Plan. Adherence to the procedures in this plan will result in periodic inspections, oversight, and the collection of data necessary for completing annual inspections and the statutory CERCLA Five-Year Reviews used in determining the long-term effectiveness of remedial actions.

Responsibilities for implementing the LTS&M Plan and associated procedures are addressed in the applicable sections in this plan. Implementation currently includes DOE representatives (contractor employees) working at the Monticello Field Office responsible for executing procedures in this plan.

1.3 Monticello LTS&M Plan Organization

This LTS&M Plan consolidates and supersedes prior versions of Monticello LTS&M plans, manuals, and documents. This LST&M Plan comprises the five major sections and associated appendices described below:

- Section 1.0, “Introduction,” describes the purpose and scope of this document, site history leading up to LTS&M, the legal and regulatory basis for LTS&M activities, and the framework for implementing the LTS&M activities.
- Section 2.0, “Site Conditions,” describes the final site conditions that are being maintained through LTS&M.
• Section 3.0, “LTS&M Administrative Framework,” identifies summary information relevant to community involvement and procedures that apply to document control, records management, health and safety, training, and quality assurance (QA).
• Section 4.0, “Operation and Maintenance Requirements,” summarizes the activities required under LTS&M, including timing and frequency. Procedures that address each LTS&M activity are included as appendixes.
• Section 5.0, “References,” identifies references cited in this LTS&M Plan.

Appendixes are:
• Appendix A—Monticello LTS&M Project Organization, Site Chronology, and Key Documents
• Appendix B—Document Control and Records Management
• Appendix C—Emergency Information
• Appendix D—LTS&M Procedures for DOE-Owned Property
• Appendix E—LTS&M Procedures for Non-DOE-Owned Property
• Appendix F—Radiological Survey Procedures
• Appendix G—Procedures for the Transportation of Radioactive Materials
• Appendix H—Annual Inspection Procedures and Checklist

Throughout this plan, the following words have the following meanings:
• “Shall” indicates a requirement, as do the synonyms “will” and “must.”
• “Should” indicates a recommendation.
• “May” indicates permission and is neither a requirement nor a recommendation.

1.4 Location and Property Ownership
The Monticello NPL sites are located in and near the City of Monticello, Utah, about 250 miles southeast of Salt Lake City (see Figure 1). Monticello is the county seat for San Juan County. As of the 2010 U.S. census, the population of Monticello was 1972 residents. Figure 1 shows the MMTS and MVP site boundaries. DOE’s property ownership is limited to the repository site and a small parcel to the east of the repository site. Formerly, DOE owned approximately 380 acres of the former mill site and peripheral properties that were transferred to the City of Monticello in June 2000 (DOE 2000) and approximately 175 acres of land adjacent to the disposal site that was transferred to private ownership in 2011 (San Juan County 2011).

1.5 Site History
The Monticello Mill was constructed in 1942 to process vanadium and, later, uranium for the U.S. government. The facility included an ore-buying station, which was constructed in 1940. Ore was processed for vanadium recovery between 1942 and 1946, and both uranium and vanadium were recovered during operations between 1948 and 1960. The ore-buying station was operational through 1962. Approximately 900,000 tons of ore were processed at the mill. Mill
tailings, generated during processing, were impounded at the mill site in four locations, known as the Carbonate Pile, Acid Pile, Vanadium Pile, and East Pile, near Montezuma Creek. The mill tailings contain hazardous radioactive and non-radioactive constituents.

Between 1961 and 1965, mill site buildings were dismantled and disposed of along with equipment and scrap, contaminated materials were buried, and some tailings piles were covered with soil and revegetated. Approximately 10 acres of former mill site property were transferred to the U.S. Bureau of Land Management in 1962. The remainder of the mill site property, owned by the U.S. Atomic Energy Commission (AEC) and its successor agencies (the U.S. Energy Research and Development Administration, and later DOE\(^1\)), was accessible by the public until the mid-1970s, when mill foundations were demolished, and a fence was constructed to deter access. In 1971, the AEC began to survey properties in the City of Monticello for radioactive contamination.

During processing operations, and while mill tailings were impounded at the mill site, contamination spread to offsite areas through the action of wind and water. Mill tailings were also removed, transported to, and used at various Monticello properties as subbase and fill material, backfill around utility lines, and in construction materials such as concrete or mortar.

A number of federal programs were established since the 1970s to clean up radioactive contamination at sites across the U.S. In 1978, DOE initiated the Surplus Facilities Management Program (SFMP) to include federally owned sites, and in 1980, the Monticello Mill was accepted into this program as the Monticello Remedial Action Project (MRAP). In 1983, the MVP and MMTS were established in place of MRAP, as they were determined to be eligible for listing on the NPL. Removal actions were completed at several Monticello properties prior to the formal listing of the MVP on the NPL in June 1986. The MMTS was listed in November 1989.

The Record of Decision (ROD) that established the site remedy for MVP was issued in 1989 (DOE 1989). The remedy included excavation of tailings, ore, and related material from 424 vicinity properties, demolition of contaminated structures, temporary storage on the Monticello mill site, and final disposal in an engineered repository. Affected properties were backfilled with clean materials, graded, and restored. Affected structures were replaced. Remediation of the MVP was completed in June 1999, and the site was deleted from the NPL in February 2000.

The ROD for the MMTS was issued in 1990 (DOE 1990). The remedy at the mill site (OU I) included constructing a permanent disposal cell, removing MVP material stockpiles to the disposal cell, regrading and revegetating, realigning the Montezuma Creek channel, and constructing wetlands. Remediation of the mill site began in 1991 with the construction of access controls and the removal and abandonment of selected monitoring wells on the former mill site. Construction of the repository began in October 1995. Placement of contaminated materials in the disposal cell began in June 1997 and was completed in September 1999. Construction of the disposal cell cover was completed in February 2000.

---

\(^1\) The U.S. Nuclear Regulatory Commission is also a successor to AEC but never owned the mill site property.
Figure 1. Monticello MMTS and MVP Sites Locations and Features
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Waste materials in the disposal cell consist primarily of uranium mill tailings from the mill site, vicinity properties, and peripheral properties. The primary contaminant of concern is radium-226 ($^{226}$Ra). It has a radioactive half-life of 1622 years and produces radon-222. Radon, a gas, and its decay products pose an inhalation health risk to humans. Other materials include milling byproduct materials, mill site building and other kinds of debris, radiologically contaminated debris from vicinity and peripheral property remediation activities, and small quantities of asbestos and hazardous substances that were discovered during remediation. The total volume of material is approximately 2.54 million compacted-in-place cubic yards.

At peripheral properties (OU II), the remedy included removal of contaminated materials, revegetation, and the use of ICs in areas where supplemental or alternative standards were applied (see further discussion in Section 1.5.2). Some properties included in OU II were deleted from the NPL in October 2003. Other properties cannot be deleted because groundwater remediation is ongoing and remedial action objectives have not been met.

The MMTS ROD designated OU III to address contaminated surface water and groundwater, stipulating that remedy selection would follow the completion of site characterization activities through a CERCLA Remedial Investigation (RI) and Feasibility Study (FS). The RI report was issued in September 1998 (DOE 1998a); however, a companion FS report was not completed at that time because the effects of ongoing surface remedial actions on the groundwater conditions was uncertain. EPA and UDEQ concurred with DOE to instead implement interim remedial actions (DOE 1998c) and to complete the FS when site conditions stabilized. Interim actions included implementing ICs in 1999 to restrict the use of contaminated groundwater, laboratory study of contaminant mobility, and implementing passive remediation using an in situ permeable reactive barrier (PRB). Other interim actions included groundwater modeling and updating human health and ecological risk assessments. Interim remedial action findings and groundwater remedy evaluations are documented in the Monticello Mill Tailings Site Operable Unit III Final Remedial Investigation Addendum/Focused Feasibility Study (RIA/FFS) (DOE 2004a). The findings were used to support the selection of monitored natural attenuation (MNA) with ICs as the OU III remedy (DOE 2004c).

By 2005, LM recognized that the PRB was becoming ineffective in treating the groundwater because internal mineral fouling resulted in a progressive loss of permeability. In response, LM installed an ex situ pump-and-treat system in 2005 using a single extraction well and two aboveground zero-valent iron (ZVI)–based treatment vessels. This system was installed upgradient of the PRB where a mound of contaminated groundwater had developed. Neither the PRB nor the ex situ treatment system was a formal component of the OU III ROD.

The OU III ROD provided specific criteria to evaluate MNA performance by comparing trends in uranium concentration over time at selected monitoring wells to those predicted by the OU III groundwater model. LM first identified in 2006 (DOE 2006) that aquifer restoration progress was not meeting the performance criteria. This observation was confirmed in 2007 (DOE 2007c) using a separate method of trend analysis. On the basis of these findings, LM, EPA, and UDEQ concurred in March 2009 to augment the MNA remedy through an Explanation of Significant Difference (ESD) (DOE 2009) to implement a contingency remedy that formalized the ex situ treatment system as a remedy component. The ESD also recognized the PRB as a formal part of the groundwater remedy.
Although the ex situ system could be operated to extract and effectively treat contaminated groundwater, it was not designed to remediate a significant portion of the aquifer. Monitoring data indicated that this system did not appear to accelerate restoration progress. The contingency remedy was therefore optimized in 2015 by implementing an expanded pump-and-treat remediation approach that is formally referred to as the OU III groundwater contingency remedy optimization system. The conceptual design, intent, and implementation plan for the remedy optimization system is documented in the *Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah* (DOE 2014).

Under that plan, groundwater is extracted in a focused area of the aquifer (referred to as the area of attainment, or AOA) and piped underground to a control/transfer building from where the water is conveyed through a buried water pipeline approximately 1 mile to the solar evaporation pond (Pond 4) at the LM repository for evaporative treatment. Construction of the GRO began in May 2014 and was completed in December 2014. The system became fully operational in February 2015. In concurrence with EPA and UDEQ, LM terminated operation of the ex situ treatment system in December 2014 as the GRO was phased into operation.

### 1.6 Regulatory Requirements

This plan describes four broad categories of LTS&M activities that are required at the MMTS and MVP sites:

- O&M of the onsite disposal cell, Pond 4, leak detection and leachate collection and recovery systems for the disposal cell and Pond 4, and the Temporary Storage Facility (TSF).
- Surveillance and radiological control of non-DOE-owned properties at which contamination was left in place (supplemental standards properties and two City-owned properties with property-specific cleanup standards). Supplemental standards properties include Monticello city streets and utility corridors, private and City-owned peripheral properties, and Utah Department of Transportation (UDOT) rights-of-way.
- Operation of the GRO and conduct of associated OU III groundwater and surface water monitoring for evaluating the performance of the selected remedy.
- Monitoring and maintaining ICs through the conduct of periodic inspections and CERCLA Five-Year Reviews to demonstrate and document the effectiveness of the selected remedies.

Key regulatory requirements pertaining to the respective category of LTS&M activity are described below. Only the applicable or relevant and appropriate requirements (ARARs) that still pertain to the sites are discussed. ARARs that are no longer relevant because certain tasks have been completed are not included.

#### 1.6.1 General Regulatory Requirements for Disposal Site Operations and Maintenance Activities

The general standards for control of disposed uranium mill tailings are contained in 40 CFR 192.02 (a), (b), and (c). The disposal cell was designed to meet these standards. The *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998d) addresses operation and monitoring of the repository and Pond 4 water management systems. Site-specific action levels and contingency measures in the contingency plan were developed by DOE, EPA, and the State...
of Utah with the objective of maintaining compliance with State of Utah standards for groundwater quality protection (R317-6). The procedures for operation of the water management systems for the disposal cell and Pond 4 are consistent with requirements for hazardous waste landfills and surface impoundments, respectively, at both 40 CFR 264 and *Utah Administrative Code (UAC) 315-264*.

### 1.6.2 General Regulatory Requirements for Soil Cleanup

Most MVP and MMTS properties were cleaned up in accordance with UMTRCA standards in 40 CFR 192, Subparts B and C. Though these standards are not strictly applicable to the MMTS and MVP, the sites were sufficiently similar to UMTRCA sites where cleanup criteria were applicable that the same criteria were considered relevant and appropriate to the MMTS and MVP. 40 CFR 192.12 (a) describes the specific standards for cleanup of contaminated land. The standards are as follows.

(a) the concentration of radium-226 in land averaged over any area of 100 square meters [m²] shall not exceed the background level by more than—

1. 5 [picocuries per gram] pCi/g averaged over the first 15 [centimeters] cm of soil below the surface, and
2. 15 pCi/g averaged over 15 cm thick layers of soil more than 15 cm below the surface.

However, in certain circumstances and under certain conditions, 40 CFR 192.21 and 40 CFR 192.22 allow supplemental standards to be applied to areas where (1) the remedial action would have resulted in excessive environmental harm compared to the health and environmental benefits or (2) the cost of remedial action would have been unreasonably high relative to long-term benefits, and the radioactive materials did not pose a clear present or future hazard. A number of such areas (e.g., upland areas densely vegetated by mature piñon and juniper forest, and the floodplain of OU II soil and sediment properties) were identified at Monticello (see Section 2.2.2). Contamination was allowed to remain in these areas, which were designated supplemental standards properties, at levels exceeding the standards identified above.

In addition to radium, it was recognized that other mill-related constituents (e.g., uranium, vanadium) needed to be considered during the cleanup of tailings and related soils at certain properties. Property-specific cleanup levels were established for these constituents after publication of the RODs to achieve risk-based levels at these properties.

Appropriate ICs were established for supplemental standards properties and properties with property-specific cleanup levels because contamination remains that does not allow for UU/UE. Table 1 summarizes the soil cleanup standards used for the MVP and MMTS.

### 1.6.3 General Regulatory Requirements for Surface Water and Groundwater

The principal ARARs for the impacted surface and groundwater at the MMTS are drinking water standards under the Safe Drinking Water Act, and Utah water quality standards. For contaminants of concern not covered by these ARARs, risk-based values were adopted as the standards (DOE 2004c). The contaminants of concern and the remediation goals for OU III groundwater and surface water are listed in Table 2.
**Table 1. Soil Cleanup Standards for MVP and MMTS OU I and OU II**

<table>
<thead>
<tr>
<th>Contaminated Area</th>
<th>Cleanup Standard</th>
<th>Source of Cleanup Standard</th>
</tr>
</thead>
</table>
| Land (soil and sediment) | • $^{226}$Ra concentrations in soil shall not exceed the background level by more than 5 pCi/g in the top 15 cm\(^a\)  
• $^{226}$Ra concentrations in soil shall not exceed the background level by more than 15 pCi/g in successively deeper 15 cm layers\(^a\) | 40 CFR 192.12(a) |
| Occupied or Habitable Structures | • Average concentration of radon decay products (daughters) in air shall not exceed 0.02 WL, to the extent practicable, and in no case 0.03 WL\(^b\)  
• Exposure rates to gamma radiation shall not exceed background by more than 20 microroentgens per hour | 40 CFR 192.12(b) |
| Land (soil and sediment) | • Hot spot criteria for $^{226}$Ra  

**Alternate Cleanup Standards**

| Any | • Supplemental standards in lieu of the standards presented above may be applied if particular circumstances exist  
• Specific numerical standards are determined on a case-by-case basis | 40 CFR 192.21 and 192.22 |
| Land (soil and sediment) | Property-specific cleanup standards for $^{230}$Th, uranium, and vanadium in soil\(^c\) | Monticello Remedial Action Project, Radiological Sampling and Verification Procedures for Operable Unit I (DOE 1998b)  
U.S. EPA Region III Risk-Based Concentration Table (first quarter 1995), Soil Ingestion, Industrial Setting (specified in DOE 1999f) |

**Notes:**

\(^a\) When averaged over 100 m\(^2\).

\(^b\) A WL is a specific amount of alpha energy ($1.3 \times 10^5$ mega electron volts) associated with the decay of radon daughters in air. The energy associated with a concentration of 4 pCi/L of radon in air is equivalent to 0.02 WL.

\(^c\) Not identified as a cleanup standard in the MMTS ROD but determined to be relevant and appropriate based on property conditions encountered during remediation.

**Abbreviations:**

$^{226}$Ra = radium-226

$^{230}$Th = thorium-230

pCi/L = picocuries per liter

WL = working level
### Table 2. OU III Contaminants of Concern (COC) and Water Quality Remediation Goals

<table>
<thead>
<tr>
<th>COC&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Groundwater Remediation Goal&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Surface Water Remediation Goal&lt;sup&gt;b, c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>10 µg/L&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10 µg/L</td>
</tr>
<tr>
<td>Manganese</td>
<td>880 µg/L&lt;sup&gt;d&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>100 µg/L&lt;sup&gt;e&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>Nitrate (as N)</td>
<td>10,000 µg/L&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4000 µg/L</td>
</tr>
<tr>
<td>Selenium</td>
<td>50 µg/L&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5 µg/L</td>
</tr>
<tr>
<td>Uranium (metal toxicity)</td>
<td>30 µg/L&lt;sup&gt;c&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>Vanadium</td>
<td>330 µg/L&lt;sup&gt;d&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>234&lt;sup&gt;U&lt;/sup&gt; and 238&lt;sup&gt;U&lt;/sup&gt; (radiological dose)</td>
<td>30 pCi/L&lt;sup&gt;e&lt;/sup&gt;</td>
<td>30 pCi/L</td>
</tr>
<tr>
<td>Gross alpha activity</td>
<td>15 pCi/L&lt;sup&gt;c, f&lt;/sup&gt;</td>
<td>15 pCi/L&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Gross beta activity&lt;sup&gt;h&lt;/sup&gt;</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Notes:
- <sup>a</sup> Source: OU III ROD (DOE 2004c).
- <sup>b</sup> State of Utah standard for surface water formally adopted as cleanup goal in ESD (DOE 2009). The goal of 30 pCi/L converts to approximately 44 µg/L.
- <sup>c</sup> EPA's maximum contaminant level.
- <sup>d</sup> EPA's 2003 risk-based concentration.
- <sup>e</sup> UMTRA maximum concentration limit.
- <sup>f</sup> Excluding uranium and radon.
- <sup>g</sup> Excluding uranium and radon for MMTS OU III.
- <sup>h</sup> There is no remediation goal for gross beta because there are no activity-based standards for this constituent, and risk factors to derive a risk-based goal are radioisotope-specific.

Abbreviations:
- 234<sup>U</sup> = uranium-234
- 238<sup>U</sup> = uranium-238
- µg/L = micrograms per liter
- pCi/L = picocuries per liter

The objective for groundwater monitoring is to ensure that MNA with ICs combined with the contingency remedy of pump-and-treat enhancement will lead to the applicable goals within an acceptable period. Groundwater within the alluvial aquifer does not presently pose a threat to human health because it is not used for domestic purposes. Aquifer yield is poor and municipal water of superior quality is available. Furthermore, ICs are in place to prohibit the use of contaminated groundwater from the alluvial aquifer as drinking water.

The PRB, the auxiliary groundwater treatment cells, the GRO, and Pond 4 will eventually require decommissioning. At that time, task-specific ARARs will be identified as components of a decommissioning plan. ARARs for other OU III activities may include Utah standards for well drilling and decommissioning. Similarly, in the event that other activities outside of the scope of this LTS&M Plan become necessary, such as modifying wetland or riparian habitat, ARARs will be identified at that time to ensure regulatory compliance of the activity.

**1.6.4 General Regulatory Requirements for Institutional Controls and Five-Year Reviews**

Section 121(c) of CERCLA requires that remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at a site above levels that allow for UU/UE be reviewed every 5 years to ensure protection of human health and the environment. Therefore, CERCLA
Five-Year Reviews are required by statute for the MVP site and the MMTS. The cycle of CERCLA Five-Year Reviews of the MMTS and MVP began in 1997.

The most recent CERCLA Five-Year Reviews conducted in 2017 for the MVP site and the MMTS were consistent with EPA’s *Comprehensive Five-Year Review Guidance* (EPA 2001a) and *Recommended Evaluation of Institutional Controls: Supplement to the “Comprehensive Five-Year Review Guidance”* (EPA 2011; OSWER Directive 9355.7-18). DOE will continue to perform its CERCLA Five-Year Reviews for the MVP site and MMTS in accordance with the most recent guidance available.

Site-specific ICs have been established for properties associated with the site that are not appropriate for UU/UE. The ICs were established using several different mechanisms, each with its own associated requirements. Requirements specific to each IC are discussed in Section 2.3.

### 2.0 Site Conditions

#### 2.1 Site Description

The federal government, through LM, is responsible for the radioactive and other hazardous substances released at and from the Monticello NPL sites. DOE disposed of the impounded tailings, contaminated soils, contaminated debris from the former mill site buildings, and contaminated materials from remediated vicinity and peripheral properties in the onsite disposal cell. Regulated nonradiological hazardous materials that were encountered during remedial action were treated and disposed of either in the disposal cell or at offsite EPA-approved disposal facilities. Several areas associated with the site require LTS&M:

- The onsite disposal cell contains approximately 2.54 million cubic yards of contaminated material.
- Residual soil and sediment contamination remains in the floodplain and banks of Montezuma Creek (ICs apply).
- Residual soil contamination remains in street and utility easement and Highways 191 and 491 rights-of-way within the city of Monticello (ICs apply).
- Residual soil contamination remains on other private and City-owned properties (ICs apply).
- Residual groundwater contamination remains in the shallow alluvial aquifer beneath and downgradient of the former mill site (ICs apply).

#### 2.1.1 DOE-Owned Properties (MMTS OU I and OU II)

DOE-owned properties include the OU I properties encompassing the disposal site [MP-01040 (South) and MP-01080] as well as an OU II property that is designated as a wildlife corridor MP-01081 (South)]. Access to the operation portions of the properties is controlled. Fences and signage are maintained along most of the DOE property boundaries.
2.1.1.1 Disposal Cell and Pond 4 Design Summary

The disposal cell contains the waste materials removed from the MMTS and MVP sites for long-term isolation from the environment. The liner of the disposal cell was designed to meet the Utah Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities (formerly UAC R315-8; currently UAC R315-264). The cover was designed to meet the EPA minimum technology requirements for a RCRA Subtitle C cover, with project-specific enhancements. Nine settlement plates were constructed in the disposal cell cover to assess the settlement of materials in the disposal cell (see Figure 2 for settlement plate locations).

The surface of the disposal cell covers approximately 90 acres; a clean-fill berm and runoff collection ditches define its perimeter (Figure 2). The disposal cell cover is composed of two layers: a vegetated evapotranspiration cover and an underlying RCRA cover. The evapotranspiration cover is designed to store precipitation outside of the growing season in a 5.5-foot (ft)-thick, fine-textured soil layer (sponge layer) overlying a sand-and-gravel capillary barrier (12 inches thick). This water is then removed from storage by plant transpiration during the growing season. A gravel admixture in the upper 8 inches of soil controls erosion and functions as a mulch to enhance seedling emergence and plant growth while reducing wind erosion. The soil sponge also functions as a frost protection layer. Water retention in the soil sponge limits deep root penetration, and the layer thickness exceeds the depth of most burrowing vertebrates in the area. Within the sponge layer is a layer of cobble-size rock about 1 ft above the capillary barrier to deter deeper burrowers such as prairie dogs. Figure 3 shows a sectional schematic view of the disposal cell cover. During construction of the disposal cell, a large drainage lysimeter was installed under a 7.5-acre facet of the disposal cell cover (EPA 2000). Apart from the LTS&M activities specified in this plan, climatic conditions and lysimeter drainage rates are monitored for use in quantitatively evaluating the performance of water-balance cover technology. Beneath the evapotranspiration cover is a RCRA cover consisting of a synthetic geomembrane and a compacted radon barrier soil layer.

The disposal cell is divided into two separate cells, east and west, each of which has a repository liner system that collects drainage liquids from the encapsulated material (Figure 4). Each cell’s liner system is composed of, from top to bottom, the primary leachate collection/removal system (LCRS), a primary composite liner, a leak detection system (LDS), and a secondary composite liner. The cells and liners are collectively referred to as the disposal cell LCRS and LDS, which rest on a 12-inch-thick layer of prepared native soil. The primary and secondary composite liners consist of a 60-mil (0.06-inch) high-density polyethylene (HDPE) geomembrane overlying a geosynthetic clay liner. A separate anchor trench was used to secure each composite liner in place along the disposal cell side slopes. The primary LCRS is a 12-inch-thick sand layer drained by a network of perforated pipe to a sump in each cell that is equipped with a submersible pump. The LCRS is designed to collect leachate draining from the disposal cell and to limit head buildup on the underlying liner system. The LDS is constructed with a geonet that provides for rapid movement of leachate to the LDS sumps. The LDS provides confirmation of the integrity of the primary composite liner and is the point of compliance for the disposal cell. Figure 5 is a schematic view of water movement in the disposal cell LCRS and LDS.

A double-walled leachate transmission pipeline extends from the disposal cell LCRS and LDS systems to Pond 4, located just east of the disposal cell. Residual water in the tailings when originally placed in the disposal cell and water added during placement of the tailings continue to
drain to Pond 4. Pond 4 serves as a containment/evaporation pond for that water. It is triple-lined and is designed and constructed to meet the technological requirements of a hazardous-waste surface impoundment as formerly specified in UAC R315-8 (currently UAC R315-264). The liner system (see Figure 4) consists of a composite primary liner (HDPE membrane overlying geosynthetic clay liner) that overlies a geonet LCRS that is underlain by a secondary HDPE liner. The secondary HDPE liner is underlain by a geonet LDS that in turn overlies a second composite liner. The LCRS and LDS sumps are equipped with a submersible pump to deliver leachate to the pond. The operating capacity of Pond 4 is 16 million gallons.

The disposal cell LCRS and LDS monitoring and pumping stations are accessed by way of manholes (vaults) constructed into the cover. The Pond 4 LCRS and LDS monitoring and pumping station is accessed above ground. The disposal cell and Pond 4 LCRS and LDS include automated controls and sensors that monitor the water levels in the sumps and operate the pumps. Communication devices allow the contractor site staff to view the water levels and operate the pumps remotely through the LM System Operation and Analysis at Remote Sites (SOARS) program. These hardware and software components comprise the site “telemetry system” and allow remote viewing of the monitoring data in real time or historically. Two inspection ports (see Figure 2) were installed to enable camera inspection of the central collection pipes of the disposal cell LCRS but, due to damage, these inspection ports are inoperable. Since the cell has been closed, inspection of the central collection pipes of the disposal cell is no longer necessary. A complete set of the construction design plan specifications for the Monticello repository is located at the Monticello Field Office and at the LM office in Grand Junction, Colorado.

2.1.1.2 Temporary Storage Facility

The TSF at the Monticello repository receives site-related radiologically contaminated material, primarily materials excavated from supplemental standards areas in Monticello. The TSF is a gravel-surfaced area enclosed with a locked chain link fence located southwest of the LTS&M office (see Figure 2). The TSF is posted as a radiological control area and includes a 22-ft-wide by 30-ft-long by 4-ft-high concrete bin which is used for temporary storage of contaminated soil and debris. The bin is open at one end, designed for access by dump trucks and front-end loaders, and covered when not in use. The area also has a support building for tool storage and temporary storage of drums containing radiologically contaminated material that contains other hazardous substances (mixed waste).

The TSF meets the substantive requirements to temporarily store hazardous substances, hazardous wastes, polychlorinated biphenyl (PCB) material, and asbestos. Administrative requirements, such as obtaining permits and notification of regulated waste activity, are not required for onsite response actions at CERCLA sites, as specified at 40 CFR 300.400(e). If mixed waste is encountered, an Environmental Compliance representative develops a management plan specific to that waste to address the requirements for the transportation, temporary storage, inspections, markings, and ultimate disposal. Mixed waste recognition criteria and management practices are provided in Appendix E, Section E10.5, of this plan.
Figure 2. Monticello, Utah, Repository Base Map
Figure 3. Schematic of Disposal Cell Cover Design
Figure 4. Disposal Cell and Pond 4 Liner Sections
Figure 5. Schematic of Disposal Cell Liquid Extraction System
2.1.2 Non-DOE-Owned Properties with Residual Soil Contamination (MMTS OU II and MVP)

As explained in Section 1.6.2, most MVP and MMTS properties were remediated to meet UMTRCA cleanup standards for $^{226}$Ra, but it was necessary to leave some contamination in place at certain properties. Table 3 summarizes risk-based soil cleanup goals and/or cleanup levels achieved for MVP and MMTS properties that did not meet UU/UE criteria using supplemental and site-specific standards. In all cases, an attempt was made to reduce contaminant concentrations to levels that were as low as reasonably achievable without causing undue damage to the environment or compromising the health and safety of remediation workers.

Table 3. Characteristics of MMTS and MVP Properties with Residual Soil Contamination

<table>
<thead>
<tr>
<th>Properties</th>
<th>Assumed Land Use</th>
<th>Established Cleanup Goals</th>
<th>Cleanup Levels Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-00211 (Phase I)</td>
<td>Industrial</td>
<td>$\leq 6100$ mg/kg uranium$^a$</td>
<td>$\leq 418$ mg/kg uranium (1 location exceeds residential RBC of 230 mg/kg uranium); average uranium concentration is $&lt; 30$ mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 14,000$ mg/kg vanadium$^a$</td>
<td>$250$ mg/kg vanadium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 15$ pCi/g $^{230}$Th$^b$</td>
<td>$9.6$ pCi/g $^{230}$Th</td>
</tr>
<tr>
<td>MP-00211 (Phase II)</td>
<td>Recreational/agricultural</td>
<td>$\leq 300$ pCi/g uranium$^c$</td>
<td>$13.5$ pCi/g uranium</td>
</tr>
<tr>
<td>• MP-00391</td>
<td></td>
<td>$\leq 32$ pCi/g $^{226}$Ra$^d$</td>
<td>$\leq 32$ pCi/g $^{226}$Ra</td>
</tr>
<tr>
<td>• MP-01041</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MP-01077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-00893 (former mill site)</td>
<td>Recreational/agricultural</td>
<td>$\leq 30$ pCi/g uranium (brine storage ponds)$^h$</td>
<td>$15.3$ pCi/g uranium (brine storage ponds)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 300$ pCi/g uranium (areas other than brine storage ponds)$^h,i$</td>
<td>$125.4$ pCi/g uranium (areas other than brine storage ponds)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$^{230}$Th dependent on $^{226}$Ra concentration$^i$</td>
<td>$11.2$ pCi/g $^{230}$Th</td>
</tr>
<tr>
<td>• MP-01040 (south portion)</td>
<td>Permanent disposal cell</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>• MP-01080 (both repository properties)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MS-00176</td>
<td>“Residential envelope”</td>
<td>For the residential envelope and areas exceeding 16 pCi/g $^{226}$Ra:</td>
<td>Remediated areas:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 5$ pCi/g $^{226}$Ra above background within the top 15 cm of soil</td>
<td>$\leq 5$ pCi/g $^{226}$Ra above background within the top 15 cm of soil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\leq 15$ pCi/g $^{226}$Ra above background below the top 15 cm of soil</td>
<td>$\leq 15$ pCi/g $^{226}$Ra above background below the top 15 cm of soil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remediation of contamination $\leq 16$ pCi/g $^{226}$Ra was not required in other areas</td>
<td></td>
</tr>
</tbody>
</table>

$^a$ vanadium, uranium, $^{230}$Th, $^{226}$Ra

$^b$ From May 2017 through June 2018.

$^c$ From June 2018 through September 2018.

$^d$ From July 2018 through September 2018.

$^e$ Only applicable to brine storage ponds.

$^f$ From September 2018 through May 2019.

$^g$ From May 2019 through August 2019.

$^h$ From May 2019 through August 2019.

$^i$ From August 2019 through May 2020.

$^j$ From May 2020 through May 2021.

$^k$ From May 2021 through May 2022.

$^l$ From May 2022 through May 2023.

$^m$ From May 2023 through May 2024.
### Table 3. Characteristics of MMTS and MVP Properties with Residual Soil Contamination (continued)

<table>
<thead>
<tr>
<th>Properties</th>
<th>Assumed Land Use</th>
<th>Established Cleanup Goals</th>
<th>Cleanup Levels Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Streets and Utilities</td>
<td>Public roadways and utilities</td>
<td>• ≤ 5 pCi/g $^{226}$Ra above background within the top 15 cm of soil&lt;br&gt;• ≤ 15 pCi/g $^{226}$Ra above background below the top 15 cm of soil</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Highways 191 and 491</td>
<td>Public roadways</td>
<td>• ≤ 5 pCi/g $^{226}$Ra above background within the top 15 cm of soil&lt;br&gt;• ≤ 15 pCi/g $^{226}$Ra above background below the top 15 cm of soil&lt;br&gt;• Contamination may be returned to the excavation$^9$</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Properties</th>
<th>Assumed Land Use</th>
<th>Concentrations Used in RIA/FFS Risk Assessment$^h$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Montezuma Creek:</td>
<td>Extended backyard</td>
<td>• Arsenic—7.8 mg/kg&lt;br&gt;• Uranium—26.3 mg/kg&lt;br&gt;• Total uranium approximately 17 pCi/g&lt;br&gt;• Gamma—35 µR/hr</td>
</tr>
<tr>
<td>• MP-00951</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MP-00990</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MG-01033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MP-01084</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle Montezuma Creek:</td>
<td>Recreational or agricultural—pass-through area only between Upper and Lower Montezuma Creek</td>
<td>• Arsenic—7.7 mg/kg&lt;br&gt;• Uranium—28.2 mg/kg&lt;br&gt;• Total uranium approximately 19 pCi/g&lt;br&gt;• Gamma—29 µR/hr</td>
</tr>
<tr>
<td>• MG-01026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MG-01027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Montezuma Creek:</td>
<td>Recreational or visitor</td>
<td>• Arsenic—6.96 mg/kg&lt;br&gt;• Uranium—18.9 mg/kg&lt;br&gt;• Total uranium approximately 13 pCi/g&lt;br&gt;• Gamma—28 µR/hr</td>
</tr>
<tr>
<td>• MG-01029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MG-01030</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
Shaded properties are those where supplemental standards were applied in accordance with 40 CFR 192.21 and 40 CFR 192.22.

- EPA Region III Risk-Based Concentration Table (first quarter 1995), Soil Ingestion, Industrial Setting as specified in DOE (1999f).
- Uranium PRG from the mill site was used. See footnote "e" below.
- DOE (1999a).
- Uranium PRG developed for the mill site in the Monticello Remedial Action Project, Radiological Sampling and Verification Procedures for Operable Unit I (DOE 1998b).
- Collectively based on a maximum dose goal of 30 mrem/yr.
- Allowed through a memorandum of understanding between DOE and UDOT (DOE 1999h).
- Exposure point concentrations used in the RIA/FFS are the preremediation concentrations from the RI risk assessment (DOE1998a); concentrations are not reduced in response to hot spot remediation.

**Abbreviations:**
µR/hr = microroentgen per hour; mg/kg = milligrams per kilogram; mrem/yr = millirem per year; PRG = preliminary remediation goal; RBC = risk-based concentration; $^{230}$Th = thorium-230

Table 3 does not provide specific cleanup goals and cleanup levels achieved for the properties located in Upper, Middle, and Lower Montezuma Creek. Instead, the exposure point concentrations used in the RIA/FFS are used to assess the protectiveness of final conditions of these properties. Because no comprehensive verification sampling was done in Montezuma Creek after the completion of remediation, the RIA/FFS used pre-remediation soil concentration data from the baseline risk assessment (DOE 1998a) as a worst-case scenario, recognizing that actual concentrations (and corresponding risks) are likely lower. There are a wide range of...
cleanup goals for the Montezuma Creek properties, which were based on levels of contamination found in soil and sediment before and after the start of remediation. Some areas were remediated to meet cleanup goals that were modified after remediation was begun because meeting the initial cleanup goals would cause excessive environmental damage. In some cases, all contamination was left in place to avoid damaging the environment. Specific cleanup goals and cleanup levels achieved for these Montezuma Creek properties are documented in individual property completion reports, pertinent remedial action reports, and in the Application for Supplemental Standards for Upper, Middle, and Lower Montezuma Creek (DOE 1999b).

2.1.3 MMTS OU III—Groundwater and Surface Water

2.1.3.1 Hydrogeological Setting

OU III of the MMTS lies within the regional setting of the broad, nearly flat surface of the Great Sage Plain, which is about 7000 ft above sea level in elevation. Average annual precipitation is 15 inches, most of which occurs during late summer and early fall storms. Montezuma Creek is the main surface water feature in OU III, flowing west to east through the center of OU III. It is a small perennial stream with headwaters in the Abajo Mountains, which rise to nearly 11,000 ft approximately 5 miles west of Monticello. Typical flow in the creek is about 0.5 cubic feet per second (225 gallons per minute [gpm]). Montezuma Creek forms at the confluence of North and South Creeks a short distance upstream of the mill site. A municipal reservoir (Loyd’s Lake or Monticello Reservoir), located about 1-mile upstream of the mill site, interrupts the natural flow of South Creek. The municipal water treatment facility interrupts the natural flow of North Creek. In the western portion of OU III, the valley of Montezuma Creek is relatively open and gently sloping and it is used for agriculture. Eastward, the creek has incised a deep canyon into the local bedrock formations. Montezuma Creek is a limited source for irrigation and livestock watering.

The hydrostratigraphic units within OU III are the shallow alluvial aquifer, the underlying Dakota Sandstone aquitard, and below that, the Burro Canyon sandstone aquifer. Remnants of the Mancos Shale formation overlie the Dakota Sandstone at some peripheral locations in the western portion of OU III. Groundwater contamination is limited to the alluvial aquifer; the Burro Canyon aquifer is not contaminated. The alluvial aquifer comprises silty sand and gravel channel-fill deposits within the valley of Montezuma Creek. The top of the bedrock is generally within 15 ft of the ground surface in the valley floor and the saturated thickness of the aquifer averages about 5 ft. Groundwater flow is predominantly west to east following the gradient of the valley.

Much of the native alluvium was excavated to bedrock during remedial actions to remove contaminated soil and sediment on the mill site. To reconstruct this portion of the aquifer, sand and gravel obtained from non-contaminated areas of the site was placed in a narrow (30 to 40 ft wide) corridor over which the channel of Montezuma Creek was then reconstructed. Within the area of the mill site, the alluvial aquifer is recharged by underflow from the west and by considerable anthropogenic sources along the north margin of the mill site, where perennial seeps and wetland vegetation are common. On the mill site, the creek and two of the three adjoining wetlands (Wetlands 2 and 3), constructed during site restoration, fully penetrate the alluvium and so are effective groundwater sinks. A downstream outlet connects each wetland to Montezuma Creek.
Where the natural alluvial channel is resumed at the east end of the mill site, the aquifer is 200 to 300 ft wide (north to south). The aquifer narrows considerably about 1 mile east as the valley transitions to a steep-walled canyon, within which the aquifer is often less than 100 ft wide and very shallow. This narrowing and thinning of the aquifer results in considerable discharge of alluvial groundwater to the creek. In addition, the Dakota Sandstone aquitard is absent in this reach, allowing for the discharge of groundwater from the Burro Canyon aquifer to the overlying alluvium, and subsequently to Montezuma Creek. This hydrologic boundary prevents further eastward advancement of contaminated groundwater. Numerous springs from the Burro Canyon aquifer are evident in this reach near the contact with the underlying Morrison Formation.

2.1.3.2 OU III Groundwater Treatment System

As part of an OU III treatability study, a PRB was installed in 1999 for in situ, passive groundwater treatment. Internal mineral fouling has substantially reduced flow through the PRB since 2005. The PRB is about 100 ft in length across the aquifer, 6 ft thick parallel to groundwater flow, and about 13 ft deep to bedrock, with low-permeability slurry walls extending out toward the lateral margins of the aquifer. Partly because of excessive mineral precipitation in the PRB, an ex situ treatment system was installed in 2005 and 2007 to provide supplemental groundwater treatment. This second system extracted groundwater from the near-upgradient area of the PRB and pumped it through a serviceable cell containing ZVI. Use of this system was discontinued in 2014 with the implementation of the GRO.

A GRO system was installed in 2014 to actively remediate groundwater in a focused AOA. It uses a network of eight vertical wells to extract groundwater in the AOA. Extracted water is pumped to the groundwater transfer building where it is batched and then pumped to Pond 4 for evaporation. As described in Section 2.1.1.1, Pond 4 was constructed to evaporate leachate collected from the disposal cell; however, the design capacity was never approached and the underutilized capacity provides the necessary treatment capacity for the GRO design. Pond 4 still receives leachate from the disposal cell as a small percentage of what is received from the GRO system. The GRO system is operated to maintain flow rates between about 5 and 15 gpm to balance aquifer productivity and the rate of evaporation at Pond 4. Figure 7 shows the location of the AOA, the groundwater transfer building, and the pipeline used to transfer water from the AOA to Pond 4.

The GRO system was designed for all-season, 24-hour-per-day operation. Sixteen monitoring wells were installed in the AOA to monitor water quality and the aquifer’s response to groundwater extraction. The GRO system is equipped for remote monitoring and operation under the LM SOARS program.

2.1.3.3 Extent of Contamination

Figure 6 shows the area of the alluvial aquifer that currently exceeds the 30 micrograms per liter (µg/L) uranium standard. Uranium is the main driver for groundwater remediation as it is the most pervasive COC in the aquifer. The cleanup goals for groundwater and surface water are provided in Table 2.
Figure 6. MMTS OU III Study Area and Features
Figure 7. Plan View of the MMTS OU III Groundwater Remedy Optimization System
2.2 Institutional Controls

Each property identified in Table 4 is affected by one or more ICs that restrict land and/or groundwater use, as summarized in the table. Figure 1 shows the locations of the different properties listed in Table 4. DOE will conduct specific LTS&M activities to ensure that these ICs remain effective in protecting human health and the environment. Details of the ICs and necessary restrictions are summarized below.

Table 4. Summary of Current MMTS and MVP Institutional Controls

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<td>DOE-Owned Property</td>
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<td></td>
<td>Restrictions on Construction of Habitable Structures, Recreational Use Only (no overnight camping)</td>
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<td>No Soil Removal from Supplemental Standards or Easement Areas</td>
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<td>Groundwater Use Restrictions for Domestic Purposes on Shallow Alluvial Aquifer</td>
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<td>Special Zoning Restrictions Related to Building Structures</td>
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<td>IC Confirmation</td>
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<td>MP-01081 (north portion)</td>
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<td>MP-01084</td>
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<td>MVP</td>
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<tr>
<td>City Streets and Utilities</td>
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<td>F</td>
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<td>Highways 191 and 491</td>
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Notes:

a Former mill site property.
b DOE repository property.
c DOE retained this area as a perpetual wildlife corridor; disturbances are prohibited.
d Properties MP-00211 and MS-00176 are included in City of Monticello Overlay Zone OL-1, which was created through City of Monticello zoning ordinances 2002-04 and 2003-02.
e 1=Routine, and/or annual LTS&M inspections.
f = Contact State of Utah, Division of Water Rights regarding water appropriation applications.
g Review property deeds during annual LTS&M inspection, verify that annotations transfer with deeds.
h Radiological control performed on excavations.

Any soil removal from a supplemental standards area on this property must be done as described in Sections 2.2.2 and 2.2.3 and in accordance with the applicable procedures in Appendix E.

Property meets UU/UE criteria with respect to residual contamination. ICs were imposed as a condition of land transfer from the federal government.

2.2.1 ICs on Properties Transferred from DOE to the City of Monticello

The transfer of approximately 383 acres from DOE to the City of Monticello was completed in 2000 through the Federal Lands-to-Parks program administered by the National Park Service (DOE 2000). This program allows the transfer of federal holdings to state or local government provided the lands remain open to the public for parks and recreation in perpetuity. Consistent with the conditions of the transfer, the former mill site was restored to a park setting, including re-introduction of native plants, establishing riparian and wetland habitat for wildlife along Montezuma Creek, and providing picnic areas and walking paths for public use.

To protect public health, DOE placed deed restrictions with ICs (in the form of restrictive easements) on the transferred properties where the underlying groundwater was contaminated or
soil was remediated to supplemental standards (DOE 1999a). The easement generally prohibits overnight camping, nighttime use, and construction of a habitable structure and, as indicated in Table 4, removal of soil and use of the shallow aquifer for domestic purposes is prohibited on specific parcels. Table 4 identifies the properties transferred from DOE to the City of Monticello and their respective ICs; Figure 1 shows the locations of those properties.

2.2.2 ICs on Public Roads and Utilities

Public roads and utilities, which are properties historically known as “City Streets and Utilities,” and “Highways 191 and 491 rights-of-way,” are supplemental standards properties (DOE 1999c; DOE 1999e, respectively) that are managed by controlling radioactive material encountered during City or UDOT excavations within Monticello city limits. Under the cooperative agreement with the City of Monticello (DOE 1999g), DOE provided the City with heavy equipment for use in removing and transferring radiologically contaminated material from City and UDOT excavations within Monticello city limits to the TSF. These properties are shown on Figure 1.

ICs affecting these properties include DOE-conducted scans for radioactive material in UDOT highways, city streets, and utility corridor excavations within Monticello city limits. Radiologically contaminated material (> 5 pCi/g $^{226}$Ra above background) encountered in a city street or utility excavation is removed and transferred to the TSF, or is stockpiled temporarily at City-owned property MS-01006 or MP-00181 (see Figure 1 for locations). At the option of UDOT, through a memorandum of understanding between DOE and UDOT (DOE 1999h), radiologically contaminated material may be returned to a UDOT Highway 191 or 491 rights-of-way excavation as fill, transferred directly to the TSF by City workers and equipment, or transferred to either properties MS-01006 or MP-00181 for temporary stockpiling and later transfer to the TSF by the City.

2.2.3 ICs as Zoning Restrictions

Private property MS-00176 (Figure 1) is a supplemental standards property (DOE 1999d) and was assigned a special zoning designation, Overlay Zone OL-1, as an IC through Zoning Ordinances 2002-04 and 2003-02. In accordance with the ordinances, the City of Monticello will not issue a building permit until the excavated foundation of any new permanent, habitable structure on property MS-00176 meets cleanup levels specified in 40 CFR Part 192.12, as determined by the contractor operations lead. Any radiological contamination found in an excavation would be removed to the TSF in accordance with applicable procedures in Appendix E and Appendix G. The property deed for MS-00176 was annotated to identify the supplemental standards used to remediate the property and the location of remaining radiological contamination.

Property MP-00211 is City property adjoining the northern boundary of the former mill site (Figure 1). This property is not a supplemental standards property; however, at one location on the property (MP-00211 Phase I), uranium in soil exceeds the EPA Region III risk-based standard for residential use. The current zoning for the property is recreational and, based on the completion report for this property (DOE 1999f), future land use is assumed to be industrial. Conditions are suitable for either use. The current zoning for the property is recreational. Through Zoning Ordinances 2002-04 and 2003-2, the City assigned a special zoning designation
(Overlay Zone OL-1) as an IC for this property in case it should be zoned for residential use in the future. The ordinances require DOE to complete a radiological survey in the footprint of any future habitable structure. If a habitable structure is proposed in the future, DOE will evaluate the suitability of the property for this use (see Appendix E, Section E8.0). Pending the results of this evaluation, a building permit may be issued.

2.2.4 ICs on Private Properties Within the Montezuma Creek Restrictive Easement Area

Eight private properties traversed by Montezuma Creek that were remediated to supplemental standards (DOE 1999b) are affected by ICs (in the form of restrictive easements). The ICs, negotiated by the U.S. Army Corps of Engineers, were applied to the portion of those properties where contaminated soil and sediments were left in place, generally within the 50 to 100 ft wide floodplain of Montezuma Creek. Construction of habitable structures within, and soil removal from, designated easement areas is prohibited. Authorized representatives of DOE, EPA, and UDEQ are granted right of entry to and across the easement areas for purposes of inspection. The private properties, identified in Table 4 and Figure 1, are sometimes referred to as Upper, Middle, and Lower Montezuma Creek, the Montezuma Creek Soil and Sediment Properties, or the Montezuma Creek restrictive easement properties. The affected properties are collectively referred to as the “Montezuma Creek restrictive easement area” for the remainder of this plan.

2.2.5 ICs in the Groundwater Restricted Area

The use of contaminated water within OU III is prohibited through a groundwater management policy (State of Utah 1999) issued and administered by the State Engineer’s Office. The policy states that applications to appropriate water from the shallow alluvial aquifer in the groundwater restricted area (GWRA) (see Figure 1) for domestic purposes will not be approved; construction of a suitable well into the deeper bedrock aquifer may be approved. The restricted area encompasses all property underlain by groundwater contamination, including properties transferred from DOE to the City of Monticello where a water use restriction was applied as a condition of the land transfer (Section 4.1.1). Table 4 identifies properties within the GWRA.

2.2.6 DOE-Owned Property

Although there are no formal ICs placed on the DOE-owned properties, federal ownership of these properties ensures that appropriate restrictions are maintained. Procedures are in place that require regular inspections and reporting (see Section 4.1). Table 4 identifies DOE-owned properties; Figure 1) shows the locations of those properties.
3.0 LTS&M Administrative Framework

The administrative practices established for the Monticello LTS&M project have been developed to implement DOE-authorized procedures; identify and assign responsibilities; and standardize the administrative systems and the documentation required for the monitoring, inspection, review, and reporting requirements documented in this LTS&M Plan. Included in this section is general information about the community involvement activities, records management and document control processes, health and safety program information, training requirements, and QA program elements that apply to the LTS&M tasks.

3.1 Community Involvement

Community relations staff seeks to keep the community informed and involved in site activities and accomplishments through newspaper announcements, DOE fact sheets and newsletters, and attendance, when warranted, at public meetings. In support of the Monticello LTS&M, the Legacy Management Support (LMS) contractor community relations lead:

- Maintains the community contacts database and provides a list of key contacts when requested.
- Manages public announcements in local newspapers and other media when required.
- Participates in the CERCLA Five-Year Review process by soliciting feedback from interested citizens and conducting interviews with designated community members.

3.2 Records Management and Document Control Process

Records management and document control procedures will be implemented during performance and documentation of the work associated with this LTS&M Plan. Records management and document control practices will comply with established QA requirements and DOE-approved procedures. Procedures used in documenting inspections and managing records and project documents associated with this LTS&M Plan are included in Appendix B.

3.2.1 Administrative Record and Information Repository

In compliance with CERCLA requirements, an Administrative Record (AR) and an Information Repository (IR) were established for the Monticello NPL Sites. Two AR collections were established for the Monticello sites: the MMTS/MVP collection, and the MMTS OU III collection. ARs contain documentation of actions leading up to the RODs or ESDs. The IR contains documents of interest to the public that were generated after issuance of the RODs.

The AR and IR collections were previously maintained in paper form but are now maintained on the [https://www.lm.doe.gov/monticello/Sites.aspx](https://www.lm.doe.gov/monticello/Sites.aspx) website where they are publicly available. The IR collection is updated on an annual basis. The paper AR collections have been transferred to DOE’s facilities in Morgantown, West Virginia, in compliance with records management requirements. No documents will be removed from the AR collections; only documents leading up to any future ESDs or ROD amendments may be added to these collections in the future.
The contractor site lead is responsible for maintaining the records collections. These responsibilities include:

- Identifying the relevant documents to include in the collections
- Identifying relevant documents to withdraw from the IR collection, based on public interest
- Ensuring that IR updates are completed on an annual basis
- Coordinating with webpage designers to ensure that documents are easily retrievable and readily available to the public

3.2.2 Document Control

The LTS&M Plan for the Monticello NPL sites is designated as a “primary” document in the FFA. This designation requires DOE approval and EPA and UDEQ review and concurrence for any changes to this document. The LTS&M Plan will be reviewed at least once every 5 years to ensure that DOE is conducting LTS&M at an appropriate level of effort. The document control administrative process and methods that will be used to manage this manual, including reviews, revisions, distribution control, program directives, and the associated records, are included in Appendix B.

Change controls, regulatory review and comment resolution processes, and approval for changes to this LTS&M Plan are managed and implemented under the direction of the LM Monticello site manager. Significant changes or development of new documents for Monticello LTS&M may be established in task orders and documented in project schedules and milestones in the continuously updated Section 5.0 of the Monticello Site Management Plan (GJO-2003-493-TAC) (SMP) and DOE deliverables schedules. Interim changes to field sampling activities may be documented and authorized for use in accordance with the Program Directive Guidelines in Attachment B-1.

The document control requirements and processes in Appendix B will be used when new documents are developed, when revisions to existing documents are needed, and to ensure that current and up-to-date documents are used in implementing this LTS&M Plan. Using document control procedures will ensure that:

- The correct documents are identified and available for use.
- The status of a document (e.g., draft, superseded, revision numbers) is easily identified.
- Changes are appropriately documented.
- The material is reviewed by the affected organizations.
- Concurrence and approvals by the responsible levels of management are obtained.
- The material is distributed to designated recipients.
3.2.2.1 LTS&M Record Books

Record books will be used to provide a history of various surveillance and inspections required by the plan. All record books are kept at the Monticello field office. The following record books are established by this plan:

- Site Representative’s record book identifies the record books that are issued, including the start and completion dates.
- Repository Site record book (includes the Disposal Cell, Pond 4, and all property within the repository boundary fence).
- Temporary Storage Facility record book.
- City-Owned Properties record book (includes properties transferred to the City through the Covenant Deferral and MP-00211).
- Private Property Restricted Areas record book (includes Montezuma Creek restrictive easement area [OU II soil and sediment] properties, supplemental standards property MS-00176, and properties included in the groundwater restricted area, as designated by the State Engineer).

3.2.2.2 Contractor Documents Used in Implementing Portions of the LTS&M Plan

DOE has authorized the use of the following LMS contractor manuals that address LM requirements and have been developed to standardize practices and procedures that apply to LM project activities (Table 5).

*Table 5. Contractor Key Documents for LM Sites*

<table>
<thead>
<tr>
<th>Manual Number</th>
<th>Manual Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMS/POL/S04320</td>
<td>Quality Assurance Manual</td>
</tr>
<tr>
<td>LMS/POL/S04321</td>
<td>Safety and Health Manual</td>
</tr>
<tr>
<td>LMS/POL/S04322</td>
<td>Radiological Control Manual</td>
</tr>
<tr>
<td>LMS/PRO/S04337</td>
<td>Safety and Health Procedures Manual</td>
</tr>
<tr>
<td>LMS/POL/S04323</td>
<td>Training Program Description</td>
</tr>
<tr>
<td>LMS/POL/S04327</td>
<td>Records Management Manual</td>
</tr>
</tbody>
</table>

3.2.3 Key Project Documents

Appendix A lists relevant project documents that (1) provide background information, (2) provide documentation of agreements, (3) establish project requirements, and (4) identify the Monticello LTS&M inspection and monitoring activities. A copy of each of these documents is available on the LM website (https://www.lm.doe.gov) under the Monticello “Key Documents and Links” or “All Site Documents” links.
3.3 Safety and Health

The Monticello contractor operations lead is the designated Site Safety Supervisor (SSS) and has the authority to enforce safety requirements for activities conducted by contractor staff in support of Monticello LTS&M activities, including work conducted by subcontractors on DOE property and projects.

LTS&M activities will be performed in accordance with company policies, safety and health regulations (e.g., Occupational Safety and Health Administration [OSHA]), and DOE-approved health and safety procedures as developed and maintained by the current LMS contractor.

Safety, including personal protection equipment (PPE), necessary to work on DOE property and projects are identified through the use of procedures, Job Safety Analysis (JSA), Safe Work Permits (SWP), or Radiological Work Permits (RWP). These are developed to control hazards associated with tasks for the Monticello project. The LMS contractor Safety and Health group manages and maintains current JSAs, SWPs, and RWPs at the site.

Site-specific information relevant to emergency contacts, local medical or emergency resources, and hazard survey information is included in Appendix C.

3.4 Training

The contractor site lead is responsible for providing the Monticello contractor staff and other affected personnel with initial orientation to the requirements and processes established within this plan. As revisions to this LTS&M Plan occur, the contractor site lead will review the changes with the affected staff and ensure that policies and procedures associated with the changes are appropriately implemented and sufficiently documented.

LTS&M briefings will be provided by the Monticello contractor operations lead to affected City or UDOT workers, subcontractors, and site visitors to give them relevant project and safety information for the work that will be done or areas they may visit.

The contractor’s training group maintains and tracks training records for Monticello contractor employees. Additionally, this includes project-required training provided by the contractor to City of Monticello and UDOT employees. Monticello contractor site staff will contact the LMS contractor’s Training group for verification of required training prior to work being performed by non-contractor personnel.

3.4.1 Monticello Contractor Operations Lead Minimum Requirements

The Monticello contractor operations lead will be qualified as an SSS through training and as authorized by the contractor site lead and the Safety and Health manager. The contractor operations lead will have a general knowledge of hazardous materials management, and will have a working knowledge of the LTS&M operating procedures within this plan.
3.4.2 Environmental Compliance Representative Minimum Requirements

The Environmental Compliance representative providing support to the project through the contractor’s compliance organization will be qualified or have access to a qualified U.S. Department of Transportation (DOT) hazardous material shipper and will have knowledge of CFRs pertaining to such topics as RCRA hazardous wastes (40 CFR 260–273), CERCLA hazardous substances (40 CFR 300–373), Toxic Substances Control Act polychlorinated biphenyls and asbestos (40 CFR 761–763), and U.S. DOT hazardous materials (49 CFR 100–180).

3.5 Quality Assurance

QA program requirements based on DOE Order 414.1D serve as the basis for the Quality Assurance documents that are implemented for Monticello LTS&M project tasks. The Legacy Management Quality Assurance Project Plan for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites (LMS/PLN/S04353) has been developed to be consistent with DOE quality management system requirements (i.e., DOE Order 414.1D), EPA’s requirements (EPA 2001b) and guidance (EPA 2002) for quality assurance project plans, and to address QA requirements for LTS&M activities at remediated CERCLA sites assigned to the long-term care of LM and subject to regulation by EPA. The QA project plan has been prepared to assure that the administrative and technical work will be of sufficient quality to satisfy project objectives.

4.0 Operations and Maintenance Requirements

The primary LTS&M activities at the MVP and MMTS are conducted to (1) operate and maintain the mill tailings disposal site, (2) provide radiological control at properties where residual soil contamination from mill tailings remains in place (e.g., supplemental standards properties), (3) operate the OU III pump-and-treat GRO system and monitor water quality restoration progress, and (4) ensure that ICs restricting the use of land and water remain effective. LM assesses MVP and MMTS conditions and remedy protectiveness through (1) inspections (monthly, quarterly, and annually) of site infrastructure and operations, (2) semiannual monitoring of groundwater and surface water, and (3) CERCLA Five-Year Reviews.

Table 6 lists all of the required O&M activities for the Monticello sites and the frequency with which they are completed. The Monticello contractor operations lead and the contractor site lead are responsible for coordinating or conducting the activities as identified in in Table 6. These are either regularly scheduled activities or activities triggered by natural events such as a significant precipitation event. This section provides an overview of the LTS&M activities that are conducted for the Monticello site. References to specific procedures that apply to those LTS&M activities are provided. Most of the procedures are included as appendixes to this LTS&M plan though some are incorporated by reference only.
Table 6. Monticello O&M Responsibilities

<table>
<thead>
<tr>
<th>Activitya, b</th>
<th>Responsible Person</th>
<th>Comments</th>
<th>Procedurec</th>
<th>Report</th>
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<tbody>
<tr>
<td>Weeklye, f</td>
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<td></td>
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<tr>
<td>Repository and Pond 4 LDS and LCRS monitoring</td>
<td>Contractor operations lead</td>
<td>Find on SOARS telemetry, includes water level monitoring of disposal cell and Pond 4, disposal cell LDS and LCRS, record in the LCRS and LDS template</td>
<td>Appendix D, Section D3.0</td>
<td>FFA4 reports and annual inspection</td>
</tr>
<tr>
<td>Public Roads and Utility Corridor surveillance</td>
<td>Contractor operations lead</td>
<td>Excavation schedule and inspections, record in the Public Roads and Utility Corridors Surveillance Record Book</td>
<td>Appendix E, Section E5.5</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>MP-00211 surveillance</td>
<td>Contractor operations lead</td>
<td>Record in the City-Owned Properties Record Book</td>
<td>Appendix E, Section E8.1</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Monthlye, f, g</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Disposal cell surveillance</td>
<td>Contractor operations lead</td>
<td>Checklist available, send signed copy to the contractor site lead, record in the Repository Site Record Book</td>
<td>Appendix D, Section D2.0</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Meteorological monitoring</td>
<td>Contractor operations lead</td>
<td>Print report send to contractor site lead</td>
<td>Appendix D, Sections D2.4 and D5.2</td>
<td>FFA reports</td>
</tr>
<tr>
<td>Pond 4 monthly surveillance</td>
<td>Contractor operations lead</td>
<td>Checklist available, send signed copy to the contractor site lead, record in the Repository Site Record Book</td>
<td>Appendix D, Section D3.0</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Disposal cell and Pond 4 water level monitoring</td>
<td>Contractor operations lead</td>
<td>Find on SOARS telemetry, includes water level monitoring of disposal cell and Pond 4, disposal cell LDS and LCRS, record in the LCRS and LDS template</td>
<td>Appendix D, Sections D5.0 and D5.2</td>
<td>FFA reports</td>
</tr>
<tr>
<td>LCRS and LDS water management reporting</td>
<td>Contractor operations lead</td>
<td>Find on SOARS telemetry, includes water level monitoring of disposal cell and Pond 4, disposal cell LDS and LCRS, record in the LCRS and LDS template</td>
<td>Appendix D, Section D5.0</td>
<td>FFA reports</td>
</tr>
<tr>
<td>Groundwater Remedy Optimization: Transfer building and groundwater system</td>
<td>Contractor operations lead</td>
<td>Verify system operation and flow and pressure levels, record verification in the Repository Site Record Book</td>
<td>Appendix D, Section D7.0</td>
<td>FFA reports</td>
</tr>
<tr>
<td>MS-00176 surveillance</td>
<td>Contractor operations lead</td>
<td>Record in the Private Property Restricted Areas Record Book</td>
<td>Appendix E, Section E7.1</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Quarterlye, f</td>
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<tr>
<td>Repository site surveillance</td>
<td>Contractor operations lead</td>
<td>Record in the Repository Site Surveillance Record Book, checklist available, send signed copy to the contractor site lead</td>
<td>Appendix D, Section D2.0</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>TSF inspection</td>
<td>Contractor operations lead</td>
<td>Checklist available, send signed copy to the contractor site lead</td>
<td>Appendix D, Section D6.0</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Activitya, b</td>
<td>Responsible Person</td>
<td>Comments</td>
<td>Procedurec</td>
<td>Report</td>
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<tr>
<td>City-owned (former DOE) properties surveillance</td>
<td>Contractor operations lead</td>
<td>Record in the City-Owned Properties Record Book</td>
<td>Appendix E, Section E5.3</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>Public roads and utility corridor surveillance</td>
<td>Contractor operations lead</td>
<td>Hwy 191 east/west embankments at Montezuma Creek</td>
<td>Appendix E, Section E5.5</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>MP-00211 surveillance</td>
<td>Contractor operations lead</td>
<td>Record in the City-Owned Properties Record Book</td>
<td>Appendix E, Section E8.1</td>
<td>FFA reports and annual inspection</td>
</tr>
<tr>
<td>LCRS and LDS water management reporting</td>
<td>Contractor site lead</td>
<td>Send report to LM Monticello site manager, EPA, and UDEQ</td>
<td>Appendix D, Sections D5.13 and D5.14</td>
<td>FFA reports</td>
</tr>
</tbody>
</table>

### Spring and Fall of Each Yearf, h

<table>
<thead>
<tr>
<th>Activitya, b</th>
<th>Responsible Person</th>
<th>Comments</th>
<th>Procedurec</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montezuma Creek restrictive easement area surveillance</td>
<td>Contractor operations lead</td>
<td>Notify landowners before surveillance activities begin</td>
<td>Appendix E, Section E9.0</td>
<td>FFA reports</td>
</tr>
<tr>
<td>Groundwater restricted area surveillance</td>
<td>Contractor operations lead</td>
<td>Notify landowners before surveillance activities begin</td>
<td>Appendix E, Section E9.2</td>
<td>None</td>
</tr>
<tr>
<td>IR Update</td>
<td>Contractor site lead</td>
<td>Send updated index annually to DOE, EPA, and UDEQ (April)</td>
<td>Appendix B</td>
<td>None</td>
</tr>
</tbody>
</table>

### Annuallyg, h, i

<table>
<thead>
<tr>
<th>Activitya, b</th>
<th>Responsible Person</th>
<th>Comments</th>
<th>Procedurec</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property MS-00176 Surveillance</td>
<td>Contractor operations lead</td>
<td>In May, verify property ownership and rezoning or building permit applications</td>
<td>Appendix E, Section E7.1</td>
<td>FFA reports and annual site inspection</td>
</tr>
<tr>
<td>Montezuma Creek restrictive easement area surveillance</td>
<td>Contractor operations lead</td>
<td>Routine inspections and inspections during sampling events performed twice each year.</td>
<td>Appendix E, Section E9.1</td>
<td>FFA reports and annual site inspection</td>
</tr>
<tr>
<td>Public roads and utility corridor surveillance</td>
<td>Contractor site lead</td>
<td>Utilize the UDOT webpage for planned highway projects</td>
<td>Appendix E, Section E5.5</td>
<td>FFA reports</td>
</tr>
<tr>
<td>Groundwater and surface water data summary and performance evaluation</td>
<td>Contractor site lead</td>
<td>Report due in September before the annual inspection begins</td>
<td>SMP</td>
<td>Annual groundwater report</td>
</tr>
<tr>
<td>PRB and GRO system surveillance</td>
<td>Contractor site lead</td>
<td>Annual reporting and inspection</td>
<td>Appendix H</td>
<td>Annual groundwater report</td>
</tr>
<tr>
<td>Activitya, b</td>
<td>Responsible Person</td>
<td>Comments</td>
<td>Procedurec</td>
<td>Report</td>
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</tr>
<tr>
<td>Contact Utah State Engineer regarding well drilling applications</td>
<td>Contractor site lead</td>
<td>Occurs during planning for annual inspection</td>
<td>Appendix H</td>
<td>Inspection report</td>
</tr>
<tr>
<td>Conduct annual inspection</td>
<td>Contractor site lead</td>
<td>Conducted in September of each year</td>
<td>Appendix H</td>
<td>Inspection report</td>
</tr>
<tr>
<td>Prepare annual inspection report</td>
<td>Contractor site lead</td>
<td>Report due to regulators December 31</td>
<td>Appendix H</td>
<td>Inspection report</td>
</tr>
<tr>
<td>Update as-built drawings</td>
<td>Contractor site lead</td>
<td>Submit to technical support beginning of calendar year (Jan–Feb), the slowest time of year, and technical support will update the drawings and return by the end of March.</td>
<td>Appendix E, Section E5.1</td>
<td>None</td>
</tr>
</tbody>
</table>

**Every 5 Years Beginning 2007**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsible Person</th>
<th>Comments</th>
<th>Procedurec</th>
<th>Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-year survey of disposal cell settlement plates</td>
<td>Contractor site lead</td>
<td>Last completed in October 2016, next survey scheduled 2021</td>
<td>FFA report</td>
<td></td>
</tr>
<tr>
<td>CERCLA Five-Year Review of MMTS and MVP</td>
<td>Contractor site lead</td>
<td>Every five years, the annual inspection functions as the Five-Year Review inspection</td>
<td>Appendix H</td>
<td>Five-Year Review inspection</td>
</tr>
<tr>
<td>Prepare and submit CERCLA Five-Year Review report</td>
<td>Contractor site lead</td>
<td>Draft due the end of January</td>
<td>EPA guidance, SMP</td>
<td>CERCLA Five-Year Reviews</td>
</tr>
</tbody>
</table>

**Triggered by 25-Year Storm Event or Periods of Significant Rainfall**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsible Person</th>
<th>Comments</th>
<th>Procedurec</th>
<th>Report</th>
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<tbody>
<tr>
<td>Repository site surveillance</td>
<td>Contractor operations lead</td>
<td>Repository surveillance checklist and document in the Repository Site Record Book</td>
<td>Appendix D, Section D2.5</td>
<td>FFA reports</td>
</tr>
<tr>
<td>City-owned and land-use restricted property surveillance</td>
<td>Contractor operations lead</td>
<td>Soil erosion, gulling, and stream channel changes (storm event inspections do not apply to MP-01042)</td>
<td>Appendix E, Section E10.1</td>
<td>FFA reports</td>
</tr>
</tbody>
</table>

**Notes:**

a Additional surveillance, inspection, and monitoring may be required based on work in progress.
b Additional recordkeeping requirements are addressed in Appendix B.
c Unless specified otherwise, procedures referred to are in the appendixes of this LTS&M Plan.
d FFA Quarterly Reports.

g Application for Supplemental Standards for DOE ID No. MS-00176-VL, DOE (1999d).
h Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan Draft Final (DOE 2004b).
4.1 Disposal Site

LTS&M activities associated with the disposal site include routine surveillance and maintenance of the surface conditions and O&M of the LCRS, LDS, and TSF. Specific requirements and procedures for the disposal site are detailed in Appendix D of this plan and summarized below. Fenced boundaries and gates limit access to the disposal site and controlled entry is required for all visitors. Visitors have to check in at the administration building or meet a contractor site employee at a prescribed time and location for access to the disposal site. The site is staffed during normal working hours.

Monticello contractor site staff shall conduct monthly and quarterly surveillance of the Monticello repository area with emphasis on the disposal cell cover. The purpose of routine surveillance is to ensure (1) protection of infrastructure from damage by human, plant, or animal intrusion, or weather, (2) early detection and resolution of potentially significant problems, (3) routine maintenance against normal attrition, and (4) adequate data collection for CERCLA Five-Year Reviews (monthly/quarterly repository surveillance checklists, inspections after major storm events, TSF inspection checklist, and documenting any maintenance or construction work in the Repository Site Record Book). Routine surveillance will include visual inspection primarily for evidence of desiccation or settlement (such as fissures), wind scouring or gully erosion, downslope movement of rock armoring, general health of vegetation, cover disturbance by burrowing animals, undesirable vegetation, human trespass, and intact fencing and signage.

In addition to routine (i.e., monthly and quarterly) monitoring, Monticello contractor site staff shall conduct a surveillance of the repository after each 25-year storm event. A 25-year storm event is defined as one in which 2.8 or more inches of rain falls in a 24-hour period. Two onsite weather gauges are used to determine significant weather concerns. One is located near the southwest corner of the administration building and one is located at the lysimeter station located at the northeast corner of the disposal cell. Information from the weather gauge located at the administration building can be viewed through either the weather instrumentation or the onsite computer. Information from the weather gauge located near the lysimeter station can be viewed by using the SOARS telemetry. The purpose of monitoring this information is to check for evidence of erosion or other storm-related damage.

Monticello contractor site staff shall monitor meteorological conditions (wind speed, wind direction, temperature, barometric pressure, and precipitation) using the onsite automated weather stations. Wind, precipitation, and temperature data are useful in assessing the condition of vegetation growing on the disposal cell cover and for initiating inspections triggered by a storm event. A summary meteorological data report with daily climatic information is printed monthly and sent to the contractor site lead.

4.1.1 Disposal Cell and Pond 4 LCRS and LDS Operation

Currently there is no groundwater monitoring associated with the repository or Pond 4. Instead, the LDS for those systems represent the points of compliance to confirm the primary liner integrity. Action levels were established based on hypothetical leakage rates of the liners. As long as leakage rates stay below the action levels, sumps are operated routinely to transfer leachate to Pond 4 from the repository and to recirculate leachate from the Pond 4 LDS. If action levels are exceeded, sampling and analysis of leachate is required. Depending on results of that analysis, other actions (e.g., groundwater monitoring) may be required (DOE 1998d).
Appendix D, Section D5.0, summarizes requirements for operating the engineered water collection systems beneath the disposal cell and Pond 4, and for initiating response actions when the established action levels are exceeded. The action levels are formally established in Repository and Pond 4 Groundwater Contingency Plan (DOE 1998d), and are summarized in Appendix D, Section D5.0, to this plan.

The LCRS and LDS telemetry system monitors sump water levels, controls pump operation between specified high and low water levels, and transmits monitoring data, including flow rates and volumes, to a central database at the LM office in Grand Junction, Colorado. The Monticello telemetry system is integrated with the LM SOARS system, which allows real-time viewing of data logging installations deployed at numerous LM facilities, including the Monticello site.

4.1.2 TSF Operations

The TSF at the Monticello repository receives site-related radiologically contaminated material, primarily materials excavated from supplemental standards areas in Monticello. The TSF includes a concrete bin for the temporary storage of contaminated soil and debris. When the bin reaches approximately 75% capacity, arrangements are made for the transportation and disposal of materials at the Grand Junction, Colorado, Disposal Site. Records are kept of materials coming into and out of the site. Radiological surveys are completed at the end of the day when any shipments come in or leave the facility. Provisions are in place for leaks and spills. Inspections of the facility are conducted quarterly and after large storm events. Procedures for operation of the TSF are included in Appendix D, Section D6.0.

4.2 Control Residual Soils at Non-DOE Owned Properties

Non-DOE owned properties (public and private) that require LTS&M are those where supplemental or property-specific standards were applied. These properties are subject to regular inspections (frequency varies according to property) to confirm the integrity of the ICs and to determine if activities are planned for the properties that might involve disturbance or excavation of contaminated soils. Inspections are also required after 25-year storm events. Procedures are in place to ensure that disturbed or excavated soils from these properties are surveyed and, if necessary, managed, both under routine and nonroutine conditions. Contingency plans are in place for handling emergencies, IC violations, or the discovery of mixed waste.

Procedures are in place for the removal of lower activity uranium mill tailings (<27 pCi/g). These materials will be transported to the TSF by City workers with the concurrence of the contractor’s radiological control technician (RCT). Management of higher activity uranium mill tailings (>27 pCi/g) has to involve the contractor’s RCT so that the material can be transported in accordance with U.S. DOT radioactive material transportation regulations. Special control procedures are also in place for materials greater than 130 pCi/g 226Ra to ensure that transportation equipment is properly decontaminated. Information on site activities is captured in record books and significant findings are reported in quarterly and/or annual reports. Any excavations that occur are surveyed and recorded in as-built drawings that are kept at the Monticello site office.
Procedures for non-DOE owned properties are located in Appendix E. Procedures for transportation of radiological materials are located in Appendix G.

4.3 MMTS OU III

Activities associated with OU III include operation and monitoring of the GRO system and routine surface water and groundwater monitoring.

4.3.1 GRO System Operation and Monitoring

LM developed a procedure to prescribe the startup, operation, maintenance, and shutdown of the GRO system. It provides a concise description of the working components of the system and associated operating procedures to enable project site operators to diagnose and respond to potential maintenance needs. The plan also identifies roles and responsibilities for system operation and response actions required in the event of off-normal operating conditions. This procedure is provided as Appendix F of the Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System (DOE 2016). Operation of the system includes the following:

- Groundwater extraction rates are monitored to evaluate individual and combined extraction well performance.
- Water quality from each operating extraction well (there are a total of eight extraction wells) is monitored monthly to evaluate uranium recovery.
- Water levels are continuously monitored to evaluate aquifer response to groundwater withdrawal.
- Water level in Pond 4 is monitored to maintain operating capacity.
- Remote monitoring, operation, and data management is performed under the SOARS program.

Figure 8 shows the locations of the monitoring and extraction wells and other features of the AOA. GRO performance is reported (1) **quartely** in the FFA Quarterly report for bulk treatment parameters (e.g., operating conditions, volume of groundwater extracted, mass of uranium extracted, and Pond 4 capacity) and (2) **annually** to evaluate the overall progress of water quality restoration toward meeting groundwater remedial action objectives (RAOs).

Water quality monitoring in the AOA is conducted separate from the routine OU III monitoring events. Monitoring wells in the AOA are sampled on a regular basis. Sampling of the transfer tank effluent is conducted monthly to estimate the mass of uranium that is extracted from the aquifer and transferred to Pond 4 for evaporative treatment. Discretionary sampling of the extraction wells is conducted monthly (from sampling ports in the groundwater transfer building) to evaluate uranium capture performance for the individual extraction wells. The water samples collected from the monitoring wells are analyzed for the full suite of site COCs.

Transfer tank and extraction wells samples are analyzed for uranium only. Monitoring requirements for the GRO are detailed in Appendix F of the Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System (DOE 2016).
Figure 8. MMTS OU III Area of Attainment Monitoring Locations
4.3.2 Routine Water Quality Monitoring

OU III groundwater and surface water samples are collected for analysis of COCs and other geochemical parameters in April and October of each year. Sampling and analysis is conducted as specified in the *Sampling and Analysis Plan for the U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated) (SAP). Sampling conducted in October is more comprehensive than the sampling conducted in April, when several distal alluvial wells, located beyond the extent of contamination, and several bedrock wells are not sampled. Water levels are measured at all active monitoring wells during the April and October events. Excluding the PRB, water quality monitoring of the alluvial aquifer is conducted at 35 locations in October and at 22 locations in April (see Table 7). Three monitoring wells completed in the Burro Canyon aquifer are sampled in October only. Three other wells completed in the Burro Canyon aquifer but at greater distance from the area of groundwater contamination are sampled every 5 years (this testing began in October 2011).

Water quality monitoring within the PRB typically occurs at nine locations during the April and October events (Table 7). Numerous other wells within the PRB were routinely sampled during earlier years of PRB operation; water levels are collected from all PRB wells on a semiannual basis.

Hydrologic monitoring is conducted to measure water levels at monitoring wells and flow in Montezuma Creek. A visual inspection of groundwater seeps is conducted as well. Water level and streamflow monitoring locations (which generally coincide with surface water sampling locations) are shown on Figure 9 and listed in Table 7.

Water quality monitoring is conducted in April and October each year at 10 surface locations in Montezuma Creek, at five groundwater seep locations, and at two locations in Wetland 3. Current routine monitoring requirements are summarized in Table 7.

*Table 7. Routine Groundwater Monitoring Requirements*

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Location Numbers</th>
<th>Water Level Only (semiannual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvial Wells</td>
<td>MW00-01, T01-02, T01-04, T01-05, T01-12, T01-19, T01-35, T01-01</td>
<td>T00-01, T00-04, T01-13, T01-18, T01-20, T01-23, T01-25 (and semiannual water levels)</td>
</tr>
<tr>
<td>Downgradient wells</td>
<td>82-08, 88-85, 92-07, 92-08, 92-09, 92-11, 0200, 0202, MW00-06, P92-06, PW-10, PW-17, PW-28</td>
<td>95-01, 95-03, MW00-07 (and semiannual water levels)</td>
</tr>
</tbody>
</table>

| Mill site wells     | MW-00-02, MW-00-03, T00-02, T00-03, T00-05, T00-06, T00-07, T01-06, T01-08, T01-09, T01-10, T01-24, T01-26, T01-27, T01-28, TW-01, TW-02, TW-03, TW-04, TW-05, TW-06, TW-07, TW-08, TW-09, TW-10, TW-11, TW-12, TW-13, TW-14 | |
### Table 7. Routine Groundwater Monitoring Requirements (continued)

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Location Numbers</th>
<th>Water Level Only (semiannual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvial Wells</td>
<td>R1-M3, R1-M4, R3-M2, R3-M3, R4-M3, R4-M6, R6-M3, R6-M4, R10-M1</td>
<td>R1-M1, R1-M2, R1-M5, R1-M6,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R2-M1, R2-M2, R2-M5, R2-M6,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R2-M7, R2-M8, R2-M9, R2-M10,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R3-M1, R3-M4, R4-M1, R4-M4,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R4-M5, R4-M7, R4-M8, R5-M1,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R5-M2, R5-M3, R5-M4, R5-M5,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R5-M6, R5-M7, R5-M8, R5-M9,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R5-M10, R6-M1, R6-M2, T1-D,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T1-S, T2-D, T2-S, T3-D, T3-S,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T4-D, T4-S, T5-D, T5-S, T6-D,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T6-S, T7-D, R6-M5, R6-M6, R7-M1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R7-M2, R8-M1, R9-M1, R11-M1</td>
</tr>
<tr>
<td>PRB wells</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Other Locations</td>
<td>SW00-01, SW00-02, SW01-02, SW01-03, SW01-01, Sorensen, SW00-04, SW92-08, SW92-09, SW94-01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SW00-04, SW01-01, SW01-02, SW01-03, SW92-08, SW92-09, SW94-01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seep 1, Seep 2, Seep 3, Seep 5, Seep 6, W3-03, W3-04</td>
<td></td>
</tr>
<tr>
<td>Burro Canyon wells</td>
<td>83-70, 92-10, 93-01—annual sample and semiannual water levels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>31NE93-205, 95-07, 95-06—sample every 5 years plus semiannual water levels</td>
<td></td>
</tr>
</tbody>
</table>

#### Analytes for Samples
- Arsenic, calcium, chloride, fluoride, iron, magnesium, manganese, molybdenum, nitrate + nitrite (as N), potassium, selenium, sodium, sulfate, TDS (locations in **bold** only)

#### Field Parameters for Samples
- Total alkalinity, dissolved oxygen, redox potential pH, specific conductance, turbidity, temperature

#### Abbreviations:
- N = nitrogen
- TDS = total dissolved solids

The sampling and analysis program for routine OU III monitoring may be subject to occasional revision to meet project needs. Such revisions are documented in program directives (see Appendix B) and maintained in the chapter specific to Monticello in the SAP.

### 4.4 Institutional Controls

Enforcement and maintenance of ICs are one of the most important elements of the DOE’s LTS&M program for the MMTS and MVP. A variety of mechanisms are used to ensure that ICs are maintained, including: visual surveillance of properties for evidence of disturbance; confirmation that administrative mechanisms (e.g., zoning) remain in place, contacts with City and UDOT personnel regarding planned excavation activities on affected properties; and contact with State Engineer regarding proposed drilling in or near the groundwater restricted area. Table 4 indicates the mechanisms by which ICs are confirmed for each property. All ICs are confirmed during the annual site inspections (Appendix H). ICs on some non-DOE owned properties are monitored more frequently (Appendix E).
4.5 Annual Inspections

The combined MMTS and MVP sites are inspected annually to (1) verify that LTS&M activities implemented through the year are effective and appropriate, (2) confirm that the ICs restricting land and groundwater use under the remedies remain effective, and (3) identify deficiencies and maintenance items and recommend corrective actions as needed. The annual inspection consists of administrative and records, repository, City-owned properties, Montezuma Creek soil and sediment properties, groundwater management area, OU III wells and water treatment systems, and MVP inspections. Every 5 years, the annual inspection serves as the CERCLA Five-Year inspection. Detailed procedures for performing annual inspections and the annual inspection checklist are in Appendix H.

4.6 Reporting

Several types of reporting are required for the LTS&M activities for the Monticello site. The SMP is annually updated and identifies reporting requirements and due dates. Quarterly FFA status reports are prepared that include monthly and quarterly surveillance checklists, meteorological summary reports, GRO quarterly progress reports, and near-term reporting deliverables. The reports describe results from the MMTS and MVP. These reports also document any notable observations over the last quarter.

Annual groundwater and surface water reports are prepared for MMTS OU III to provide an annual analysis of water quality restoration progress. The reports provide routine groundwater and surface water monitoring results, a summary of the operation of the GRO, and an assessment of the likelihood of achieving remediation goals.

Annual inspection reports are completed for the combined MMTS and MVP. This report documents results of the annual inspection and is due to EPA and UDEQ by December 31 of each calendar year. The annual inspection reporting procedure is included in Appendix H.

CERCLA Five-Year Reviews are conducted for the MMTS and the MVP, as mandated by CERCLA, because contamination remains in place that prevents UU/UE for portions of the site. The reviews are conducted to determine if the selected remedies remain protective of human health and the environment. Separate Five-Year Review reports are prepared for the MMTS and the MVP. Reviews are conducted in accordance with applicable EPA five-year review guidance (e.g., EPA 2001a).
Figure 9. Monticello Sites Routine Monitoring Network
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5.0 References


San Juan County, 2011. Quitclaim Deed recorded in San Juan County, Utah, between U.S. Government and Jesse L. Hammons, August.

Appendix A

Monticello LTS&M Project Organization, Site Chronology, Key Documents, and Glossary
Figure A-1. Monticello LM Project Organization
<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone Number</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monticello site phone</td>
<td>(435) 587-2098</td>
<td>Monticello Site Administration Building</td>
</tr>
<tr>
<td>Contractor site lead</td>
<td>(970) 248-6182</td>
<td>Grand Junction Contractor Administration</td>
</tr>
<tr>
<td>DOE notification phone</td>
<td>(970) 248-6070</td>
<td>Grand Junction DOE Administration</td>
</tr>
<tr>
<td>DOE toll-free number</td>
<td>(877) 695-5322</td>
<td>Grand Junction DOE Administration</td>
</tr>
</tbody>
</table>
# A2.0 Chronology of MMTS and MVP Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanadium- and uranium-ore milling at the Monticello mill resulted in four tailings piles. Operations and tailings piles resulted in contamination of soils, buildings, processing equipment, surface water and groundwater, and peripheral properties.</td>
<td>1941–1960</td>
</tr>
<tr>
<td>The AEC, a predecessor agency of the DOE, regraded and stabilized the tailings piles. Fill dirt and rock were spread over the tops and sides of all tailings piles. Contaminated soils were removed from surrounding ore-storage areas and used as fill material to partially bury the mill foundations.</td>
<td>1964</td>
</tr>
<tr>
<td>AEC began radiological surveys of Monticello properties. Monticello mill accepted into the DOE SFMP as a government facility retired from service but still containing radioactive contamination. Monticello Remedial Action Project, which included the mill site, mill site peripheral properties, and vicinity properties, was established.</td>
<td>1971</td>
</tr>
<tr>
<td>Removal actions initiated for first two vicinity properties (completed in 1984). The Monticello Remedial Action Project was separated into the Monticello Radioactively Contaminated Properties site, also known as the MVP site and the MMTS. Removal actions initiated for additional vicinity properties prior to signing the ROD.</td>
<td>1983</td>
</tr>
<tr>
<td>The MVP was placed on the NPL.</td>
<td>June 10, 1986</td>
</tr>
<tr>
<td>Federal Facility Agreement Pursuant to CERCLA Section 120 (FFA) signed by the EPA, UDOH, and DOE to establish roles and responsibilities for conducting remedial actions at the MMTS.</td>
<td>December 1988</td>
</tr>
<tr>
<td>The MMTS was placed on the NPL.</td>
<td>November 21, 1989</td>
</tr>
<tr>
<td>MVP ROD signed. Millsite pre-excavation final design report established an alternate IR that would be used to store wastes removed from MVP. No ESD required for this action.</td>
<td>November 29, 1989</td>
</tr>
<tr>
<td>Final Remedial Investigation/Feasibility Study—Environmental Assessment for the Monticello, Utah, Uranium Mill Tailings Site, which analyzed remedial action alternatives for OU I and OU II of the MMTS, are completed.</td>
<td>January 1990</td>
</tr>
<tr>
<td>Monticello Mill Tailings Site Declaration for the Record of Decision and Record of Decision Summary, selecting remedies for OU I and OU II, is signed. OU III is designated.</td>
<td>September 1990</td>
</tr>
<tr>
<td>MMTS OU I and OU II remedial actions initiated.</td>
<td>1992</td>
</tr>
<tr>
<td>MMTS OU III RI/FS initiated.</td>
<td>1992</td>
</tr>
<tr>
<td>Selection of the onsite disposal alternative is finalized by DOE. ESD issued to explain increased scope and costs of remediation for MMTS OU I and projected cost increases associated with remediation of additional vicinity properties.</td>
<td>December 22, 1994</td>
</tr>
<tr>
<td>MVP OU A through OU H construction completed.</td>
<td>May 1996 to December 1998</td>
</tr>
<tr>
<td>MVP OU A remedial action report issued.</td>
<td>January 1997</td>
</tr>
<tr>
<td>Pre-final design and specification package for mill site remediation completed.</td>
<td>April 28, 1995</td>
</tr>
<tr>
<td>EPA notification of stipulated penalty against DOE (in accordance with the FFA) for non-compliant discharges into Montezuma Creek.</td>
<td>May 1995</td>
</tr>
<tr>
<td>Repository construction initiated.</td>
<td>October 27, 1995</td>
</tr>
<tr>
<td>U.S. Environmental Protection Agency Region VIII Hazardous Waste Management Division Five-Year Review (Type Ia), Monticello Mill Tailings Site, San Juan County, Utah, first CERCLA Five-Year Review report completed.</td>
<td>February 13, 1997</td>
</tr>
<tr>
<td>Four MVP sites were administratively transferred to MMTS to accommodate construction of the repository (MS-01040, MS-01041, MS-01042, and MS-01080).</td>
<td>April 1997</td>
</tr>
<tr>
<td>Remediation of the mill site started.</td>
<td>May 1997</td>
</tr>
<tr>
<td>Event</td>
<td>Date</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>MMTS OU III RI/FS completed and Record of Decision for an Interim Remedial Action at the Monticello Mill Tailings Site, Operable Unit III - Surface Water and Ground Water, Monticello, Utah, signed. The interim ROD implemented an IRA until the OU III ROD was issued.</td>
<td>August 1998</td>
</tr>
<tr>
<td>ESD issued to provide rationale for applying supplemental standards to MMTS OU II properties in which contamination was left in place. Rationale for applying supplemental standards is found in Application for Supplemental Standards for Upper, Middle, and Lower Montezuma Creek and Application for Supplemental Standards for Government-Owned Properties in Monticello, Utah, DOE ID Nos. MP-00391-VL, MP-01041-VL, and MP-01077-VL.</td>
<td>February 1999</td>
</tr>
<tr>
<td>Ground-Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas issued by the Utah State Engineer. The policy established the groundwater restricted area and serves as an IC to prohibit the use of contaminated groundwater for domestic purposes.</td>
<td>May 21, 1999</td>
</tr>
<tr>
<td>Remediation of soil and sediment contamination from MMTS properties in the Montezuma Creek canyon, originally part of OU III remedy, was transferred for inclusion under the OU II remedy.</td>
<td>Spring 1999</td>
</tr>
<tr>
<td>Cooperative Agreement DE-FC13-99GJ79485 between the City of Monticello and the U.S. Department of Energy signed. The agreement includes specifications for restoration of the mill site and for managing residual contamination on vicinity properties affected by ICs.</td>
<td>June 1999</td>
</tr>
<tr>
<td>PRB treatability study started for OU III.</td>
<td>June 1999</td>
</tr>
<tr>
<td>Remedial action reports for MVP OU B through OU H issued.</td>
<td>July 1999</td>
</tr>
<tr>
<td>MOU between DOE and UDOT signed (agreement for managing residual contamination on properties affected by ICs).</td>
<td>August 1999</td>
</tr>
<tr>
<td>Tailings removal completed from OU I and OU II.</td>
<td>August 1999</td>
</tr>
<tr>
<td>Final closeout reports for OU A through OU H issued.</td>
<td>September 1999</td>
</tr>
<tr>
<td>Covenant deferral request allowing transfer of federal property prior to completion of cleanup activities signed.</td>
<td>February 6, 2000</td>
</tr>
<tr>
<td>MVP site is deleted from NPL.</td>
<td>February 28, 2000</td>
</tr>
<tr>
<td>Transfer of mill site and other peripheral properties from DOE to the City of Monticello completed through a quitclaim deed. Some restrictions in the deed serve as ICs to restrict groundwater use. Some restrictions are related to site-specific cleanup standards. Other restrictions are related to land transfer, not contamination.</td>
<td>June 28, 2000</td>
</tr>
<tr>
<td>Repository construction completed (OU I).</td>
<td>July 30, 2000</td>
</tr>
<tr>
<td>Mill site restoration completed (OU I).</td>
<td>August 2001</td>
</tr>
<tr>
<td>MVP and MMTS transferred to LTS&amp;M Program.</td>
<td>October 1, 2001</td>
</tr>
<tr>
<td>LTS&amp;M Plan for the Monticello NPL sites issued.</td>
<td>April 2002</td>
</tr>
<tr>
<td>Second CERCLA Five-Year Review report completed.</td>
<td>June 2002</td>
</tr>
<tr>
<td>Overlay Zone OL-1 created by City of Monticello, Ordinance 2002-04 (an IC that affects land use at MVP OU H supplemental standards property MS-00176-VL). Amended by City of Monticello Ordinance 2003-2.</td>
<td>July 2002–April 2003</td>
</tr>
<tr>
<td>Property deed restrictions placed on designated MVP OU H UDOT properties MS-00892-OT, MS-00895-OT, MS-01020-OT, and MS-01021-OT (maintaining IC to manage residual contamination on these properties).</td>
<td>April 2003</td>
</tr>
<tr>
<td>MMTS OU II nonsurface and groundwater impacted peripheral properties deleted from the NPL.</td>
<td>October 14, 2003</td>
</tr>
<tr>
<td>MVP and MMTS transferred to LM.</td>
<td>December 2003</td>
</tr>
<tr>
<td>Event</td>
<td>Date</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Monticello Mill Tailings Site, Operable Unit III Remedial Investigation Addendum/Focused Feasibility Study finalized.</td>
<td>January 2004</td>
</tr>
<tr>
<td>Record of Decision for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface Water and Groundwater signed.</td>
<td>May 2004</td>
</tr>
<tr>
<td>Remedial Action Report for Monticello Mill Tailings (USDOE) Site Repository issued.</td>
<td>August 2004</td>
</tr>
<tr>
<td>MMTS OU III IRA report issued documenting interim action is complete.</td>
<td>September 2004</td>
</tr>
<tr>
<td>Preliminary Close Out Report Monticello Mill Tailings (USDOE) Site Operable Units I, II, and III issued. Established “construction complete” status for OU I properties, 12 OU II properties where contaminated surface water or groundwater is present, and OU III.</td>
<td>September 29, 2004</td>
</tr>
<tr>
<td>Ex situ groundwater treatment system installed as a treatability study for OU III.</td>
<td>2005</td>
</tr>
<tr>
<td>Ex situ groundwater treatment system expanded.</td>
<td>2007</td>
</tr>
<tr>
<td>Cooperative Agreement between DOE and City of Monticello extended to December 31, 2016.</td>
<td>April 2007</td>
</tr>
<tr>
<td>Third CERCLA Five-Year Review report completed.</td>
<td>June 2007</td>
</tr>
<tr>
<td>Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites updated, consolidated from Volumes I–IV, April 2002. The plan established procedures for conducting LTS&amp;M at the MMTS to ensure that the remedy remains protective.</td>
<td>June 2007</td>
</tr>
<tr>
<td>MMTS OU III Analysis of Uranium Trends in Groundwater issued confirming that ROD specified performance metrics were not met for groundwater restoration.</td>
<td>August 2007</td>
</tr>
<tr>
<td>Explanation of Significant Difference (ESD) for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface Water and Ground Water (DOE 2009) issued to implement the contingency remedy for MMTS OU III.</td>
<td>January 2009</td>
</tr>
<tr>
<td>Monticello Mill Tailings Site Operable Unit III Water Quality Compliance Strategy issued.</td>
<td>December 2009</td>
</tr>
<tr>
<td>Fourth Five-Year Review Report for Monticello Mill Tailings (USDOE) Site, City of Monticello, San Juan County, Utah, completed.</td>
<td>June 2012</td>
</tr>
<tr>
<td>Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan, for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah, issued.</td>
<td>February 2014</td>
</tr>
<tr>
<td>Groundwater remediation system expanded in AOA under Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan, for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah.</td>
<td>January 2015</td>
</tr>
<tr>
<td>Seep 6 sampling by DOE.</td>
<td>September 2015</td>
</tr>
<tr>
<td>Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System, Monticello Mill Tailings Site, Monticello Site issued.</td>
<td>May 2016</td>
</tr>
<tr>
<td>Cooperative agreement between DOE and City of Monticello extended to March 31, 2022.</td>
<td>March 31, 2017</td>
</tr>
<tr>
<td>Revision to LTS&amp;M Plan.</td>
<td>To Be Determined</td>
</tr>
</tbody>
</table>

**Abbreviations:**

AOA = area of attainment  
AEC = U.S. Atomic Energy Commission  
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act  
DOE = U.S. Department of Energy  
EPA = U.S. Environmental Protection Agency  
ESD = Explanation of Significant Difference  
FFA = Federal Facilities Agreement  
IC = institutional control  
IRA = interim remedial action  
LTS&M = Long-Term Surveillance and Maintenance  
MMTS = Monticello Mill Tailings Site
Abbreviations (continued):
MVP = Monticello Vicinity Properties
MOU = Memorandum of Understanding
NPL = National Priorities List
OU = operable unit
RI/FS = Remedial Investigation/Feasibility Study
ROD = Record of Decision
SFMP = Surplus Facilities Management Program
UDOH = Utah Department of Health
UDOT = Utah Department of Transportation
A3.0 Key Project Documents

This section lists key documents that provide additional information about the Monticello Mill Tailings Site and Monticello Vicinity Properties. Also included are procedures and regulatory reference documents that are relevant to the sites. Several of the references are available for review at the Monticello public website [https://www.lm.doe.gov/monticello/Sites.aspx](https://www.lm.doe.gov/monticello/Sites.aspx). The Administrative Record and Information Repository Indexes are available at the Monticello Disposal and Processing Sites administration office.


San Juan County, 2011. Quitclaim Deed recorded in San Juan County, Utah, between U.S. Government and Jesse L. Hammons, August.


State of Utah, 2014. Public Health Assessment Monticello Mill Tailings Site (MMTS) and Monticello Vicinity Properties (MVP), Monticello, San Juan County, Utah, February.

A4.0  Glossary

The terms defined below are applicable to this manual and its associated operating procedures.

Administrative Record—An electronic file available for public inspection that contains documents that form the basis of a response action. The electronic administrative records for the Monticello Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) sites (Monticello Vicinity Properties [MVP] Project and the Monticello Mill Tailings Site [MMTS]) are located at the U.S. Department of Energy (DOE) in Grand Junction, Colorado. A duplicate copy is maintained at the DOE Field Office in Monticello, Utah.

Annual inspection—A review, conducted by the DOE Office of Legacy Management (LM) of the work and documentation completed by the DOE-LM contractor representative for Monticello. The review is combined with a visit to the site to determine protectiveness of the remedy. One or more persons knowledgeable with the site conduct the annual inspection.

Becquerel (Bq)—The unit of measure of the activity of a radioactive material, which indicates the number of nuclear disintegrations per unit time. One becquerel is equal to 1 disintegration per second.

Carrier operators—Drivers of vehicles that transport radiologically contaminated materials; carrier operators may include the Monticello contractor operations lead, City of Monticello or Utah Department of Transportation (UDOT) workers, or common carriers.

CERCLA Five-Year Report—A report required by statute or EPA policy that presents the findings and conclusions of the review conducted every 5 years. The report includes recommendations, follow-up actions and protectiveness determination and contains sufficient data and information to support all findings and conclusions.

CERCLA hazardous substance—Material that is harmful to human health or the environment and is specifically defined and regulated under CERCLA.

Certified shipper—A person who has received DOE-approved training to ship radioactive or hazardous material.

Chief inspector—Lead inspector of the LM inspection team, responsible for writing the annual inspection report; LMS staff member (other than the onsite Monticello contractor operations lead).

Environmental Sciences Laboratory—A technical applications facility based in Grand Junction, Colorado, that provides the science and technology foundation for monitoring and evaluating long-term performance of surface and subsurface remedies.

Contractor site lead—Grand Junction, Colorado, based contractor employee responsible to DOE for administering the long-term surveillance and maintenance (LTS&M) activities at the Monticello site.
Controlled area—Any area to which access is restricted to protect individuals from inadvertent exposure to radiation and radiologically contaminated materials.

Delta Scintillometer—An instrument that measures gamma activity in units of counts per second (cps), which may be converted to equivalent picocuries per gram (pCi/g) 226Ra by using a conversion factor specific to the instrument.

Difficult-to-remove material—Radiologically contaminated material with a 226Ra concentration greater than 130 pCi/g that cannot be easily removed using hand tools and having a volume greater than one cubic yard.

DOT radioactive material (DOT RAM)—Radioactive material that meets the U.S. Department of Transportation (DOT) definition of radioactive material.

Easily removed material—Radiologically contaminated material with a 226Ra concentration greater than 130 pCi/g that can be removed with a shovel or similar hand-operated tool and having a volume less than or equal to 1 cubic yard.

EPA standard—The EPA “Radium in Soil Standard” in Title 40 Code of Federal Regulations Part 192 (40 CFR 192) states that the 226Ra concentration in soil shall not exceed background by more than 5 pCi/g in the surficial 15 cm of soil averaged over 100 m², or more than 15 pCi/g in successively deeper 15-cm layers averaged over 100 m². As a conservative approach, only the 5 pCi/g surface standard will be applied during LTS&M activities.

Field Office—The building location in Monticello, Utah, of the office for the Monticello contractor operations lead and the electronic Administrative Record and Information Repository record collections. The address of this office is 1665 South Main Street, Monticello, Utah, 84535.

Field recognition criteria—Anomalous physical conditions that would lead an inspector to believe that material has been released that may be harmful to human health or the environment. These physical conditions may be observed with sensory perceptions (e.g., sight, odor) or with field screening equipment such as a photoionization detector.

5-year review team—A team consisting of at least two members who conduct the CERCLA Five-Year Review and write the CERCLA Five-Year Review Report. The Monticello contractor site lead selects the team with concurrence of the LM Monticello site manager.

Gamma scintillometer—A crutch-mounted detector.

Government-owned piñon/juniper properties—These properties are identified as MP-00391-VL, Phase III; MP-01077-VL, Phase II; and MP-01041-VL. These properties are owned by the City of Monticello.

Habitable structure—A structure intended for human habitation.
**Hazardous substances**—In this document, the term “hazardous substances” includes CERCLA hazardous substances present in concentrations greater than EPA’s risk-based cleanup concentrations, hazardous waste, polychlorinated biphenyls, and asbestos.

**Hazardous waste**—Waste material that is harmful to human health or the environment and that is specifically defined and regulated under the Resource Conservation and Recovery Act (RCRA).

**Inactive wells**—Operable Unit (OU) III monitor wells that are not monitored for water level measurement or sampled for analytical purposes.

**Information Repository**—An electronic collection of documents, maintained for public review, describing the remediation of the Monticello Mill Tailings Site (OUs I, II, and III), and the Monticello Vicinity Properties (MVP) Project as well as those documents generated as a result of long-term surveillance and maintenance. The electronic collections are located at the LM office in Grand Junction, Colorado, and at the Field Office in Monticello, Utah.

**Inspection**—Review and observation by a formally constituted team for the purpose of oversight, mobilized either at regular intervals or in response to specific concerns.

**Institutional controls**—Administrative procedures and or controls that are implemented to ensure that a remedy is protective of human health and the environment. For example, a restriction on the use of groundwater is an institutional control.

**Leachate collection and removal system (LCRS)**—An engineered system designed to collect and transfer water draining from the repository or Pond 4.

**Leak detection system (LDS)**—Sumps designed to detect and collect water that has leaked through the primary liner of the repository or the secondary liner of Pond 4.

**LM**—See Office of Legacy Management

**LM Monticello Site Manager**—An LM employee assigned the overall responsibility for managing the Monticello project.

**LM Records Collection**—A set of programmatic and site-specific records for DOE-LM sites that includes those generated by the activities of the Monticello Projects. An electronic collection is stored at the LM office in Grand Junction, Colorado, and at the Field Office in Monticello, Utah.

**LM Records Coordinator**—A designated member of the Grand Junction Records Operations staff who maintains the active LM site records.

**LM Records Lead**—A designated member of the Grand Junction Records Operations staff who provides oversight of the LM records processes such as review of site file plans, revisions of site file plans, and site record transfers to inactive storage.

**LM site file number**—A site-specific alphanumeric code (e.g., MNT 005.02) used to identify, organize, control, and manage project records. The number consists of a site abbreviation (MNT for Monticello) plus a unique numeral (e.g., 005.02) identifying the file category.
**LMS Site File Plan**—A revisable document that defines project records, file organization, records coordinators, file locations, and file transfer instructions. The LMS Records Lead controls revisions to this document.

**Major excavation**—Excavations that require the use of heavy motorized equipment to excavate soil beneath or adjacent to city streets, utilities, or Highways 191 or 491 rights-of-way. For example, replacing or repairing a buried utility line, installing a culvert, replacing road base beneath a paved surface, or replacing fill material in an embankment would constitute a major excavation.

**Minor excavation**—Excavations that can be made with hand tools or hand-operated mechanical tools (e.g., post-hole augers).

**Mixed waste**—Waste material that is regulated under RCRA as hazardous waste and that also meets the definition of radiologically contaminated material.

**Monticello contractor operations lead**—A contractor employee that is located at the Monticello site during normal operating hours. The Monticello contractor operations lead is on call 24 hours a day, 7 days a week. A backup person is available to perform the duties required of the Monticello contractor operations lead when necessary.

**Natural attenuation**—Natural attenuation processes includes a variety of physical, chemical, or biological process that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, or volume of contaminants in soil or groundwater. These in situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants. The hydrological and geochemical processes identified in the OU III groundwater system are expected to restore groundwater quality to remediation goals.

**Observations**—Data recorded in a formal manner suitable for communication, interpretation, or processing.

**Office of Legacy Management (LM)**—The Office of Legacy Management was formally established as a new DOE element on December 15, 2003. LM is responsible for ensuring that DOE’s postclosure responsibilities are met and for providing DOE programs for long-term surveillance and maintenance, records management, work force restructuring and benefits continuity, property management, land use planning, and community assistance.

**Permeable reactive barrier**—An engineered subsurface zone of chemically reactive material that stabilizes or degrades dissolved contaminants during flow-through of groundwater. The Monticello permeable reactive barrier contains zero-valent iron as the reactive medium to treat the primary groundwater contaminants, which are arsenic, molybdenum, selenium, uranium, and vanadium.

**Planned excavation**—Excavations that are part of the annual budget and planning process for the City of Monticello and UDOT; excavations that are included in the city’s Street
Improvement Master Plan or in UDOT’s Statewide Transportation Improvement Plan or Spot Improvement Plan.

_Private owned piñon/juniper property_—This property is identified as MS–00176–VL.

_Protectiveness statement_—A statement in the CERCLA Five-Year Review report that documents whether a remedy is, is not, or will be protective of human health and the environment.

_Radioactive material area (RMA)_—An area or structure where radiologically contaminated material with $^{226}\text{Ra}$ concentrations exceeding 130 pCi/g is used, handled, or stored.

_Radiological as-built_—Engineering drawings, located in the Monticello contractor operations lead’s office, that identify radiation levels at individual properties that were remediated in the Monticello Vicinity Properties and the Monticello Mill Tailings Site Remedial Action Programs. Radiological as-built drawings are also part of the property completion reports.

_Radiological Control Manager_—The person, located at DOE’s office in Grand Junction, Colorado, who leads and is responsible for the Radiological Protection Program.

_Radiological survey_—A survey that delineates and documents the surface area and radioactivity in soil in units of counts per second or gamma exposure rate (μR/h). The vertical extent of contamination and radionuclide concentrations in picocuries per gram (pCi/g) may also be determined.

_Radiologically contaminated materials_—Residual radioactive material resulting from DOE-related uranium and vanadium ore processing that contains $^{226}\text{Ra}$ concentrations exceeding background by more than 5 pCi/g in the surficial 15 cm of soil averaged over 100 m$^2$, or more than 15 pCi/g in successively deeper 15-cm layers averaged over 100 m$^2$.

_Record_—Includes all books, papers, maps, photographs, machine-readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency in connection with the transaction of business and preserved or appropriated for preservation by that agency as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the agency.

_Record book_—For the purposes of this plan, record books will refer to the field logbooks and checklist forms kept by the Monticello contractor operations lead for each of the LTS&M inspection and monitoring activities. These include, but are not limited to, the repository and Pond 4, temporary storage facility, telemetry system, former mill site, government-owned and privately owned piñon/juniper properties, city streets and utilities, Highways 191 and 491 rights-of-way, and OU II soil and sediment properties.

_Records system_—Computer-based information management system that provides data on record responsibility, location, storage, access, and disposition and record retrieval.
Repository cover—A multilayered earthen and geomembrane barrier overlying the mill tailings. The cover is designed to prevent radon emission and create a barrier to restrict surface water infiltration into the repository.

Soil and sediment properties—Privately owned properties adjacent to Montezuma Creek that have soil and sediment contamination remaining on site and are identified as MP-00951-VL, MP-00990-CS, MP-01084-VL, MG-01026-VL, MG-01027-VL, MG-01029-VL, MG-01030-VL, and MG-01033-VL.

Spill—Any accidental release of petroleum products, hazardous substances, or radiologically contaminated material from packaging, containments, or transport vehicles.

Supplemental standards properties—Property where radioactive contamination was left in place in compliance with 40 CFR 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings. These properties include the city of Monticello streets and utility corridors, Highways 191 and 491 rights-of-way, privately owned piñon/juniper property, government-owned piñon/juniper properties, and the soil and sediment properties.

Surveillance—The act of monitoring or observing to determine whether an item or activity conforms to specified requirements; routine observations that do not require the involvement of formal inspection teams.

Suspected hazardous substance—Any material with field recognition criteria that indicate the material is potentially harmful to human health or the environment. Because sampling and analysis have not been completed, the material is “suspected” to be a hazardous substance.

Technical review—A formally documented review of technical material performed by individuals who are independent of those directly responsible for the work but who may be members of the organization that performed the work. A technical reviewer shall have expertise at least equal to that of the individuals who prepared the material under review.

Temporary storage facility (TSF)—A secure area located at the Monticello Field Office complex where radioactive material and hazardous substances are stored in containers.

Transportation incidents or emergencies—Any spill, release, accident, medical situation, or potential situation that may occur while loading, unloading, or inspecting a vehicle for transport; any spill, release, accident, medical situation, or potential situation that may occur while transporting materials in a vehicle on public highways.

Unplanned excavation—Excavations that are not planned but are necessitated by an emergency situation (e.g., a utility line break) or occur as a result of a natural event (e.g., a flood, storm, or subsidence event).

Well abandonment—The process of removing or perforating the casing of a monitor well followed by grout placement. Well abandonment will conform to the substantive requirements of the Utah Well Drilling Standards.
Appendix B

Document Control and Records Management
B1.0  Document Control and Records Management

Procedures have been developed to define responsibilities, establish documentation and change control requirements, and employ standard work processes in implementing the monitoring, inspection, and review requirements established in the Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites (LMS/MNT/S00387) (LTS&M Plan). Included within this appendix are the requirements for controlling the LTS&M Plan, managing and preserving the records created during postclosure site stewardship, and documenting the work activities established by the LTS&M Plan for the Monticello National Priorities List (NPL) sites.

B1.1 Document Control

This appendix also describes the requirements and processes that will be used to maintain the Monticello LTS&M Plan for project use. It will ensure that the changes are appropriately documented, reviewed by the affected organizations, and approved by the responsible levels of management.

B1.1.1 Scope

This appendix will be used to initiate and authorize changes to the Monticello LTS&M Plan resulting from:

- The U.S. Department of Energy (DOE) task assignment modification that authorizes changes to project scope.
- Significant or unanticipated changes to site conditions.
- Regulatory direction that affects the monitoring or inspection requirements established in the Plan.

B1.1.2 Responsibilities and Procedures for LTS&M Plan Review and Change Control

Because the LTS&M Plan is listed as a “primary document” in the Monticello Federal Facilities Agreement (FFA), no changes will be initiated or made without DOE authorization and U.S. Environmental Protection Agency (EPA), and Utah Department of Environmental Quality (UDEQ) concurrence. DOE, EPA, UDEQ, or contractor staff may request changes to the LTS&M Plan. Contractor-initiated change requests will be made to the contractor site lead, who will evaluate the request and bring the matter to the attention of the task assignment manager and DOE’s Office of Legacy Management (LM) Monticello site manager when appropriate. The LM Monticello site manager will evaluate proposed changes, and if warranted, will confer with EPA and UDEQ to jointly discuss the proposed changes and the resulting effects to the project.

The LTS&M Plan will be reviewed annually (concurrent with the annual inspection) and revised as needed to ensure that DOE is conducting LTS&M at an appropriate level of effort.
When authorized by DOE, and with EPA and UDEQ concurrence, the contractor site lead will:

- Prepare a draft of the new or revised material for internal review.
- Resolve internal review comments and prepare and distribute a draft (including a Record of Review for written comments) for external review by DOE, EPA, UDEQ, and other subject matter experts (SME), as requested.
- Resolve review comments.
- Send a draft final copy to DOE, EPA, and UDEQ for final review and concurrence.
- Ensure that external comments have been satisfactorily addressed and then prepare the new or revised material for final production.
- File the DOE, EPA, and UDEQ Records of Review in the electronic recordkeeping system (ERKS).

Project documents, including changes and reviews, will be maintained in accordance with the records requirements and the Monticello site file plan (contact the contractor’s records department for updated guidance).

Designated reviewers will:

- Review the change for completeness and technical accuracy.
- Ensure that the change will enhance or improve the procedure.
- Document comments to the author through approved methods (e.g., standard review forms, redline/strikeout markup of electronic files or paper copy of the document, email correspondence that clearly identifies the reviewer and contains specific comments) that include the name of the reviewer, the date of the review, review comments, and whether the comments are for the authors consideration or must be resolved.

Markings such as change bars or text highlighting of some sort may be used to identify the revised material. When a new procedure, process, or a major revision to a current procedure is prepared, markings such as these are not needed, and the change will be noted by the revision date on the footer and the identifier used in the contents. A “Summary of Changes” page will be included with the controlled document transmittal package when substantial changes or new procedures or processes are introduced. Changes will be summarized in the document history in the front of the document.

After the review comments have been addressed, the changes will be issued to the document holders (including Master Copy, Record Copy, and Information Repository [IR] copy holders) identified on the controlled document distribution list shown in Table B-1.
**Table B-1. Distribution List for the LTS&M Plan**

<table>
<thead>
<tr>
<th>Copy Recipient</th>
<th>LTS&amp;M Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM Monticello site manager</td>
<td>2 copies</td>
</tr>
<tr>
<td>EPA</td>
<td>3 copies</td>
</tr>
<tr>
<td>UDEQ</td>
<td>2 copies</td>
</tr>
<tr>
<td>Monticello city manager</td>
<td>1 copy</td>
</tr>
<tr>
<td>UDOT Monticello station supervisor</td>
<td>1 copy</td>
</tr>
<tr>
<td>Contractor task assignment manager</td>
<td>1 copy</td>
</tr>
<tr>
<td>Contractor site lead</td>
<td>1 copy</td>
</tr>
<tr>
<td>Monticello contractor site staff</td>
<td>3 copies (1 each)</td>
</tr>
<tr>
<td>Contractor environmental specialist</td>
<td>1 copy</td>
</tr>
<tr>
<td>Contractor Monticello AR/IR coordinator</td>
<td>2 copies</td>
</tr>
<tr>
<td>Contractor Monticello records coordinator</td>
<td>Record copy</td>
</tr>
<tr>
<td>Contractor Document Management staff</td>
<td>Master electronic document</td>
</tr>
</tbody>
</table>

### B1.1.3 Program Directives

Program Directives will be used to document and authorize site-specific changes to Operable Unit (OU) III field sampling, monitoring tasks, and project documents. Program Directives that affect changes to this plan are prepared by the Environmental Monitoring Operations manager, site management personnel, or site technical personnel and are approved by the Environmental Monitoring Operations manager. The procedures and format used for preparing program directives are found in Section 6.0, “Program Directives,” within the Document Management Manual (LMS/POL/S09818). A summary of the process, instructions, and a blank example directive are shown in Attachment B-1. Program Directives will be reviewed by affected organizations and authorized by DOE with concurrence from EPA and UDEQ. The contractor site lead will summarize changes that have been authorized through program directives, in routine FFA reports.

### B1.2 Records Management

To support the construction completion maintenance of the Monticello, Utah, NPL sites, LM maintains records on the DOE Monticello website and at the Legacy Management Business Center (LMBC) in Morgantown, West Virginia. These records contain critical information required to protect human health and the environment, manage land and assets, protect the interests of the public and DOE, and mitigate community impacts resulting from the cleanup of legacy waste. Site historical records about the environmental remediation and stewardship are included in the collection. LM records will be managed in accordance with the following requirements:

• 44 USC 33, “Disposal of Records,” United States Code, available online at
   https://www.archives.gov/about/laws/disposal-of-records.html

• Title 36 Code of Federal Regulations Parts 1220–1239, Chapter 12, Subchapter B.

B1.2.1 CERCLA Administrative Record and Information Repository

Administrative Record—The Administrative Record (AR), governed by CERCLA, is
established to provide the public with information on a site’s background and the technical basis
for the selected remedy. The remediation of the Monticello NPL sites initially required two ARs.
The first was a consolidated collection for the Monticello Mill Tailings Site (MMTS) (OU I and
OU II) and the Monticello Vicinity Properties (MVP) Project. A second AR was established to
address the Monticello Surface Water and Groundwater Remedial Action Project administered as
OU III of the MMTS. Each AR is retained on the Monticello website for a minimum of 10 years.
With the signing of each Record of Decision, the AR for OU I and II was closed, and the
MMTS/MVP AR was preserved by transferring the paper records to the LMBC in Morgantown,
West Virginia. Any additions to the AR for OU III will be made by responsible technical staff
when documents are identified that affect the remedy.

Information Repository—The IR is a working set of documents that contain the information
pertaining to the response action as required under CERCLA. The contractor site lead is
responsible for determining the project documents that will be included in the IR. The IR
collection of documents is updated annually (typically in December). DOE, EPA, and UDEQ
will be informed of the December update including a list of the changes that were made.
Following the update, a printed copy of the index and list of changes will be sent to DOE, EPA,
and UDEQ. This will enable DOE and regulators to have a current version of the index should
they need to use it in planning for the annual inspection, annual reports, copies of the completed
record books, and supporting documentation in the IR will do the following:

• Document the history of the remedy performance.

• Provide documentation necessary to prepare and conduct site surveillance and maintenance
  activities.

• Provide DOE, EPA, and UDEQ with the information necessary to forecast future
  surveillance and maintenance needs.

• Provide information to the public to demonstrate that remedy integrity has been
  maintained.

B1.2.1.1 Transferring Records to the LM Records Collection

Most record material is transferred electronically to the LM records collection at the time of
distribution. The records are received by the contractor records organization, which enters key
data in LM ERKS for future records retrieval. Records created in paper receive a barcode and the
associated metadata is entered the ERKS.
B1.2.2 Drawings

MMTS and MVP completion reports available in the IR file 054 include drawings of assessed and removed contamination and may include contamination data in adjoining city streets or utility rights-of-way.

An indexed set of radiological as-built drawings reside in the Monticello Field Office. The index lists engineering drawings of the supplemental standards properties at Monticello. The index is used by the Monticello contractor site staff to identify the appropriate drawing for locating contamination left in place, utility lines, erosion activity, and documenting excavations for each of the properties. Additionally, the drawing index lists the scale of each drawing and the most recent date that each drawing was electronically updated.

The Monticello contractor operations lead is responsible for keeping the radiological as-built drawings up to date with pertinent information required by operating procedures in the LTS&M Plan. Changes to the drawings will be annotated in permanent red ink by the Monticello contractor site staff each time new information with regard to radioactive contamination becomes available. The drawings shall be stored in the Monticello Field Office records vault room. The annotated drawings will be forwarded annually, by the Monticello contractor operations lead to the contractor site lead to be electronically updated. Updates are generally made during the first part of the calendar year when city construction activities are minimal. Copies of the revised index and drawings will be returned to the Monticello contractor operations lead and the record copy will be sent to the assigned LTS&M records coordinator for storage in the Monticello LM records collection.

B1.2.3 Record Books

Documentation is necessary to record LTS&M activities for the Monticello NPL sites. The activities will be recorded in the record books and on drawings that have been established for this purpose. The following section describes the process for ensuring complete and accurate histories of these activities so that evidence of compliance with the LTS&M Plan is adequately documented.

The contractor site lead shall

- Establish a contractor site lead’s record book for documentation to:

  —Identify the record books that are issued, location of the record books, the unique identifier (beginning with Book #1) for each record book, and the period of time (e.g., beginning and end date) covered by the book.

  —Update the contractor site lead’s record book with information and completion or termination dates for record books that have been completed, lost or destroyed, or terminated through completed work or revised procedures.

  —Other LTS&M information may be addressed by the contractor site lead in the record book as deemed appropriate.
• Assign the following individual record books to the Monticello contractor operations lead:
  — Repository Site record book (includes the Disposal Cell, Pond 4, the Groundwater Remedy Optimization (GRO) system, and all property within the repository boundary fence)
  — Temporary Storage Facility record book
  — City-owned Properties record book (includes properties transferred to the City through the Covenant Deferral and MP-00211)
  — Public Roads and Utilities record book (includes city streets, utility corridors, and Highway 191 and 491 rights-of-way)
  — Private Property Restricted Areas record book (includes restrictive easement [i.e., OU II soil and sediment] properties, supplemental standards property MS-00176, and properties included in the groundwater restricted area, as designated by the State Engineer)

• Review quarterly copies of record book entries and give them to the AR/IR coordinator for maintenance until the record book has been completed.

The Monticello contractor operations lead shall:

• Review the procedures in the LTS&M Plan for the Monticello NPL Sites, including the appendixes to determine the information to be recorded in each of the record books.

• Upon receiving the record book, the Monticello contractor operations lead shall ensure the following information is recorded on the cover and will make any necessary corrections:
  — Title of record book (property identification as listed above).
  — Starting date of the record book using four characters to designate the year (mm/dd/yyyy).
  — The location of the Monticello site; including the address (both site and the post office box), and contact phone numbers.

• Initiate or ensure that a signature/initial log has been established on the first page of the record book. The log will provide for the printed name, signature, and initials used by the Monticello contractor site staff and reviewers who are authorized to make entries in the record book.
  — Annotate the entry as “discontinued” when an individual is no longer authorized (e.g., change in job or employment). The correction will be initialed and dated.

  Note
  A two-character year designation (e.g., 2/14/06 for February 14, 2006) is adequate, since the book cover will identify the years covered using a four-character entry.

  — Create a backup copy of the record book by photocopying each day’s entry. The duplicate copies will be stored temporarily onsite in the records vault before being sent on a quarterly basis to the contractor site lead for review and retention until the book is complete.
When a record book is complete, record the completion date on the cover, using a four character entry for the year (e.g., 2017). The final entry will identify the title and book number where additional information will be recorded.

— The representative will review the record book for completeness, make any needed corrections, initial and date all entries, and send the completed record book to the contractor site lead.

The Monticello AR/IR coordinator shall:

• Store the backup copies of record book entries, received quarterly, following their review by the contractor site lead. Backup (i.e., duplicate) copies will be retained in a three-ring binder labeled and numbered in a fashion similar to the original record book.

• Ensure that completed record books are photocopied in duplicate for inclusion in the IR and that the original record book is transferred to the assigned LM records coordinator. Upon inclusion in the IR, the working collection of duplicate copies may be discarded. If retained, they will be identified as reference material.

### B1.2.3.1 Recording Field Data

When making entries in the record books, the Monticello contractor site staff or other authorized individuals shall:

• Write legibly with permanent ink so that the entry is reproducible.

• Clearly describe the activity’s purpose (e.g., semiannual groundwater restricted area inspection, monthly Pond 4 surveillance) and any observations so that other equally experienced personnel can understand what was observed.

• Keep the record book pages intact (i.e., do not remove pages from the book).

• For the first entry in a record book, refer to the previous record book title and number.

• Sign and date each entry if a page has entries for more than one day.

**Note**

Initials are acceptable for signing an entry, as long as the individual making the entry is authorized and has signed the signature/initials log in the front of the record book. The format of the date will identify the month, day, and year (e.g., 2/14/17).

• Rule across the blank area and sign and date the rule line if a page or part of a page must be left blank.

• Cross-reference the pages or records of related information so that they are known to belong together; for instance, if entries for a specific activity are made on two or more pages, write “continued” on each subsequent page and if entries are included in separate records, make a note such as “initial information recorded during the previous month, see page #.”

• Cross-reference drawing page numbers for radiological survey data entries.

• Make a copy of each completed entry and send it on a quarterly basis to the contractor site lead for review and maintenance as a duplicate (backup) of the record book in a similarly labeled and numbered three-ring binder.
For the last entry in a record book, state that the activities are complete, or give a reference to the next sequential record book. Add the completion date (using the four-character year) to the cover of the record book.

Transfer record books to the contractor site lead, or his designee, for final review and records management responsibilities.

**B1.2.3.2 Correcting Errors**

If an error is made in a record book, entry authorized personnel shall:

- Draw a line through the error.
- Enter the correct data.
- Initial and date the correction.
- State in the record book the reason for the correction, as appropriate.
- Materials such as opaquing fluid or correcting tape that obscures the original entry are prohibited.

**B1.2.3.3 Storage of Record Books at the Monticello Field Office**

The Monticello contractor operations lead shall:

- Protect record books from loss or damage.
- Protect record books from light, moisture, heat, and pests.
- Retain photocopies of record book entries in a three-ring binder marked “copy” and labeled with the name of the record books.

**B1.2.3.4 Review of Record Books**

Each of the LM record books is reviewed by an independent reviewer during the annual inspection.

The independent reviewer shall:

- Evaluate the record book for accuracy, content, error correction, legibility, and reproducibility.
- Ensure that record book notations and observations conform to the requirements of the procedures in this manual.
- If an error in an entry is found,
  - Verify the correction with the Monticello contractor site staff.
  - Draw a line through the error.
  - Make the correct entry.
  - Initial and date the correction.
  - State in the record book the reason for the correction.
  - State that the correction was verified by the Monticello contractor operations lead.
• If a written comment needs to be made in a record book,
  — Clearly identify the comment as a review comment.
  — Sign and date the comment.
• If any of the pages are changed during the review, make a copy of the pages and send the copy to the AR/IR coordinator for the duplicate record book.
• When satisfied that the data entered are complete and correct, sign and date the record book, making note of the pages and supporting documentation that were reviewed.

**B1.2.3.5 Managing Record Books**

Requirements to maintain backup copies of each record book have been established to reduce the risk and minimize the impact if a record book is lost or destroyed. If a record book is lost or destroyed, the backup duplicate copy retained by the AR/IR coordinator will be used as the record copy and basis for duplicating material for inclusion in the IR. The end date for the lost or destroyed book and the reason the incomplete book was ended will be noted in the contractor site lead’s record book. A new record book will be started.

If a record book is terminated because the work is complete or procedures have changed such that the information will be recorded in a consolidated record book, the record book will be closed out as if it had been completed.

**B1.2.3.6 Transfer and Closure of Completed Record Books**

When a record book is completed, the contractor operations lead will submit it to the contractor site lead, who will update the record book log, in the contractor site lead’s logbook, and perform a final review of the contents of the record book for completeness and accuracy. Upon completion of the review, the contractor site lead will make a final entry in the record book indicating it has been reviewed and is accepted as complete and will then sign and date the final entry. The contractor site lead will then coordinate long-term storage of completed record books through the AR/IR coordinator and the assigned LM records coordinator as follows:

• Following the final review of a completed record book, two copies will be made for inclusion in the Monticello and Grand Junction IR record collections.
• The duplicate copies previously retained by the AR/IR coordinator will be discarded after the IR has been updated.
• The original record book will be forwarded to the assigned LM records coordinator to receive a barcode and to be stored in the Monticello LM records collection.
B1.2.4 Photographic Records

Photographs are used as a means to document conditions in the city, on the supplemental standards properties, and at the site. The Monticello contractor site staff shall:

- Take photographs with a digital camera or 35-millimeter (mm) film that is not self-developing.
- Many photographs are taken on a yearly basis. Many of these photos contain information that is only relevant to a particular non-record event or they are general photos of an area. Some photos are record photos and shall have the following information addressed on the photo:
  - Property and location.
  - Date and time of day.
  - File number or film roll number and frame number (if film camera is used).
  - Subject and description.
  - Weather conditions, if applicable.
  - Direction photograph taken. Use the following abbreviations, if needed:
    - N north
    - NNE north northeast
    - NE northeast
    - ENE east northeast
    - E east
    - ESE east southeast
    - SE southeast
    - SSE south southeast
    - S south
    - SSW south southwest
    - SW southwest
    - W west
    - WNW west northwest
    - WSW west southwest
    - NW northwest
    - NNW north northwest
    - SM survey monument
    - SMK Site marker
    - mi. mile
    - in. inches
    - ft foot
- Upon receipt of the digital photographs, identify each print as follows: site name (or abbreviation), date (e.g., 2/03/17), and description.
- Place photos on the LM shared directory for the Monticello project (Graphic Design can help place the photos on the Monticello project shared drive).

B1.2.4.1 Digital Media

Digital media in an electronic format (e.g., .jpeg, .tif, .png, .eps) are uploaded to the Monticello LM folder and the pictures are organized by year (i.e., 2017 is a folder name).

Within each folder is a subfolder containing the date and a general description of contents of each photograph. Each photo has a date and time stamp, and the file name has a description of the photo. Each month, the photos are backed up to a CD for storage, and at the end of each year, the digital media is backed up to CD by year and sent to the records management organization as a backup.
Attachment B-1

Program Directive Guidelines
Program Directives

Section 6.0, “Program Directives” in the Document Management Manual (LMS/POL/S09818) establishes the procedures and format for initiating and implementing program directives. The process is summarized below.

Individuals initiating a directive prepare a draft using the program directive template from the LM Intranet template library, obtain internal reviews and resolve the comments, and send the draft program directive and any attachments to Document Management.

Document Management assigns a unique number to the directive, updates the program directive log, ensures the expiration date does not exceed the review date of the affected document, and edits and formats the directive.

The initiator will review and concur with the directive, obtain any required external reviews, and resolve the comments. If any changes are made to the program directive, it will be returned to Document Management for final copy. The initiator will obtain approval signatures and return to Document Management.

Document Management will maintain a master copy, ensure the program directive is included in the affected document, and post the newly revised documents to the LM Intranet (all controlled documents are maintained in a library in this location).

The manager of the affected document ensures affected organizations are notified of changes, the program directive is implemented, and any required external distributions are made.
Instructions for Program Directive

Program Directives document program or project-specific changes to procedures or project-planning documents. Program directives cannot be used to make changes to company-wide policy or to administrative policy and procedures. Changes to those documents are made on an Interim Process Directive.

Program Directives may be in effect for a single event. For long-term directives, expiration date cannot be longer than the review cycle.

Lifecycle of a Program Directive:

[1] **Author** fills in or updates all areas in yellow and deletes areas that do not apply:

[a] **Effective and Expiration dates** (The expiration date should be no longer than the required review frequency of the controlling document.)

[b] **Initiated By** (Name of person originating.)

[c] **Directive Subject** (A brief title identifying what the directive is about.)

[d] **Directive and Associated Task Changes** (Description of the specific changes. Include attachments that provide guidelines or procedures that will be used or other relevant information.)

[e] **Organization(s) Affected** (Identify the appropriate group of individuals whose work will be impacted by the Program Directive.)

[f] **Affected Documents** (Specify what documents will be affected by the Program Directive being issued.)

[g] **Justification** (Basis and nature of the changes)

[h] **Review and Concurrency** (Delete/add reviewers as appropriate. Minimal review should include the site manager or lead [if not the originator], assigned QA Specialist, and as appropriate the Laboratory services coordinator if sample management is affected and Environmental Support Services as appropriate when drawings, maps, etc. are affected.)

[i] **Manager Approval** (Provide the name and title.)

[j] **Electronic Distribution** (Include the name of the person responsible for the Administrative Record or the Information Repository, if applicable. Provide the record file number.)

[2] **Author** emails file to Document Production for formatting and technical editing.

[3] **Document Production** emails the formatted and edited file back to the author for review.

[4] **Document Production** emails the final PDF file to the author for signature approval.

[5] **Document Production** modifies the affected documents to insert the IP directive at the front of the electronic file and reposts the affected document on the LM Intranet.
Program Directive

Initiated By:

Directive Subject:

Directive and Associated Task Changes:

Organization(s) Affected:

Affected Documents:

Justification:

Review and Concurrence:

Name, Title, date  Name, Title, date

Name, Title, date  Name, Title, date

Name, Title, date  Name, Title, date

Manager Approval:

Name, Title, date

Electronic Distribution:
Name for Administrative Record
Name for Information Repository

Page 1
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Appendix C

Emergency Information
### Site-Specific Emergency Response Information

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

**Site name:** Monticello Disposal and Processing Sites  
**Date:** 2/14/2017

**Site address:** 1665 South Main Street, Monticello, Utah 84535  
**Phone number:** 435-587-2098

- [x] Occupied site  
- [ ] Unoccupied site

**Hazard Profile** (summary of Site Hazard Survey [LMS 1587] Information)

- [x] Disposal Cell  
- [ ] Public Access  
- [x] Water Treatment Plant  
- [ ] Monitor Wells  
- [ ] Decommissioned Reactor  
- [ ] Other

Please indicate the type of phone number provided. **W** = work; **C** = cell; **H** = home; **O** = other

<table>
<thead>
<tr>
<th>Site Manager Name</th>
<th>Primary phone number</th>
<th>Secondary phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fred Smith</td>
<td>970-245-6182</td>
<td>435-459-4980</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOE Site Contact Name</th>
<th>Primary phone number</th>
<th>Secondary phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason Nguyen</td>
<td>970-248-6707</td>
<td>309-310-2544</td>
</tr>
</tbody>
</table>

**Medical emergency support facility/hospital:** San Juan Clinic and San Juan Hospital

**Fire:** 911 or 435-587-3226

**Ambulance:** 911 or 435-587-3226

**Air Rescue:** 911 or 970-298-2551

**Police/sheriff:** 911 or 435-587-2544

**Nearest available telephone:**  
Cellular phone must accompany personnel to site: 435-587-2098 or 435-459-4128

**Nearest emergency room:** San Juan Hospital
Site-Specific Emergency Response Information (continued)

Emergency assembly area:
At the two entrance gates to the administration parking lot.

Evacuation warning system:
Siren air horn and cell phone communications.

Directions from site to emergency facility (including map):
Turn right on Highway 191. Travel to the only stop light in the City of Monticello and turn left (Center Street). Travel to the end of Center street and the San Juan Clinic and Hospital are located to the right.

Personnel accountability process and responsible individuals
Define how the accountability process will work at your site, who is responsible for performing the task, how it is documented, etc.
Immediate Emergency: David Dille is the emergency coordinator. He will direct emergency response personnel to the area of concern. David will notify the Site Manager located in Grand Junction, Colorado.
Immediate Emergency: Gary McKinnon is the backup emergency coordinator. He will direct emergency response personnel to the area of concern. Gary will notify the Site Manager located in Grand Junction, Colorado.
Bill Cary is the site’s Safety and Health technician. He is an alternate.
Site Manager: Will provide instructions to the site personnel as necessary. The Site Manager will notify upper level management of the emergency and will contact the NW DOE Site Manager.
### Section A: General Site Conditions

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Comments</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>N/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>Do permanent buildings exist on site?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If so, are they occupied?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Public Access</td>
<td>Is the site completely fenced?</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Is access restricted, such as by a locked gate?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Is the site within five minutes response time for emergency responders?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Section B: Radiation Protection

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Comments</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>N/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiological</td>
<td>Does the site contain a radioactive waste disposal cell?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If yes, is the cell completed and capped?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Does the site have an operating water treatment system (plant or passive groundwater system)?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Is the site an underground test site?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are there posted radiological areas on site? If yes, indicate applicable.</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Section C: Industrial Hygiene

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Comments</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>N/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Materials</td>
<td>Are there any poison inhalation hazard (PIH) materials?</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If yes, list PIH:</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Is there a laboratory that uses chemicals on site?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are chemicals present other than laboratory or consumer products?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If yes, are they properly stored and labeled?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are Material Safety Data Sheets (MSDS) available on site?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Metallic Lead</td>
<td>Is there any metallic lead present at the site?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Noise</td>
<td>Are there any posted high noise areas or conditions?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Nonionizing Radiation</td>
<td>Example: Lasers</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Biological Hazards</td>
<td>Do you suspect the presence of bacterial agents, viral agents, fungal agents, or parasitic agents?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Is there a known infestation of venomous snakes, spiders, or rodents?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
## Site Hazard Survey (continued)

### Section D: Industrial Safety

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Comments</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>N/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confined Space</td>
<td>Are there any posted confined spaces?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Storage Tanks</td>
<td>Are there any aboveground storage tanks (&gt;55 gallons)?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If aboveground storage tanks are present, what was/is in them?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- Gas ☐ Diesel ☐ Oil ☐ Acid ☐ Other Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volume 5025 gallons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do all aboveground storage tanks have adequate secondary containment?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are there any underground storage tanks?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>If underground storage tanks are present, what was/is in them?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- Gas ☐ Diesel ☐ Oil ☐ Acid ☐ Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure Vessels and Systems</td>
<td>Are pressure vessels (pressurized tanks, compressed cylinders, or</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>pressurized lines) on site?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire/Explosion</td>
<td>Are all occupied buildings equipped with a fire suppression system?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>List those that are not. Administration Building, Sheds 1,2, and Groundwater Building</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Setting</td>
<td>Is the site in a flood zone as determined by FEMA?</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are there arroyos or other structures that may present a flash flooding</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>area during heavy rains?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drowning</td>
<td>Do ponds, lakes, and rivers exist on the site that present a drowning</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>hazard?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inclement Weather</td>
<td>Does the site have frequent inclement weather conditions (high winds,</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>lightning, hurricanes, or tornados)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are assembly areas designated?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Are tornado shelters identified?</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other Hazards</td>
<td>Describe</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Site Conditions and Additional Comments:

A water plant was added to the system. The plant was built in 2014 and began operations in January of 2015. This system is partly on City of Monticello property and partly on the DOE property. The plant extracts contaminated water from private property and pumps the water to a DOE evaporation pond. The site is in good condition and is monitored by site personnel.

Inspector: [Signature]  
Date: 3/17/17

Site Lead or Site Manager verification of accuracy

Reviewer: [Signature] FREDERICK SMITH (Affiliate)  
2017.03.07 15:11:29 -07'00'

Print and Sign Name
Appendix D

LTS&M Procedures for DOE-Owned Property
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D1.0 LTS&M Procedures for DOE-Owned Property

This section provides the detailed plan by which U.S. Department of Energy (DOE) will conduct long-term surveillance and maintenance (LTS&M) activities at the DOE repository properties (repository). The repository comprises (1) the permanent disposal cell and associated leachate collection removal system (LCRS) and leak detection system (LDS), (2) Pond 4 and associated LCRS and LDS, (3) the disposal cell and Pond 4 telemetry system, (4) the disposal cell cover, (5) the Temporary Storage Facility (TSF), (6) the groundwater remedy optimization (GRO) system, and (7) all other DOE property and support facilities within the DOE repository boundary (see Figure D-1).

Site activities are divided into routine surveillance and maintenance of the surface conditions (Section D2.0), Pond 4 surveillance (Section D3.0), operation and management of the LCRS and LDS (Section D5.0), and TSF (Section D6.0). Information is provided to direct the onsite contractor staff in the conduct of required surveillance, system operations, maintenance, reporting/documentation, and response actions, and to identify roles and responsibilities of DOE in reporting and communicating findings with U.S. Environmental Protection Agency (EPA) and Utah Department of Environmental Quality (UDEQ), when required.

D1.1 Documented Procedures

The following documented procedures are used for the Monticello, Utah, Disposal and Processing Sites project:

- **Portable Gamma Scintillometer Measurements Procedure for the Monticello, Utah, Site**, LMS/MNT/S09166, continuously updated.


- **Soil Characterization Survey Procedures for the Monticello, Utah, Sites**, LMS/MNT/S09165, continuously updated.

- **Monticello City and Repository Site Routine Inspection, Surveillance, and Monitoring Procedures, Monticello, Utah**, LMS/MNT/S10320, continuously updated.

- **Operating Procedure for the Groundwater Remedy Optimization System at the Monticello, Utah, Site**, LMS/MNT/S12738, continuously updated.

D2.0 Routine Surveillance of the Monticello Repository

This section describes routine surveillance by the onsite contractor staff to monitor and maintain the condition of the disposal cell, Pond 4, and surrounding area comprising the repository site. The purpose of routine surveillance is to ensure (1) protection of infrastructure from damage by human, plant, animal intrusion, or weather, (2) early detection and resolution of potentially significant problems, (3) routine maintenance against normal attrition, and (4) data collection for Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Five-Year Reviews. Activities and procedures described in this section are similar to those...
associated with annual site inspections, which are conducted by a separate review team (see Appendix H).

D2.1 Responsibilities

Monticello contractor staff are responsible for (1) conducting routine surveillance and reporting of repository site conditions, (2) conducting routine custodial maintenance, and (3) notifying the contractor site lead of maintenance requiring subcontractor services or resources not available on site.

Contractor site lead is responsible for (1) ensuring that routine surveillance is conducted in accordance with procedures described below, (2) procuring resources beyond those of the Monticello contractor operations lead for maintenance items as needed, and (3) informing the LM Monticello site manager of conditions requiring additional resources or possible regulatory guidance.

D2.2 Repository Area Surveillance Procedure

The Monticello contractor site staff shall conduct monthly and quarterly surveillance of the Monticello repository area with emphasis on the disposal cell cover. Specific elements of the surveillance are described below and itemized on the Repository Area Surveillance Checklist (LMS 5502MON) (Figure D-2). Routine surveillance will include visual inspection primarily for evidence of desiccation or settlement (such as fissures), wind scouring or gully erosion, downslope movement of rock armoring, general health of vegetation, cover disturbance by burrowing animals, undesirable vegetation, human trespass, and intact fencing and signage.
Figure D-1. Monticello, Utah, Repository Base Map
## Repository Area Surveillance Checklist

<table>
<thead>
<tr>
<th>Inspection Item</th>
<th>Acceptable</th>
<th>Comments and Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Monthly surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Quarterly surveillance:</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>[ ] Storm event triggered surveillance due to _____ inches of rainfall over the past 24 hours.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>[ ] February</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>[ ] May</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>[ ] August</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>[ ] November</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

### Condition of:

- [ ] Fences, gates, and locks
- [ ] Roads
- [ ] Signs
- [ ] Site monuments
- [ ] Drainage ditches
- [ ] Manholes
- [ ] Vegetation

### Evidence of erosion of:

- [ ] Top of disposal cell
- [ ] Disposal cell sideslopes
- [ ] Ditches
- [ ] Surrounding area

### Evidence of:

- [ ] Vandalism
- [ ] Intrusion by livestock
- [ ] Burrowing animal damage
- [ ] Intrusion by humans
- [ ] Accumulation of trash

### Additional Quarterly Surveillance Requirements

*Note: All transsects, shown in Figure 3-1, must be walked during this inspection.*

### Condition of:

- [ ] Settlement plate structures
- [ ] Manholes
- [ ] Sediment ponds

### Evidence of:

- [ ] Structural instability

### Additional comments:

---

*Inspections required following a significant storm event.

*Open to inspect quarterly*
The Monticello contractor site staff shall monitor the condition of the disposal cell and surrounding area on a **monthly** basis as described below:

- Get a copy of the *Repository Area Surveillance Checklist* (Figure D-2).
- Drive or walk to high points to view the fence line along the perimeter of the disposal cell and visually inspect items on the checklist.
- Drive or walk the disposal cell top perimeter road and visually inspect items on the checklist.
- Photograph erosion features within the fenced site boundary and record them in the *Repository Site record book*.
- Visually inspect the general condition of the following items:
  - Access gates
  - Access roads
  - Signs
  - Perimeter fences (disposal cell wildlife fence and repository boundary fence)
- Inspect for and make note of the following items:
  - Intrusion by livestock
  - Evidence of animal burrowing on the cover
  - Trash or weed accumulation
  - Earth movement, erosion, or changes in drainage channels that could affect disposal cell integrity
- Evaluate and note the need for maintenance actions, particularly erosion control, sign replacement, and fence repairs.
- Record the results/observations of the surveillance on the checklist at the time of the inspection.
- Maintain the signed checklist in the Monticello Field Office and provide an electronic copy to the contractor site lead (annually, send originals to the records department).

The **quarterly** surveillance will be conducted in February, May, August, and November in place of the monthly surveillance. In addition to the requirements listed above, the **quarterly** surveillance will include the following:

- Walk Transects A–F identified on Figure D-1. Primarily inspecting for evidence of cover cracking, wind or water erosion, poor drainage, structural discontinuity, and intrusions into the cover by undesirable plants, animals, or humans. In addition, inspect for and note the presence or absence of noxious weeds.
- On Transect A (perimeter of the disposal cell), give particular attention to the steep, rock-armored slopes (see Figure D-1) for evidence of instability (displaced riprap, knickpoints, intrusion points, and riprap integrity).
- Walk Transects B–F inspecting for intrusion points directly over the tailings (delineated by the disposal cell top perimeter road).
• Areas that are not in satisfactory condition or that may require repairs or more frequent monitoring will be marked in the field and on a map to make it easy to find during follow-up visits.

• Inspect all manhole exteriors for damage. Open manhole covers and inspect for damage (manhole locations are shown in Figure D-1).

• Inspect the surface of the settlement plate completions.

• Record the results/observations of the surveillance on the checklist at the time of inspection, noting that Transects A–F were inspected.

• Maintain the signed checklist in the Monticello Field Office and provide an electronic copy to the contractor site lead (annually, send originals to the records department).

D2.3 Entering Manholes

There are six manholes within the repository area. Manhole 1 and Manhole 3 in Figure D-1 are associated with the disposal cell LCRS and LDS. Manhole 1 provides access to LCRS 1 and LDS 1, leachate management components of the western cell (or Cell 1). Manhole 3 provides access to LCRS 2 and LDS 2, the leachate management components of the eastern cell (Cell 2). Entry into Manholes 1 and 3 is required for equipment operation, maintenance, and data collection. Manholes 2, 4, and 5 provide access to service ports to the leachate transmission line from the disposal cell to Pond 4. Inspection ports MH 1 and MH 2 were used to provide access for camera inspection of the central collection pipes of the disposal cell LCRS, but they are no longer used. Manhole 6 is located north of Pond 4 and provides access to piping and instrumentation associated with the GRO system. Manholes 1 and 3 require routine access.

All manholes are permit-required confined spaces; Manholes 1 through 5 are designated radioactive controlled areas. Procedures are in place for access to the manholes as defined in this appendix. Potential atmospheric hazards include radon gas accumulation and oxygen deficiency. These potential hazards require proper ventilation and verification of sufficient oxygen content prior to entry.

To enter Manhole 1 or 3, the Monticello contractor site staff shall follow these procedures.

• Open the cover of the manhole and secure the latch.

• A qualified coworker shall remain outside of the manhole with a functioning cell phone to assist in case of an emergency.

• Prior to entry, the contractor site staff shall ventilate the manhole airspace using a ventilation system that will provide a minimum of 40 air exchanges per hour. Contractor site staff shall ensure that the intake of the ventilation system remains outside of the manhole, place the ventilation tube into the manhole, plug the ventilation system into the electrical outlet provided near the top of the manhole, and run the ventilation system for a minimum of 30 minutes.

• Entry into the manhole is allowed only if the oxygen concentration is greater than 19.5% oxygen by volume. Oxygen content of the manhole atmosphere is determined using an appropriate measuring device (e.g., Gas Alert monitoring meter).
• If the oxygen concentration is less than or equal to 19.5%, the manhole ventilation shall continue until the oxygen concentration is greater than 19.5% oxygen by volume.

• Every manhole onsite is a permit-required confined space until downgraded by a contractor Safety and Health representative. No entry is allowed until authorized by a contractor Safety and Health representative.

• All appropriate Radiological Work Permit (RWP) procedures for entry into a radioactive controlled area shall be observed.

• As long as personnel are in a manhole, a Monticello contractor site employee shall continue to monitor the oxygen content to ensure that it exceeds 19.5%. If the oxygen content falls below 19.5%, personnel shall be evacuated immediately from the manhole.

• Conduct work in the manhole as necessary.

• Follow the appropriate RWP procedures for exiting the radioactive controlled area.

• Upon exit, remove ventilation equipment, and close and lock the manhole cover.

Note 1  
Entry and exit procedures specific to radioactive controlled areas are included in the current LM-approved radiological control manuals. Updated manuals are provided to Radiological Control Technician (RCT) personnel.

Note 2  
Manholes 2, 4, and 5 will not be entered without first meeting the appropriate entry requirements as determined through the Safety and Health manager. In the event that entry into Manholes 2, 4, and 5 is necessary, the onsite representative will notify the contractor site lead. The contractor site lead will inform the Safety and Health manager that the process for permitting the entry should begin as soon as possible.

D2.4 Meteorological Monitoring

Meteorological conditions are monitored on a real-time basis using two onsite automated weather stations. One station is located in the administration building’s parking lot and the other station is located at the east end of the disposal cell. The weather station located at the east end of the disposal cell is linked to the System Operation and Analysis at Remote Sites (SOARS) telemetry system. Monitored weather parameters are wind speed and direction, air temperature, barometric pressure, solar radiation, and precipitation. This data is useful for assessing the condition of vegetation growing on the disposal cell cover and for initiating inspections triggered by a storm event (see Section D2.5). This data is also used for evaluating evaporation from Pond 4. A summary meteorological data report with daily climatic information is printed monthly by the contractor operations lead or designee and sent to the contractor site lead. A reference copy is retained at the site.

D2.5 Repository Surveillance Triggered by a Storm Event

In addition to routine (i.e., monthly and quarterly) monitoring, the Monticello contractor site staff shall conduct a surveillance of the repository after each 25-year storm event. After significant precipitation events, the Monticello contractor site staff shall check the automated weather stations.
If 2.8 inches or more of rain falls within a 24-hour period (equivalent to a 25-year storm event),

- Get a copy of the *Repository Area Surveillance Checklist* (Figure D-2).
- Drive or walk the perimeter fence lines and visually inspect for evidence of erosion.
- Drive or walk the disposal cell top perimeter road and visually inspect for evidence of erosion.
- Photograph erosional features and make a notation of the features in the Repository Site record book checklist.
- Record the results of the surveillance, including the inches of precipitation, on the checklist.

Discretionary storm damage surveillance may be conducted and documented in the event of intense, short-duration storms that do not discharge 2.8 inches or more of rain.

### D3.0 Pond 4 Monthly Surveillance

The Monticello contractor site staff shall monitor the condition of Pond 4 on a *monthly* basis as follows:

- Obtain a copy of the *Monthly Pond 4 Surveillance Checklist* (LMS 5501MON) (Figure D-3). This checklist shall be used as a guide for conducting the surveillance and shall be completed at the time of the inspection.
- Drive or walk the top perimeter of Pond 4 and inspect for evidence of failed liner integrity, including the following:
  - Liner bubbling
  - Visible tears
  - Eroded anchor trenches
  - Debris in the pond
  - Vandalism to the liner or facility
- Drive or walk the toe of the berm of Pond 4 and inspect for evidence of leakage and of unwanted plant growth. Unwanted plants are noxious weeds listed by San Juan County and the State of Utah.
- Evaluate the need for maintenance actions. Conduct minor maintenance actions as appropriate. Notify the contractor site lead of any necessary maintenance requiring additional resources.
- Record the results of the surveillance on the checklist, maintain the completed checklists in the Monticello Field Office, and provide a signed copy to the contractor site lead (annually, send the original copies to the records department).
## Monthly Pond 4 Surveillance Checklist

<table>
<thead>
<tr>
<th>Inspection Item</th>
<th>Acceptable</th>
<th>Comments and Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condition of:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fences, gates, and looks</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Roads</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Signs</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Visible piping</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Visible liner and anchors</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Rescue equipment</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td><strong>Evidence of erosion of:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top of Pond 4 berm</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Pond 4 sideslopes</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Ditches</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Surrounding area</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Seepage from Pond 4</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Overtopping of Pond 4</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td><strong>Evidence of:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vandalism</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Intrusion by wildlife</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Intrusion by humans</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td>Accumulation of trash</td>
<td>□ □</td>
<td></td>
</tr>
<tr>
<td><strong>Additional comments:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Monticello LM Representative:** ___________________________  **Date:** ____________

---

*Figure D-3. Example Checklist for Monthly Pond 4 Surveillance*
D4.0 Corrective Action

The Monticello contractor site staff shall conduct or report necessary maintenance activities identified as a result of monthly and quarterly surveillances. The Monticello contractor site staff shall perform routine maintenance tasks that can be done safely and cost-effectively with the resources available at the site. Examples include installing or repairing signs, eradicating weeds, repairing damaged fencing, installing temporary barriers, removing windblown trash, and removing tumbleweeds.

The Monticello contractor site staff will document immediate corrective actions taken in the comments portion of the surveillance checklist or may note corrective actions needed and record the follow-up corrective actions taken in the Repository Site record book. Entries in the record book will identify the date on the surveillance checklist where the problem was originally identified.

The Monticello contractor operations lead will (1) notify the contractor site lead of maintenance requiring outside resources (e.g., repair of significant erosion) who will then initiate the procurement process for any necessary repairs, and (2) notify the contractor site lead of other evidence of site degradation (e.g., poor plant health on the disposal cell cover) who will then notify the LM Monticello site manager to determine the appropriate corrective action in consultation with EPA and UDEQ.

D4.1 Emergency Measures

Extreme natural events or purposeful intrusion at the site may warrant emergency action. Because the Monticello contractor site staff are onsite during normal working hours, it is anticipated that he/she will be directly aware, or be informed by the general public, of an emergency situation. In emergency situations, the Monticello contractor site staff shall follow the requirements of the current DOE-approved LM project safety plan available at the Monticello Field Office. At a minimum, this will require placing a call to the 24-hour telephone number at the LM Office in Grand Junction, Colorado ([970] 248-6070) for notification. Telephone numbers for the Monticello contractor operations lead (for cellular and Monticello Field Office contacts) and the DOE Grand Junction 24-hour telephone number are posted at the Repository entrance and on the Pond 4 gate for the general public.

The Monticello contractor site staff will document any emergency condition in the Repository Site record book. The information recorded should include the identity of the individuals who reported the conditions, a description of the conditions and immediate actions taken, and, as appropriate, any notifications made to local entities and contractor management.

D4.2 Notifications

The Monticello contractor site staff shall notify the contractor site lead of any emergency situations. The contractor site lead will notify the DOE Monticello site manager. DOE will notify EPA and UDEQ within 24 hours upon discovery of an emergency or situation that could affect the integrity of the site. The Monticello contractor site staff will document in the Repository Site record book any additional directions (e.g., actions or notifications) from the contractor site lead.
D4.3 Summary of Repository Surveillance and Reporting Requirements

LTS&M surveillance requirements for the repository include:

- Monthly and quarterly surveillance of the disposal cell cover and surrounding area for evidence of infrastructure degradation.
- Monthly surveillance of Pond 4 for evidence of infrastructure degradation.
- Inspection of the repository after major storm events for evidence of erosion.
- Real-time meteorological monitoring.
- Monthly and/or quarterly surveillance checklists (disposal cell and Pond 4) submitted to the contractor site lead (original copies maintained at the site).
- Monthly summary report of meteorological monitoring data submitted to the contractor site lead.
- Results of inspections or actions taken in response to special event conditions.

D5.0 Disposal Cell and Pond 4 LCRS and LDS Operation

This section specifies the procedures and responsibilities for operating the disposal cell and Pond 4 leachate management systems (LCRS and LDS) and for initiating contingency measures when site-specific action levels are triggered. LCRS and LDS action levels, approved by EPA and UDEQ, are formally developed in Repository and Pond 4 Groundwater Contingency Plan (DOE 1998d). The action levels and response actions, summarized in Sections D5.3 through D5.14 below, are based on the rate of leachate production in the respective LCRS and LDS, as determined by metered pump discharge from each of the installations.

The LCRS and LDS telemetry system monitors sump water levels, controls pump operation between specified high and low water levels, and transmits monitoring data to a central database at the LM office in Grand Junction, Colorado. The Monticello telemetry system is integrated with the LM SOARS system, which allows real-time desktop viewing of data logging installations deployed at numerous LM facilities, including the Monticello site. In the event of a failure of the Monticello repository telemetry system, onsite operators will operate pumps manually until the system can be diagnosed and repaired. The normal operating levels of the repository sumps and the sump capacities are shown in Table D-1.
Table D-1. Normal Operating Conditions for LCRS and LDS Sumps

<table>
<thead>
<tr>
<th>Operating Parameter</th>
<th>Repository: Height above Base of Sump (feet)</th>
<th>Pond 4: Height above Base of Sump (feet)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LCR</td>
<td>LDS</td>
<td>LCR</td>
</tr>
<tr>
<td>Sump ceiling</td>
<td>3.0</td>
<td>3.0</td>
<td>2.5</td>
</tr>
<tr>
<td>High water level alert</td>
<td>2.9</td>
<td>2.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Pump on water level</td>
<td>2.8</td>
<td>2.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Pump off water level</td>
<td>0.7</td>
<td>0.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Low water level alert</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Sump capacity (gallons)</td>
<td>2000</td>
<td>324</td>
<td>145</td>
</tr>
</tbody>
</table>

Note:
These systems are automated and monitored through the telemetry system to SOARS.

D5.1 Responsibilities

Monticello contractor site staff are responsible for the operation and maintenance of the disposal cell and Pond 4 LCRS and LDS, monthly reporting of LCRS and LDS monitoring data, and notification of potential problems with the disposal cell or Pond 4 LCRS and LDS.

Contractor site lead is responsible for ensuring that LCRS and LDS operational procedures are implemented by the Monticello contractor operations lead, and for implementing appropriate response actions when established action levels are exceeded.

LM Monticello site manager is responsible for interfacing with EPA and UDEQ.

D5.2 Disposal Cell and Pond 4 LCRS and LDS Operation

To operate the disposal cell and Pond 4 LCRS and LDS, the Monticello contractor site staff shall:

- On a weekly basis, the site operator shall confirm that the telemetry system is functioning properly.
  
  — If the system has failed, the operator will immediately notify the contractor site lead to discuss procedures for interim monitoring and operation of the sump pumps by manual methods and to discuss diagnosis and repair.

- Confirm that water levels and flow meter data are reasonable in comparison to known sump dimensions and capacities.

- Confirm that water levels in sumps are maintained within the normal operating levels.

- Notify the contractor site lead of anomalous monitoring data (e.g., abrupt increase in disposal cell or Pond 4 water levels or pumping rates).

- Follow the appropriate response actions in Section D5.3 through Section D5.14.
**D5.3 Action Levels and Response Actions for the Disposal Cell LDS and LCRS**

The established action-level leakage rate for the disposal cell LDS is 20 gallons per acre per day (gpad) for either Cell 1 or Cell 2, averaged over a 7-day period. Leakage rates calculated individually for Cell 1 and Cell 2 are based on the area of the floor of the cell. Cell 1 covers 9.73 acres, resulting in an action leakage rate of 194.6 gallons per day. Cell 2 covers 10.79 acres, resulting in an action leakage rate of 215.8 gallons per day. There is no action level for the disposal cell LCRS except that the pumping frequency shall maintain water levels below 2.8 ft (see Table D-1).

**D5.4 When There is No Water in the Disposal Cell LDS**

If the volume of water in LDS1 and LDS2 remains below the pump operating level (automated or manual) for 3 consecutive months, DOE may contact EPA and UDEQ to discuss changing the monitoring frequency.

**D5.5 When the Water in the Disposal Cell LDS is Less than the Action-Level Leakage Rate**

Based on the weekly rate of leachate collection, if the volume of water pumped from either LDS is greater than zero and less than the action level:

- The Monticello contractor site staff will confirm that leachate is entering the LDS by checking the LDS pump, controls, and flow meter for proper operation. Deficiencies will be identified and corrected at that time, if possible, and the contractor site lead will be notified.

- The contractor site lead shall confirm the leakage rate and notify the LM Monticello site manager.

- The LM Monticello site manager will notify EPA and UDEQ of leakage into the LDS.

- At the direction of DOE and in consultation with EPA and UDEQ, the contractor site lead will develop an appropriate sampling and analysis plan to characterize the composition of the LDS liquid.

*Note*

The plan will be based on then-current LM-approved sampling and analysis protocol and on a review of historical information on the wastes placed in the disposal cell and the tailings pore-fluid composition.

**D5.6 When Water in the Disposal Cell LDS is Greater than the Action-Level Leakage Rate**

Based on the weekly rate of leachate collection, if the volume of water pumped from either LDS is greater than the action level:

- Response actions identified in Section D5.5 will be followed, and

- At the direction of DOE and in consultation with EPA and UDEQ, the contractor site lead will implement the appropriate contingency actions identified in DOE (1998d).
D5.7  Action Levels and Response Actions for Pond 4 LCRS and LDS

The action-level leakage rate established for the Pond 4 LCRS and LDS are 851 gpad (2000 gallons per day) and 20 gpad (47 gallons per day), respectively, averaged over a 7-day period. Leakage rates are based on the area of the floor of Pond 4, which is 2.35 acres.

Since January of 2015, the GRO has transferred contaminated water to Pond 4, resulting in the LCR action limit of 851 gpad being surpassed. DOE, EPA, and UDEQ have been notified of this exceedance and concur with the plan of pumping the contaminated water from the LCRS sump back into Pond 4.

D5.8  When Water in Pond 4 LCRS is Less than the Action-Level Leakage Rate

The telemetry system will activate the LCRS pump at the prescribed high water set point to recirculate any water collected in Pond 4 LCRS to Pond 4 by pumping (see the note above in Section D5.7).

D5.9  When Water in Pond 4 LCRS is Greater than the Action-Level Leakage Rate

If the rate of contaminated water into the LCRS is greater than the action level,

- The Monticello contractor operations lead will confirm that contaminated water is entering the LCRS by checking SOARS.
- The contractor operations lead will notify the contractor site lead of the leakage.
- The contractor site lead shall confirm the leakage rate and notify the LM site manager.
- The LM site manager will notify EPA and UDEQ of the leakage rate into the LCRS.
- At the direction of DOE and in consultation with EPA and UDEQ, the contractor site lead will implement the appropriate contingency actions prescribed by DOE, EPA, and UDEQ.

Since January of 2015, the GRO has transferred contaminated water to Pond 4, resulting in the LCR action limit of 851 gpad being surpassed. DOE, EPA, and UDEQ have been notified of this exceedance and concur with the plan of pumping the contaminated water from the LCR sump back into Pond 4.

D5.10  When There is No Water in Pond 4 LDS

If Pond 4 LDS remains dry on a consistent basis, DOE may contact EPA and UDEQ to discuss changing the monitoring frequency.
D5.11 When Water in Pond 4 LDS is Less than the Action-Level Leakage Rate

Based on the weekly rate of leachate collection, if the rate of leachate inflow into Pond 4 LDS is greater than zero and less than the action level:

- The LM Monticello site manager will notify EPA and UDEQ of leakage into the LDS.

*Note*  
Contaminated water is leaking into the LDS and DOE, EPA, and UDEQ have been notified of this leakage. DOE, EPA, and UDEQ concur with pumping the contaminated water in the LDS sump back into Pond 4.

D5.12 When the Water in Pond 4 LDS is Greater than the Action-Level Leakage Rate

Based on the weekly rate of leachate collection, if the rate of leachate inflow into the LDS is greater than the action level,

- At the direction of DOE and in consultation with EPA and UDEQ, the contractor site lead will implement the appropriate contingency actions identified in DOE 1998d.

D5.13 LCRS and LDS Water Management Reporting Requirements

Each quarter, the Monticello contractor operations lead will prepare and submit to the contractor site lead a report indicating the water levels, flow rates, and quarterly and cumulative flows for the disposal cell and Pond 4 LCRS and LDS. The reports shall identify the respective action levels and shall identify and describe anomalous data, action level exceedances, and response actions. The contractor site lead will report LCRS and LDS water management information to the LM Monticello site manager who will forward the information to regulators each quarter.

D5.14 Summary of Repository Operating and Reporting Requirements

- Weekly documentation by the Monticello contractor operations lead of disposal cell and Pond 4 LCRS and LDS telemetry system operation.
- Weekly tabulation and graphing by the Monticello contractor operations lead of disposal cell and Pond 4 LCRS and LDS monitoring data.
- Prompt notification by the Monticello contractor operations lead of system failure or anomalous data to the contractor site lead.
- Quarterly reporting of monitoring results to the contractor site lead. Quarterly reporting by contractor site lead to DOE, EPA, and UDEQ.
- DOE will, in consultation with EPA and UDEQ, implement contingency actions as necessary for LCRS and LDS system-specific action levels.
D6.0 Temporary Storage Facility Operation and Maintenance

This section provides the operating procedures and guidance for the safe handling and control of radiologically contaminated materials at the TSF, and for transporting these materials to and from the TSF. The TSF at the Monticello repository receives radiologically contaminated material excavated from utility corridors or beneath city streets or rights-of-way in Monticello. The TSF is a gravel-surfaced area enclosed with a locked chain link fence located southwest of the Monticello Field Office (see Figure D-1). The TSF includes a 22-foot-wide by 30-foot-long by 4-foot-high concrete bin which is used for temporary storage of contaminated soil and debris. The bin is open at one end and is designed for access by dump trucks and front-end loaders. The TSF area also has two radiological storage containers for bags of radiologically contaminated wastes. Also stored onsite are empty storage drums that can be used to contain other hazardous substances (mixed waste). Mixed waste recognition criteria and management practices are provided in Appendix E, Section E10.5, of this plan.

The TSF meets the substantive requirements to temporarily store hazardous substances, hazardous wastes, polychlorinated biphenyl (PCB) material, and asbestos. Administrative requirements, such as obtaining permits and notification of regulated waste activity, are not required for onsite response actions at CERCLA sites, as specified at Title 40 Code of Federal Regulations Section 300.440(e) (40 CFR 300.400(e)). If mixed waste is encountered, the contractor site lead will direct an Environmental Compliance (EC) representative to develop a management plan specific to that waste to address the requirements for the transportation, temporary storage, inspections, markings, and ultimate disposal.

D6.1 Responsibilities

Monticello contractor operations lead—Responsibilities include (1) ensuring that personnel entering the TSF are trained and/or escorted, (2) conducting routine inspections of the TSF and maintaining appropriate signage and postings at the TSF, (3) performing radiological surveys and monitoring at the TSF, (4) ensuring accurate recordkeeping of TSF inventory and all TSF activities, (5) ensuring procedural conformance with all other TSF activities, including waste type recognition, waste handling and transfers, and third party conformance with procedures.

Carrier operators—Responsible for conforming to procedures directed by the Monticello contractor operations lead, EC representative, and U.S. Department of Transportation (DOT) radioactive material (RAM) shipper for transporting and handling radiologically contaminated TSF materials.

Contractor site lead—Responsible for overall implementation of these procedures.

City of Monticello workers—Responsible for adhering to these procedures and for conducting work in accordance with direction received from the Monticello contractor site staff.

EC representative—Contractor employee responsible for evaluating, planning, and directing the handling and management of TSF radiological materials that may also contain suspected hazardous materials.
Radiological control manager—Responsible for directing decontamination actions and reviewing documentation associated with radiological contamination having radium-226 (\(^{226}\text{Ra}\)) concentrations equal to or greater than 130 picocuries per gram (pCi/g).

**D6.2 TSF Entry and Exit**

The Monticello contractor site staff shall:

- Escort all personnel (visitors or workers) entering the TSF.
- Ensure that the gate to the TSF is locked at all times when DOE or the Monticello contractor site staff is not present.
- Ensure that all persons entering the TSF complete the required information on the Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Entry Log (LMS 5503MON) (Figure D-4).
- Record entries in the Temporary Storage Facility record book legibly and with indelible ink.
- Upon exiting the TSF, note the time in the entry log section of the Temporary Storage Facility record book.
- Lock the gate after exiting the TSF.

**D6.3 TSF Inspections**

On a quarterly basis and following a significant weather event, the Monticello contractor site staff shall:

- Inspect the TSF to determine if the concrete bin and drum containers and covers are secure and in good condition.
- Ensure that containers remain closed except when material is being added or removed.
- Ensure that drums containing stored materials are properly labeled and identified.
- Inspect for appropriateness, legibility, and visibility of signs and postings.
- Ensure the surface area is in good condition (no erosion, no water damage, no excessive vegetation).
- Inspect the fence surrounding the TSF and ensure that it remains in good condition.
- Review the Temporary Storage Facility record book to ensure that radiological monitoring has been conducted and documented in accordance with Section D6.5.
- Record results of the inspection and applicable notations on the Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility (TSF) Record Book Inspection Report (LMS 5504MON) (Figure D-5).
Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Entry Log

<table>
<thead>
<tr>
<th>Name (Print)</th>
<th>Company</th>
<th>Date</th>
<th>Time In</th>
<th>Time Out</th>
<th>Purpose/Comment</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

*Figure D-4. Example Temporary Storage Facility Record Book Entry Log*
Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility (TSF) Record Book Inspection Report

Acceptable?
- [ ] Yes
- [ ] No

- [ ] Was the gate locked upon arrival?
- [ ] Are signs posted in accordance with Section 3.4.4?
- [ ] Are all posting legible?
- [ ] Are enclosures on the concrete bin and stored drum containers tight?
- [ ] Are containers in good physical condition (no rust, no holes, no bulges, etc.)?
- [ ] How much radiologically contaminated material is in the concrete bin? Note: the material should be shipped when the volume in storage approaches 75 percent of the storage capacity.
- [ ] Is the surface area of the TSF in good physical condition (no erosion, no flood damage, no excessive vegetation growth, etc.)?
- [ ] Has radiological monitoring been conducted in accordance with Section 3.4.5?
- [ ] Is the security fence in good condition?

Comments:

Signature of Monticello LM Representative ____________________________ Date of Inspection ____________________________

Figure D-5. Example Temporary Storage Facility Record Book Inspection Report
D6.4 Radiological Control

The entire TSF is a controlled area. The TSF perimeter fence shall be posted with signs containing the following: Controlled Area; Enter at Designated Access Only; Worker—GERT Required for Access; Visitor—Radiological Orientation or Escort Required for Access. Posting intervals are provided in the current LM-approved radiological control manual maintained by the contractor.

The TSF is divided into the following areas:

- Concrete bin where radiologically contaminated material is stored
- Radiological storage bins where bags of radiologically contaminated wastes are stored

Located outside of the TSF area:

- Drum storage area
- Shed for storage of uncontaminated support equipment

The concrete bin is for storage of radiologically contaminated material and will be posted and managed as a soil contamination area if contamination is not suspected of exceeding 130 pCi/g $^{226}$Ra. If radiologically contaminated material is suspected of exceeding 130 pCi/g, the bin or area of the bin shall be posted and managed as a contaminated area. The onsite contractor site staff shall post and manage the soil contamination area or the contamination area, as appropriate, in accordance with specific procedures included in the current LM-approved radiological control manual. Updated manuals are provided to all RCT personnel.

D6.5 Radiological Monitoring of the TSF

The Monticello contractor site staff shall:

- Conduct radiological surveys of the TSF in accordance with appropriate radiological monitoring requirements in Appendix F, “Radiological Survey Procedures,” and with the following minimum frequencies:
  
  — Routine surveys are required at the end of the day after receiving radioactive material for storage and after transporting stored radioactive material offsite. The TSF perimeter and affected work areas will be surveyed and the results are documented on the radiological survey form Radiological Survey Map (LMS 1533) (Figure D-6) and the Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Materials Transfer Log (LMS 5505MON) (Figure D-7).

  — After a leak or spill of radiologically contaminated materials in the TSF.

- Place a copy of all monitoring results in the “Radiological Monitoring Results” section of the Temporary Storage Facility record book. Retain the original survey form for Safety and Health’s radiological records.
### Radiological Survey Map

**Site Name:**

**Purpose:**

**Technician:**

**Date:**

**Location:**

**Reviewer:**

**Date:**

#### Instrument 1

<table>
<thead>
<tr>
<th>Instrument/Probe Model</th>
<th>Instrument Serial No.</th>
<th>Probe Serial No.</th>
<th>Calibration Due</th>
<th>Efficiency</th>
<th>BKGD (cpm)</th>
<th>Area Probe Correction Factor</th>
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#### Instrument 2

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<th>Instrument Serial No.</th>
<th>Probe Serial No.</th>
<th>Calibration Due</th>
<th>Efficiency</th>
<th>BKGD (cpm)</th>
<th>Area Probe Correction Factor</th>
</tr>
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<tbody>
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#### Instrument 3

<table>
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<th>Instrument Model</th>
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<th>Probe Serial No.</th>
<th>Calibration Due</th>
<th>Efficiency</th>
<th>BKGD (cpm)</th>
<th>Area Probe Correction Factor</th>
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**Standardized Symbols for Surveys**

- Tape press (W/K/W) (no. inside)
- Swabs (no. inside)
- Large area smears
- Air samples (no. inside)
- Neutron readings in mrem/hr unless otherwise noted
- Gamma readings in mrem/hr unless otherwise noted (beta readings above)
- Contact readings (dose rate)
- Hot spot
- Backwindow
- K = Reading at knee level (when source is overhead)
- H = Reading at head level (when source is overhead)
- Xxxxx = Contaminated area
- XXXX = Radiation area
- W+ = Contaminated waste area
- RM = Radioactive material area
- F = Floor drain
- C = Corrected net cpm (gross background for direct tasks, alpha or beta)
- gamma specified
- ‡ = Direct task

**Highest Dose Rates**

- General Area
- Contact
- Field
- Loose

**File Index No.:**

---

*Figure D-6. Radiological Survey Form*
<table>
<thead>
<tr>
<th>Item Surveyed</th>
<th>Location Surveyed</th>
<th>Direct Survey</th>
<th></th>
<th></th>
<th></th>
<th>Smear Survey</th>
<th>Inst. No. Used</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Gross Counts</td>
<td></td>
<td></td>
<td></td>
<td>Gross Counts</td>
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<tr>
<td></td>
<td></td>
<td>Beta/Gamma gpm</td>
<td>Alpha gpm</td>
<td>Beta/Gamma gpm</td>
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**Applicable Limits (check one for alpha and one for beta)**

- Alpha (removable/total): 1000/5000 200/1000 20/500
- Beta (removable/total): 1000/5000 200/1000

**Activity Equation**

- Gross count minus BKGD count = Net count
- Net count/Eff = dpm
- Dpm x Area Probe Correction Factor (APCF) = dpm/100 cm²

**APCF**

- 44-9 = 6.5
- FHZ 732 (GM) = 6.5
- 43-10-1 = 1

**Remarks:**

**Released To:**

- [ ] Unrestricted
- [ ] Restricted
- [ ] Other (see remarks)

*See Table 2-2 of Site Radiological Control Manual I (LMS/POL/04322).*
Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Materials Transfer Log

Date: 

Time of entry: 

Name of driver: 

Number and type of container(s) inspected: 

Condition of containers: No leaks, spills, or damage Other (see comments below) 

Origin of material (if transported to the TSF):

Property address: Property #: Grid #: 

Destination of material (if shipment is made from the TSF): 

Type of radiologically contaminated material: (check all that apply)

- [ ] < 130 pCi/g material from concrete bin
- [ ] > 130 pCi/g material stored in RMA drum
- [ ] Radiologically contaminated hazardous substance

<table>
<thead>
<tr>
<th>Estimated volume in cubic yards</th>
<th>Activity in pCi/g Ra-226*</th>
</tr>
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<tbody>
<tr>
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</tbody>
</table>

Comments: 

*From appropriate supplemental standard property record book

Signature of DOE-LM Representative: 

---

Figure D-7. Example Temporary Storage Facility Record Book Materials Transfer Log
D6.6 TSF Waste Types

The Monticello contractor operations lead shall ensure that only the following material is transferred to and stored at the TSF:

- Radiologically contaminated material.
- Mixed waste as directed by the EC representative.

D6.7 Mixed Waste TSF Management

The Monticello contractor site staff shall adhere to the management plan that will be developed by the EC representative in accordance with Appendix E, Section E10.5, of this plan, “Suspected Mixed Waste,” for recognition, transfer, storage, and management of mixed waste.

D6.8 Transfers of Radiologically Contaminated Material to the TSF

Before transferring radiologically contaminated material from supplemental standards areas to the TSF, the contractor site staff will first scan the material by the methods described in Appendix F to determine specific activity of the material. If the activity exceeds 27 pCi/g $^{226}$Ra, the material may be DOT RAM and may be subject to DOT shipping regulations. If material exceeding 27 pCi/g $^{226}$Ra is to go to the TSF, the contractor site staff will first notify the contractor site lead, who will then enlist the support of a certified DOT RAM shipper to perform the necessary calculations (average specific activity concentration and total activity) to determine applicable DOT RAM shipping requirements, as described in Appendix G. To enable the DOT RAM shipper to perform the calculations, the contractor site staff will provide the DOT RAM shipper with the specific activity measurement results, in pCi/g $^{226}$Ra, and the associated volumes of material, in pounds, as recorded in the appropriate Supplemental Standards record book and/or the delta scintillometer field data form (see Appendix F). The DOT RAM shipper will use this information to determine (1) whether the material is DOT RAM and (2) the applicable DOT RAM shipping requirements. Radioactive material that is not DOT RAM (i.e., < 27 pCi/g $^{226}$Ra) will be transported to the TSF using the “best management practice” guidelines provided in Appendix G to prevent dispersal of contamination to the environment and unnecessary exposure. Radioactive material that is DOT RAM (i.e., specific activity concentration > 27 pCi/g $^{226}$Ra and total activity in the consignment > 27,000 pCi $^{226}$Ra) must be transported in compliance with applicable DOT RAM requirements, as described in Appendix G.

Authorized City of Monticello workers, under the direction and presence of the Monticello contractor site staff, will:

- Transfer radiologically contaminated material that is not DOT RAM, as described in Appendix G; to the concrete bin except when it is known to be mixed waste materials (see Appendix E, Section E10.5).

Note: Small, localized quantities of radiologically contaminated material or point sources (i.e., ore) that are not DOT RAM may be transported by the contractor site staff, as described in Appendix G.
• Transport radiologically contaminated material that is DOT RAM to the TSF only through approved carriers, as described in Appendix G. The DOT RAM shipper, in coordination with the contractor site lead, Monticello EC representative, and contractor procurement staff, will determine who is an approved carrier for Monticello DOT RAM.

• Do the following when transferring radiologically contaminated material with $^{226}$Ra concentrations less than 130 pCi/g are transferred:
  — Clean out the transport vehicle and equipment used to transfer the material with a broom so that all visible contamination is removed.
  — Place the sweepings into the same container as the transferred material.
  — Ensure that the cover of the concrete bin is tightly closed.
  — Keep the broom and other tools used for cleaning in the TSF.

• Decontaminate the transport vehicle and equipment in accordance with instructions provided by the Radiological Control manager when radiologically contaminated material with concentrations of $^{226}$Ra greater than or equal to 130 pCi/g is being transferred.

  The Monticello contractor site staff will ensure that decontamination is only conducted by personnel with current Radiation Worker II training and that equipment is frisked and free-released by a RCT.

• Make applicable material transfer notations in the Temporary Storage Facility record book, including volume and activity of the material transferred (Figure D-7).

D6.9 Transfers of Radiologically Contaminated Material from the TSF to the Grand Junction, Colorado, Disposal Site

When the concrete bin approaches 75% capacity, which is equivalent to a volume of approximately 75 cubic yards, the material shall be shipped to an appropriately licensed disposal facility. Currently, the Grand Junction, Colorado Disposal Site near Whitewater, Colorado, is the facility designated for disposal of radiologically contaminated material from the TSF.

The Monticello contractor operations lead shall:

• Notify the contractor site lead that the concrete bin is approaching 75% of capacity.
  — Upon notification by the Monticello contractor operations lead that the TSF is approaching 75% capacity, the contractor site lead will enlist the support of a DOT RAM shipper to perform the necessary calculations (average specific activity concentration and total activity) to determine applicable DOT RAM shipping requirements, as described in Appendix G.

• Provide radiological survey information and estimated quantities of materials stored in the TSF as required by the DOT RAM shipper for performing adequate radioactivity calculations to determine applicable DOT RAM shipping requirements.
• Work with the contractor site lead, Monticello EC representative, and DOT RAM shipper to ensure radioactive material is transported from the TSF to the Grand Junction disposal site, in accordance with the requirements of Appendix G.

• Make applicable material transfer notations in the “Material Transfer” section of the Temporary Storage Facility record book.

Once the applicable shipping requirements are determined, the contractor site lead will work with the Monticello EC representative, DOT RAM shipper, and contractor procurement staff to procure an approved transportation subcontractor to transport radioactive material from the TSF to the Grand Junction disposal site. Radioactive material that is not DOT RAM (i.e., \( \leq 27 \text{ pCi/g} \) \(^{226}\text{Ra}\)) will be transported to the Grand Junction disposal site using the “best management practices” provided in Appendix G. Radioactive material that is DOT RAM (i.e., specific activity concentration \( > 27 \text{ pCi/g} \) \(^{226}\text{Ra}\) and total activity in the consignment \( > 27,000 \text{ pCi} \) \(^{226}\text{Ra}\)) must be transported in compliance with applicable DOT RAM requirements, as described in Appendix G.

### D7.0 Groundwater Remedy Optimization System

The configuration and operating procedures of the GRO system that was installed in 2014 (and operational in January 2015) is documented in *Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System, Monticello Mill Tailings Site, Monticello Site* (DOE 2016c). Appendix J of that document prescribes the procedures for startup, operation, maintenance, and shutdown of the GRO system. It provides a concise description of the working components of the system and associated operating procedures to enable project site operators to diagnose and respond to potential maintenance needs. The plan also identifies roles and responsibilities for system operation and response actions required in the event of off-normal operating conditions. A description of the GRO system and monitoring and reporting requirements is provided in Section 4.3 of this LTS&M Plan.

### D8.0 Forms and Worksheets Referenced in This Manual

Forms are accessible on the LMS Forms webpage at: LM Intranet home page > Library > LMS Forms.

*Radiological Survey Map*  
LMS 1533

Site-specific worksheets are available on the LM Intranet at [https://importal.lm.doe.gov/Library/Worksheets/Worksheets.aspx](https://importal.lm.doe.gov/Library/Worksheets/Worksheets.aspx); select the appropriate site.

*Monthly Pond 4 Surveillance Checklist*  
LMS 5501MON

*Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Entry Log*  
LMS 5503MON
Monticello Long-Term Surveillance and Maintenance
Temporary Storage Facility (TSF) Record Book Inspection Report  LMS 5504MON

Monticello Long-Term Surveillance and Maintenance
Temporary Storage Facility Record Book Materials Transfer Log  LMS 5505MON

Repository Area Surveillance Checklist  LMS 5502MON
Appendix E

LTS&M Procedures for Non-DOE-Owned Property
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E1.0 LTS&M Procedures for Non-DOE-Owned Property

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) representatives utilize work procedures that were developed to meet the requirements of this Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites (LMS/MNT/S00387) (LTS&M Plan) and to operate the Monticello, Utah, Disposal and Processing Sites. The procedures in this appendix address how the city streets and utility corridors are monitored, how radiological survey of removed soils is performed, how information from the radiological surveys are recorded, and how materials are transferred to the Temporary Storage Facility (TSF) located at the Monticello disposal site.

E1.1 Documented Procedures

The following documented procedures (see attachments to this appendix) are used for the Monticello disposal and processing sites:

- **Portable Gamma Scintillometer Measurements Procedure for the Monticello, Utah, Site** (LMS/MNT/S09166)
- **Delta Scintillometer Measurements for In Situ Radium Analysis Procedure for the Monticello, Utah, Site** (LMS/MNT/S09167); includes Appendix, A Standard Test Method for In Situ Radium-226 Analysis
- **Soil Characterization Survey Procedures for the Monticello, Utah, Sites** (LMS/MNT/S09165)
- **Monticello City and Repository Site Routine Inspection, Surveillance, and Monitoring Procedures, Monticello, Utah** (LMS/MNT/S10320)
- **LTS&M Plan Procedures for Non-DOE-Owned Property** (LMS/MNT/S00387)

E2.0 Scope

These procedures shall be used to perform LTS&M activities on non-DOE-owned properties for the Monticello disposal and processing sites.

E2.1 Responsibilities

Contractor site staff are responsible for the implementation of these procedures as described in the LTS&M Plan and the successful operation of the Monticello disposal and processing sites.

E3.0 LTS&M Procedures for Non-DOE-Owned Property

This section identifies the LTS&M activities that DOE will conduct at the formerly DOE-owned properties that were deeded to the City of Monticello in June 2000 (DOE 2000), and at other privately owned or municipal Monticello Mill Tailings Site (MMTS) and Monticello Vicinity Properties (MVP) site requiring LTS&M. Table E-1 lists the affected properties by site.
(MMTS or MVP), ownership (City or private), and if supplemental standards for soil remediation apply. The location of these properties is shown in Figure E-1.

**Table E-1. Non-DOE-Owned Properties Requiring LTS&M**

<table>
<thead>
<tr>
<th>MMTS City-Owned Non-Supplemental Standards Properties</th>
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<tr>
<td>MP-00181 and MS-00893 (former mill site)</td>
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<td>MP-01042</td>
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<td>MP-00211</td>
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</table>

<table>
<thead>
<tr>
<th>MMTS City and Privately Owned Supplemental Standards Properties</th>
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<td>MP-00391&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>MP-01041&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>MG-01026&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MG-01030&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MP-00951&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MP-01077&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>MG-01027&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MP-00990&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MP-01084&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>MG-01029&lt;sup&gt;b&lt;/sup&gt;</td>
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<thead>
<tr>
<th>MMTS Privately Owned Non-Supplemental Properties</th>
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<tr>
<td>MP-00179 and MP-00947</td>
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<tr>
<th>MPP Supplemental Standards Properties</th>
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<tr>
<td>MS-00176&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>City Streets and Utilities</td>
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<tr>
<td>UDOT Highways 191 and 491 (formerly 666) Rights-Of-Way Within the City</td>
</tr>
</tbody>
</table>

**Notes:**

- <sup>a</sup> City property.
- <sup>b</sup> Private property.
Figure E-1. MMTS and MVP Supplemental Standards and Groundwater Restricted Areas
E4.0  Institutional Controls

Each property identified in Table E-1 is affected by one or more institutional control (ICs) that restricts land or groundwater use, or both. DOE will conduct specific LTS&M activities to ensure that controls remain effective in protecting human health and the environment. Properties listed in Table E-2 are shown in Figure E-1.

Table E-2. Summary of Current MMTS and MVP Institutional Controls

<table>
<thead>
<tr>
<th>DOE Property ID</th>
<th>Type of Property</th>
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<th>DOE Property ID</th>
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<td>MP-01041</td>
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<td>MP-01042b</td>
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<tr>
<td>Highways 191 and 491</td>
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**Notes:**

- **a** Former mill site property.
- **b** DOE repository property.
- **c** DOE retained this area as a perpetual wildlife corridor; disturbances are prohibited.
- **d** Properties MP-00211 and MS-00176 are included in City of Monticello Overlay Zone OL-1, which was created through City of Monticello zoning ordinances 2002-04 and 2003-02.
- **e** 1=Routine and/or annual LTS&M inspections.
- **f** 2=Contact State of Utah, Division of Water Rights regarding water appropriation applications.
- **g** 3=Review property deeds during annual LTS&M inspection, verify that annotations transfer with deeds.
- **h** 4=Radiological control performed on excavations.
- **i** Any soil removal from a supplemental standards area on this property must be done as described in Sections 2.2.2 and 2.2.3 and in accordance with the applicable procedures in Appendix E.
- **j** Property meets UU/UE criteria with respect to residual contamination. ICs were imposed as a condition of land transfer from the federal government.

**Abbreviation:**

OU = Operable Unit
Figure E-2. MMTS OU III Features
E5.0 Routine Surveillance Procedures

This section describes the procedures and contingency actions for routine LTS&M activities on all non-DOE-owned property for which ICs apply at the Monticello National Priorities List (NPL) sites.

E5.1 Responsibilities

Monticello contractor operations lead—Is responsible for conducting and documenting routine surveillance, inspections, radiological surveys, contaminated material scans, updating the radiological as-built drawings (Appendix B), and making the appropriate contacts and notifications.

City/Utah Department of Transportation (UDOT) workers—Are responsible for complying with Monticello contractor site staff instructions for handling and transporting radiologically contaminated materials and will comply with the associated safety and health requirements for personal protective equipment (PPE) and monitoring.

Contractor site lead—Ensures that routine surveillance and management of radiological materials are conducted in accordance with these procedures and ensures proper notification of IC violations.

Radiological control manager—Is responsible for directing activities and reviewing documentation associated with radiological contamination having radium-226 (\(^{226}\text{Ra}\)) concentrations equal to or greater than 130 picocuries per gram (pCi/g).

Environmental Compliance (EC) representative—Consults with project staff and coordinates activities associated with suspect hazardous substances and, in consultation with a U.S. Department of Transportation (DOT) radioactive material (DOT RAM) shipper, transportation of radioactive material to the TSF.

DOT RAM shipper—Is responsible for working with the contractor site lead and the Monticello contractor operations lead to facilitate the transportation of DOT RAM material. The DOT RAM shipper has the primary responsibility for determining any applicable DOT RAM shipping requirements for any radioactive material from the Monticello sites.

LM Monticello site manager—Is responsible for reviewing, updating, and, as appropriate, initiating cooperative agreements, memorandums of understanding, and other agreements between DOE and affected city, county, or state entities.

City of Monticello—Is responsible for coordinating city street excavations with the Monticello contractor operations lead and ensuring workers receive and maintain DOE-provided radiological training commensurate with assigned work responsibilities.

UDOT—Is responsible for coordinating planned and unplanned excavations with the contractor operations lead.
E5.2 City-Owned Properties Transferred from DOE

Properties MP-00181 and MS-00893 are non-supplemental standards properties comprising the former mill site. Properties MP-00391 (Phase III), MP-01077, and MP-01041 are supplemental standards properties historically referred to as government-owned piñon/juniper properties. Property MP-01042 and MP-01040 (north portion) are non-supplemental standards properties. Each of the above-listed properties was transferred from DOE to the City of Monticello in 2000 (DOE 2000).

The LTS&M strategy for these City-owned properties is:

- Quarterly inspections to ensure that ICs are effective.
- Quarterly inspection of the wetland areas and Montezuma Creek on the former mill site to ensure that no manmade damage is occurring.
- Contingency actions to address any violation of the ICs.
- Documentation, notification, and reporting.
- Inform the City of maintenance issues on the affected property.

E5.3 LTS&M Surveillance for City-Owned Properties

The Monticello contractor site staff shall:

- Inspect each property on a quarterly basis to confirm that
  - Use of these properties remains restricted to public recreational use.
  - No habitable structures are being built.
  - No overnight camping is occurring or has occurred.
  - No water wells have been installed in the alluvial aquifer on MP-00181, MS-00893, or MP-01077.
  - No soil removal from properties MP-00391, MP-01041, or MP-01077 has occurred (inspect for excavations).
  - No damage by human activity to wetland areas along Montezuma Creek has occurred.
- Record inspection results in the City-owned Properties record book in accordance with recordkeeping requirements identified in Appendix B.

If activities out of compliance are noted,

- The Monticello contractor operations lead will inform the Monticello City Manager and the contractor site lead of the violation or damage.
- The contractor site lead will inform the LM Monticello site manager of the violation.
- The LM Monticello site manager will notify the City Manager, U.S. Environmental Protection Agency (EPA), Utah Department of Environmental Quality (UDEQ), and the National Park Service of the violation, as deemed appropriate.
E5.4 Public Roads and Utility Corridors

The LTS&M strategy for the roadway and utility corridor properties is:

- Obtaining prior notification of planned excavation activity from City and UDOT officials.
- Providing radiological control at all City and highway excavations in Monticello city limits.
- Removing radiologically contaminated material > 5 pCi/g $^{226}$Ra above background from planned and unplanned excavations to the TSF in accordance with the procedures in Appendix G, except as noted.
- Documentation, notification, and reporting.

E5.5 Surveillance for Public Roads and Utilities

The Monticello contractor site staff shall:

- On a weekly basis, identify planned excavations within the city streets and utility corridors (see Plate 1) and within Highways 191 and 491 rights-of-way (see Plate 2). Scheduled excavations are reported in the Blue Stakes of Utah excavation safety program. The contractor site staff has email contact with Blue Stakes for scheduled excavations.

- On a weekly basis, inspect the city rights-of-way and the Highways 191 and 491 rights-of-way to determine if erosion, unauthorized excavations, or unreported emergency excavations have occurred. Inspect (scan) fresh soil on the street or in piles on the sides of the street, new potholes in the street surface, and gullies across or on the sides of the street in accordance with the radiological survey procedures in Appendix F. Plates 1 and 2 show the location of the city and highway rights-of-way that shall be investigated each week.

- On a quarterly basis, inspect the base of the west and east sides of the Highway 191 embankments at Montezuma Creek to determine if erosion or unauthorized excavations have occurred. Eroded material and unplanned excavations will be scanned in accordance with the radiological survey procedures in Appendix F.

- On an annual basis, the contractor site lead or designee will view the UDOT website, preferably near the start of UDOT fiscal year (July), to obtain information on planned state highway projects that will impact the supplemental standards areas of Highways 191 and 491. The Monticello contractor operations lead will be informed of and document the result, and plan accordingly.

- While excavation work is in progress, visit each planned or unplanned excavation and conduct a radiological survey in accordance with the radiological survey procedures in Appendix F. During the survey, check for suspected hazardous substances.

- Document inspection results, notifications and follow-up actions, summarize survey results, including as-built drawing numbers that were updated in the Public Roads and Utilities record book in accordance with recordkeeping requirements identified in Appendix B.

- The contractor site staff will follow the procedures as outlined in Monticello City and Repository Site Routine Inspection, Surveillance, and Monitoring Procedures, Monticello, Utah (LMS/MNT/S10320).
E5.6 Radiological Control for Roadways and Utilities

The following general guidelines can be used for radiological control in roadways and utilities:

- If excavated material is ≤ 5 pCi/g $^{226}$Ra above background, the material is not contaminated and can be returned to the excavation.

- If excavated material is > 5 pCi/g $^{226}$Ra above background and ≤ 27 pCi/g $^{226}$Ra, the material is contaminated and will be removed from the property unless UDOT chooses to return the material to the UDOT excavation. Radioactive material that is > 5 pCi/g $^{226}$Ra above background and ≤ 27 pCi/g $^{226}$Ra can be transported without complying with DOT RAM shipping requirements. However, such radioactive material will be transported in accordance with the applicable best management practices provided in Appendix G.

- If the excavated material is > 27 pCi/g $^{226}$Ra, the material may be DOT RAM, and a certified DOT RAM shipper must determine applicable DOT RAM shipping requirements. Radioactive material > 27 pCi/g $^{226}$Ra cannot be transported until the DOT RAM shipper determines (1) whether the material is DOT RAM and (2) the applicable DOT RAM shipping requirements. The procedures for transporting radioactive material that is > 27 pCi/g $^{226}$Ra are in Appendix G, Section G4.2.

Additional details for radiological control in roadways and utilities are provided below.

- At open-area excavations (e.g., road surface excavations), the Monticello contractor site staff will:
  - Survey the surface of the exposed area after asphalt has been removed using the procedures for conducting gamma scans and delta measurements in Appendix F.
  - Survey the surface of each additional lift to be removed. Appendix G, Section G4.0, describes the necessity for and type of radiological survey data that is needed for determining the transportation requirements for radioactive material that is > 5 pCi/g $^{226}$Ra above background and ≤ 27 pCi/g $^{226}$Ra and radioactive material that is > 27 pCi/g $^{226}$Ra. Depending on the level of radioactivity found in excavated material, the Monticello contractor operations lead may need to provide radiological survey data to a DOT RAM shipper so that the shipper can determine applicable DOT RAM shipping requirements.
  - Segregate any material with $^{226}$Ra concentration that exceeds 5 pCi/g above background from uncontaminated material. To minimize TSF management, consider surveying each loader bucket of material.
  - The contractor operations lead will notify the contractor site lead of any materials that require transport to the TSF.

- At trench excavations (e.g., utility line excavations):
  - Survey the stockpile of excavated material using the gamma scan and delta measurement procedures in Appendix F. Appendix G, Section G4.0, describes the necessity for and type of radiological survey data that is needed for determining the transportation requirements for radioactive material that is > 5 pCi/g $^{226}$Ra above background and ≤ 27 pCi/g $^{226}$Ra and radioactive material that is > 27 pCi/g $^{226}$Ra. Depending on the level of radioactivity found in excavated material, the Monticello contractor operations
lead may need to provide radiological survey data to a DOT RAM shipper so that the shipper can determine applicable DOT RAM shipping requirements.

— Segregate any material with $^{226}\text{Ra}$ concentration that exceeds 5 pCi/g above background from uncontaminated material.

- At City excavations:
  
  — If radiologically contaminated materials are found and the specific activity is $\leq 27$ pCi/g $^{226}\text{Ra}$, instruct City of Monticello workers to transport the material to the TSF. See Appendix G for transportation requirements for radioactive material that is $\leq 27$ pCi/g $^{226}\text{Ra}$.
  
  — If radiologically contaminated material is $> 27$ pCi/g $^{226}\text{Ra}$, then notify the contractor site lead, radiological control technician (RCT), EC representative, and a DOT RAM shipper. The DOT RAM shipper must determine applicable DOT RAM shipping requirements. The procedures for transporting radioactive material that is $> 27$ pCi/g $^{226}\text{Ra}$ are in Appendix G, Section G4.2.

- At UDOT excavations:
  
  — If radiologically contaminated materials are found in sufficient quantity, UDOT may elect to have the material transferred to the TSF. The Monticello contractor site staff will notify the Monticello City Public Works Manager to have a city crew load and transport the material to the TSF if the material is $\leq 27$ pCi/g $^{226}\text{Ra}$. See Appendix G, Section G4.1, for transportation requirements for radioactive material that is $\leq 27$ pCi/g $^{226}\text{Ra}$.
  
  — If radiologically contaminated material is $> 27$ pCi/g $^{226}\text{Ra}$, notify the contractor site lead, RCT, EC Representative, and a DOT RAM shipper. The DOT RAM shipper must determine applicable DOT RAM shipping requirements. The procedures for transporting radioactive material that is $> 27$ pCi/g $^{226}\text{Ra}$ are in Appendix G, Section G4.2.

- At the Highway 191 east and west embankments across Montezuma Creek:
  
  — If soil has been significantly eroded or excavation is apparent, treat the condition as an unplanned excavation.

- Record the survey data for all excavations on the radiological as-built drawing and summarize the survey results, including the drawing number that was updated, in the Public Roads and Utilities record book in accordance with record keeping requirements identified in Section E11.0 of this appendix, and Appendix B.

### E6.0 Transfers of Radiologically Contaminated Material to the TSF

Before transferring radiologically contaminated material from supplemental standards areas to the TSF, the contractor site staff will first scan the material by the methods described in Appendix F to determine specific activity of the material. If the activity exceeds 27 pCi/g $^{226}\text{Ra}$, the material may be DOT RAM and may be subject to DOT RAM shipping regulations. If material exceeding 27 pCi/g $^{226}\text{Ra}$ is to go to the TSF, the contractor operations lead will first notify the contractor site lead, who will then enlist the support of a certified DOT RAM shipper.
to perform the calculations (average specific activity concentration and total activity) necessary to determine applicable DOT RAM shipping requirements, as described in Appendix G, Section G4.0. To enable the DOT RAM shipper to perform the calculations, the contractor operations lead will provide the DOT RAM shipper with the necessary specific activity measurement results, in pCi/g $^{226}$Ra, and the estimated quantity of material, in pounds, as recorded in the appropriate supplemental standards record book or the delta scintillometer field data form (see Appendix F), or both. The DOT RAM shipper will use this information to determine (1) whether the material is DOT RAM and (2) the applicable DOT RAM shipping requirements. Radioactive material that is not DOT RAM ($\leq 27$ pCi/g $^{226}$Ra) will be transported to the TSF using the “best management practices” provided in Appendix G, Section G4.1. to prevent dispersal of contamination to the environment and unnecessary exposure. Radioactive material that is DOT RAM (specific activity concentration $> 27$ pCi/g $^{226}$Ra, total activity in the consignment $> 27,000$ pCi $^{226}$Ra) must be transported in compliance with applicable DOT RAM requirements, as described in Appendix G, Section G4.2. Section E5.0 of this appendix contains detailed radiation control procedures for supplemental standards areas.

Authorized City of Monticello workers, under the direction and presence of the Monticello contractor site staff, will:

- Transfer radiologically contaminated material that is not DOT RAM, as described in Appendix G, Section G4.1, to the concrete bin except for known mixed waste materials (see Section E10.5 of this appendix.

  \[\textit{Note}\] Small, localized quantities of radiologically contaminated material or point sources (i.e., ore) that are not DOT RAM may be transported by the contractor site staff, as described in Appendix G, Section G4.1.

- Radiologically contaminated material that is DOT RAM can be transported to the TSF only by approved carriers, as described in Appendix G, Section G4.2. The DOT RAM shipper, in coordination with the contractor site lead, Monticello EC representative, and contractor procurement staff, will determine who is an approved carrier for Monticello DOT RAM.

- When radiologically contaminated material with $^{226}$Ra concentrations less than 130 pCi/g are transferred,
  - Clean out the transport vehicle and equipment used to transfer the material with a broom so that all visible contamination is removed.
  - Place the sweepings into the same container as the transferred material.
  - Ensure that the cover of the concrete bin is tightly closed.
  - Keep the broom and other tools used for cleaning in the TSF.

- When radiologically contaminated material with $^{226}$Ra concentrations greater than or equal to 130 pCi/g is transferred, decontaminate the transport vehicle and equipment in accordance with instructions provided by the Radiological Control manager.

  \[\textit{Note}\] The Monticello contractor site staff will ensure that decontamination is only conducted by personnel with current Radiation Worker II training and that equipment is frisked and free-released.
• Make applicable material transfer notations in the Temporary Storage Facility record book, including volume and activity of the material transferred (see D-7).

**E6.1 Transfers of Radiologically Contaminated Material from the TSF to the Grand Junction Disposal Site**

When the concrete bin approaches 75% capacity, which is equivalent to a volume of approximately 75 cubic yards, the material shall be shipped to an appropriately licensed disposal facility. Currently, the Grand Junction, Utah Disposal Site near Whitewater, Colorado, is the facility designated for disposal of radiologically contaminated material from the TSF.

The Monticello contractor operations lead shall:

• Notify the contractor site lead that the concrete bin is approaching 75% of capacity.

   Upon notification by the Monticello contractor operations lead that the TSF is approaching 75% capacity, the contractor site lead will enlist the support of a DOT RAM shipper to perform the calculations (average specific activity concentration and total activity) necessary to determine applicable DOT RAM shipping requirements, as described in Appendix G.

• Provide radiological survey information and estimated quantities of materials stored in the TSF as required by the DOT RAM shipper for performing adequate radioactivity calculations to determine applicable DOT RAM shipping requirements.

• Work with the contractor site lead, Monticello EC representative, and DOT RAM shipper to ensure radioactive material is transported from the TSF to the Grand Junction disposal site in accordance with the requirements of Appendix G.

• Make applicable material transfer notations in the “Material Transfer” section of the Temporary Storage Facility record book.

Once the applicable shipping requirements are determined, the contractor site lead will work with the Monticello EC representative, DOT RAM shipper, and contractor procurement staff to procure an approved transportation subcontractor to transport radioactive material from the TSF to the Grand Junction disposal site. Radioactive material that is not DOT RAM (≤ 27 pCi/g 226Ra) will be transported to the Grand Junction disposal site using the “best management practices” provided in Appendix G, Section G4.1. Radioactive material that is DOT RAM (specific activity concentration > 27 pCi/g 226Ra, total activity in the consignment > 27,000 pCi 226Ra) must be transported in compliance with applicable DOT RAM requirements, as described in Appendix G, Section G4.2.

**E6.2 Emergency Handling of Excavated Material**

Under emergency conditions (e.g., severe erosion, water line break), when a contractor site employee is not available, City workers may stockpile excavated materials at the spoils storage area on property MS-01006 or property MP-00181 (see Figure E-1 for location). The presence of radiologically contaminated soils cannot be determined under these emergency conditions, therefore DOT RAM shipping requirements cannot be determined. These materials will be surveyed for radiological contamination by the contractor site staff when the material is suitably dry. After the scan, the material will either be transported in accordance with the requirements of
Appendix G to the TSF if $^{226}$Ra concentration exceeds 5 pCi/g above background or it will be released back to the City or UDOT. Material that is not radiologically contaminated will not be managed at the TSF.

If $^{226}$Ra concentrations exceed 5 pCi/g above background in the stockpiled material (excluding localized contamination or point sources), the Monticello contractor site staff will locate, scan, and as appropriate, decontaminate the equipment used to excavate and transport the material to the stockpile area and any hand tools associated with the activity that have the potential to be radiologically contaminated.

Radiological survey data obtained from stockpiled material will be documented on the appropriate radiological as-built drawing and summarized, including the drawing number that was updated, in the Public Roads and Utilities record book in accordance with recordkeeping requirements identified in Section E11.0 of this appendix, and Appendix B.

### E7.0 Property MS-00176

The LTS&M strategy for property MS-00176 (historically identified as privately owned piñon/juniper property) is:

- Ensuring that the special zoning district is maintained by the City.
- Routine surveillance and inspection to include radiological scanning of building excavations and eroded material.
- Contingency action if radiologically contaminated material is encountered.
- Documentation, notification, and reporting.

### E7.1 LTS&M Surveillance for Property MS-00176

The Monticello contractor site staff shall:

- On an annual basis (in May), determine if property ownership or habitation has changed and, if so, inform the new owner and occupant of the land use restrictions associated with the property.
- On an annual basis (in May), check with the City to see if rezoning has been applied for or if building permits have been issued and, if so, determine if such actions are in conflict with the zoning restrictions established through the supplemental standards agreement.
- On a monthly basis, inspect the publicly accessible perimeters of the property to determine if unauthorized habitable structures have been constructed or if soil has eroded from the property or onto Woodland Way. Inspect for major excavations on the property and fresh soil deposits on the roads adjacent to the property.

Excavations for habitable structures that are identified through routine surveillance or other notification will be scanned for radiological contamination using the measurement procedures provided in Appendix F.

— If radiologically contaminated materials are found, each lift of soil will be scanned until all contamination is removed from the excavation to a spoils pile.
Radiologically contaminated materials will be chased in a vertical direction only, not in a lateral direction beyond the excavation.

If spoils are not scanned during excavation, the Monticello contractor site staff will scan the stockpile, or excavated material that may have eroded off the property, before the materials are moved.

— When the radiological scan results indicate that the residential cleanup standard for residual radioactive materials have been achieved ($\leq 5$ pCi/g $^{226}$Ra above background), the Monticello contractor operations lead will sign Part 1 of the two-part building permit, allowing construction to proceed.

— If radiologically contaminated materials $> 5$ and $\leq 27$ pCi/g $^{226}$Ra are encountered, the Monticello contractor operations lead will notify the City and instruct the City workers to remove the materials to the TSF (see Appendix G for general transport guidelines).

— Materials greater than $27$ pCi/g $^{226}$Ra will be transported in accordance with DOT regulations.

- Record the survey data on the radiological as-built drawing for property MS-00176 that is maintained in the Monticello Field Office.

- Document inspection results, notifications and follow-up actions, summarize survey results and as-built drawing numbers that were updated, in the Private Property Restricted Areas record book in accordance with recordkeeping requirements identified in Section E11.0 of this appendix, and Appendix B.

### E8.0 Property MP-00211

The LTS&M strategy for property MP-00211 is:

- Ensuring that the special zoning district is maintained by the City.
- Routine surveillance and inspection including uranium scanning within the footprint of a structure.
- Contingency actions if contaminated material is identified.
- Documentation, notification, and reporting.

### E8.1 LTS&M Inspection and Recording for Property MP-00211

The Monticello contractor site staff shall take the following actions:

- On a weekly basis, identify planned excavations on the property. Scheduled excavations are reported in the Blue Stakes excavation safety program. The contractor site staff has email contact with Blue Stakes for scheduled excavations.

- On a quarterly basis, inspect the property to determine if an excavation suitable for construction of a habitable structure has been initiated.
If there is no evidence of construction of a habitable structure, and there are no plans to build a habitable structure, note the observations in the City-owned Properties record book.

If there is evidence of construction of a habitable structure, or there are plans to build a habitable structure on the property,

— Halt construction work when the excavation is complete.

*The uranium scanning procedure includes scanning for \(^{226}\text{Ra}\).*

— Notify the contractor site lead.

— Notify the Radiological Control manager for direction on surveying disturbed soils according to the current regulated concentrations for the intended land use. DOE will evaluate survey results to determine if additional soil removal or management is needed.

- Record the survey data on the radiological as-built drawing for property MS-00211 that is maintained in the Monticello Field Office.
- Document inspection results, notifications and follow-up actions, summarize survey results, including as-built drawing numbers that were updated, in the City-owned Properties record book in accordance with recordkeeping requirements identified in Section E11.0 of this appendix, and Appendix B.

**E9.0 Montezuma Creek Restrictive Easement Area**

The LTS&M strategy for the Montezuma Creek restrictive easement properties is:

- Routine surveillance and inspection to ensure compliance with the restrictive easement requirements.
- Implement applicable contingency actions if restrictive easement requirements are violated or if contaminated soil has been transported by erosion from areas in the restrictive easement.
- Documentation, notification, and reporting.

**E9.1 LTS&M Surveillance for Montezuma Creek Restrictive Easement Area**

The Monticello contractor operations lead shall take the following actions:

- On an **annual basis**, if property ownership or habitation has changed inform the new owner and occupant of the land use restriction that applies to the property. Status of property ownership is determined during the annual inspection by inspection team members.
- In the **spring and fall of every year**, inspect the Montezuma Creek restrictive easement area to ensure that habitable structures have not been built in the restrictive easement. Look for any significant natural or manmade disturbances to the land.
Water quality monitoring is conducted each spring and fall for Operable Unit (OU) III. Observations from sampling teams may be used by the Monticello contractor operations lead in documenting the conditions in the restrictive easement area west of location SW92-08 (see Figure E-2). Water quality monitoring is not conducted in the restrictive easement area east of location SW92-08.

If evidence of construction of a habitable structure or removal of soils to locations outside the restrictive easement area is discovered,

— Notify the individual(s) in violation and request that the activity be discontinued.

— Notify the contractor site lead (who will then notify the LM Monticello site manager) of the violation and landowner response.

— Document the conditions observed, property owner contact, and notification made to the contractor site lead in the Private Property Restricted Areas record book. Record dates and times associated with the observations, contacts, and notifications made.

If the activity involves removal of material from the premises, attempt to locate the material.

If the material can be located,

— Conduct a radiological survey in accordance with the procedures in Appendix F to determine if it is contaminated.

— Record the results of the survey in the Private Property Restricted Areas record book and contact the contractor site lead.

If the material is contaminated,

— Notify the contractor site lead of the results of the radiological survey. The contractor site lead will inform the LM Monticello site manager. The LM Monticello site manager, in consultation with EPA and UDEQ, will make a decision regarding the final disposition of the radiologically contaminated material.

— Conduct a follow-up inspection within a reasonable period of time to determine if the activity has ceased.

If the activity has been discontinued, note this fact in the Private Property Restricted Areas record book.

If the activity has not been discontinued, note this fact in the Private Property Restricted Areas record book and contact the contractor site lead, who in turn will inform the LM Monticello site manager.

The LM Monticello site manager may serve legal notice through the appropriate DOE protocols following consultation with EPA and UDEQ.
E9.2 Groundwater Restricted Area

The LTS&M strategy for properties within the groundwater restricted area (GWRA) is:

- Ensure that domestic use of alluvial aquifer groundwater within the restricted area is prevented.
- Document, notify, and report surveillance findings.
- Annual contact with the State Engineer to identify drilling applications in or near the groundwater restricted area.

E9.3 LTS&M Surveillance for Groundwater Restricted Area

The Monticello contractor operations lead shall:

- Inspect each property within the restricted area (see Figure E-1) in the spring and fall for evidence of water well drilling in and near the GWRA.

If evidence of water well drilling or domestic use of the alluvial aquifer is discovered through routine inspection, and the location is within or near the restricted area,

- The Monticello contractor operations lead will contact the landowner or driller and determine the zone of completion and construction of the well.

- The Monticello contractor operations lead will notify the contractor site lead and document the conditions observed, property owner contact, and notification made to the contractor site lead in the appropriate City-owned or Private Property Restricted Areas record book in accordance with the recordkeeping requirements in Section E11.0 of this appendix, and Appendix B.

- The contractor site lead will contact the State Engineer to confirm that the well complies with the requirements of the groundwater management policy.

If the well is in violation of the policy, the Monticello contractor operations lead will notify the landowner or driller of the violation and request that drilling cease immediately or domestic use be discontinued. The contractor site lead will instruct the Monticello contractor operations lead to:

- Conduct a follow-up inspection within a reasonable period of time to determine if the activity has ceased.

If the activity has been discontinued, the Monticello contractor operations lead will note this fact in the appropriate City-owned or Private Property Restricted Areas record book.

If the activity has not been discontinued, the Monticello contractor operations lead will note this fact in the record book and contact the contractor site lead, who in turn will inform the LM Monticello site manager and the State Engineer for possible enforcement action, following consultation with EPA and UDEQ.

- Document inspection results, observations, and notifications to landowners in the appropriate City-owned or Private Property Restricted Areas record book in accordance with the recordkeeping requirements in Section E11.0 of this appendix, and Appendix B.
E10.0 Requirements for Non-Routine Conditions

This section provides procedures that will be implemented in the event of a 25-year storm event, for managing radiologically contaminated material in excess of 130 pCi/g $^{226}$Ra, and for recognizing and managing mixed or suspected mixed waste.

E10.1 Storm Events

Significant storm events trigger follow-up inspection to ensure that radiologically contaminated soil on supplemental standards properties is not transported from the property. After major storm events, the Monticello contractor site staff shall check the automated rain gauges located on the computer in the administration office and the SOARS telemetry for the weather station located at the east end of the disposal cell.

If 2.8 inches or more of rain falls at either location within a 24-hour period (equivalent to a 25-year storm event), or significant rainfall has occurred, the contractor site staff shall:

- Inspect the restrictive easement area along Montezuma Creek and note changes in the stream channel or new erosion or depositional features.
- Inspect the publicly accessible perimeter of property MS-00176 to determine if soil has been eroded offsite or onto Woodland Way. With the consent of the property owner, inspect the supplemental standards property and the adjacent properties to determine if soil has eroded off the supplemental standards property.
- Inspect the City-owned supplemental standards properties (see Table E-1) and the areas adjacent to the properties to determine if soil material has eroded off the supplemental standards properties.
- Inspect city street rights-of-way for fresh eroded soil on the street and gullies across or on the sides of the street.
- Inspect the highway rights-of-way for fresh eroded soil on the highway and gullies adjacent to the highway, and inspect the toe of the Highway 191 east and west embankments across Montezuma Creek.

If significant erosion and transport of soil has occurred from areas of potential radiological contamination to uncontaminated properties, the contractor site staff shall:

- Conduct a radiological survey of the transported soil in accordance with procedures described in Appendix F.
- Record the survey data on the appropriate radiological as-built drawing and summarize the survey results, including drawing numbers that were updated, in the appropriate record book in accordance with the recordkeeping requirements in Section E11.0 of this appendix, and Appendix B.

If the surveyed material is radiologically contaminated, the contractor site staff shall:

- Photograph each feature and record the location and other observations in the record book for the affected property.
- Hand-draw the location of the feature and record the survey data on the appropriate radiological as-built drawing maintained at the Monticello Field Office. Summarize the
survey results, including the drawing number that was updated, in the appropriate record book in accordance with the recordkeeping requirements in Appendix B.

- Contact the City to transport radiologically contaminated material to the TSF.
- Handle and transport radiologically contaminated materials to the TSF in accordance with the transportation requirements in Appendix G and TSF entry, exit, and materials transfer requirements in Appendix D, Section D6.8.

Note

Montezuma Creek restrictive easement area material will not be transferred to the TSF unless directed by the LM Monticello site manager, in consultation with EPA and UDEQ.

E10.2 Special Radiological Control Procedures

This section addresses radiological control procedures that will be followed when material is encountered that has $^{226}$Ra concentrations of 130 pCi/g or greater. The Monticello contractor site staff routinely performs radiological surveys to determine the radioactivity of the excavated or eroded material in accordance with Appendix F.

- If the material is not radiologically contaminated, no further action is required.
- If the material is radiologically contaminated and has $^{226}$Ra concentrations less than 130 pCi/g, the radioactive material will be transported to the TSF in accordance with the requirements of Appendix G and the TSF placement requirements provided in Appendix D, Section D6.8.
- If the material is radiologically contaminated and has $^{226}$Ra concentrations of 130 pCi/g or greater and is “Easily Removed Material” (see definition in the Glossary located in Appendix A), refer to Section E10.3 of this appendix.
- If the material is radiologically contaminated and has $^{226}$Ra concentrations of 130 pCi/g or greater and is “Difficult-to-Remove Material” (see definition in the Glossary located in Appendix A), refer to Section E10.4 of this appendix.

E10.3 “Easily Removed” Radiologically Contaminated Material with $^{226}$Ra Concentration of 130 pCi/g or greater

When localized radiological contamination or point source (e.g., ore) with $\geq 130$ pCi/g $^{226}$Ra are identified, it must be transported to the TSF in accordance with the transportation requirements referenced in Appendix G. The Monticello contractor operations lead shall notify the contractor site lead and RCT when such radioactive material is found. The contractor site lead will enlist the support of a DOT RAM shipper to perform the calculations (average specific activity concentration and total activity) necessary to determine applicable DOT RAM shipping requirements, as described in Appendix G.
Prior to transportation of the radioactive material, the Monticello contractor site staff, with the assistance of an RCT, shall:

- Obtain the following materials.
  - Shovel or similar hand tool
  - Suitable container for managing the contaminated material or point source
  - Steel drum with sealable lid for containing PPE or as directed by the Radiological Work Permit (RWP) and RCT
  - Plastic bag
  - Duct tape
  - Disposable rubber overshoes and gloves
  - Form LMS 1551, *Radiological Access and Frisking Log* sheet

- Place the plastic bag in the steel drum.
- Don rubber overshoes and gloves (PPE).
- Sign in on the *Radiological Access and Frisking Log* sheet.
- Place the contaminated material in the plastic bag.
- Remove PPE and place it in the plastic bag.
- Seal the bag with duct tape and mark the bag with “Caution, Radioactive Material.”
- Close the steel drum.
- Perform a whole-body contamination survey per the RWP and RCT directions.
- Sign out on the *Radiological Access and Frisking Log* sheet.
- Perform a radiological contamination survey of potentially contaminated equipment and materials in accordance with the procedure for contamination surveys and equipment and material release in the current DOE-approved *Safety and Health Procedures Manual* (LMS/PRO/S04337) maintained by the contractor.
- If the radiological contamination survey results indicate contamination levels greater than the release limits in the current DOE-approved *Safety and Health Procedures Manual* decontaminate the equipment or material in accordance with instructions provided by the Radiological Control manager.
- The radioactive material will be transported to the TSF in accordance with the applicable requirements in Appendix G and follow TSF entry, exit, and materials transfer requirements in Appendix D, Section D6.8.

### E10.4 “Difficult to Remove” Radiologically Contaminated Materials with $^{226}$Ra Concentration Greater Than or Equal to 130 pCi/g

When contaminated materials having $^{226}$Ra concentrations of 130 pCi/g or greater are difficult to remove (i.e., cannot be easily removed with a shovel or hand-operated tool and has a volume greater than 1 cubic yard), the Monticello contractor operations lead shall notify the contractor site lead and RCT. The contractor site lead will enlist the support of a DOT RAM shipper to
perform the calculations (average specific activity concentration and total activity) necessary to determine applicable DOT RAM shipping requirements, as described in Appendix G.

Prior to transportation of the radioactive material, the Monticello contractor operations lead, with the assistance of an RCT, shall:

- Post the area containing the contamination as a “Contamination Area” in accordance with the current LM-approved Safety and Health Procedures Manual.
- Ensure that any workers that are assisting with the management of the material are properly trained to remove radiologically contaminated materials having $^{226}$Ra concentrations of 130 pCi/g or greater.
- Ensure that workers don the proper PPE.
- Ensure that each worker signs in on the Radiological Access and Frisking Log sheet.
- Oversee the removal of the contaminated material and its placement in shipping containers and the transport vehicle of an approved carrier.
- Ensure that workers remove their PPE and place it in a plastic bag when work within the contamination area is completed.
- Seal the bag with duct tape and mark the bag with “Caution, Radioactive Material.”
- Perform whole-body contamination surveys on each worker.
- Ensure that each worker signs out on the Radiological Access and Frisking Log sheet.
- Perform a radiological contamination survey of potentially contaminated equipment and materials in accordance with the current DOE-approved Safety and Health Procedures Manual maintained by the contractor.
- If the radiological contamination survey results indicate contamination levels greater than the release limits in the current DOE-approved Safety and Health Procedures Manual, decontaminate the equipment or material in accordance with instructions provided by the RCT.
- The radioactive material will be transported to the TSF in accordance with the applicable transportation requirements in Appendix G and follow TSF entry, exit, and materials transfer requirements in Appendix D, Section D6.8.

E10.4.1 Documentation and Review

The Monticello contractor operations lead shall:

- Record the disposition of radiologically contaminated materials, including survey data and as-built drawing numbers that were updated, in the appropriate record book in accordance with the recordkeeping requirements in Appendix B.
- Submit documentation associated with radiologically contaminated materials having $^{226}$Ra concentrations of 130 pCi/g or greater to the Radiological Control manager for supervisory review and sign-off.
E10.5 Suspected Mixed Waste

This section describes the procedures for identifying and managing radiologically contaminated material that contains other hazardous substances (mixed waste). The procedures are limited to radiologically contaminated material located within the Monticello supplemental standards properties. DOE is not responsible for managing non-radiological hazardous substances encountered on supplemental standards properties.

E10.5.1 Responsibilities

LM Monticello site manager—Notifies EPA and UDEQ when suspected mixed waste is confirmed.

Contractor site lead—Responsible for:
- Contacting the Safety and Health manager to obtain the services of an industrial hygienist, if needed.
- Providing appropriately qualified personnel to sample and characterize suspected mixed waste.
- Providing appropriately qualified personnel to remediate, transport, store, and dispose of suspected or confirmed mixed waste.
- Notifying the LM Monticello site manager when suspected mixed waste is confirmed.

Environmental Compliance (EC) representative—Responsible for developing and implementing the sampling and waste management plan for suspected mixed waste.

Monticello contractor operations lead—Responsible for requesting assistance from the contractor site lead for sampling, characterizing, and implementing the appropriate management of any suspected or confirmed mixed waste.

E10.5.2 Recognition and Management of Suspected Mixed Waste

The Monticello contractor site staff are aware that (1) non-radiological hazardous substances may be encountered in any excavation or during routine surveillance associated with the LTS&M activities described in this plan and (2) these substances may or may not be mixed with radiologically contaminated material. Field recognition of such hazardous substances, whether mixed or not, includes, but is not limited to:
- Materials that are odorous or emit organic vapors.
- Evidence of oily or stained soil, concrete, or debris.
- Workers experience of acute health symptoms (e.g., dizziness, headaches, nausea).
- Improper disposal of commercial, domestic, industrial, agricultural, construction, medical waste.
- Stressed vegetation.
• If field recognition criteria identify the presence of a suspected hazardous substance, cease all work and isolate the area with a barricade (e.g., construction fence, rope, or warning tape)
  — Contact the contractor site lead. The contractor site lead will enlist the support of a subject matter expert (SME) to determine the appropriate PPE.
  — The Monticello contractor site staff will don appropriate PPE and conduct a radiological survey and, as appropriate, screen the suspect material per the SME’s direction. Upon completion of the survey, the PPE will be left in the controlled area to be managed with the suspected hazardous substance.
  If the material is not radiologically contaminated, allow the work to proceed.
  If the material is radiologically contaminated, the radioactive material will be excavated and transported to the TSF in accordance with the requirements of Appendix G, where it will be isolated until further characterization.
• The contractor site lead will notify an EC representative to develop and implement a sampling and analysis plan to classify the waste. When analytical results are received, the EC representative will develop a comprehensive, waste-specific compliance strategy, including ultimate disposal of the waste.
  — If the material does not contain a regulated hazardous substance, the Monticello contractor site staff will be notified to manage the material consistent with the appropriate radiological management procedures.
  — If the material contains a regulated hazardous substance, the Monticello contractor site staff will be notified to implement the waste-specific compliance strategy under instruction and oversight from the EC representative, to include the ultimate disposal of the waste.
• The Monticello contractor operations lead will note all observations and actions directed by the contractor site lead, SME, and EC representative related to identification, sampling, stockpiling, storage, and management of suspected or confirmed hazardous substances in the appropriate record book and drawings in accordance with recordkeeping requirements in Appendix B and in Section E11.0 of this appendix. Include the following information:
  — Description and dates of actions taken
  — Location and volume of suspected hazardous substance
  — Field recognition criteria observed
  — Photograph number and description (if photographs are taken)
  — A summary of the survey results, including the drawing number that was updated

E11.0 Recording Field Data

Field observations and radiological measurements made during routine or non-routine surveillance and monitoring activities are recorded by the Monticello contractor site staff in the record book for the respective property, on the appropriate radiological as-built drawing, or on the applicable form for the activity, or on both. Recordkeeping procedures for these activities are
described in Appendix B. Possible field entries are listed below; many are applicable to all LTS&M activities while others are activity-specific. The contractor site staff will ensure that the relevant information is entered into the appropriate record book. Record book entries are in addition to completing the required inspection and surveillance, drawing updates, or radiological survey forms referenced under the respective LTS&M activity. Record book entries should include:

- Date of surveillance or survey
- Location and description of areas inspected or surveyed
- Results of the radiological survey, including references to the drawing number that was updated
- Description of the location or proximity to an excavation where the material was found and approximate quantity involved
- Inches of precipitation (if a storm event triggered the inspection)
- Observations concerning erosional features or excavations (type of feature, location, size, photograph number, photograph description)
- Sign and fence condition
- Observations and actions taken concerning excessive or stressed vegetation, noxious weeds, and undesirable plants
- Identification of and actions taken regarding suspected hazardous substances
- Final quantity and disposition of excavated material
- Observations concerning the presence of unauthorized habitable structures or areas where soil may have been removed (type of feature, location, size, photograph number, photograph description) and actions taken or needed
- Observations concerning camping activities (e.g., none observed or evidence of unauthorized overnight camping, including the location for follow-up monitoring)
- Observations concerning changes in the stream channel or the presence of new erosional features
- Observations concerning the presence of unauthorized water wells and actions taken or needed
- Observed violations to the ICs, including dates and times of contact with property owners, notification made to the contractor site lead, and results of follow-up inspections
- Results of annual review of deed restrictions and property ownership through the San Juan County records, including associated discussions with owner/occupant
- Date and results of annual contact with UDOT with regard to planned construction in supplemental standards areas
- Date and results of annual review and discussions held with new property owners and occupants
• Date and results of annual review of checks with the City regarding re-zoning plans, pending actions, or permits associated with the property
• Dates of contact and summary of communication (e.g., nature of inquiry, notifications, and results) with property owners and city, county, or UDOT representatives
Delta Scintillometer Measurements for In Situ Radium Analysis Procedure for the Monticello, Utah, Sites

May 2017
Contents

Forms Referenced in This Manual.................................................................................................. ii
1.0 Purpose ...................................................................................................................................1
2.0 Responsibilities ......................................................................................................................1
   2.1 Team Leader ................................................................................................................1
   2.2 Team Member .............................................................................................................1
3.0 Operational Check..................................................................................................................1
4.0 Data Reduction .......................................................................................................................2
5.0 Instrument Calibration and Repair .........................................................................................2
6.0 Records ...................................................................................................................................2

Appendix

Appendix A Standard Test Method for In Situ Radium-226 Analysis
Forms Referenced in This Manual

Forms are accessible on the LMS Forms webpage at: LM Intranet home page > Library > LMS Forms.

*Daily Instrument Response Check Data Sheet*  LMS 1974A
*Delta Scintillometer Field Data*  LMS 2012
1.0 Purpose

This procedure describes the setup and operation of EL-0018B a delta-gamma scintillometer for performing in situ equivalent radium-226 ($^{226}\text{Ra}$) analysis. A standard method for operation of this instrument is included as Appendix A, “Standard Test Method for In Situ Radium-226 Analysis.”

2.0 Responsibilities

2.1 Team Leader

Team leader responsibilities include:
- Ensure that instruments are available and returned from the field each day.
- Ensure that operational checks are performed and documented.
- Report nonconformance items to the immediate supervisor.
- Perform the duties of a team member.

2.2 Team Member

Team members’ responsibilities include:
- Perform and document operational checks.
- Verify current instrument calibration.
- Collect data using methods described in this procedure.
- Prevent loss of instruments.
- Clean and decontaminate instruments, as appropriate.

3.0 Operational Check

Detailed procedures for performing operational checks are given in Appendix A. Record operational check results on the Daily Instrument Response Check Data Sheet (form LMS 1974A).

Perform an operational check using the operational check block (concrete ammo can). Place the instrument’s detector over the solid part of the block.

Establish the operational check range by taking a total-count operational reading. The range is equal to ±20%.
4.0 Data Reduction

Reduction of delta scintillometer data (in counts per second) to \(^{226}\text{Ra}\) concentration in picocuries per gram (pCi/g) is accomplished manually using the equation given on the Delta Scintillometer Field Data form (LMS 2012) and the slope and intercept factors from the card attached to the instrument. Data reduction may also be done using a database.

**Delta Measurements**

[1] Following the gamma scan, investigate all areas with gamma activity that exceed 1.3 times the average background; use the delta scintillometer to estimate the Ra-226 concentration of the soil.

[2] Make a delta measurement at the highest gamma location within each discrete area.

[3] If needed, make additional measurements to establish the area boundary.

[4] Turn power switch to ON and set the time switch to the desired interval (normally 120 seconds). Remove the filter.

[5] Place the instrument on the surface to be measured. Do not move the instrument during the sequence of unfiltered and filtered measurements.

[6] Press the START button to initiate the total count. Verify that the count is increasing. If it is not, press the RESET button and then the START button.

[7] At the end of the counting interval, record the total count on the Delta Scintillometer Field Data form.

[8] Place the filter in the receptacle beneath the detector without moving the detector.

[9] Press the START button and verify that the count is decreasing.

[10] At the end of the counting interval, record the difference (delta count) on the Delta Scintillometer Field Data form.

5.0 Instrument Calibration and Repair

Send the delta scintillometer to outside vendors for calibration and repair.

6.0 Records

Records generated by this procedure are:

- *Daily Instrument Response Check Data Sheet.* Completed forms are retained for a period of 1 year.

- *Delta Scintillometer Field Data* form. Completed forms are retained for a period of 1 year.
Appendix A

Standard Test Method for
In Situ Radium-226 Analysis
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**A1.0 Purpose and Scope**

This procedure describes the setup and operation of the BFEC Model EL-0018B delta-gamma (delta) scintillometer for performing in situ equivalent radium-226 ($^{226}\text{Ra}$) analysis.

This method can be used to measure $^{226}\text{Ra}$ concentrations in soil with results that compare favorably with laboratory analysis of soil samples for radium-226. The user must be aware that the sample volume of the measurement and soils may vary.

**A2.0 Procedure**

**A2.1 Hazard Analysis**

These procedures bring personnel into contact with radioactive sources and material. Controls and safe practices described in the *Safety and Health Manual* (LMS/POL/S04321) must be implemented.

**A2.2 Summary of Test Method**

The BFEC Model EL–0018B delta scintillometer, when properly calibrated, provides readings that may be used to measure $^{226}\text{Ra}$ concentrations in soil in picocuries per gram (pCi/g). Two measurements are collected: one with the detector unfiltered and one with a filter between the detector and the volume of interest. The difference between the two measurements is the gamma radiation emanating directly from the volume of interest beneath the detector with the interfering adjacent sources of gamma radiation substantially reduced. This method of measurement is typically used when a measurement is required within a secondary radiation field.

**A2.3 Significance and Use**

This test method is used for determining Ra-226 concentrations in soil.

Concentrations of $^{226}\text{Ra}$ in soil are compared to the U.S. Environmental Protection Agency standards in Title 40 *Code of Federal Regulations* Part 192 or other applicable regulations.

Delta scintillometer measurements will not correspond precisely with other soil samples collected at the same location because of uncontrolled geometry and unknown sample volume.

**A2.4 Interferences**

The variables in the test method requiring interpretation include gamma-emitting radionuclides other than Ra-226 in the soil sample, atmospheric and cosmic radiation, nearby radioactive sources, radon exhalation, soil moisture, and electronic “noise.”

Potassium-40 (K-40) and thorium-232 (Th-232) are among the gamma-emitting radionuclides occurring naturally in soil. Average world concentrations of K-40 and Th-232 are approximately
13 pCi/g and 0.7 pCi/g, respectively, and are equivalent to a gamma signal of approximately 1.5 pCi/g Ra-226 as measured by this method.

Values for these contributions can be determined from laboratory spectral assays of soils collected onsite, or a regional average may be determined if the geology is similar.

These values may be subtracted from the $^{226}$Ra, as determined by the delta scintillometer method.

A correction factor may also be applied for soil moisture content because soil moisture reduces the total gamma-ray flux at the surface and because concentrations are conventionally based on dry sample weight.

The soil sample correction factor is determined by measuring the moisture content of soil samples collected onsite.

Radon escaping from the soil decreases the concentration of Ra-226 measured in situ because the delta-scintillometer method actually measures gamma-emitting radon daughters. The amount of this decrease is the fraction of radon that escapes from the soil. The equation used for the disequilibrium correction is

$$ F_e = 1/(1 - E) $$

where $F_e = $ disequilibrium correction, and $E = $ fraction of radon escaping from the soil.

A value for disequilibrium can be determined from laboratory analysis of soil samples collected at each site.

The calculations of the operational check range and the operational check are highly site dependent. A range established for one site may not be useful at another. An operational check range should be established and the operational check performed as near the site of measurement as is practicable.

A2.5 Apparatus
BFEC delta scintillometer, Model EL–0018B.
Tungsten filter.
Operational check block (concrete ammo can).
Data forms (Daily Instrument Response Check Data Sheet [form LMS 1974A] and the Delta Scintillometer Field Data [form LMS 2012, Figure A-1]).
Operational check data book.

A2.6 Calibration and Repair
The instrument will be sent to outside vendors for calibration and repair.
A2.7 Preparation of the Delta Scintillometer

[1] Turn power switch to ON. Check calibration sticker to verify that instrument calibration is current (i.e., calibration performed less than 1 year before the current date).

[2] If the batteries are low, an arrow and colons will appear in the display; and the batteries must be replaced.

[3] Select the proper counting interval (normally 120 seconds) and set the rotary switch. Refer to the Daily Instrument Response Check Data Sheet and the Delta Scintillometer Field Data form to verify the counting interval information.

[4] Initiate the UP count by pressing the START button.

[5] To interrupt the counting sequence, press the RESET button.
A2.8  Operational Check Procedure

[1] Perform the operational check at the beginning or end of each day the instrument will be in use.

[2] Place the EL−0018B delta scintillometer on the top surface of the operational check block (concrete ammo can).

[3] Using the rotary switch, select the desired counting interval (normally 120 seconds).

[4] Remove the tungsten filter from the slot on the undersurface of the instrument.

[5] Press the START button to initiate the UP or total count.

[6] Verify that the displayed count is increasing.

   [a] If the displayed count is decreasing, depress the RESET button then the START button.

[7] When the total-count interval is complete, record the total count on the Daily Instrument Response Check Data Sheet.

[8] Compare the total-count operational check reading to the operational check range specified on the Daily Instrument Response Check Data Sheet and register response in proper column.

[9] If the total count is within the range specified, the instrument may now be used for $^{226}$Ra measurements.

[10] If the total count is not within the specified range, ensure that all instrument settings are correct.

[11] If any instrument settings are incorrect, correct them and begin the procedure at step 5.

[12] If the instrument settings are correct, notify the team leader, red tag the instrument, and note the problem with an “Out of Range” comment. Record the operator’s name, instrument serial number, and date on the Out of Range tag. Submit the instrument to the Safety and Health group for repair.

A2.9  In Situ Measurement Procedure

[1] Complete the header information on the Delta Scintillometer Field Data form. Place the instrument on the surface to be measured. Identify the location of the sample measurement on the Delta Scintillometer Field Data form. When conditions warrant, place a plastic bag between the detector and the soil to protect the instrument from contamination. Do not move the instrument during the sequence of unfiltered and filtered measurements.

[2] With the filter removed, press the START button to initiate the total count. Verify that the count is increasing; if it is not, press the RESET button and then the START button.

[3] At the end of the counting interval, record the total count on the Delta Scintillometer Field Data form.

[4] Place the filter in the receptacle beneath the detector without moving the detector.
[5] Press the START button and verify that the count is decreasing.

[6] At the end of the counting interval, record the difference (delta count) on the \textit{Delta Scintillometer Field Data} form.

\textbf{A2.10 Calculation of Results}

The counting interval is chosen to ensure that the delta measurement has the necessary precision. The 1-sigma relative uncertainty must be less than 5\% for the check-source and calibration measurements and less than 15\% for in situ measurements. Sigma ($\sigma$) is defined as 1 standard deviation of the delta count and is expressed by the equation

$$\sigma = \sqrt{2TC - \Delta}$$

where $TC$ is the unfiltered accumulated count (total count), and $\Delta$ is the delta count.

The 1-sigma percent uncertainty of the delta count is expressed by the equation

$$\%\text{Uncertainty} = 100\left(\frac{\sigma}{\Delta}\right)$$

The reduction of delta scintillometer data from counts per second (cps) to $^{226}$Ra concentration in picocuries per gram with correction for K-40 and Th-232 is accomplished using the equation

$$eRa = (A_1 \times \text{cps}) - (A_2 \times K) - (A_3 \times Th)$$

where

- $eRa =$ equivalent Ra-226 concentration in pCi/g,
- $A_1$, $A_2$, $A_3 =$ calibration constants,
- cps $= \Delta$ scintillometer reading in counts per second,
- K $= \text{K-40 concentration in pCi/g}$, and
- Th $= \text{Th-232 concentration in pCi/g}$.

The K-40 and Th-232 values can be obtained by spectrometer measurements onsite, or they can be established by region or area. The values for the Colorado Plateau region are $16.7 \pm 4.2$ pCi/g for K-40 and $0.98 \pm 0.55$ pCi/g for Th-232. When the K-40 and Th-232 concentrations are known, they may be combined with the coefficients $A_1$ and $A_2$ for a given instrument and presented as the intercept in

$$eRa = \text{slope} \times (\Delta \text{ count/count time}) - \text{intercept}$$

where

- slope $= A_1$ coefficient, and
- intercept $= (K-40 \times A_2) + (Th-232 \times A_3)$

The calibration constants $A_1$, $A_2$, and $A_3$ are specific to each instrument for each calibration period. Record the percent uncertainty and Ra-226 concentration in picocuries per gram in the appropriate space on the \textit{Delta Scintillometer Field Data} form.
A2.11 Precision and Bias

For delta measurements, the shielded count \( (N_s) \) is subtracted from the unshielded count \( (N_u) \) to produce the delta count \( (N_d) \). The standard deviation of \( N_d \) is expressed as

\[
\sigma_{N_d} = \sqrt{\sigma^2_{N_u} + \sigma^2_{N_s}}
\]

where \( \sigma_{N_u} \) and \( \sigma_{N_s} \) are the unshielded and shielded counting standard deviations, respectively, based on Poisson statistics, and \( N_d = N_u - N_s \). This uncertainty can be quite large if the shielded and unshielded counts are of the same magnitude (i.e., the difference is small), which is generally the case when measuring low concentrations in the presence of high ambient radiation. For this reason, collimation is recommended for the delta scintillometers used in remedial action measurements. Collimation is the use of lead or tungsten shielding to prevent the recording of gamma radiation from sources other than the soil sample volume of interest. Collimation effectively increases the difference between \( N_u \) and \( N_s \).

The maximum recommended uncertainty attributable to counting statistics is 5% for calibration data and 15% for field measurement data.

A3.0 References


Monticello City and Repository Site Routine Inspection, Surveillance, and Monitoring Procedures, Monticello, Utah

May 2017
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Contents

Abbreviations .................................................................................................................................. ii
Units of Measure Abbreviations .................................................................................................... iii
Forms Referenced in This Manual ................................................................................................. iv
Worksheets Referenced in This Manual ........................................................................................ iv
Glossary ........................................................................................................................................... v
1.0 Introduction ............................................................................................................................1
  1.1 Purpose ........................................................................................................................1
  1.2 Scope ...........................................................................................................................1
  1.3 Responsibilities ............................................................................................................2
  1.4 Procedures ...................................................................................................................3
    1.4.1 Daily Activities ............................................................................................3
    1.4.1.1 Monitoring Intrusive Work Activities in the City of Monticello. ................3
    1.4.1.2 Public Roads and Utility Surveillance. .......................................4
    1.4.2 Weekly .........................................................................................................6
    1.4.2.1 Monday (or first of the week) .....................................................6
    1.4.2.2 During the Course of the Week ...................................................7
    1.4.2.3 Friday (or the end of the week) ...................................................7
    1.4.3 Monthly ........................................................................................................8
    1.4.3.1 Repository Area Surveillance. ....................................................8
    1.4.3.2 Pond 4 Surveillance. ...................................................................9
    1.4.3.3 Meteorological Monitoring. ........................................................9
    1.4.3.4 Offsite Property MS-00176-VL. ...............................................10
    1.4.4 Quarterly ....................................................................................................10
    1.4.4.1 Offsite Quarterly Assignments..................................................10
    1.4.4.2 Repository Quarterly Assignments ..........................................11
    1.4.5 Procedure for Entering Manholes 1 and 3 .................................................13
    1.4.6 Non-Routine ...............................................................................................14
  2.0 Training ................................................................................................................................14
  3.0 References ............................................................................................................................14

Attachments

Attachment 1 Contact List
Attachment 2 Discovery of Contaminated Soils: Scenario One
Attachment 3 Discovery of Contaminated Soils: Scenario Two
Attachment 4 Discovery of Contaminated Soils: Scenario Three
Attachment 5 Discovery of Contaminated Soils: Scenario Four
Attachment 6 Weekly Monticello Site Activity Status
# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>DOE</td>
<td>U.S. Department of Energy</td>
</tr>
<tr>
<td>DOT</td>
<td>U.S. Department of Transportation</td>
</tr>
<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>LCRS</td>
<td>leachate collection and removal system</td>
</tr>
<tr>
<td>LDS</td>
<td>leak detection system</td>
</tr>
<tr>
<td>LM</td>
<td>DOE Office of Legacy Management</td>
</tr>
<tr>
<td>LMS</td>
<td>Legacy Management Support (contractor)</td>
</tr>
<tr>
<td>LTS&amp;M</td>
<td>long-term surveillance and maintenance</td>
</tr>
<tr>
<td>NPL</td>
<td>National Priorities List</td>
</tr>
<tr>
<td>OU</td>
<td>Operable Unit</td>
</tr>
<tr>
<td>POW</td>
<td>Plan of the Week</td>
</tr>
<tr>
<td>Ra-226</td>
<td>radium-226</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>SOARS</td>
<td>System Operations and Analysis at Remote Sites (LM Remote Monitoring Project)</td>
</tr>
<tr>
<td>TSF</td>
<td>Temporary Storage Facility</td>
</tr>
<tr>
<td>UDOT</td>
<td>Utah Department of Transportation</td>
</tr>
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</table>
### Units of Measure Abbreviations

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>cm</td>
<td>centimeter</td>
</tr>
<tr>
<td>dpm/cm²</td>
<td>disintegrations per minute per square centimeter</td>
</tr>
<tr>
<td>m²</td>
<td>square meter(s)</td>
</tr>
<tr>
<td>pCi/g</td>
<td>picocuries per gram</td>
</tr>
</tbody>
</table>
Forms Referenced in This Manual

Forms are accessible on the LMS Forms webpage at: LM Intranet home page > Library > LMS Forms.

- Plan of the Day/Plan of the Week LMS 2130
- Routine Safety and Health Inspection Checklist LMS 2114

Worksheets Referenced in This Manual

Site-specific worksheets are available on the LM Intranet at https://lmportal.lm.doe.gov/Library/Worksheets/Worksheets.aspx; select the appropriate site.

- Monthly Pond 4 Surveillance Checklist LMS 5501MON
- Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility Record Book Entry Log LMS 5503MON
- Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility (TSF) Record Book Inspection Report LMS 5504MON
- Repository Area Surveillance Checklist LMS 5502MON
Glossary

CERCLA hazardous substance: Material that is harmful to human health or the environment and is specifically defined and regulated under CERCLA.

certified shipper: A person who has received DOE/U.S. Department of Transportation (DOT)-approved training to ship radioactive or hazardous material.

City-owned properties: These properties include properties transferred to the City by DOE (MP-00181-OT, MS-00893-OT, MP-01040-VL, MP-01042-VL and MP-01077-VL), City property MP-00211-VL, and the City-owned supplemental standards properties.

City-owned supplemental standards properties: These properties, identified as MP-00391-VL, Phase III; MP-01077-VL, Phase II; and MP-01041-VL, contain supplemental standards areas. They are also called “piñon/juniper properties” in the LTS&M Plan.

controlled area: Controlled areas are established and posted to warn individuals that they are entering areas controlled for radiation protection purposes. All radiological areas and radioactive material areas lie within the boundaries of controlled areas. Each access point to a controlled area shall be posted whenever radiological areas or radioactive material areas exist in the area. Individuals who enter only controlled areas without entering radiological areas or radioactive material areas are not expected to receive a total effective dose of more than 0.1 rem (0.001 sievert [Sv] in a year (see 10 CFR 835.602[a]).

delta scintillometer: Model EL0018B delta-gamma scintillometer. The instrument measures gamma activity in units of counts per second, which may be converted to equivalent picocuries per gram (pCi/g) radium-226 (Ra-226) by using a conversion factor specific to the instrument and specific to the Monticello site. This factor is determined during the bench calibration of the instrument, which includes cross correlation of counts per second to known calibration source concentrations (airport calibration reference models).

difficult-to-remove material: Radiologically contaminated material with a Ra-226 concentration greater than 130 pCi/g that cannot be easily removed using hand tools and having a volume greater than 1 cubic yard.

DOT radioactive material: Radioactive material that meets the U.S. Department of Transportation (DOT) definition of radioactive material, that is, any material having a total activity exceeding 70 becquerels per gram (about 1,890 pCi/g). Total activity is the sum of all activities of the radionuclides present in the material.

easily removed material: Radiologically contaminated material with a Ra-226 concentration greater than 130 pCi/g that can be removed with a shovel or similar hand-operated tool and having a volume less than or equal to 1 cubic yard.

Field Office: The building in Monticello, Utah, containing the Monticello LMS representative’s office. The address of the office is 1665 South Main, Monticello, Utah 84535, which is on the east side of Highway 191, approximately 1 mile south of the Highway 191 and 491 intersection (city center).
gamma scintillometer: A model SC-133 rate-meter with an external, crutch-mounted detector consisting of a 1.5-inch-thick by 1.5-inch-diameter sodium iodide crystal. This instrument reads in counts per second and microroentgens per hour.


hazardous substances: In this document, “hazardous substances” includes CERCLA hazardous substances in concentrations greater than EPA’s risk-based cleanup concentrations, hazardous waste, polychlorinated biphenyls, and asbestos.

hazardous waste: Waste material that is harmful to human health or the environment and that is specifically defined and regulated under the Resource Conservation and Recovery Act (RCRA).

inspection: Review and observation by a formally constituted team for the purpose of oversight, mobilized either at regular intervals or in response to specific concerns. Procedures for Temporary Storage Facility (TSF) inspections are included in this document, but procedures for site-wide annual inspections are not.

institutional controls: Administrative procedures and/or restrictions that are implemented to ensure that a remedy is protective of human health and the environment. A restriction on the use of groundwater is an institutional control.

leachate collection and removal system (LCRS): An engineered system designed to collect and transfer water draining from the repository or Pond 4.

leak detection system (LDS): Sumps designed to detect and collect water that has leaked through the primary liner of the repository or the secondary liner of Pond 4.

Legacy Management Support (LMS) contractor: The current prime contractor for the DOE Office of Legacy Management.

major excavation: An excavation that require the use of heavy motorized equipment to excavate soil beneath or adjacent to city streets, utilities, or Highways 191 or 491 rights-of-way. Replacing or repairing a buried utility line, installing a culvert, replacing road base beneath a paved surface, or replacing fill material in an embankment would constitute a major excavation.

minor excavation: An excavation that can be made with hand tools or hand-operated mechanical tools (e.g., post-hole augers).

mixed waste: Waste material that is regulated under RCRA as hazardous waste and that also meets the definition of radiologically contaminated material.

monitoring: Information collection related to a specific purpose. At the Monticello site, routine monitoring of disposal cell LCRS and LDS performance and meteorological monitoring are conducted. Also, excavations are monitored for radiologically contaminated materials.
Monticello LM site manager: The DOE Office of Legacy Management federal employee assigned the overall management responsibility for the Monticello project.

Monticello LMS representative: A LMS contractor employee on call 24 hours a day, 7 days a week. A backup employee is available to perform the duties required of the LMS representative when necessary.

Monticello LMS site lead: The LMS contractor employee responsible for overseeing implementation of the groundwater and surface water remedy (OU III) and managing site budgets and activities—including LTS&M activities - at the Monticello site.

observations: Data recorded in a formal manner suitable for communication, interpretation, or processing.

planned excavation: An excavation that is part of the annual budget and planning process for the City of Monticello and UDOT; an excavation that is included in the City’s Street Improvement Master Plan or in UDOT’s Statewide Transportation Improvement Plan or Spot Improvement Plan.

deylorchinated biphenyl (PCB): Any of several chlorinated biphenyl compounds that are harmful to human health and the environment and that are specifically defined and regulated under the Toxic Substances Control Act.

privately owned piñon/juniper property: This is identified as MS-00176-VL, located east of Woodland Way. The property contains supplemental standards areas. It is also called a piñon/juniper property in the LTS&M Plan.

radioactive material area: An area or structure where radiologically contaminated material with $^{226}$Ra concentrations exceeding 130 pCi/g is used, handled, or stored.

radiological as-built: Engineering drawings, located the Monticello Field Office, that identify radiation levels at individual properties that were remediated in the Monticello Vicinity Properties and the Monticello Mill Tailings Site Remedial Action Programs. A large set of as-built drawings are periodically updated by the Monticello LMS representative as excavations are monitored. Separate radiological as-built drawings are included in individual property completion reports; these drawings are not updated, and they are available in the Information Repository, a collection of documents for public use also located at the Field Office.

radiological survey: A survey that delineates and documents the surface area and radioactivity in soils in units of counts per second or gamma exposure rate (microroentgens per hour). The vertical extent of contamination and radionuclide concentration in picocuries per gram may also be determined.

radiologically contaminated materials: Residual radioactive material resulting from DOE-related uranium- and vanadium-ore processing that contains $^{226}$Ra concentrations exceeding background by more than 5 pCi/g in the surficial 15 cm of soil averaged over 100 m$^2$ or more than 15 pCi/g in successively deeper 15 cm thick layers averaged over 100 m$^2$. 
**record book:** Field logbooks and checklist forms kept by the Monticello LMS representative for each of the LTS&M inspection and monitoring activities. Record books specified in the LTS&M Plan include the Repository Site, TSF, City-owned Properties, Private Property Restricted Areas, and Public Roads and Utilities. Log books include, but are not limited to, the repository, Pond 4, and Temporary Storage Facility (TSF) checklists, the telemetry system, and a daily log book.

**Resource Conservation and Recovery Act (RCRA):** A federal law that sets standards for treatment, storage, and disposal of hazardous waste. Although the Monticello site is not regulated under RCRA, substantive requirements of the law apply.

**soil and sediment properties:** Privately owned properties adjacent to Montezuma Creek that have soil and sediment contamination remaining onsite and are identified as MP-00951-VL, MP-00990-CS, MP-01084-VL, MG-01026-VL, MG-01027-VL, MG-01029-VL, MG-01030-VL, and MG-01033-VL.

**supplemental standards properties:** Areas where radioactive contamination was left in place according to provisions in 40 CFR §192.21, “Criteria for Applying Supplemental Standards,” and §192.22, “Supplemental Standards.” In Monticello, properties with supplemental standards areas include the City of Monticello streets and utility corridors, Highways 191 and 491 rights-of-way, one privately owned supplemental standards property, City-owned supplemental standards properties, and the soil and sediment properties.

**surveillance:** Routine observations that do not require the involvement of formal inspection teams. At the Monticello site, routine surveillance is conducted on DOE property (the disposal site) and on non-DOE property (City-owned properties, privately owned properties with restrictions or supplemental standards areas, and public roads and utility corridors).

**suspected hazardous substance:** Any material with field recognition criteria that indicate the material is potentially harmful to human health or the environment. Because sampling and analysis have not been completed, the material is “suspected” to be a hazardous substance.

**Temporary Storage Facility (TSF):** A secure area located at the Monticello Field Office complex where radioactive material and hazardous substances are stored in containers.

**Toxic Substances Control Act:** A federal law that regulates chemicals that pose a risk to human health or the environment.

**unplanned excavation:** Excavations that are not planned but are necessitated by an emergency situation (e.g., a utility line break) or occur as a result of a natural event (e.g., a flood, storm, or subsidence event).
1.0 Introduction

1.1 Purpose

This document describes the daily, weekly, monthly, and quarterly activities that are required to meet the programmatic goals discussed in the *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites* (LTS&M Plan; DOE 2017). This document provides detail for procedures described in the LTS&M Plan but does not replace or supersede any portion of the plan. It also provides procedures for routine inspection procedures and does not include annual inspections, CERCLA Five-Year Reviews, or many of the procedures related to Operable Unit III (surface water and groundwater remediation).

1.2 Scope

This document provides direction for conducting activities in the City of Monticello and at the U.S Department of Energy (DOE) onsite disposal cell. These activities include:

- **Daily activities**
  - Monitoring the intrusive work activities in the city of Monticello.
  - Public roads and utility surveillance.

- **Weekly activities**
  - First of the week tasks.
  - In the course of the week tasks.
  - End of the week tasks.

- **Monthly activities**
  - Repository area surveillance.
  - Pond 4 surveillance.
  - Meteorological monitoring.
  - Offsite property MS-00176-VL surveillance.

- **Quarterly activities**
  - Offsite assignments.
  - Repository assignments.
  - Procedures for entering manholes.
  - TSF inspection.

- **Non-routine Activities**
  - Storm events.
1.3 Responsibilities

This section outlines responsibilities for routine inspection, monitoring, and surveillance procedures at the Monticello site. Other site responsibilities are not included.

**Monticello Legacy Management Support (LMS) representative:** Responsible for operation and maintenance of the disposal cell and Pond 4 leachate collection and removal system (LCRS) and leachate detection system (LDS), monthly reporting of LCRS and LDS monitoring data, and notification of potential problems with the disposal cell or Pond 4 and LDS. The Monticello LMS representative is responsible for conducting and documenting routine surveillance, inspections, radiological surveys, uranium scans, updates to the radiological as-built drawings (refer to Appendix B in the LTS&M Plan), and making appropriate contacts and notifications.

**Monticello LMS site lead:** Responsible for ensuring that LCRS and LDS operational procedures are implemented by the Monticello LMS representative and for implementing appropriate response actions when established action levels are exceeded. The site lead ensures that routine surveillance and management of radiological material is conducted in accordance with these procedures and ensures proper notification of institutional controls violations.

**DOE Office of Legacy Management (LM) Monticello site manager:** Responsible for interfacing with the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality. The LM Monticello project manager is responsible for reviewing, updating, and as appropriate, initiating cooperative agreements, memorandums of understanding, and other agreements between DOE and affected citizens and city, county, and state entities.

**City/Utah Depart of Transportation (UDOT) workers:** Responsible for complying with the Monticello LMS representative’s instructions for handling and transporting radiologically contaminated material, the associated safety and health requirements for personal protective equipment and monitoring, and with all applicable federal, state, and local laws.

**Radiological control technician:** Responsible for directing activities and reviewing documentation associated with radiological contamination having radium-226 concentrations equal to or greater than 130 picocuries per gram.

**Environmental compliance point of contact:** Responsible for ensuring that site work is done in accordance with all applicable environmental regulations and requirements, for consulting with project staff, and coordinating activities associated with suspected hazardous substances and transportation of TSF-managed material.

**Environmental specialist:** Responsible for consulting with project staff and coordinating activities associated with suspected hazardous substances and transportation of TSF managed material.
City of Monticello: Responsible for coordinating city street excavations with the Monticello LMS representative and for ensuring that workers receive and maintain DOE-provided radiological training commensurate with assigned work responsibilities.

UDOT: Responsible for coordinating planned and unplanned excavations with the Monticello LMS representative.

1.4 Procedures

1.4.1 Daily Activities

1.4.1.1 Monitoring Intrusive Work Activities in the City of Monticello.

[1] Attend the City of Monticello maintenance crew’s 7:00 morning meeting located upstairs at the city workshop on 100 South, 100 West, southeast corner of the intersection. Inquire if any excavations will be occurring this day or the remainder of the week.

[2] At the administration office on the DOE site check for Blue Stakes notifications in the Blue Stakes three-ring binder or call the City Administrator for planned excavations. The Blue Stakes notification will detail the location of excavations. All scheduled excavations are reported in the Blue Stakes excavation safety program. Access this program by calling the Monticello City Manager at (435) 587-2271; request the excavations planned for the week. The city crew can also help with the excavation locations. Check the current Blue Stakes for addresses, dates, digging in the street, or digging on a utility. If necessary, copy the current Blue Stakes and take the copy along during the surveillance. (LTS&M Plan Appendix E, Section E5.5). See Contact List (Attachment 1)

[3] The LMS representative can determine if the excavation is near a public road or utility corridor, privately owned supplemental standards area, or City-owned property.

[4] Calibrate the radiological instruments according to the scintillometer and delta meter procedures. Place the radiological tools, a note pad, LTSM City Streets and Utilities 11 × 17-inch drawings (located in the drawing room); appropriate writing tools, and camera in the government vehicle.

[5] Tour the city of Monticello and look for excavations in the public roads and utility corridors according to the procedures in Section 1.4.1.2. When excavations are located, the inspector must determine if DOE has any responsibilities for soils removed from the excavation, as discussed in the LTS&M Plan.

Simple rule: If the excavation is located within city limits, and if the excavation is in a highway, street, or over a utility corridor, then scan the excavated soils. Do not scan utilities that go to houses on private property. These have already been surveyed and either remediated or contamination was insufficient to require remediation.

Follow the procedure outlined in the radiological survey procedures (LTS&M Plan Appendix E, Sections E5.5 and E5.6, and Appendix F)

\[\text{Caution}\]

\textit{Do not enter any excavations. Only scan the removed soils.}
[6] If soils are identified as having radium-226 in concentrations that exceed the standard, then follow the Discovery of Contaminated Soils: Scenarios 1 through 4 procedures (see Attachments 2 through 5). Choose the scenario that best fits the current concern. Notify management of any concerns. Let them help.

[7] Record any excavations that occurred that day in the appropriate record book located at the administration office on the DOE site, which is usually the Public Roads and Utilities record book. Additionally, document the excavation on the red-line radiological as-built drawings located in the drawing room. Use red ink or red pencil on the red-line drawings and document the excavation(s) in the same format as other documented red-line comments. Refer to the radiological survey procedures in the LTS&M Plan, Appendix E, Section E5.6.

[8] Record daily items in the Daily Log Book located in the drawing room. Follow the same format as the other entries. (LTS&M Plan Appendix E, Section E5.6)

Note
Many of the above items stated in the LTS&M Plan call for a weekly surveillance. During the warmer months, excavations can occur daily and have to be inspected on a daily schedule to ensure better oversight.

1.4.1.2 Public Roads and Utility Surveillance

The public roads and utility corridor inspections are conducted only within the Monticello city limits. Additionally, the inspections are restricted to excavations of main utility lines, not utility lines that are minor laterals going to residences and businesses.

[1] Check the Blue Stakes three-ring binder located in the administration building or contact the city administrator for updated Blue Stakes within the city limits. See item 2 in Section 1.4.1.1 above.

[2] Inspect the vehicle that will be used to perform the drive-around surveillance. Follow the defensive driver training for the inspection.

[3] The radiological instruments are located at the Monticello Disposal and Processing Sites administration building. Take the appropriate radiological equipment to scan any excavations or soil disturbances. Take one delta counter and one gamma scintillometer and use according to the calibration and scanning procedures.

[a] Delta Scintillometers.
   [i] Delta Scintillometer EL0018B.
   [ii] Delta counter Scintillometer EL0018B.

[b] Scintillometers
   [i] SC-132A/EL0047A.
   [ii] SC-133.
   [iii] SC-133.

[4] Take the LTSM City Streets and Utilities 11 × 17-inch drawings (located either in the Drawing Room or on the main table), paper, and appropriate writing tools.
During the drive-around surveillance, look for any excavations or soil disturbances. Look for heavy equipment operating, people with digging tools, asphalt or concrete removal, and other indications of soil-disturbing activities. Also inspect the city rights-of-way and the Highways 191 and 491 rights-of-way to determine if erosion, unauthorized excavations, or unreported emergency excavations have occurred. Fresh soil on the street or in piles on the sides of the street, new potholes in the street surface, and gullies across or on the sides of the street will be treated as excavations and will be scanned according to procedures in Section 1.4.1.1. Plates 1 and 2 in the LTS&M Plan show the locations of the city and highway rights-of-way that shall be investigated each week. (LTS&M Plan Appendix E, Section E5.5)

Conduct the drive-around surveillance as follows:

[a] Leave the site and head north on Highway 191. View the old mill site on the east side of the road as you enter the town. Look for any excavations or damage to the area, either natural (e.g., storms) or manmade.

[b] Turn right and head east on 300 South (where the Public Services building is located). The turn is shown on Drawing Detail Sheet 54 of the engineered drawings.

[c] Turn right and continue south on 200 East to the old mill site boundary and the city’s secondary water load-out station. Immediately east of this area is property MP-00211-VL. This area is located on Drawing Detail Sheet 63 and is identified on the drawing as 211-PH-2. Inspect this area for any soil disturbances.

[d] Turn around and go to 300 South and turn right. Continue southeast down Clay Hill Road (go downhill; if you stay on top, you will go to the cemetery; see Drawing Detail Sheet 55). Continue south on Clay Hill Road. Look for excavations or drilling on lands between Clay Hill Road and Montezuma Creek and the hillside to the south. Follow Clay Hill Road to the city sewer lagoons. Turn around and head back toward the west.

[e] From Clay Hill Road, turn right on Woodland Way and continue north up the gravel (road base) road. Go straight until the right turn at the top of the road, and then turn the vehicle around. Look for any soil disturbances on the east (uphill) side of the road. This property is MS-00176-VL and is a private supplemental standards area. Inspect for storm water concerns, erosion, or manmade excavations.

[f] Turn right on Clay Hill Road and go to 300 East. Turn right and look up and down the streets as you drive north for any excavation activities. See Drawing Detail Sheet 55 for the correct turn.

[g] Go to Highway 491 (Center Street) and turn right. Continue east to the Utah State Port of Entry. Turn around and head back west.
Go to Main Street and turn right. Continue north to the Four Corners Outdoor College on the west side of the highway. Turn around and head south. See Drawing Detail Sheet 1.

Turn right on 400 North and continue west. Follow through the curve and continue south past the temple and school. Look up and down the streets for any excavations.

Turn right on 100 North and continue west past the hospital.

Turn left on 400 West and tour the roads in this area. Check the Pinion Ridge Drive area off Oakcrest or Abajo Drive (Pinion Ridge intersects both roads.) See Drawing Detail Sheets 31 and 41.

Turn onto Abajo Drive and check Latigo Loop and Silverstone for excavations. See Drawing Detail Sheet 51.

Drive east on Abajo Drive and turn right on 200 West. Continue south and view the roads in this area for excavations. See Drawing Detail Sheets 43 and 53.

Turn left on 400 South and follow roads to Highway 191. Turn right and return to the site.

Drive east on Abajo Drive and turn right on 200 West. Continue south and view the roads in this area for excavations. See Drawing Detail Sheets 43 and 53.

Turn left on 400 South and follow roads to Highway 191. Turn right and return to the site.

If an excavation is found, follow procedures in Section 1.4.1.1. (steps 7 through 9). If you are uncertain about whether an excavation is on private property or if the excavated soil is contaminated, call the contractor site lead, Environmental Compliance POC, or site Hydrologist for help.

### 1.4.2 Weekly

Perform the following items weekly.

#### 1.4.2.1 Monday (or first of the week)

1. Contact the contractor site lead and obtain a signed copy of the Plan of the Week (POW). Read the POW and sign on the signature page. Place the copy in the POW three-ring-binder located on the main table.

2. Check the SOARS data at [https://soars.lm.doe.gov](https://soars.lm.doe.gov). If you do not have access, the manager of the Environmental Sciences Laboratory can help with access or working with the SOARS data. Send data to the site Hydrologist or manager of Environmental Sciences Laboratory until you are trained on the spreadsheet. Check to see if data are different from the previous week. The SOARS data spreadsheet is located on GoFlex Public-Monticello Files on the X drive. Check Monticello Disposal Cell 1, Monticello Disposal...
Cell 2, Monticello Pond 4, and the Treatment Cells in the SOARS data. (LTS&M Plan Appendix D, Sections D5.5 through D5.12)

[3] Check the meteorological station located in the west office. Check for any storm events that may have occurred when the site was not occupied. If any major storm events have occurred, follow procedures in Section 1.4.5.

[a] The meteorological computer is located in the administration office on the DOE site and is on the floor and under the west table. The computer should be on and ready for use. If not, turn the computer on and follow the directions for access on the side of the computer.

[b] The two computers in this area use one monitor. Press the Change button (farthest left) on the monitor until it reads “3. Digital Input.”

[c] Use the mouse under the table that is associated with the computer on the floor. Open the icon WeatherLink 6.00 exc.

[d] Click the Download the Weather Station icon (second icon from the left).

[e] Click NOAA, and the summary will appear. Under Reports you can view previous months’ data.

1.4.2.2 During the Course of the Week

[1] Check the appointment calendar and use the phone call-in system to attend any scheduled meetings.

[2] Check the Blue Stakes notifications (per Section 1.4.1.1 item 2) for any excavations that may be occurring on property number MP-00211-VL. If an excavation has occurred, inspect the area of the excavation and scan the removed soil Section 1.4.1.2). Notify the contractor site lead, Environmental Compliance POC, or site Hydrologist immediately of any excavations on this property. The property is located at the south end of 200 East and immediately east of the city’s secondary water load-out.

[3] Weather permitting, tour the disposal cell area and visually inspect for significant erosion, dead animals, unauthorized access by humans, and stability of the fences.

1.4.2.3 Friday (or the end of the week)

[1] Complete a Weekly Monticello Site Activity Status (for example see Attachment 6) of what occurred on the site and in the city limits. Send the completed form to the contractor site lead and include on the list the Environmental Compliance POC, and site Hydrologist.

[2] Using form LMS 2130, Plan of the Day/Plan of the Week, fill out the work that is anticipated for the next week, mark the POW box, and send to the contractor site lead.

[3] Document in the Public Roads and Utilities record book and the City-Owned Properties book the inspections that were performed during the week. Note how the other entries have been made and document the inspections the same way. The record books are located in the drawing room.
1.4.3 Monthly

1.4.3.1 Repository Area Surveillance

[1] Print a copy of LMS 5502MON, Repository Area Surveillance Checklist, located at https://lmportal.lm.doe.gov. Under Library, click Site-Specific Worksheets, and Monticello to guide the surveillance. Complete the form at the time of the inspection. (LTS&M Appendix D, Section D2.0)

[2] Get a blank copy of the Routine Safety and Health Inspection Checklist (form LMS 2114) located at https://lmportal.lm.doe.gov and inspect the site in accordance with the form. Note items that require correcting on the Problems/Issues Report located on GoFlex Public, then Monticello Files. Send an email copy of the checklist to the appropriate administrative assistant and the contractor site lead.

Note Marking YES means that the item is acceptable. Do not fill out the Quarterly Inspection portion of the checklist unless you are performing a quarterly inspection (LTS&M Plan Appendix D, Section D2.2).

[3] Inspect the Monticello repository on a monthly basis. Take the Repository Area Surveillance Checklist with you, inspect the site according to the items on the list, and document the inspection on the checklist. Drive or walk the main disposal cell roads and visibly inspect the general condition of the following items:

- [a] Access gates: closed, open, easily operated, and stable.
- [b] Access roads: in good condition, no major ruts, no signs of erosion, enough gravel.
- [c] Signs: legible, need replacing, firmly attached to the fence, gate, manhole, or vault.
- [d] Perimeter fences (disposal cell wildlife fence and repository boundary fence).
- [e] Intrusion by livestock, pets, wildlife.
- [f] Evidence of animals burrowing on the cover.
- [g] Trash or weed accumulation.
- [h] Earth movement, erosion, or changes in drainage channels that could affect disposal cell integrity.
- [i] Any anomaly that should be noted and immediately reported to the contractor site lead.

[4] Describe erosion of concern or other anomalies in the Repository Site record book, and take photographs as needed. Send an email copy to the contractor site lead, Environmental Compliance POC, and site Hydrologist.

[5] Conduct a water usage survey monthly. The water meter is located under the northeast corner of the administration building. A small hole has been cut in the building’s skirting and can be opened with a 1/4-inch socket or wrench. Remove the screw that holds the cut flaps closed. Wearing leather gloves, open the metal flaps and view the water meter.
Document the numbers and email the numbers to the site Environmental Compliance POC. Close the flaps and replace the screw.

[6] Entering the manholes is not required for the monthly inspection. If manholes are entered, follow the procedures as outlined in Section 1.4.5 for entering manholes and always contact Safety and Health prior to entering a manhole.

Marking YES means that the item is acceptable. Do not fill out the Quarterly Inspection portion of the checklist unless you are also performing a quarterly inspection.

1.4.3.2 Pond 4 Surveillance

[1] Print a copy of LMS 5501MON, Monthly Pond 4 Surveillance Checklist, located at https://lmportal.lm.doe.gov. Under Library, click Site-Specific Worksheets, and Monticello to guide the surveillance. Complete the form at the time of the inspection. (LTS&M Plan Appendix D, Section D3.0)

[2] Inspect Pond 4 on a monthly basis. Take the Monthly Pond 4 Surveillance Checklist with you, inspect the Pond 4 area according to the items on the list, and document the inspection on the checklist.

Marking YES means that the item is acceptable.

[a] Inspect the condition of the gates and perimeter fence. Ensure that the gate was closed and locked upon entry. Look for breaches in the fence. Visually check the integrity of the fence for evidence of intrusion by humans or animals or any vandalism. Ensure that the signs are intact and legible. Note any accumulation of trash in the area.

[b] Walk the top perimeter of the berm. Look for evidence of animal burrows and erosion in the berm and at the piping outfall. Inspect the pond liner for obvious bubbling, visible tears, debris, vandalism to the pond or facility, and any anomalies that appear. Note the level of water in the pond.

[c] Look in the rescue storage cabinets and inspect the condition of the rescue supplies.

[d] Visually inspect the toe of the pond berm and look for evidence of erosion, seepage, and unwanted plant growth.

1.4.3.3 Meteorological Monitoring

On the computer in the southwest office, double-click on the Weather Link 6.0 desktop symbol and then double-click Download Weather Station button located second from the left. Download the pages and then double-click the NOAA button on the far right. This will bring up the weather averages for the month. Print the weather information and send to the contractor site Hydrologist and site lead. Place a copy in the Monthly Inspection three-ring binder. (LTS&M Plan Appendix D, Section D2.4)
1.4.3.4 Offsite Property MS-00176-VL

In accordance with the LTS&M Plan, Appendix E, Section E7.1, this privately owned supplemental standards property is inspected monthly to ensure that institutional controls remain effective. This property is included in the public roads and utility surveillance (Section 1.4.1.2) procedures, and it is inspected for evidence of soil disturbance on a daily or weekly basis. This property must also be inspected for evidence of excavations for habitable structures.

If any soil disturbances are found, notify the contractor site lead immediately. Follow the procedure directed in Appendix E, Section E7.0, of the LTS&M Plan. Document the inspection in the Private Property Restricted Areas record book.

1.4.4 Quarterly

Perform the following items quarterly (February, May, August, and November).

1.4.4.1 Offsite Quarterly Assignments

City-Owned Properties:

[1] Several properties formerly owned by DOE were transferred to the City of Monticello. These properties have to be inspected quarterly but should be checked weekly, as items can change rapidly during the summer months. Visually inspect the following properties quarterly and document the inspections in the City-Owned Property record book:

[a] MP-00181-VL, MS-00893-VL, MP-00391-VL, MP-01077-VL, MP-01041-VL, MP-01042-VL, and MP-01040-VL.

[b] MP-00181-VL is located just off and northwest of the old mill site. It can be accessed off Highway 191 or 200 East.

[c] MS-00893-VL is the former mill site property, and it can be accessed off Clay Hill Drive.

[d] The remaining properties are accessed by a two track dirt road just north of the current disposal cell east of Highway 191. Drive through the gate and follow the road, which circles back to the gate.

[2] Inspect each property to confirm that:

[a] Use of these properties remains restricted to public recreational use.

[b] No habitable structures are being built.

[c] No overnight camping is occurring or has occurred.

[d] No water wells have been installed in the alluvial aquifer on MP-00181-VL, MS-00893-VL, or MP-01077-VL.

[e] No soil removal from properties MP-00391-VL, MP-01041-VL, or MP-10177-VL (inspect for excavation).

[f] No damage by human activity to wetland areas along Montezuma Creek.

[g] Notify the City of Monticello city manager and the contractor site lead of any noncompliance activities. (LTS&M Plan Appendix D, Section D5.2)
The public roads and utility corridors are inspected on a weekly basis, when a storm event occurs, and often on a daily basis in the summer months. They also have to be inspected quarterly according to the following instructions:

[a] Inspect the base of the west and east sides of the Highway 191 embankments at Montezuma Creek for signs of erosion or unauthorized excavation. Scan eroded material and excavated material.


[c] If contamination, a concern, or an anomaly is noted then contact the contractor site lead, Environmental Compliance POC, or site Hydrologist. Refer to the LTS&M Plan Appendix E, Section E5.5.

Property MP-00211-VL is located east of the secondary water load-out station at the far south end of 200 East. The property is located on the east side. Each quarter, inspect the property for excavations. If an excavation has occurred, contact the contractor site lead, Environmental Compliance POC, or site Hydrologist. Refer to the LTS&M Plan Appendix E, Section E8.0. Document any findings (including no excavations) in the City-Owned Property record book.

### 1.4.4.2 Repository Quarterly Assignments

The repository is located approximately 1 mile south of Monticello on the east side of Highway 191. The disposal cell and appurtenances are enclosed within a fence with a closed and locked gate. The gate takes a numbered (3359) key. The administration building is located behind another locked gate with the same key number. The repository is located directly east of the turnoff to the administration building and is enclosed with a fence. Begin the quarterly inspection using the following procedures.

[1] Check the SOARS data per Section 1.4.2.1.

[2] From the computer in the southwest office, double-click the **Weather Link 6.0** desktop symbol and then double-click the **Download Weather Station** button located second from the left. Download the pages and then double-click the **NOAA** button on the far right. This will bring up the weather averages for the month. Print the weather information and send to the contractor site lead and site Hydrologist. (LTS&M Plan Appendix D, Section D2.4).

[3] Get a copy of the LMS 5502MON **Repository Area Surveillance** checklist located at the [https://lmportal.lm.doe.gov](https://lmportal.lm.doe.gov). This is the same as the monthly inspection checklist, but the inspector will also complete the bottom portion of the checklist. Obtain a map of the settling plates along transects A through F, which the inspector will walk to perform the following inspections:

**Note 1**

- The inspector should wear appropriate clothing for the time of season and use gloves, preferably leather, for this inspection.

**Note 2**

- Marking YES means that the item is acceptable. Fill out the Quarterly Inspection portion of the checklist.
[a] Walk transects A through F (identified in Appendix D as Figure D-3 in the LTS&M Plan), primarily inspecting for evidence of cover cracking, wind or water erosion, poor drainage, structural discontinuity, and undesirable intrusions into the cover by plants, animals, or humans.

[b] On transect A (perimeter of the disposal cell), give particular attention to the steep, rock-armored slopes (see Figure D-3 in Appendix D of the LTS&M Plan) for evidence of instability (displaced riprap, knick points, intrusion points, riprap integrity, or any anomalies).

[c] Walk transects B through F, inspecting for intrusion points directly over the tailings (delineated by the disposal cell top perimeter road).

[d] Areas that are not in satisfactory condition or that may require repairs or more frequent monitoring will be field marked and located on a map to easily find the area of concern during follow-up visits.

[e] Inspect all manhole exteriors for damage. Open the manhole covers and visually inspect for damage. Do Not Enter The Manholes. All of the manholes are permit required until downgraded by Safety and Health. Manholes 1 and 3 can be accessed only with Safety and Health staff approval. The remaining manholes are permit only and cannot be accessed without upper management’s concurrence. See Appendix D, Section D.2.3.

[f] Inspect the condition of the settlement plate surface completions.

[g] Record the results/observations of the surveillance on the checklist at the time of the inspection, noting that transects A–F were inspected.

[h] Maintain the signed original of the checklist in the Field Office and provide a signed copy to the contractor site lead. On a yearly basis send the signed originals to the records department.

[4] TSF inspection. The TSF is the fenced area at the southwest corner of the Administration Building parking lot. The TSF is equipped to store radiological material, hazardous material, and mixed waste encountered during excavations. Print a copy of the Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility (TSF) Record Book Inspection Report (LMS 5504MON) from the LM website at https://limportal.lm.doe.gov/. Click Library, Site-Specific Worksheets, and Monticello. Use the checklist) to guide the inspection. Each quarter and following a significant storm event, perform the following steps:

Note: Marking YES on the LMS 5504MON form checklist means that the item is acceptable.

[a] Inspect the TSF to determine if the concrete bin and drum containers and covers are secure and in good condition.

[b] Ensure that containers remain closed except when material is being added or removed.

[c] Ensure that drums containing stored material are properly labeled and identified.

[d] Inspect for appropriateness, legibility, and visibility of signs and posting.
[e] Ensure the surface area is in good condition (no erosion, no water damage, and no excessive vegetation).

[f] Inspect the fence surrounding the TSF and ensure that it remains in good condition.

[g] Review the TSF record book to ensure that radiological monitoring has been conducted and documented in accordance with Appendix D, Section D6.5, of the LTS&M Plan.

[5] Forward the completed checklists and weather information to the contractor site lead and Hydrologist.

[6] Check the site after each large storm event. If erosion has occurred or water has accumulated in places that should not have water accumulation, contact the contractor site lead, Environmental Compliance POC, or site Hydrologist.

1.4.5 Procedure for Entering Manholes 1 and 3

Manholes 1 and 3 are permit-required confined spaces. Procedures allow these confined spaces to be entered after they have been downgraded to non-permit confined spaces. Additionally, they are radioactive controlled areas and require the attendance of a qualified radiological control technician. (LTS&M Appendix D, Section D2.3)

[1] Review the Job Safety Analysis and Plan of the Day/Plan of the Week prior to work commencement.

[2] Ensure that the buddy system is used, and that two way communication (cell phones or radios) are available.

[3] Unlock and open the manhole cover. Ensure that the hinge safety latches are engaged.

[4] Without entering the manhole, place the duct of the ventilator into the vault, plug the fan in and ventilate the vault for a minimum of 30 minutes.

[5] Using the gas alert meter, (or equivalent and appropriate meter) check the atmosphere in the vault. Entry is allowed if the oxygen is 19.5 percent or greater and the other readings are within the normal range. Each level must be checked prior to entry on that level.


[7] Follow the direction of the Radiation Work Permit (RWP) and the radiological control technician (RCT) for entry into the radioactive controlled area (vault). The atmosphere must be continuously monitored while personnel are in the vault. If the meter alarm sounds, you must exit the vault.

[8] Conduct work within the vault as necessary.

[9] Remove any items used during the work and any debris generated. Follow appropriate procedures (under the direction of the RWP and RCT) for exiting the vault.

[10] Upon exit close and lock the vault doors.

Note

Manholes 2, 4, and 5 are permit-required confined spaces and have different entry requirements, which are not addressed in this procedure.
1.4.6 Non-Routine

[1] After a major storm event, check the weather station computer to determine the amount of rainfall from the storm. If 2.8 inches or more falls within a 24-hour period (equivalent to a 25-year storm event) or a significant rainfall occurs, perform the following inspections:

[a] Inspect the restrictive easement area along Montezuma Creek and note changes in the stream channel, new erosion, or depositional features. This is the creek that flows through the former mill site.

[b] Inspect the area of property MP-00176-VL to determine if soil has been eroded off the property and onto Woodland Way or in the ditch on the east side of Woodland Way and north of Clay Hill Road.

[c] Inspect the City-owned supplemental standards properties and the areas adjacent to the properties to determine if soil has eroded off the supplemental standards properties.

[d] Inspect the city streets for freshly eroded soil on the street and gullies across or on the sides of the street.

[e] Inspect the highway rights-of-way for freshly eroded soil on the highway and gullies adjacent to the highway and inspect the toe of Highway 191 east and west embankments across Montezuma Creek.

Record the inspections in the appropriate record book. If contamination is found, refer to the LTS&M Plan and notify the contractor site lead, Environmental Compliance POC, or site Hydrologist.

2.0 Training

The following training may be required:

- Radiological Worker II (Rad Worker II)
- Radiological Work Permit MNT-13-0001A, Access to Pond 4 to Perform Inspections and Maintenance. Brief
- Job Safety Analysis
- Confined Space training
- Lockout/Tagout (LOTO) training

3.0 References

Attachment 1

Contact List
## Contact List

<table>
<thead>
<tr>
<th>Contact</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Monticello Offices</td>
<td>(435) 587-2271</td>
</tr>
<tr>
<td>Monticello City Manager</td>
<td>(435) 587-2271</td>
</tr>
<tr>
<td>City Crew Chief</td>
<td>(435) 459-0078</td>
</tr>
<tr>
<td>City Crew</td>
<td>(435) 459-2222</td>
</tr>
<tr>
<td>Fred Smith - Contractor Site Lead</td>
<td>(970) 248-6182 or (435) 459-4980</td>
</tr>
<tr>
<td>Jason Nguyen - LM Site Manager</td>
<td>(309) 310-2544</td>
</tr>
</tbody>
</table>
Attachment 2

Discovery of Contaminated Soils: Scenario One
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I. Discovery of Contaminated Soil – Scenario One

- Activity is Greater Than 5 pCi/g But Less Than 27 pCi/g and the Volume is Manageable Using 5-Gallon Buckets.
  1. Ensure there are no safety hazards or hazardous waste involved.
  2. Determine pCi/g of $^{226}$Ra using the Delta and estimate the volume of material involved.
  3. Isolate and mark the elevated materials with paint, pin flags, lathe, or other isolating identifying media.

II. Make Notifications to Inform Site Management Personnel of Volume and Activity Level of Impacted Material

- Important Contacts:
  1. Contractor site lead.
  2. Environmental Compliance.
  3. Safety and Health/Radiological Control Technician (RCT).

III. Contamination Removal

- Prior to Removal.
  1. Arrange to have an RCT come to perform and document radiological surveys on personnel, tools, transport vehicle, and at the TSF.
  2. If materials are less than 27 pCi/g it is not DOT regulated.
  3. Using form LMS 2130 create a POD and have the work authorized by the contractor site lead or designee.
  4. Contact Safety and Health and determine if a task specific JSA or RWP is needed.
  5. Obtain Environmental Compliance, Safety and Health/RCT, and management approval to transport the material to the TSF.

- Removal.
  1. Wear gloves and shoe covers as necessary to avoid personal contamination.
  2. Using hand tools, place the contaminated material into a 5-gallon bucket.
  3. Using a 5-gallon plastic bucket with a secure lid is preferred.
  4. Seal the 5-gallon bucket with the bucket’s lid.
  5. Place the 5-gallon bucket of contaminated material onto a plastic liner in the transport vehicle and secure the bucket so that it does not fall over.
  6. Transport the material to the TSF and place the material inside the TSF.
  7. Inspect the transport vehicle for any loose material.
  8. The RCT will survey the transport vehicle, tools, and personnel prior to exiting the TSF.
  9. The RCT will document surveys.
IV. Site Requirements

- **TSF Entry.**
  1. Ensure all personnel entering the TSF are trained and/or escorted in accordance with the entry requirements listed in Appendix D, Section D6.2 of the LTS&M Plan.
  2. Personnel who enter the TSF must be Radiological Worker II qualified or be escorted by a DOE-LM or Contractor LMS representative who is qualified.
  3. Ensure all persons entering the TSF complete the required information in the entry log of the TSF Record Book.
  4. Record entries in the TSF Record Book legibly and with indelible ink.
  5. Ensure the storage bin or container is posted as a soil contamination area.

- **Radiological surveys/monitoring of the TSF.**
  1. Radiological survey personnel must be DOE RCT qualified.
  2. Ensure the instrumentation has a current calibration and has been performance tested prior to use.
  3. A radiological survey is required after receiving material for storage.
  4. Radiologically monitor personnel and equipment during the placement of the contaminated materials into the TSF.
  5. Radiologically survey the perimeter and affected work areas and document on a radiological survey form as shown in Figure D-6 of Appendix D of the LTS&M Plan.

- **TSF Exit.**
  1. Upon exiting the TSF, note the time in the entry log section of the TSF Record Book.
  2. Lock the gate after exiting the TSF.
  3. Place a copy of all monitoring results in the Radiological Monitoring Results section of the TSF Record Book. Retain the original survey form for processing with Safety and Health radiological records.

- **Task Completion.**
  1. Make notifications to Management personnel that the remediation task has been completed and provide results of surveys.
  2. Ensure all required documentation including the TSF Material Transfer Log (Figure D-7 in Appendix D of the LTS&M Plan) has been completed and filed appropriately.
Attachment 3

Discovery of Contaminated Soils: Scenario Two
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I. Discovery of Contaminated Soil – Scenario Two

- Activity is Greater Than 27 pCi/g but Less Than 130 pCi/g and the Volume is Less Than a 5-gallon Bucket of Material.
  1. Ensure there are no safety hazards or hazardous waste involved.
  2. Determine pCi/g of $^{226}$Ra using the Delta and estimate the volume of material involved.
  3. Isolate and mark the elevated materials with paint, pin flags, lathe, or other isolating identifying media.

II. Make Notifications to Inform Site Management Personnel of Volume and Activity Level of Impacted Material

- Important Contacts:
  1. Contractor site lead.
  2. Environmental Compliance.
  3. Safety and Health/Radiological Control Technician (RCT).

III. Contamination Removal

- Prior to Removal.
  1. Arrange to have an RCT come to perform and document radiological surveys on personnel, tools, transport vehicle, and at the TSF.

  *Note 1*
  The contaminated material is greater than 27 pCi/g so it is DOT regulated if, in addition, the total activity for $^{226}$Ra in the consignment exceeds 27,000 pCi.

  *Note 2*
  The Environmental Compliance Point of Contact or other DOT-certified shipper will perform the calculation to determine if the contamination is DOT RAM.

  2. Coordinate with the Environmental Compliance POC (or other DOT-certified shipper) for determination and transportation of the DOT RAM material.
  3. Using form LMS 2130 create a POD and have the work authorized by the contractor site lead or West Operation Manager.
  4. Contact Safety and Health and determine if a task specific JSA or RWP is needed.
  5. Obtain the required shipping documents, placards and labels as determined by the Environmental Compliance POC (or other DOT certified shipper) for the transport of the material.
  6. Obtain Environmental Compliance, Safety and Health/RCT, and management approval to transport the material to the TSF.
• Removal.
  1. Wear Personal Protective Equipment as directed by the Radiological Work Permit (RWP) and the Radiological Control Technician (RCT).
  2. Using hand tools, place the contaminated material into a 5-gallon bucket. Using a 5-gallon plastic bucket with a secure lid is preferred.
  3. Seal the 5-gallon bucket with the bucket’s lid.
  4. Place the 5-gallon bucket of contaminated material onto a plastic liner in the transport vehicle and secure the bucket so that it does not fall over.
  5. Transport the material to the TSF per the requirements of the DOT-certified shipper and place the material inside the TSF.
  6. Inspect the transport vehicle for any loose material.
  7. The RCT will survey the transport vehicle, tools, and personnel prior to exiting the TSF.
  8. The RCT will document surveys.

IV. Site Requirements
• TSF Entry.
  1. Ensure all personnel entering the TSF are trained and/or escorted in accordance with the entry requirements listed in Appendix D, Section D6.2 of the LTS&M Plan.
  2. Personnel who enter the TSF must be Radiological Worker II qualified or be escorted by a DOE-LM or Contractor LMS representative who is qualified.
  3. Ensure all persons entering the TSF complete the required information in the entry log of the TSF Record Book.
  4. Record entries in the TSF Record Book legibly and with indelible ink.
  5. Ensure the storage bin or container is posted as a soil contamination area.

• Radiological surveys/monitoring of the TSF.
  1. Radiological survey personnel must be DOE RCT qualified.
  2. Ensure the instrumentation has a current calibration and has been performance tested prior to use.
  3. A radiological survey is required after receiving material for storage.
  4. Radiologically monitor personnel and equipment during the placement of the contaminated materials into the TSF.
  6. Radiologically survey the perimeter and affected work areas and document on a radiological survey form as shown on Figure D-6 of Appendix D of the LTS&M Plan.
- **TSF Exit.**
  1. Upon exiting the TSF, note the time in the entry log section of the TSF Record Book.
  2. Lock the gate after exiting the TSF.
  3. Place a copy of all monitoring results in the Radiological Monitoring Results section of the TSF Record Book. Retain the original survey form for processing with Safety and Health radiological records.

- **Task Completion.**
  1. Make notifications to Management personnel that the remediation task has been completed and provide results of surveys.
  2. Ensure all required documentation including the TSF Material Transfer Log (Figure D-7 in Appendix D of the LTS&M Plan) has been completed and filed appropriately.
Attachment 4

Discovery of Contaminated Soils: Scenario Three
I. Discovery of Contaminated Soil – Scenario Three

- Activity is Greater Than 5 pCi/g but Less Than 27 pCi/g and the Volume is Large Enough to Utilize a Haul Truck.
  1. Ensure there are no safety hazards or hazardous waste involved.
  2. Determine pCi/g of $^{226}\text{Ra}$ using the Delta and estimate the volume of material involved.
  3. Isolate and mark the elevated materials with paint, pin flags, lathe, or other isolating/identifying media.

II. Make Notifications to Inform Site Management Personnel of Volume and Activity Level of Impacted Material

- Important Contacts:
  1. Contractor site lead.
  2. Environmental Compliance.
  3. Safety and Health/Radiological Control Technician (RCT).

III. Contamination Removal

- Prior to Removal.
  1. Arrange to have an RCT come to perform and document radiological surveys on personnel, tools, transport vehicle, and at the TSF.
  2. The contaminated material is less than 27 pCi/g so it is not DOT regulated.
  3. Using form LMS 2130 create a POD and have the work authorized by the contractor site lead or designee.
  4. Contact Safety and Health and determine if a task specific JSA or RWP is needed.
  5. Obtain Environmental Compliance, Safety and Health/RCT, and Management approval to transport the material to the TSF.

- Removal.
  1. Wear Personal Protective Equipment as directed by the Radiological Work Permit (RWP) and the Radiological Control Technician (RCT).
  2. Utilizing the City of Monticello’s Radiological Worker II trained personnel and their heavy equipment. Load the contaminated material into a dump truck that has been lined with 6-mil plastic (see Appendix G-Transportation – Using the “Best Management Practice” Includes: [see items 1–9 below]).

    **Note**
    If the City of Monticello is not used in the transportation of the contaminated materials then the other carrier will follow the same requirements.

- Transportation - Using the “Best Management Practice” Includes:
  1. Coordinate with Monticello City Manager to arrange transport of the contaminated materials from the excavation to the TSF. If another carrier is used follow the items
in the Statement of Work and follow the requirements of Safety and Health and Environmental Compliance POC.

2. Dump trucks will be fully lined using 6-mil plastic (or equivalent) and will not allow soil or liquid leakage. The liner will extend up and over the sides of the dump bed and shall have enough length to fold over and encapsulate the contaminated materials. The liner will not interfere with the visibility of the taillights, turn signals, or license plate.

3. Covering the load of radioactive material during transport with a tight sealing bed cover (canvas or equal) over the loaded truck bed that will overlap the truck-bed sides, front, and back by a minimum of 6 inches. Mechanical tarping devices may be specified to enable remote taping to avoid the need of the carrier/operator to climb onto or into the truck bed to cover the load.

4. Inspecting the transport vehicle to ensure that tailgates, latching mechanisms, tarping device, and hoisting/dumping devices operate properly prior to loading and transport.

5. After loading, inspecting the transport vehicle to ensure that there is no loose contaminated material on the exterior surfaces of the vehicle.

6. Transporting the material directly to either the TSF or to the designated location at City Property MS-01006-VL or MP-00181-Phase III.

7. Placing the material in the TSF in accordance with procedures in Appendix D, Section D6.0 of the LTS&M Plan “Temporary Storage Facility Operation and Maintenance.”

8. The RCT will survey the transport vehicle, tools, and personnel prior to exiting the TSF.

9. The RCT will document surveys.

IV. Site Requirements

- TSF Entry.
  1. Ensure all personnel entering the TSF are trained and/or escorted in accordance with the entry requirements listed in Appendix D, Section D6.2 of the LTS&M Plan.
  2. Personnel who enter the TSF must be Radiological Worker II qualified or be escorted by a DOE-LM or Contractor LMS representative who is qualified.
  3. Ensure persons entering the TSF complete the required information in the entry log of the TSF Record Book.
  4. Record entries in the TSF Record Book legibly and with indelible ink.
  5. Ensure the storage bin or container is posted as a soil contamination area.

- Radiological surveys/monitoring of the TSF.
  1. Radiological survey personnel must be DOE RCT qualified.
  2. Ensure the instrumentation has a current calibration and has been performance tested prior to use.
3. A radiological survey is required after receiving material for storage.

4. Radiologically monitor personnel and equipment during the placement of the contaminated materials into the TSF.

7. Radiologically survey the perimeter and affected work areas and document on a radiological survey form as shown on Figure D-6 of Appendix D of the LTS&M Plan.

- **TSF Exit.**
  1. Upon exiting the TSF, note the time in the entry log section of the TSF Record Book.
  2. Lock the gate after exiting the TSF.
  3. Place a copy of all monitoring results in the Radiological Monitoring Results section of the TSF Record Book. Retain the original survey form for processing with Safety and Health radiological records.

- **Task Completion.**
  1. Make notifications to management personnel that the remediation task has been completed and provide results of surveys.
  2. Ensure all required documentation including the TSF Material Transfer Log (Figure D-7 in Appendix D of the LTS&M Plan) has been completed and filed appropriately.
Attachment 5

Discovery of Contaminated Soils: Scenario Four
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I. Discovery of Contaminated Soil – Scenario Four
   - Activity is Greater Than 27 pCi/g but Less Than 207 pCi/g and the Volume is Large Enough to Utilize a Haul Truck.
     1. Ensure there are no safety hazards or hazardous waste involved.
     2. Determine pCi/g of $^{226}\text{Ra}$ using the Delta and estimate the volume of material involved.
     3. Isolate and mark the elevated materials with paint, pin flags, lathe, or other isolating/identifying media.

II. Make Notifications to Inform Site Management Personnel of Volume and Activity Level of Impacted Material
   - Important Contacts:
     1. Contractor site lead.
     2. Environmental Compliance.
     3. Safety and Health/Radiological Control Technician (RCT).

III. LSA-1 Radioactive Materials
   - Refer to Appendix G of the LTS&M Plan.
     1. The contacts noted in item II above will help you with this category.
     2. *Do not ship this material without authorization and help.*
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Attachment 6

Example of
Weekly Monticello Site Activity Status
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Weekly Monticello Site Activity Status

Site activities planned for the week of January 06 include:
- Site personnel will attend the city’s morning meeting.
- Site personnel will perform inspections and surveillance of the site and city.
- Site personnel will perform any necessary repairs and maintenance to the site.
- The water samplers will be at the Treatment Cells.
- Environmental Scientist will attend Arc Flash Training in Grand Junction.

City construction activities planned for the week of Jan. 06 include:
- The City of Monticello has no excavation plans.

City construction activities conducted during the week of Dec. 30 included:
- The city did not perform any excavations this week.

Contractor site activities completed during the week of Dec. 30 included:
- Safety and Health was on site on Monday. Site personnel accessed Vault One and inspected the electrical switches and hoses on LCRS #1. The system was tested after the inspection and the system operated.
- With Safety and Health on site Fred accessed Vault Three and removed water that had accumulated in the bottom of the vault. Approximately 3.5-inches of water were removed.
- The site was open on January 1, 2014.
- Site personnel met with the city crew each morning with the exception of Jan. 1st.
- Site personnel performed their routing inspections and surveillances.

Date Prepared: September 06, 2013
Appendix F

Radiological Survey Procedures
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F1.0 Radiological Survey Procedures

This section describes the actions and method used by the Legacy Management (LM) representative at the Monticello, Utah, Sites, when conducting radiological surveys for the purpose of identifying radiologically contaminated material and determining the radium-226 ($^{226}$Ra) concentration of that material. This section applies to radiological surveys on Monticello supplemental standards properties and the Temporary Storage Facility (TSF).

F1.1 Responsibilities

The Monticello contractor site staff is responsible for:

- Performing radiological surveys in accordance with this procedure
- Maintaining the instruments in calibration and in good working condition
- Collecting accurate, adequate, and appropriate data and properly recording such data
- Notifying the contractor site lead in the event of conditions outside the normal scope of this procedure; these conditions may be the discovery of radiologically contaminated material in excess of 130 picocuries per gram (pCi/g), suspected hazardous material, or other safety hazards

The contractor site lead is responsible for:

- Overseeing the data collected to ensure it meets programmatic goals discussed in the Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites (LTS&M Plan) to which this is an appendix.

F1.2 Instrument Response Checks

The results of a daily instrument response check for each instrument must be within ±20% of the After-Calibration Source Response, as determined by the Radiological Control Technician (RCT) before the instrument may be used. The procedure below should be used to determine whether the instrument is still in calibration. The instructions for the Mount Sopris models SC-132A and SC-133 portable gamma scintillometer equipment currently being utilized at the Monticello site comprise Attachment F-2, Portable Gamma Scintillometer Measurements Procedure for the Monticello, Utah, Site (LMS/MNT/S09166).

F1.2.1 After-Calibration Source Response

Ensure each calibrated instrument has a completed After-Calibration Source Response Check Data Sheet (form LMS 1974) (Figure F-1). If there isn’t one, inform the RCT so that more forms can be made. The RCT will perform the following tasks:

[1] Select the correct radioactive source for the type of instrument.

[2] Record the following information at the top of the After-Calibration Source Response Check Data Sheet.
   - Location (site) (e.g., Monticello)
   - Date
## After-Calibration Source Response Check Data Sheet

### Location:
- Month: __________
- Day: __________
- Year: __________

### Detector/Probe Data (if applicable)
- Manufacturer: ____________________
- Model No.: ____________________
- Serial Number: ____________________
- Calibration Due Date: ____________________

### Survey Instrument Data
- Manufacturer: ____________________
- Model No.: ____________________
- Serial Number: ____________________
- Calibration Due Date: ____________________

### Check Source Data
- Isotope: ____________________
- Source I.D. No.: ____________________

<table>
<thead>
<tr>
<th>Instrument Scale</th>
<th>Source Detector Distance</th>
<th>Shielding/Geometry</th>
<th>Instrument Response</th>
<th>-20%</th>
<th>+20%</th>
<th>Scale Units</th>
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### Comments

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Performed by (print): ____________________
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Date: __________

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Date: __________

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*Figure F-1. Example After-Calibration Source Response Check Data Sheet*
• Instrument manufacturer, model number, and government property number
• Probe manufacturer, model number, and government property number
• Instrument and probe calibration due date
• Radioactive check source identification number and isotope

[3] Select the appropriate scale and choose a source-to-detector distance and geometry and any shielding necessary to obtain an instrument response at or near the middle of the scale.

[4] Record this information and the instrument response on the form.


[6] If the instrument functions only as a rate meter, allow the meter to stabilize for approximately 30 seconds.

[7] If the instrument is equipped with integrating or scaler functions, allow the meter to count the source for 1 minute.

[8] Record the indicated value in the instrument response column of the form.

[9] Calculate the values for ±20% of the instrument response and record these values in the appropriate locations on the form.

[10] Repeat all the steps in Section F1.2.1 for each type of radiation detection instrument and for each scale. For instruments that automatically adjust the scale (i.e., microprocessor-based instruments), repeat all of the steps in this subsection for two activities known to be within the range of levels of radioactivity expected during the upcoming measurement event.

F1.2.2 Gamma Scintillometer Daily Response Check

[1] Check the instrument tag to ensure the instrument is calibrated. Scintillometers are calibrated by contract service providers every 12 months or after major repairs, whichever comes first.

[2] Perform a battery check by selecting Check Mode. The battery voltage must be at least 25%; if it isn’t, turn the instrument off and replace the batteries.

Note

If the battery icon appears while using the scintillometer in any operational mode, stop and replace the batteries and start the procedure over.

[3] Set the response setting to a 4-second response time. Set the multiplier to the 500 scale.

[4] Insert the detector of the crutch scintillometer into the hole in the operational check fixture.

[5] Compare the reading to the response check range specified on the After-Calibration Source Response Check Data Sheet. Record the data in the applicable column of the Daily Instrument Response Check Data Sheet (form LMS 1974A) (Figure F-2).
**Daily Instrument Response Check Data Sheet**

<table>
<thead>
<tr>
<th>Day</th>
<th>Response (Scale or Decade)</th>
<th>Battery Check</th>
<th>Physical Inspection</th>
<th>High Voltage</th>
<th>Initials</th>
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Initial if daily response check is satisfactory

H&D Reviewer (print and sign)                              Date

File Index No.__________________________________________

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*Figure F-2. Example Daily Instrument Response Check Data Sheet*
If a reading is out of range, check the instrument settings to make sure all settings were correct. If they were not correct, change the settings and repeat the operational check. If instrument settings were correct, tag the instrument with a “Defective” tag. Record the operator’s name, instrument serial number, and date on the tag. Submit the instrument for repair.

**F1.2.3 Delta Scintillometer Daily Response Check**

1. Check the instrument tag to ensure the instrument is calibrated. Scintillometers are calibrated by contract service providers every 12 months or after major repair, whichever is first.

2. Turn power switch to **ON**.

3. Replace the batteries if an arrow and colons appear in the display.

4. Remove the tungsten filter from the slot on the undersurface of the instrument.

5. Place the instrument on the top surface of the operational check fixture.

6. Using the rotary switch, select the desired counting interval (normally 120 seconds).

7. Depress the **START** button to initiate the **UP** or total count.

8. Verify that the displayed count is increasing; if the displayed count is decreasing, depress the **RESET** button, then depress the **START** button.

9. When the total-count interval is complete, record the total count on the *Daily Instrument Response Check Data Sheet*.

10. Compare the total-count operational check reading to the operational check range specified on the *After-Calibration Source Response Check Data Sheet*. If the total count is within the range specified, record the data in the appropriate column of the *Daily Instrument Response Check Data Sheet*. The instrument may now be used for $^{226}$Ra measurements.

11. If the total count is not within the specified range, ensure that all instrument settings are correct. If any instrument settings are incorrect, correct them and repeat the response check.

12. If the instrument settings are correct, tag the instrument with a “Defective” tag. Record the operator’s name, instrument serial number, and date on the tag. Submit the instrument for repair.

**F1.3 Background Determination and Survey Procedures**

Refer to Attachment F-1, *Soil Characterization Survey Procedures for the Monticello, Utah, Sites* (LMS/MNT/S09165).
F2.0 Forms Referenced in This Manual

Forms are accessible on the LMS Forms webpage at: LM Intranet home page > Library > LMS Forms.

After-Calibration Source Response Check Data Sheet LMS 1974

Daily Instrument Response Check Data Sheet LMS 1974A
Attachment F-1

Soil Characterization Survey Procedures for the Monticello, Utah, Sites
Soil Characterization Survey Procedures for the Monticello, Utah, Sites

May 2017
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Contents

Forms Referenced in This Manual ........................................................................................................... ii
1.0 Soil Characterization Survey Procedures ............................................................................................ 1
2.0 Responsibilities ...................................................................................................................................... 1
  2.1 Monticello Contractor Operations Lead .......................................................................................... 1
  2.2 Monticello Contractor Site Lead ...................................................................................................... 1
3.0 Instrument Response Checks ............................................................................................................... 2
  3.1 After-Calibration Source Response ............................................................................................... 2
  3.2 Gamma Scintillometer Daily Response Check ............................................................................... 3
  3.3 Delta Scintillometer Daily Response Check .................................................................................... 3
  3.4 Background Determination ............................................................................................................. 4
  3.5 Gamma Scan ................................................................................................................................... 5
  3.6 Delta Measurements .......................................................................................................................... 5

Figure

Figure 1. Example of Recorded Readings—Before and During Excavations ........................................... 4
Forms Referenced in This Manual

Forms are accessible on the LMS Forms webpage at: LM Intranet home page > Library > LMS Forms.

- After-Calibration Source Response Check Data Sheet LMS 1974
- Daily Instrument Response Check Data Sheet LMS 1974A
- Delta Scintillometer Field Data LMS 2012
1.0 Soil Characterization Survey Procedures

This procedure describes the method the Monticello Legacy Management Support (LMS) representative uses to conduct soil surveys to identify radiologically contaminated soils and estimate the radium-226 (\(^{226}\text{Ra}\)) concentration in the soil. This section applies to all soil characterization surveys on Monticello supplemental standards properties.

2.0 Responsibilities

2.1 Monticello Contractor Operations Lead

The Monticello contractor operations lead will be responsible for:

- Performing soil characterization surveys in accordance with this procedure.
- Maintaining instruments in calibration and in good working condition.
- Collecting accurate, adequate, and appropriate data and properly recording such data.
- Notifying the Monticello contractor site lead if conditions outside the normal scope of this procedure are identified (e.g., finding radiologically impacted material with \(^{226}\text{Ra}\) concentrations greater than 130 picocuries per gram \([\text{pCi/g}]\), or finding suspected hazardous material, or encountering safety hazards in the course of performing duties).

2.2 Monticello Contractor Site Lead

The Monticello contractor site lead is responsible for overseeing the data collected to ensure that it meets programmatic goals discussed in the Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites.
3.0 Instrument Response Checks

The results of a daily instrument response check for each instrument must be within 20% of the After-Calibration Source Response before the instrument may be used. Follow the procedure below to determine whether the instrument is still in calibration.

3.1 After-Calibration Source Response

[1] Ensure that each calibrated instrument has a completed After-Calibration Source Response Check Data Sheet (form LMS 1974). Set up the After-Calibration Source Response Check Data Sheet as follows:

[a] Select the correct source for the type of instrument. Guidelines for source selection are provided in the Safety and Health Procedures Manual (LMS/PRO/S04337) for portable radiation survey instrument response checks (e.g., procedure HS–310.01).

[b] Record the following information at the top of the After-Calibration Source Response Check Data Sheet.

[i] Location (site) (e.g., Monticello),
[ii] Date,
[iii] Instrument manufacturer, model number, and government property number,
[iv] Probe manufacturer, model number, and government property number,
[v] Instrument and probe calibration due date, and
[vi] Radioactive check source identification number and isotope.

[c] Select the appropriate scale and choose a source-to-detector distance and geometry and any shielding necessary to obtain an instrument response at or near the middle of the scale.

[d] Record this information and the instrument response on the After-Calibration Source Response Check Data Sheet.

[e] Expose the instrument to a source of radiation.

[f] IF the instrument functions only as a rate meter, THEN allow the meter to stabilize for approximately 30 seconds.

[g] IF the instrument is equipped with integrating or scaler functions, THEN allow the meter to count the source for 1 minute.

[2] Record the indicated value in the instrument response column of the After-Calibration Source Response Check Data Sheet.

[3] Calculate the values for 20% above and below the instrument response, and record these values in the appropriate locations on the After-Calibration Source Response Check Data Sheet.

[4] Repeat all the steps in this subsection for each type of radiation detection instrument and for each scale. For instruments that automatically adjust the scale (i.e., microprocessor-
based instruments), repeat all the steps in this subsection at two activities in the range of expected radioactivity to be measured.

3.2 **Gamma Scintillometer Daily Response Check**

1. Verify current instrument calibration. Time between calibrations shall not exceed 12 months.

2. Perform a battery check by selecting Check Mode. The battery voltage must be at least 25%; if less than 25%, turn the instrument off and replace the batteries.

3. Set the response mode to the 500 scale and a 4-second response time on the model SC-132. On the SC-133 model, count time is Auto.

4. Insert the detector of the crutch scintillometer into the hole in the operational check block (concrete ammo can).

5. Compare the reading to the response check range specified on the After-Calibration Source Response Check Data Sheet. Record the data in the applicable column of the Daily Instrument Response Check Data Sheet form (LMS 1974A).

6. If a reading is out of range, check the instrument settings to verify that all settings are correct. If they are not correct, change the settings, and repeat the operational check. If instrument settings were correct, tag the instrument as defective and return the instrument to the Safety and Health department for repair.

3.3 **Delta Scintillometer Daily Response Check**

1. Verify that instrument calibration is current.

2. Turn power switch to ON.

3. Replace the batteries if an arrow and colons appear in the display.

4. Place the delta on the top surface of the operational check block (concrete ammo can).

5. Using the rotary switch, select the desired counting interval (normally 120 seconds; 2 min on dial).

6. Remove the tungsten filter from the slot on the undersurface of the instrument.

7. Press the START button to initiate the UP or total count.

8. Verify that the displayed count is increasing; if the displayed count is decreasing, press the RESET button, then the START button.

9. When the total-count interval is complete, record the total count on the Daily Instrument Response Check Data Sheet.

10. Compare the total-count operational check reading to the operational check range specified on the After-Calibration Source Response Check Data Sheet. If the total count is within the range specified, record the data in the appropriate column of the Daily Instrument Response Check Data Sheet. The instrument may now be used for $^{226}$Ra measurements.
If the total count is not within the specified range, ensure that all instrument settings are correct. If any instrument settings are incorrect, correct them and repeat the response check.

If the instrument settings are correct, tag the instrument with a “Defective” tag. Record the operator’s name, instrument serial number, and date on the tag. Submit the instrument to the Safety and Health department for repair.

### 3.4 Background Determination

1. Set the gamma scintillometer function switch to 1-second response time for the model SC-132A; the model SC-133 is Auto mode.

2. Take three to five scintillometer readings in areas away from the suspected contamination.

3. Record these readings on a 20- or 50-scale map (for city streets and utilities and for Highway 191 and 491 rights-of-way) or a 200-scale map (for MS-00176-VL and MP-00211-VL). A map may also be hand-drawn and labeled in the appropriate Monticello long-term surveillance and maintenance (LTS&M) record book. Figure 1 shows an example of the recorded readings.

4. Average these readings to determine the background value.

![Figure 1. Example of Recorded Readings—Before and During Excavations](image)
3.5 Gamma Scan

[1] Set the gamma scintillometer function switch set to 1-second response time. The digital display will provide accurate information up to twice the range of the meter scale for the SC-133 model. For SC-132A model, read analog, then multiply analog by scale setting.

[2] Measure anomalies, and initiate a 10-second count. The average value is displayed at the end of 10 seconds. Take several 10-second reading then average the values.

[3] Walk slowly over the area of the survey, swinging the detector in a 3- to 5-foot-wide traverse approximately 3 inches off the ground.

[4] Note any areas that exceed 1.3 times the background value. All areas that exceed 1.3 times the average background will be investigated using a delta scintillometer to estimate the $^{226}$Ra concentration.

[5] As the traverse is performed, note the boundaries of the elevated areas and mark them with spray paint, if needed.

[6] Ensure that the entire area of interest is scanned.

[7] Record these readings on the appropriate scale map in the appropriate LTS&M record book (include date and map page) for the site. Figure 1 shows an example of the recorded readings.

3.6 Delta Measurements

[1] Following the gamma scan, investigate all areas of gamma activity that exceed 1.3 times the average background with the delta scintillometer to estimate the $^{226}$Ra concentration in the soil.

[2] Perform a delta measurement at the highest gamma location within each discrete area.

[3] If needed, perform additional measurements to establish the area boundary.

\[ The \text{ EPA-approved} \quad ^{226}\text{Ra soil standard for Monticello is 6.0 pCi/g.} \]

\[ \text{Note} \quad \text{The action level for delta measurements is 5.0 pCi/g. Soil is identified as radiologically contaminated if} \quad ^{226}\text{Ra concentrations estimated from delta measurements exceed the 5.0 pCi/g action level.} \]

[4] Turn power switch to ON and set the time switch to the desired interval (normally 120 seconds). Remove the filter (tungsten plate).

[5] Place the instrument on the surface to be measured. Do not move the instrument during the performance of unfiltered and filtered measurements.

[6] Press RESET then START button to initiate the total count. Verify that the count is increasing; if it is not, press the RESET button and then the START button.


[8] Place the filter in the receptacle beneath the detector without moving the detector.
Press the START button and verify that the count is decreasing.

At the end of the counting interval, record the difference (delta count) on the Delta Scintillometer Field Data form.

Calculate the uncertainty using the following equation:

\[
\% \text{ Uncertainty} = \frac{\sqrt{2TC - \Delta}}{\Delta} \times 100
\]

Where \( TC \) is the total count, and \( \Delta \) is the delta count.

Calculate the \(^{226}\text{Ra} \) concentration using the following equation:

\[
^{226}\text{Ra} = \text{slope} \times (\text{delta count/count time}) - \text{intercept}
\]

The slope and intercept values are found on the card attached to the instrument.

Use orange spray paint to define a boundary of the soil area where \(^{226}\text{Ra} \) concentrations exceed 5.0 pCi/g or greater. These soils are considered radiologically impacted according to the Monticello soil standard.

Notify excavation/backfill personnel that the marked soil materials must be sent to the Temporary Storage Facility at the Monticello site.
Attachment F-2

Portable Gamma Scintillometer Measurements Procedure for the Monticello, Utah, Site
Portable Gamma Scintillometer Measurements Procedure for the Monticello, Utah, Site

May 2017
## Contents

Forms Referenced in This Manual ................................................................. ii

1.0  Purpose ................................................................................................. 1

2.0  Responsibilities ..................................................................................... 1

   2.1  Team Leader .................................................................................... 1

   2.2  Team Members ................................................................................ 1

3.0  References ............................................................................................ 1

4.0  Procedures ............................................................................................ 2

   4.1  Equipment and Supplies ................................................................. 2

   4.2  Operational Checks ......................................................................... 2

      4.2.1  Battery Check .......................................................................... 2

      4.2.2  SC-132 and SC-133 Crutch Scintillometer Operational Checks .... 2

   4.3  Field Measurements ....................................................................... 3

      4.3.1  Field Measurements with the Crutch Scintillometer ................. 3

   4.4  Instrument Calibration and Repair .................................................. 3

5.0  Records ................................................................................................. 3
Forms Referenced in This Manual

Forms are accessible on the **LMS Forms** webpage at: LM Intranet home page > **Library** > **LMS Forms**.

- After-Calibration Source Response Check Data Sheet  
  LMS 1974
- Daily Instrument Response Check Data Sheet  
  LMS 1974A
1.0 Purpose

This procedure describes the operational checks and setups for field measurements using the Mount Sopris models SC-132A and SC-133 portable gamma scintillometers.

2.0 Responsibilities

2.1 Team Leader

Team leader responsibilities include those listed below. The team leader may delegate responsibility to one or two team members to provide overall control.

- Ensure that instruments are available for use.
- Ensure that operational checks are performed and that instruments have a current calibration.
- Verify operational checks.
- Report instrument operational inconsistency to the immediate supervisor.

2.2 Team Members

Team members’ responsibilities include:

- Perform operational checks
- Notify the team leader if instruments fail operational checks
- Keep instruments clean and decontaminated

3.0 References

The following references are sources of information used in this procedure:


4.0 Procedures

4.1 Equipment and Supplies

- Mount Sopris Portable Gamma Scintillometer, models SC-132A and SC-133, with external detector (modified). The model CE-975 detector, with a 1.5-inch-diameter by 1.5-inch-thick sodium iodide crystal, was removed from the unit and mounted on a crutch with a built-in amplifier. This model is referred to as a “crutch scintillometer.”
- D cell batteries.
- Portable operational check block (concrete ammo can).

4.2 Operational Checks

Perform operational checks for all instruments at the beginning of each workday. At remote sites, operational checks are recommended at the end of the last workday. Instruments that fail the operational check shall be removed from service.

The operational check range for a scintillometer will be established as ±20 percent of the mean value of all available instrument readings for the operational check block measurements.

Unusually high background activity may cause instruments to fail operational checks. If an elevated background is suspected as the cause of an operational check failure, perform operational checks at a different, lower-background location.

4.2.1 Battery Check

All scintillometer operational checks include a battery check prior to the operational check.

[1] On the hand-held crutch, select the BAT position. If the meter does not read in the green area of the scale (above 0.7), the batteries must be replaced. If the meter reads below zero, improper battery polarity is likely, and the batteries must be reversed (positive end toward rear of handle). If this reversal does not correct the problem, tag the instrument “Defective” (red tagged) and submit it to the Safety and Health department for repair.

4.2.2 SC-132 and SC-133 Crutch Scintillometer Operational Checks

[1] Complete the instrument number, calibration date, and operator initials portion of the operational check sheet provided for the instrument (the After-Calibration Source Response Check Data Sheet [form LMS 1974e] and the Daily Instrument Response Check Data Sheet [form LMS 1974Ae]).

[2] Using the operational check block, insert the detector of the crutch scintillometer into the hole in the block. Record the data in the “Response” column.

[3] Adjust the scale-multiplier switch as necessary, note the meter reading, and record the reading on the daily operational check sheet.

[4] Compare the reading to the operational check range specified on the daily operational check sheet.
If a reading is out of range, check the instrument settings to make sure all settings are correct. If they are not correct, change the settings, and repeat the operational check. If instrument settings are correct, (1) notify the team leader, and (2) red tag the instrument and note the problem with an “Out of Range” comment, record the operator’s name, the instrument identification number and date on the tag, and submit the instrument for repair.

When notified of an operational check failure, the team leader shall (1) locate and evaluate the data obtained by that instrument during the time period between the last successful operational check and the operational check failure, (2) make a determination as to the validity of this data, (3) take appropriate action, and (4) document the Team Leader Notes accordingly.

A team leader shall review each daily operational check sheet. It is recommended that this review be conducted daily, prior to field measurement activities. If incomplete or incorrect entries are found, the team leader shall contact the individual involved, resolve all inconsistencies, evaluate the impact of each incomplete/incorrect entry, and take the action necessary to remedy the impact of incomplete or incorrect entries and data.

If an operator enters incorrect information on the daily operation check sheet, the operator corrects the entry by lining through the incorrect information and initialing and dating the change.

Once the operational check form is completed, the team leader shall line through the unused portion of the form and sign and date the bottom of the form. Completed operational check forms are submitted to the Safety and Health department.

4.3 **Field Measurements**

4.3.1 **Field Measurements with the Crutch Scintillometer**

Whenever possible, take field measurements with the meter scale multiplier set to read in the upper 50% of the scale.

4.4 **Instrument Calibration and Repair**

Calibration and repair of the SC-132 and SC-133 crutch scintillometers are performed by a qualified vendor.

5.0 **Records**

This procedure generates Operational Check and Equipment Summary forms and field measurements. Contractor records shall be maintained in accordance with applicable project working file indexes and the Records Management Manual (LMS/POL/S04327).
Appendix G

Procedures for the Transportation of Radioactive Materials
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G1.0 Purpose

The purpose of this procedure is to ensure that radioactive material is transported (1) using best management practices, (2) in compliance with U.S. Department of Transportation (DOT) requirements, and (3) with minimal risk to human health and the environment.

G2.0 Scope

This procedure:

- Establishes the requirements for transporting radioactive material on public highways safely and in compliance with DOT radioactive material (DOT RAM) shipping requirements.
- Establishes the requirements for transporting radioactive material
  - From locations within Monticello, Utah, to the U.S. Department of Energy (DOE) Temporary Storage Facility (TSF) located at the DOE repository site in Monticello.
  - From the TSF to the Grand Junction, Colorado, Disposal Site (GJDS).

For the purposes of this procedure, radioactive material refers to uranium mill tailings (UMT)-related material, unless stated otherwise. UMT-related material includes uranium ore. The primary type of material that will be transported is UMT-related material mixed with soil and/or debris that is excavated from Monticello supplemental standards areas, such as Monticello streets and utilities.

This procedure specifically excludes the transportation of radioactive material that is not UMT-related radioactive material, such as radiometric calibration sources, and nonradioactive hazardous materials or wastes. Additionally, UMT-related radioactive material that is mixed with other hazardous substances (e.g., asbestos or polychlorinated biphenyls [PCBs]), or is mixed with Resource Conservation and Recovery Act (RCRA) hazardous waste (i.e., mixed waste) shall be handled per the procedures in Appendix E, Section E10.5. Shipment of non-UMT-related radioactive material under the Monticello, Utah, Disposal and Processing Sites’ current long-term surveillance and maintenance (LTS&M) scope is not likely. However, mixed waste (e.g., UMT-related radioactive material mixed with petroleum contamination) may be encountered in Monticello streets and utilities. If a shipment of mixed waste is required, it will be addressed on a case-by-case basis, and such materials will be shipped in compliance with applicable DOT hazardous material shipping requirements. The Monticello contractor site lead shall contact the Office of Legacy Management (LM) Monticello site manager in the event that any of the materials described above are encountered when performing LTS&M activities.
G3.0 Responsibilities

LM Monticello site manager—Responsible for:

- Informing U.S. Environmental Protection Agency (EPA) and Utah Department of Environmental Quality (UDEQ) of any emergency or noncompliant situation
- Completing required regulatory reports resulting from transportation incidents or relevant to the storage of UMT-related radioactive material that is mixed with other hazardous substances or hazardous wastes

Contractor site lead—Responsible for:

- Ensuring that Monticello contractor site staff receive the required training
- Providing assistance to the Monticello contractor operations lead in emergency situations
- Contacting a Contractor Radiological Technician (RCT) to support the transportation of any UMT-related material
- Coordinating with the Monticello contractor operations lead, Environmental Compliance (EC) representative, and DOT RAM shipper for the proper transport of all radiologically contaminated material
- Reporting emergency situations to DOE

Environmental Compliance (EC) representative—Responsible for:

- Providing support as requested by the contractor site lead for determining transportation and disposal requirements for radioactive material.
- Designating the certified DOT RAM shipper or, if required, serving as the certified shipper for radioactive material that qualifies as DOT RAM. The responsibilities of the DOT RAM shipper are provided below.
- Working with contractor procurement staff and the DOT RAM shipper as necessary to hire qualified carriers for transporting radioactive material.
- Providing assistance to the contractor site lead and DOT RAM shipper as necessary to facilitate the shipment of DOT RAM, including assisting with required regulatory reporting and notifications related to transporting radioactive materials.

DOT RAM shipper—Responsible for:

- Working with the Monticello EC representative as necessary to facilitate the shipment of DOT RAM.
- Obtaining information from the Monticello contractor operations lead about the radioactivity level and the quantity of radioactive material that needs to be shipped so that applicable DOT RAM shipping requirements can be determined.
- Working with the Monticello EC representative and contractor procurement staff as necessary to hire qualified carriers for transporting radioactive material.
• Ensuring DOT RAM is shipped in accordance with applicable DOT RAM shipping requirements, including, but not limited to, preparing required DOT RAM shipping documentation, packaging, marking, labeling, and placarding.

• Communicating with security personnel at the LM Grand Junction office ([970] 248-6070) to provide information about an upcoming DOT RAM shipment.

• Communicating with the Utah Division of Waste Management and Radiation Control about an upcoming shipment of DOT RAM from the Monticello TSF to the GJDS.

• Being present in the field to oversee DOT RAM shipping activities as necessary.

• Conducting inspections of vehicles, packages, and containers of radioactive material.

• Working with the RCT to ensure radiological surveys are performed in compliance with DOT RAM shipping requirements.

• Completing DOT RAM shipping papers and identifying the pertinent emergency response guide for radioactive material.

• Communicating with the receiving facility to ensure a DOT RAM shipment has arrived.

• Working with the Monticello contractor operations lead to contact the contractor site lead, security personnel at the LM office in Grand Junction office, and emergency services in the event of an emergency.

• Maintaining copies of Monticello shipping-related documents in applicable record files.

Monticello contractor site staff—Responsible for:

• Measuring and recording the radioactivity of any material excavated in accordance with routine radiological control procedures described in this Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites (LMS/MNT/S00387) (LTS&M Plan) and in accordance with radiological survey procedures described in Appendix F of this plan.

• Measuring and recording the radioactivity and estimated quantity (pounds) of any material that will be transported.

• Notifying the contractor site lead of UMT-related material > 5 pCi/g radium-226 (226Ra). The Monticello contractor site staff shall isolate materials exceeding this standard and request an RCT come to the location of the contaminated materials.

• Coordinating with the EC representative and DOT RAM shipper for the transportation of DOT RAM.

• Following the procedures in Appendix D, Section 6.0, for transferring radioactive material to and from the TSF.

• Ensuring that carrier operators comply with the procedures for transporting radioactive material to and from the TSF.

• Working with the DOT RAM shipper to respond to incidents that may occur during transport of radioactive materials.
• Working with the DOT RAM shipper to contact the contractor site lead, security personnel at the LM office in Grand Junction, and emergency services in the event of an emergency.
• Providing immediate notification and follow-up documentation to the contractor site lead of incidents or potential incidents occurring during transport.

**Carrier operators**—Responsible for:

• Transporting and handling radioactive material in accordance with these procedures and under the direction of the Monticello contractor operations lead and DOT RAM shipper.

**Safety and Health specialist**—Responsible for:

• Assisting the contractor site lead and Monticello contractor operations lead with worker safety issues, transportation incidents, or emergencies.

**Radiological Control Technician (RCT)**—Responsible for:

• Assisting site personnel with all radiological concerns.
• Performing radiological inspections as directed by the LTS&M Plan and the *Radiological Control Manual* (LMS/POL/S04322).

### G4.0 Procedures for Transporting Radioactive Materials

The general guidelines for transporting radioactive material are:

• If UMT-related material is \( \leq 5 \) picocuries per gram (pCi/g) \(^{226}\text{Ra}\) above background, no transportation is required.

• If UMT-related material is \( > 5 \) pCi/g \(^{226}\text{Ra}\) above background and \( \leq 27 \) pCi/g \(^{226}\text{Ra}\), the material can be transported without complying with DOT RAM shipping requirements. However, such radioactive material will be transported in accordance with the applicable best management practices provided in Section G4.1 of this appendix.

• If UMT-related material is \( > 27 \) pCi/g \(^{226}\text{Ra}\), the material may be DOT RAM, and a certified DOT RAM shipper must determine applicable DOT RAM shipping requirements.

For the purposes of shipping Monticello radioactive material, UMT-related material is regulated as DOT RAM if the specific activity concentration (radioactivity per unit mass) for \(^{226}\text{Ra}\) is \( > 27 \) pCi/g and the total activity for \(^{226}\text{Ra}\) in the consignment\(^1\) is \( > 27,000 \) pCi. If either of these values is not exceeded, the UMT-related material is not DOT RAM for shipping purposes.

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\(^1\) A consignment is a package or group of packages containing radioactive material offered for transport in the same shipment. For example, a truckload of radioactive material is considered a consignment. If a vehicle is transporting several separate packages of radioactive material, all the packages together in the vehicle are considered one consignment.
More details about the general guidelines for transporting radioactive material are provided below.

- **UMT-related material ≤ 5 pCi/g above background**
  - UMT-related material that is ≤ 5 pCi/g $^{226}\text{Ra}$ above background is not considered contaminated for remediation purposes. Therefore, such material can be returned to the excavation and no transportation is required.

- **UMT-related material > 5 pCi/g $^{226}\text{Ra}$ above background and ≤ 27 pCi/g $^{226}\text{Ra}$**
  - UMT-related material that is > 5 pCi/g $^{226}\text{Ra}$ above background is considered contaminated for remediation purposes. If excavated radioactive materials are controlled by the City of Monticello in city streets or utility excavations, then the materials must be removed and transported to the TSF. If excavated radioactive materials are controlled by the Utah Department of Transportation (UDOT) in Highways 191 or 491 rights-of-way excavations within city limits, then UDOT has the option to return the radioactive material to the excavation or have the radioactive material removed and transported to the TSF. Further information about transporting radioactive material that is > 5 pCi/g $^{226}\text{Ra}$ above background to the TSF or returning the material to a UDOT excavation is provided in Appendix E, Sections E5.6 and E6.0.

Though UMT-related material that is > 5 pCi/g $^{226}\text{Ra}$ above background is considered contaminated for remediation purposes, material that is ≤ 27 pCi/g $^{226}\text{Ra}$ does not qualify as DOT RAM. Therefore, such material can be transported without complying with DOT RAM shipping requirements. However, such radioactive material will be transported in accordance with the applicable best management practices provided in Section G4.1 of this appendix.

The Monticello contractor site staff must obtain adequate radiological survey data (e.g., gamma exposure rates and delta measurements) to make the determination that radioactive material is ≤ 27 pCi/g $^{226}\text{Ra}$ and, therefore, not regulated as DOT RAM for shipping purposes. If all the radioactive material surveyed is ≤ 27 pCi/g $^{226}\text{Ra}$, then the material is not DOT RAM. It may be necessary to obtain multiple radiological survey measurements to ensure all the radioactive material is ≤ 27 pCi/g $^{226}\text{Ra}$, if there is a large amount of material to be transported, or there is significant variation in gamma exposure rates in the material to be transported, or both. The Monticello contractor site staff must conduct radiological surveys in accordance with the radiological survey procedures in Appendix F, and radiological survey data must be documented in accordance with the requirements of Appendix B; Appendix E, Section E11.0; and Appendix F.

- **UMT-related material is > 27 pCi/g $^{226}\text{Ra}$**
  - UMT-related material that is > 27 pCi/g $^{226}\text{Ra}$ may be DOT RAM. The Monticello contractor operations lead must notify the contractor site lead if UMT-related material > 27 pCi/g $^{226}\text{Ra}$ is encountered. In addition, the Monticello contractor operations lead will isolate any radioactive material > 27 pCi/g $^{226}\text{Ra}$ and request that an RCT come to the

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3 In emergency situations, there are exceptions to transporting radioactive material to the TSF. See Appendix E, Section E6.2.
location to perform radiological surveys of equipment and personnel per the *Radiological Control Manual*.

The contractor site lead will request assistance from the Monticello EC representative and a DOT RAM shipper to determine the transportation requirements for radioactive material that is > 27 pCi/g $^{226}$Ra. The radioactive material cannot be transported from the location where it was found until the DOT RAM shipper determines (1) whether the material is DOT RAM and (2) the applicable DOT RAM shipping requirements.

The Monticello contractor site staff must provide the DOT RAM shipper with all available radiological survey data (e.g., gamma exposure rates and delta measurements) for radioactive material that is > 27 pCi/g $^{226}$Ra. The radiological surveys must be conducted in accordance with the radiological survey procedures in Appendix F. In addition to providing radiological survey data, the Monticello contractor site staff must estimate the quantity of radioactive material (in pounds) that is > 27 pCi/g $^{226}$Ra and provide that information to the DOT RAM shipper. The estimated quantity of material will be used to determine the total activity of the material that needs to be transported. The radiological survey data that the Monticello contractor site staff provides to the DOT RAM shipper must be documented in accordance with the requirements of Appendix B; Appendix E, Section E11.0; and Appendix F. The Monticello contractor site staff also must document any estimates of material quantity.

The DOT RAM shipper also may request that the Monticello contractor site staff provide additional radiological survey data and material quantity estimates. The DOT RAM shipper may need multiple radiological survey measurements and material quantity estimates to determine the most representative average specific activity concentration (pCi/g $^{226}$Ra) for the material that needs to be transported. The DOT RAM shipper will use the most representative specific activity concentration and the total activity of the material to be transported to determine (1) whether the material is DOT RAM and (2) the applicable DOT RAM shipping requirements.

If the DOT RAM shipper determines that a material qualifies as DOT RAM for shipping purposes, the material must be shipped in accordance with the requirements of Section G4.2 of this appendix and with all applicable DOT RAM shipping requirements. The DOT RAM shipper will work with the contractor site lead, other Monticello contractor site staff, and the Monticello EC representative to ensure DOT RAM is shipped in accordance with all applicable requirements. The DOT RAM shipper has the primary responsibility for determining any applicable DOT RAM shipping requirements for Monticello radioactive materials.

### G4.1 Transportation of Radioactive Material That Is Not DOT RAM

UMT-related material with a specific activity concentration of $\leq 27$ pCi/g $^{226}$Ra or with a total activity in the consignment of $\leq 27,000$ pCi $^{226}$Ra is not DOT RAM for shipping purposes. Such radioactive material can be transported without complying with DOT RAM shipping requirements. However, the following “best management practices” will be used when transporting a bulk quantity of such radioactive material. A bulk quantity refers to a truckload...
quantity, such as a quantity that must be transported by a dump truck that holds 10–15 cubic yards of material.

G4.1.1 **Best Management Practices for Transporting a Bulk Quantity of Radioactive Material**

- Dump truck beds will be lined with 6-mil plastic sheeting (or equivalent) and will not allow radioactive material leakage. The bed liners will cover the bottom and sides of the dump truck bed and have enough liner plastic remaining to completely cover the top of the radioactive materials so as to encapsulate the radioactive materials. The liner will not interfere with the visibility of the taillights, turn signals, or license plate.
- Radioactive material will be covered during transport with a tight sealing tarp (canvas or equal) over the loaded truck bed that will overlap the truck-bed sides, front, and back by a minimum of 6 inches. Mechanical tarping devices may be specified to enable remote tarping to avoid the need of the carrier/operator to climb onto or into the truck bed to cover the load.
- Prior to loading radioactive material, the transport vehicle will be inspected to ensure that tailgates, latching mechanisms, tarping device, and hoisting/dumping devices operate properly.
- After loading radioactive material, the transport vehicle will be inspected to ensure that there is no loose contaminated material on the exterior surfaces of the vehicle.
- Radioactive material will be transported directly to the TSF or, in the case of emergencies (see Appendix E, Section E6.2), to the designated locations at either City property MS−01006 or City property MP-00181.
- Radioactive material will be transported using a “Material Movement Manifest” provided by an RCT.
- Radioactive material will be placed in the TSF in accordance with the procedures in Appendix D, Section D6.0.

A bulk quantity of radioactive material that is not DOT RAM may be transported to the TSF by the City of Monticello using City equipment under the direction and presence of the Monticello contractor site staff.

There are no special requirements for shipping a small quantity of radioactive material that is not DOT RAM other than those provided below. A small quantity refers to a quantity that will fit into the back of a pickup truck, or even less, such as a quantity that will fit into a 5-gallon bucket.

- Radioactive material will be transported as directed by the RCT per the *Radiological Control Manual*.
- Radioactive material will be packaged so that no leaks occur during transport.
- Radioactive material will be transported in compliance with any pertinent health and safety requirements.

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4 Soil that includes standing liquid will not be transported. Any excess liquid must be removed from the soil to the satisfaction of the Monticello contractor operations lead before the soil can be transported.
A small quantity of radioactive material that is not DOT RAM may be transported to the TSF by the City of Monticello using city equipment or by a Monticello contractor site staff using equipment from the LM Monticello field office.

G4.2 Transportation of Radioactive Material That Is DOT RAM

UMT-related material with a specific activity concentration of > 27 pCi/g $^{226}$Ra and with a total activity in the consignment of > 27,000 pCi $^{226}$Ra is DOT RAM for shipping purposes. Such radioactive material must be transported in compliance with applicable DOT RAM shipping requirements and with the best management practices specified in Section G4.1, whether the radioactive material is shipped to the TSF or to the GJDS.

The DOT RAM shipper has the primary responsibility for determining the applicable DOT RAM shipping requirements. The DOT RAM must work with the contractor site lead, Monticello contractor site staff, and the Monticello EC representative to ensure Monticello DOT RAM is shipped in accordance with all applicable requirements.

Summarized below are requirements for transporting a bulk quantity of Monticello radioactive material that is DOT RAM. Additional requirements may also apply, as determined by the DOT RAM shipper, contractor site lead, and contractor Safety and Health staff.

- Monticello DOT RAM must be transported in accordance with all applicable DOT RAM shipping requirements, including, but not limited to, the requirements pertaining to shipping documentation, packaging, marking, labeling, placarding, notifications, and training.
- Monticello DOT RAM can be transported by only an approved carrier operator. An approved carrier operator for transporting a bulk quantity of DOT RAM may need to meet certain specialized criteria specified by DOE. The DOT RAM shipper will work with the contractor site lead and contractor procurement staff to ensure that only an approved carrier operator is used to transport a bulk quantity of Monticello DOT RAM.
- A formal transportation plan will be developed for the transportation of a bulk quantity of Monticello DOT RAM to the GJDS. Among other things, the transportation plan will address required documentation, training requirements, incident response, vehicle inspections, and procedures for receiving radioactive material at the GJDS.
- Pertinent radiological surveys of the radioactive material and the transport vehicle will be performed by an RCT as required by DOT RAM regulations and in accordance with radiological survey procedures in Appendix F. The results shall be documented on the appropriate survey form, a copy of which will be attached to shipping documentation.
- Before the transport vehicle is loaded with radioactive material, the Monticello DOT RAM shipper or designee will review driver paperwork, such as the driver’s commercial driver’s license and DOT medical card, and inspect vehicle safety features, such as lights, signals, and safety equipment. The vehicle will also be inspected after the vehicle is loaded to ensure the radioactive material is properly loaded, tailgates are fastened, tarps are tightened, leaks of radioactive material are absent, and so forth.
- Transport vehicle operators must have the required training for transporting DOT RAM. The required training will be identified by the DOT RAM shipper and contractor procurement staff prior to the selection of the transportation subcontractor.
Before radioactive material is transported, the DOT RAM shipper will contact security personnel at the LM office in Grand Junction and provide information about the pending shipment. The DOT RAM shipper shall provide copies of the DOT RAM shipping paper and the pertinent emergency response guide to the security personnel at the LM office in Grand Junction prior to the start of transportation.

Before radioactive material is transported, the DOT RAM shipper (as requested by UDEQ) will provide a courtesy notification to the Utah Division of Waste Management and Radiation Control about the pending shipment of DOT RAM from the Monticello site to the GJDS.

After the transportation of Monticello DOT RAM has commenced, the DOT RAM shipper will contact the GJDS to ensure the shipment has arrived.

G4.2.1 Requirements If A DOT RAM Spill Occurs During Transportation

If a spill of DOT RAM occurs during the transportation of radioactive material to the TSF, the carrier operator shall:

- If practical, pull the truck off the road and out of the way of traffic.
- Put on a high visibility traffic safety vest and place warning reflectors in front and behind the truck.
- Stop or secure the spill.
- Isolate the spill area from public access by establishing control boundaries.
- Notify the operator’s immediate supervisor and the Monticello contractor operations lead.

Note
The operator’s supervisor will also contact the Monticello contractor operations lead to ensure notification of the spill has been made.

The Monticello contractor operations lead shall:

- Determine the extent of contamination from the spill.
- Report the spill to the contractor site lead, who in turn will notify the LM Monticello site manager. The contractor site lead will also notify the Monticello EC representative and a contractor DOT RAM shipper.
- Arrange for the City to recover the spilled material under direction of the Monticello contractor operations lead, an RCT, and a DOT RAM shipper and transport the radioactive material to the TSF.
- Evaluate the spill and report findings on the contractor Incident Report form (LMS 1743).
- The LM Monticello site manager, in consultation with the contractor site lead, Monticello EC representative, and contractor DOT RAM shipper, will notify the Utah Division of Waste Management and Radiation Control and, if necessary, the National Response Center about a spill of DOT RAM.

---

5 DOT shipping regulations require a 24-hour emergency contact to be available during transportation of radioactive material. The LM office in Grand Junction security staff serve as that 24-hour emergency contact.
For a spill of DOT RAM that occurs during the transportation of radioactive material to the GJDS, spill response information, including emergency contact information, will be included in the transportation plan developed for that particular transportation event.

Should they be needed in the event of a spill of radioactive material during transportation, a variety of emergency contact phone numbers are provided below (Table G-1).

<table>
<thead>
<tr>
<th>Agency</th>
<th>Location</th>
<th>Services</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Department</td>
<td>City of Monticello</td>
<td>Law Enforcement</td>
<td>911 or (435) 587-2544</td>
</tr>
<tr>
<td>Fire Department</td>
<td>City of Monticello</td>
<td>Fire and Emergencies</td>
<td>911 or (435) 459-4741</td>
</tr>
<tr>
<td>Medical Emergency</td>
<td>San Juan County</td>
<td>Emergencies</td>
<td>911</td>
</tr>
<tr>
<td>Medical Services</td>
<td>City of Monticello</td>
<td>Medical Emergencies</td>
<td>911 or (435) 587-2116</td>
</tr>
<tr>
<td>Radiological Emergency</td>
<td>LM Grand Junction Office in Grand Junction, CO</td>
<td>Security Desk (Staffed 24 hours per day)</td>
<td>(970) 248-6070</td>
</tr>
<tr>
<td>LM Monticello Site Manager: Jason Nguyen</td>
<td>LM Grand Junction Office in Grand Junction, CO</td>
<td>LM Site Management</td>
<td>(970) 248-6707</td>
</tr>
<tr>
<td>Contractor Site Lead: Fred Smith</td>
<td>LM Grand Junction Office in Grand Junction, CO</td>
<td>LMS Site Management</td>
<td>(970) 248-6182</td>
</tr>
<tr>
<td>Utah Division of Waste Management and Radiation Control</td>
<td>State of Utah</td>
<td>Waste Management and Radiation Control</td>
<td>(801) 536-4250</td>
</tr>
<tr>
<td>UDEQ Monticello Project Manager</td>
<td>State of Utah</td>
<td>Environmental Management</td>
<td>(801) 536-4179</td>
</tr>
<tr>
<td>Colorado Department of Public Health and Environment</td>
<td>State of Colorado</td>
<td>Environmental Management</td>
<td>(800) 886-7689</td>
</tr>
</tbody>
</table>

### G5.0 Forms Referenced in This Manual

Forms are accessible at: LM Intranet home page > Library > LMS Forms and Worksheets.

*Incident Report*  
LMS 1743
Appendix H

Annual Inspection Procedures and Checklist
H1.0 Introduction

Annual inspections have been performed at the Monticello Mill Tailings Site (MMTS) and Monticello Vicinity Properties (MVP) site (Figure H-1 in Section H4.0) since 2001. The sites are inspected annually to (1) verify that long-term surveillance and maintenance (LTS&M) activities implemented through the year are effective and appropriate, (2) confirm that the institutional controls (ICs) restricting land and groundwater use under the remedies remain effective, and (3) identify deficiencies and maintenance items and recommend corrective actions as needed. Every 5 years, the annual inspection also serves as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review inspection.

H2.0 Annual Inspection Procedure

All activities listed on page 1 of the annual inspection checklist (Section H5.0) will be completed in preparation for the annual inspection, which will normally take place during the month of September. The resulting report is due to regulators by December 31 of each year. The Office of Legacy Management (LM) site manager, the Legacy Management Support (LMS) contractor site lead, and the LMS contractor operations lead may choose to participate in all or any part of the inspection.

H2.1 Responsibilities

The U.S. Department of Energy (DOE) LM site manager is responsible for:

- Scheduling the annual inspection.
- Notifying regulators from the U.S. Environmental Protection Agency (EPA), the Utah Department of Environmental Quality (UDEQ), and other agencies as necessary, at least 2 weeks prior to the inspection to invite them to participate.
- Submitting the annual inspection report to EPA and UDEQ.

The contractor site lead is responsible for:

- Assigning the chief inspector.
- Assigning subject matter experts (SMEs), including an environmental compliance lead, a geotechnical engineer (or appropriately qualified civil engineer or engineering geologist), and an ecologist to the inspection team.
- Ensuring the chief inspector and SMEs are assigned roles based on their technical area of expertise and they understand their roles and responsibilities for the sections in the checklist they are responsible for completing.
- Ensuring that the inspection is conducted when scheduled.
- Providing relevant site information, including any information from Federal Facility Agreement (FFA) quarterly reports and maintenance performed, to the chief inspector.
- Coordinating the inspection with the LM site manager.
- Submitting the annual inspection report to LM for transmittal to regulators.
The contractor operations lead is responsible for:

- Ensuring that access and notification agreements are in place.
- Notifying appropriate landowners.
- Performing site briefings, and ensuring that Safety and Health procedures are followed during the annual inspection.

The chief inspector is responsible for:

- Assigning an assistant inspector.
- Providing a schedule of annual inspection activities to the contractor site lead.
- Reviewing requirements and reports related to the annual inspection.
- Preparing background information, maps, and Safety and Health documents for use during the inspection.
- Briefing inspection team members on appropriate field equipment and clothing.
- Assembling the necessary equipment to complete the inspection (e.g., reserved vehicles, first aid kit, water, two-way radios).
- Conducting and documenting the annual inspection.
- Delegating annual inspection tasks to the assistant inspectors as needed.
- Writing the annual inspection report.

Assistant inspectors are responsible for:

- Assisting with the annual inspection, recording observations, and providing annotated maps, field notes, and photographs to the chief inspector.
- Completing reviews of the annual inspection report.

**H2.2 Performing the Inspection**

The chief inspector will provide a schedule of annual inspection activities to the LM site manager, contractor site lead, contractor operations lead, and inspection team. The activity schedule will be tentative and may change in the field due to weather conditions or other factors. The inspection may be performed in any order and does not need to conform to the order of the annual inspection checklist (Section H5.0).

Before inspection field activities begin, the chief inspector will provide field copies of the annual inspection checklist and annual inspection maps (Section H4.0) to all participants. Additional electronic copies of these documents also may be sent out in advance. The inspector will provide Safety and Health documents (e.g., *Job Safety Analysis (JSA)* form [LMS 1748]) and review them with the inspection team, and the contractor operations lead will perform a site briefing with associated documentation (e.g., *Plan of the Day/Plan of the Week* form [LMS 2130]) in accordance with current procedures before field activities begin.
The annotated annual inspection checklists, maps, photographs, and field notes recorded by the inspection team serve as a record of inspection activities and will be completed during the inspection. The records will sufficiently document site conditions and a review of the work performed by the contractor operations lead and other site staff in the past year.

H2.2.1 Completing the Annual Inspection Checklist

Inspection participants will utilize the annual inspection checklist to document observations (Section H5.0). The chief inspector will complete the “Annual Inspection Preparation” section of the checklist. The following subsections provide additional instructions for completing the checklist.

H2.2.1.1 Interviews

During the course of the annual inspection, the chief inspector or assistant inspector will conduct formal or informal interviews to obtain relevant site information. The following persons will be interviewed:

- The contractor operations lead
- The Utah State Engineer
- Additional site contractor staff, the city manager, or others identified on a case-by-case basis

Relevant information will be recorded in Part I of the checklist. Interviews for CERCLA Five-Year Reviews are not part of the annual inspection and will be conducted by the Public Relations team.

H2.2.1.2 Administrative and Records Inspection

The following administrative documents and records will be verified during the annual inspection, using Part II of the annual inspection checklist (Section H5.0):

- **Online access:** Verify that controlled documents (e.g., the *Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites* [LTS&M Plan]), the MMTS/MVP and Operable Unit (OU) III Administrative Record collections, and the Information Repository collections are accessible from the Monticello site electronically.

- **Training records:** Verify with the LMS contractor training department that radiological training for site personnel is current. Inspect the Temporary Storage Facility (TSF) log books to ensure that all City of Monticello or subcontractor employees who accessed the TSF were escorted by trained LMS contractor personnel. If any City or subcontractor employees were unescorted, verify with the training department that the workers have been trained and that their training is current.

- **Monticello, Utah, Processing and Disposal Sites record books:** Inspect the site record books to ensure that entries are correct, complete, and demonstrate protectiveness of the remedy. Ensure that individuals making entries have signed the list of authorized persons at the beginning of the record book. Specific record books to be inspected are listed in Part II.3 of the checklist. The contractor operations lead’s record book may be used to support the records inspection but it is not included in the inspection. The contractor operations lead can
assist the inspectors in locating the record books in the field office and answer questions about specific entries. Make note of any record books that are full, nearly full, or that have been changed over the course of the year. Verify that the original copy of each full record book was sent to Records Management Support.

- **Radiological as-built drawings:** The as-built drawings are a record of contamination encountered in supplemental standards areas (shown on Figures H-2 and H-3 in Section H4.0). The drawings are kept at the Monticello field office and updated annually. They must be verified to ensure that scan information has been recorded for all excavations noted in the Public Roads and Utilities record book. Normally, there is not time to inspect every entry, so verify a random subset of entries.

- **Surveillance checklists and records:** The contractor operations lead maintains sign-in sheets for TSF access (in the TSF entrance log book), monthly meteorological monitoring data, monthly and quarterly repository surveillance checklists, and Pond 4 monthly surveillance checklists for inspections. Verify that the dates of TSF entries are consistent with those on drawings and in the TSF record book. Verify that follow-up actions for large storm events as defined in the LTS&M Plan were appropriately recorded.

- For Five-Year Review inspections, verify that the cooperative agreement is current with the LM site manager.

- For Five-Year Review inspections, contact the City of Monticello to verify that Zoning Ordinances 2002-4 and 2003-2 are current and active.

- **Deed restrictions:** Verify that deed restrictions are present in property records through the San Juan County Recorder’s Office (at 117 S. Main Street in Monticello). Use the electronic record system to locate each restricted property’s deed and verify that DOE’s deed restriction is still attached. Look for parent deeds and verify that any properties that were subdivided from the original restricted properties carry the DOE deed restriction.

Any deficiencies will be recorded on the annual inspection checklist. Deficiencies in the site record books may be corrected during the annual inspection, or recommendations for corrections may be verified later with the contractor operations lead. Inspectors will not record annual inspection observations in the site record books, but the chief inspector will make a note in each record book indicating the date and time of the inspection.

**H2.2.1.3 Repository Inspection**

Relevant observations will be recorded for the repository in Part III of the checklist.

**Access area:** Inspect the access area to ensure that signs at the site entrance gate are legible and that the information is current. Note the condition of the field office facilities, and discuss planned maintenance with the contractor operations lead. Inspect the TSF, noting the condition of the fence and gates, the condition of the exterior of the bin and other containers, any potential maintenance issues, the adequacy of Safety and Health postings, and any evidence of trespass or vandalism. Note any evidence of spills from containers or the bin. Note the materials stored and approximate volume of contents in the bin. In Five-Year Review inspections, open the bin for visual inspection; during other years, the contractor operations lead may report on the contents and condition of the bin.
Repository perimeter: Monitor the site perimeter, transects (shown on Figure H-1 in Section H4.0) and features listed on Part III.B of the checklist for evidence of disturbance or maintenance issues including the condition of:

- Onsite perimeter roads, noting any areas that are inaccessible or require maintenance.
- Fences, gates, and locks, noting any areas of damage or vandalism and whether or not the fence, gate, or lock is still functional.
- Permanent site-surveillance features (survey monuments, boundary markers, and perimeter signs), noting any damaged or illegible features.
- Site vegetation, noting obvious infestations of noxious weeds or sparse vegetation that may contribute to erosion.
- Soil surfaces, looking for evidence of significant sedimentation or erosion; compare with previous years’ inspection results and note any significant changes in erosion features.
- Offsite portion of drainage/runoff ditches, noting any areas of excessive vegetation growth that could impede flows, erosion/headcutting, sedimentation, or degradation of rock armor.
- Evidence of any type of disturbance on property MP-01081 (South), which is located adjacent to the southeast corner of the repository (shown on Figure H-3 in Section H4.0).

During inspection of the repository perimeter, note any evidence of land use changes on adjoining properties (also verify with the contractor operations lead), trespass, or vandalism.

Repository runoff/run-on controls: Monitor the North and East Toe Drains and the South and West Drain Ditches for evidence of settlement, material degradation, erosion rills or gullies, siltation, obstructions, excessive vegetation that could impede the function of the controls, or other items that could pose a concern for the drains and ditches.

Pond 4: Monitor the condition of features associated with Pond 4 (listed in Part III.D of the checklist) for conditions that require maintenance or corrective action. Describe animal burrows that could affect the integrity of the berm including burrows with large amounts of castings to indicate a large, deep burrow or burrows located adjacent to the pond liner. Monitor for signs of seepage or significant erosion rills on the berm.

Repository cover inspection: Monitor the disposal cell for evidence of the following, which may indicate a need for maintenance or corrective action:

- Structural instability due to differential settlement, subsidence, cracking, sliding, or creep
- Erosion as evidenced by rills or gullies
- Sedimentation or debris
- Rapid deterioration of rock cover caused by weathering or erosion
- Removal of rock or soils from the disposal cell
- Seepage, ponding, or vegetation (phreatophytes) that indicate high moisture levels
- Human or animal intrusion, including animal burrows
• Vandalism
• Wildlife trail development
• Maintenance needed on roads accessing the repository cover and Pond 4, noting any areas that are inaccessible or require maintenance

Inspect the cover vegetation and complete the Repository Cover Vegetation Index form at the end of the inspection checklist, noting any areas of concern on the inspection map. The two site monuments will be inspected for evidence of damage, degradation, or vandalism to the monuments or their concrete bases.

**Cover penetrations:** Manholes 1 and 3 contain Leachate Collection and Removal System (LCRS) and Leak Detection System (LDS) access. Equipment within Manholes 1 and 3, and equipment associated with the large lysimeter located within the eastern portion of the repository, is monitored and maintained by the contractor operations lead and through System Operation and Analysis at Remote Sites (SOARS). During annual inspections, inspect the surface features of Manholes 1 through 5 and the LCR video port covers for evidence of vandalism, trespass, damage, or leakage. Also inspect the surface and inner plates of nine settlement monuments on the repository cover for signs of damage. Interview the contractor operations lead to report any anomalies or other observations associated with the LCRS and LDS for the repository and Pond 4 during the past year. During Five-Year Review inspections, inspect the interior areas of Manholes 1 and 3 without entering the manholes. The settlement plates will be surveyed every 5 years in preparation for the Five-Year Reviews. The surveys do not coincide with the annual inspection, and results are not included in the annual inspection report. They are reported in the quarterly FFA reports. Inspect surface components of the lysimeter for evidence of seepage, vandalism, or damage.

**H2.2.1.4 City-Owned Properties Inspection**

The annual inspection includes verifying restrictions related to the transfer of properties from DOE to the City of Monticello and ICs related to maintaining the MMTS remedy. The restrictions are listed in Part IV.A of the checklist. Inspect the properties for physical evidence that any of the restrictions have been violated during the past year (e.g., presence of unpermitted water wells, fire rings, or areas where soils may have been removed). Note the condition of any areas that were identified for monitoring during previous annual inspections. Note any new areas to be monitored on the current year’s inspection drawings and describe them on the checklist. At City-owned property MP-00211, note any evidence of recent excavation or construction; if found, interview the contractor operations lead for additional information to explain any findings. Note the condition of access roads, signs, or fencing as applicable to report to the City of Monticello for maintenance.

**H2.2.1.5 Montezuma Creek Soil and Sediment Properties**

Montezuma Creek soil and sediment properties (located in the Montezuma Creek Restrictive Easement Area shown on Figure H-3 in Section H4.0) are inspected by the contractor operations lead on a routine basis. The inspections are done to ensure that no habitual structures have been built and that soils have not been removed from the restricted areas of properties adjacent to Montezuma Creek. The contractor operations lead also inspects for significant erosion in these areas. During the annual inspection, the condition of these properties will be determined through
interviews with the contractor operations lead, or an examination of site record books, or both. The properties will be visited by the inspection team during the annual inspection if it is a Five-Year Review inspection or if the contractor operations lead has reported any conditions that require further documentation.

**H2.2.1.6 Groundwater Management Area**

In conjunction with the annual inspection, but not necessarily during the inspection, contact the State Engineer’s office to obtain information regarding well permit or water appropriation applications within the groundwater restricted area during the past year or those that are pending. Summarize this information on Parts I and VI of the checklist. Prepare a phone or email record documenting the conversation with the State Engineer; this record may be used as an attachment to the annual inspection report.

The remainder of Part VI of the checklist will be completed after interviewing the contractor operations lead. If any wells have been permitted or water has been appropriated within the restricted area, follow-up investigations may be necessary to ensure that the wells were installed or water was appropriated in compliance with LM’s groundwater management policy. Inform the contractor site lead that a follow-up investigation may be needed.

**H2.2.1.7 OU III Monitoring Wells and Water Treatment Systems**

Components associated with OU III, including inactive wells, are monitored and maintained twice annually by water sampling teams. Damage to any wells observed during the annual inspection will be reported to the contractor site lead and included in the inspection report. The groundwater remedy optimization (GRO) system is continuously monitored and maintained by onsite personnel. Inspect major features of the GRO system (i.e., extraction well field, transfer building, pipeline access road, and components related to Pond 4) during City-owned properties and repository inspections, and report damage to any components of the system to the contractor operations lead.

**H2.2.1.8 MVP Field Inspection**

The contractor operations lead will direct inspectors to the location of any open excavations or areas where excavations have occurred during the past year. The contractor operations lead is made aware of excavations through regular contact with the City of Monticello and through routine inspections. The contractor operations lead will report any issues encountered during the past year and the location of any radioactive material encountered during excavations to inspectors. Inspectors will record observations and information from the contractor operations lead on Part VIII.A of the checklist.

Inspectors will record observations related to Utah Department of Transportation (UDOT) highway excavations on Part VIII.B of the checklist. Inspect the Highway 191 embankment at the west edge of the mill site for evidence of significant erosion; compare conditions to those described in the previous year’s inspection report. Verify results of radiological scans, if performed, with the contractor operations lead.
Private property MP-00176 (shown on Figure H-3 in Section H4.0) contains supplemental standards areas that are managed through zoning restrictions (this is an IC shared with City property MP-00211 that is verified in Part II.8 of the checklist). During the annual inspection, inspect the property from the road for evidence of unmonitored excavations or for other conditions that could indicate violation of the IC. The contractor operations lead monitors sediment from the property for radiological contamination and records any elevated areas. Verify any observations with the contractor operations lead.

**H2.2.2 Photographs**

Inspection team members will use photographs to document observations during the annual inspection. A representative photograph will be taken to record the condition of each type of feature inspected (e.g., the inspector will not take a photograph of every perimeter sign but instead a photograph of a representative sign). Inspectors will also photograph any issue or site condition encountered during the inspection that will be reported (e.g., a damaged or illegible perimeter sign, or evidence of prairie dog activity on the repository cell cover). The location of each photograph will be recorded on the site inspection maps; a point will indicate the location of the photograph, and an arrow will indicate its azimuth. Unless it is self-explanatory on the map, inspectors will note a brief caption for each photograph on the checklist.

**H2.2.3 Field Maps**

Inspectors will record relevant observations and the location of photographs on field maps that will be provided by the chief inspector at the beginning of the inspection. Field maps are based on the maps shown in Section H4.0 but are updated after each annual inspection to reflect new information. Each field inspector will print their name and date on their copy of the field map and sign the map. The chief inspector will use the signed maps to prepare the annual inspection report.

**H2.3 Concluding the Inspection**

At the conclusion of the annual inspection, the team will meet briefly to discuss findings, collect annotated checklists, maps, and field notes; and check for any outstanding items that need to be resolved before concluding the annual inspection.

**H3.0 Reporting**

Annual inspection reports provide site status to stakeholders and allow LM to evaluate the effectiveness of LTS&M activities on a more frequent basis than CERCLA Five-Year Reviews. One annual inspection report is completed for the combined MMTS and MVP. This report is due to EPA and UDEQ by December 31 of each calendar year and is posted on the LM website for availability to the public.
The annual inspection report will conform to guidelines for annual reporting of LM sites and contain:

- A brief summary of the site history, properties, ICs, and LTS&M activities to ensure that the report is an easily understood stand-alone document.
- A summary of the inspection scope, participants, and schedule.
- Inspection results, with a section for each part of the annual inspection checklist (Section H5.0).
- A section containing conclusions and recommendations.
- Photographs of selected features with azimuths shown on report figures (maps).
- Updated site maps.
- The completed annual inspection checklist.

OU III groundwater quality data are reported separately from the annual inspection. Inspection and monitoring of OU III components are not included in the annual inspection except as described in Section H2.0.

Annotated field maps, inspection checklists, field notes, and the signed JSA will be submitted to Records Management when the draft report is submitted. Photo logs and electronic copies of photographs not used in the report will also be retained as records.

**H4.0 Inspection Maps**
Figure H-1. Monticello, Utah, Repository Base Map
Figure H-2. Monticello, Utah, Supplemental Standards Areas
Figure H-3. Monticello, Utah, MVP and MMTS Supplemental Standards and Groundwater Restricted Areas
H5.0 Annual Inspection Checklist

| MMTS: Monticello Mill Tailings (DOE) Site; Operable Units I, II, and III (UT 3890090035) |
| MVP: Monticello Radioactively Contaminated Properties (Monticello Vicinity Properties) (UTD 980667208) |
| Location: Monticello, Utah: EPA Region 8 |

Annual Inspection Preparation:

The following tasks were completed in preparation for the current MMTS and MVP annual inspection:

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<thead>
<tr>
<th>Task</th>
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<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review annual inspection requirements in the LTS&amp;M Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review additional requirements for Five-Year Review inspections when applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule site inspection, appoint chief and assistant inspectors, and assign SMEs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review previous reports and records as applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Provide team members with background information, maps, and inspection checklists
Prepare a Job Safety Analysis (JSA) and other required Safety and Health documents
Notify EPA and UDEQ at least 2 weeks prior to site visit and invite them to participate
Notify representatives from other agencies as necessary and invite them to participate
Verify names and telephone numbers of parties with access or notification agreements
Contact State Engineer’s office for water well permit applications in/near groundwater management area

Date(s) of Annual Inspection: ____________

Inspection Team Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Phone Number</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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Note: Attach additional sheets as needed for any of the following sections.
## I. Interviews

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<tr>
<td>Contractor Operations Lead</td>
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<td>State Engineer</td>
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Notes:
## II. Administrative and Records Inspection

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<td>Administrative Record, OU III Administrative Record, and Information Repository collections</td>
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<table>
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<tr>
<th>2. LTS&amp;M Training Records for access to radiologically controlled areas</th>
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<tr>
<td>Onsite employees</td>
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<td>All City workers were escorted</td>
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<th>3. Record Books</th>
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<td>Record book entries/documentation</td>
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<td>City-owned Properties record book</td>
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<tr>
<td>Private Property Restricted Areas record book</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Public Roads and Utilities record book</td>
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<td>Documentation/recordkeeping requirements met</td>
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<td>Information readily traced to updated drawings</td>
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<td>Rad scan info for eroded/excavated material</td>
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<th>6. Surveillance Checklists and Records</th>
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<tbody>
<tr>
<td>TSF Access/Security Logs</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Meteorological Monitoring Data, Monthly and Quarterly Repository Surveillance Checklists, and Monthly Pond 4 Surveillance Checklists</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. Agreements (verify on 5-Year Review inspections only)</th>
<th>Readily Available</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE/City Cooperative Agreement (verify current with Environmental Compliance)</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. Zoning Restriction—Overlay Zone OL-1 (verify on 5-Year inspections only)</th>
<th>Readily Available</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction is verified as current through City for property MP-00211-VL</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Restriction is verified as current through City for property MP-00176-VL</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
9. Deed Restrictions (verify at San Juan County Recorder’s Office, 117 S. Main)

Properties Transferred from DOE to City of Monticello  

<table>
<thead>
<tr>
<th>DOE ID</th>
<th>Parcel</th>
<th>Document</th>
<th>Book</th>
<th>Page</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-00181-OT</td>
<td>A33230367201</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>33S23E367204</td>
<td>electronic record</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-00391-VL</td>
<td>A3324E316001</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-00893-OT</td>
<td>A3324E315400</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-01040-VL(N)</td>
<td>A3424E061200</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>34S24E061201</td>
<td>electronic record</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-01041-VL</td>
<td>A3424E060600</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-01042-VL</td>
<td>A3424E060000</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP-01077-VL</td>
<td>A3324E318400</td>
<td>E061691</td>
<td>B788</td>
<td>100-113</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Correction to quitclaim deed for properties transferred to City recorded as E062130, B789, P450-452 (applies to all of the above listed properties).

Properties Sold by DOE to Private Party  

<table>
<thead>
<tr>
<th>DOE ID</th>
<th>Parcel</th>
<th>Document</th>
<th>Book</th>
<th>Page</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-01081-VL(N)</td>
<td>A34S24E</td>
<td>114283</td>
<td>933</td>
<td>105-111</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Montezuma Creek Soil and Sediment Properties  

<table>
<thead>
<tr>
<th>DOE ID</th>
<th>Parcel</th>
<th>Document</th>
<th>Book</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-00990-CS</td>
<td>33S24E324800</td>
<td>E063343</td>
<td>B793</td>
<td>831-852</td>
</tr>
<tr>
<td></td>
<td>33S24E328400</td>
<td>E063343</td>
<td>B921</td>
<td>474-476</td>
</tr>
<tr>
<td></td>
<td>33S24E324802</td>
<td>E063343</td>
<td>B921</td>
<td>474-476</td>
</tr>
<tr>
<td></td>
<td>A33240324802</td>
<td>E063343</td>
<td>B921</td>
<td>474-476</td>
</tr>
<tr>
<td></td>
<td>A33240324804</td>
<td>E063343</td>
<td>B921</td>
<td>474-476</td>
</tr>
<tr>
<td>MG-01033-VL</td>
<td>34S24E050000</td>
<td>E063343</td>
<td>B793</td>
<td>831-852</td>
</tr>
<tr>
<td></td>
<td>34S24E050601</td>
<td>E063343</td>
<td>B793</td>
<td>831-852</td>
</tr>
<tr>
<td>MS-01026-VL</td>
<td>34S24E043000</td>
<td>E063343</td>
<td>B793</td>
<td>831-852</td>
</tr>
<tr>
<td>MS-01027-VL</td>
<td>34S24E042400</td>
<td>E063343</td>
<td>B793</td>
<td>831-852</td>
</tr>
<tr>
<td>MG-01030-VL</td>
<td>34S24E047200</td>
<td>E063255</td>
<td>B793</td>
<td>526-538</td>
</tr>
<tr>
<td>MG-01029-VL</td>
<td>34S24E040000</td>
<td>E063255</td>
<td>B793</td>
<td>390-404</td>
</tr>
<tr>
<td>MP-00951-VL</td>
<td>33S24E317200</td>
<td>E063926</td>
<td>B796</td>
<td>188-202</td>
</tr>
<tr>
<td></td>
<td>33S24E317204</td>
<td>E063926</td>
<td>B796</td>
<td>188-202</td>
</tr>
</tbody>
</table>

Note: Correction to warranty deed for MP-01026-VL recorded as E073394, B830, P611.

Utah Department of Transportation Properties  

<table>
<thead>
<tr>
<th>DOE ID</th>
<th>Parcel</th>
<th>Document</th>
<th>Book</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-00895-OT</td>
<td>A33230367811</td>
<td>E068703</td>
<td>B814</td>
<td>533</td>
</tr>
<tr>
<td></td>
<td>A33230367825</td>
<td>electronic record</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-00892-OT</td>
<td>A33230367202</td>
<td>E068704</td>
<td>B814</td>
<td>534</td>
</tr>
<tr>
<td>MS-01021-OT</td>
<td>A33230367812</td>
<td>E068705</td>
<td>B814</td>
<td>535-536</td>
</tr>
<tr>
<td>MS-01020-OT</td>
<td>A33230369001</td>
<td>E068706</td>
<td>B814</td>
<td>537-538</td>
</tr>
</tbody>
</table>

Notes for deed restriction inspection:

Property MP-00181 has an error: the access agreement shows a well, but the well is on MP-00179.

(Note: New parcel numbers, if any, will be added to the checklist for future inspection years.)
### III. Repository Inspection

#### A. Access Area

<table>
<thead>
<tr>
<th>Description</th>
<th>Satisfactory</th>
<th>Repairs/Maintenance Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Access Sign/Emergency Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Storage Facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bin cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate volume of bin contents (cubic yards)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and Health/rad postings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drums and secondary containment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vandalism/trespassing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Describe access area repairs/maintenance needed:

#### B. Repository Perimeter *(Note locations of erosion, noxious weeds, vandalism, or excessive vegetation on map)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Satisfactory</th>
<th>Repairs/Maintenance Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Fencing and Gates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs (Note condition of the 40 numbered reference signs and posts.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs damaged but legible, requiring monitoring: ________________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signs requiring replacement: ______________________________________________________________________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Boundary Markers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion/Gullying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land use changes on adjoining property</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of disturbance on property MP-01081 (South)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vandalism/trespassing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for condition of repository perimeter (e.g., repairs needed, erosion areas, vandalism):

#### C. Repository Runoff/Run-On Controls *(North and East Toe Drains; South and West Drain Ditches)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Not evident</th>
<th>Evident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settlement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Degradation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion/gullies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siltation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive Vegetation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for condition of repository runoff and run-on controls *(locate all areas of concern on map.):*
### D. Pond 4 (Note: Locate all areas of concern on map.)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter Fence and Access Gate</td>
<td></td>
</tr>
<tr>
<td>Safety Equipment</td>
<td></td>
</tr>
<tr>
<td>Pond 4 LCRS and LDS Electrical Housing/Surface Installations</td>
<td></td>
</tr>
<tr>
<td>Liner—Holes/Cracks/Tears</td>
<td></td>
</tr>
<tr>
<td>Siltation and Vegetation in Pond 4</td>
<td></td>
</tr>
<tr>
<td>Pond 4 Water Level</td>
<td></td>
</tr>
<tr>
<td>Vandalism</td>
<td></td>
</tr>
</tbody>
</table>

**Notes for condition of Pond 4 features:**

### E. Repository Cover Inspection

<table>
<thead>
<tr>
<th>Feature</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Perimeter Road and Road to Pond 4</td>
<td></td>
</tr>
<tr>
<td>Interior Wildlife Fence and Wildlife Gates</td>
<td></td>
</tr>
<tr>
<td>Cover Vegetation</td>
<td></td>
</tr>
<tr>
<td>Rip-Rap Armoring</td>
<td></td>
</tr>
<tr>
<td>Settlement/Desiccation/Erosion/Gullies</td>
<td></td>
</tr>
<tr>
<td>Holes/Burrows/Biointrusion</td>
<td></td>
</tr>
<tr>
<td>Seepage/Ponding</td>
<td></td>
</tr>
<tr>
<td>Site Monument at apex of cover</td>
<td></td>
</tr>
<tr>
<td>Site Monument at boundary gate</td>
<td></td>
</tr>
</tbody>
</table>

**Notes for repository cover inspection:**
### F. Cover Penetrations (Caution: confined space entry requirements in effect for all manholes)

<table>
<thead>
<tr>
<th>1. Manholes 1 and 3 (LCRS and LDS access vaults)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers secure and operable</td>
</tr>
<tr>
<td>Exterior pump access ports are undamaged</td>
</tr>
<tr>
<td>Evidence of leakage into vaults</td>
</tr>
<tr>
<td>Evidence of drainage through cover penetrations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Manholes 2, 4, and 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers secure and operable</td>
</tr>
<tr>
<td>Evidence of drainage through cover penetrations</td>
</tr>
</tbody>
</table>

Notes for condition of manholes (include condition of telemetry equipment and appropriateness of Safety and Health postings):

<table>
<thead>
<tr>
<th>3. LCR Video Ports (check covers only; ports are inoperable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covers secure and operable</td>
</tr>
<tr>
<td>Evidence of drainage through cover penetrations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Settlement Monuments (A to I) (Note: Plates surveyed during 5-year review inspections only.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface completions undamaged</td>
</tr>
<tr>
<td>Inner plates undamaged</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Embedded Lysimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of seepage at outlet</td>
</tr>
<tr>
<td>Instrumentation installations undamaged</td>
</tr>
<tr>
<td>Evidence of drainage along cover penetrations</td>
</tr>
<tr>
<td>Telemetry surface installations in good condition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Operation of Repository and Pond 4 LCRS and LDS (interview onsite LM operator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumping rates are reported in quarterly Federal Facility Agreement reports to EPA and UDEQ. Reports are available in SOARS.</td>
</tr>
<tr>
<td>Note any anomalies or other observations reported by the LM operator:</td>
</tr>
</tbody>
</table>

Notes for cover penetrations inspection and operation of LCRS/LDS:
### IV. City-Owned Properties Inspection

#### A. City-Owned Properties Transferred from DOE

<table>
<thead>
<tr>
<th>Property</th>
<th>181</th>
<th>391</th>
<th>893</th>
<th>1040</th>
<th>1041</th>
<th>1042</th>
<th>1077</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible to public</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Evidence of camping</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Habitable structure(s)</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Gullies/erosion</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Runoff/drainage controls intact and in good repair (ditches, riprap structures, dams, check dams, berms)</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Land use changes</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Evidence of vandalism</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Soil removal evident</td>
<td>n/a</td>
<td>Y</td>
<td>n/a</td>
<td>n/a</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Water well installation</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Wetland/creek damage</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Supp. Stds. fence intact</td>
<td>n/a</td>
<td>Y</td>
<td>n/a</td>
<td>n/a</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Describe any violations of institutional controls and/or repair/maintenance issues (locate on map):

#### B. City-Owned Property MP-00211

<table>
<thead>
<tr>
<th>Evidence of excavation or construction</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, confirm the following the onsite contractor operations lead:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In accordance with Monticello zoning district Overlay Zone (OL-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violation has been reported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiological contamination was encountered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiological contamination was appropriately managed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrective action required</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for City-owned property MP-00211 inspection:

#### V. Montezuma Creek Soil and Sediment Properties

<table>
<thead>
<tr>
<th>Evidence of habitable structures within the restricted area</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of soil removal from the restricted area</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Land use/ownership has changed*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Land owners are aware of use restrictions*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Violations have been reported*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Corrective action required</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes for Soil and Sediment Properties inspection:

* Confirm with onsite contractor operations lead.
## VI. Groundwater Management Area

<table>
<thead>
<tr>
<th>Evidence of water well installation within the restricted area*</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>No permits for water well installation within the restricted area</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Violations have been reported*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Land ownership has changed*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Landowners are aware of water use restriction*</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Corrective action required</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Confirm with onsite contractor operations lead*

## VII. OU III Monitoring Wells and Water Treatment Systems

### A. Monitoring well surface completions
(Note: Active wells are inspected and maintained biannually during sampling events. Observations on inactive wells are reported to the sampling team.)

<table>
<thead>
<tr>
<th>Outer casing or flush mount vault of inactive wells intact</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells are locked/flush mount well lids secured</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for inactive monitoring well inspection (note location of any maintenance issues on map):

## VIII. MVP Field Inspection

### A. City Streets and Utilities

<table>
<thead>
<tr>
<th>Roads/Utilities under Construction</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmonitored excavations observed during inspection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned excavations are identified by onsite contractor operations lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiological material is properly controlled and managed</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

Notes for City streets and utilities inspection:

### B. UDOT Highways 191 and 491 Rights-of-Way

#### 1. Roads under Construction

<table>
<thead>
<tr>
<th>Unmonitored excavations observed during inspection</th>
<th>Y</th>
<th>N</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned excavations are identified by onsite contractor operations lead</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiological material is properly controlled and managed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes for UDOT highways inspection:
## 2. Erosion (highway shoulders and Highway 191 embankment at Montezuma Creek)

- [ ] New erosion evident
- [ ] Previous erosion evident; unchanged
- [ ] No erosion evident

Eroded material scanned for radiological contamination and properly managed
- [ ] Yes
- [ ] No
- [ ] N/A

Describe erosion noted on UDOT highways:

## C. Property MS-00176

(Note: Observations and activities for MS-00176 are recorded by the onsite contractor operations lead in the Private Properties Restricted Areas record book.)

*Monticello zoning district Overlay Zone (OL-1) requires radiological scanning of the footprint of new habitable structures. Radiologically contaminated material is removed under the direction of the onsite contractor operations lead.*

| Unmonitored excavations observed during inspection | [ ] [ ] |
| Planned excavations are identified by onsite contractor operations lead | [ ] [ ] |
| Site conditions indicate ICs properly implemented | [ ] [ ] |

Notes for Property MS-00176 inspection:

Record the photographs taken during the annual inspection, including the location on map(s), azimuth, and a brief description of the feature(s) photographed.
Repository Cover Vegetation Index
Monticello, Utah

Date inspected: ___________    Inspected by:  ______________________________________________________

Dominant species present on the repository cover at time of inspection (Note: Dominant species make up
an estimated 10% or more of the vegetative cover.):

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Growth Form</th>
<th>Life Cycle</th>
<th>Vegetation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shrub</td>
<td>Annual</td>
<td>Native</td>
</tr>
<tr>
<td></td>
<td>Grass</td>
<td>Perennial</td>
<td>Weedy</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

Less common species present on repository cover:
__________________________________________________________
__________________________________________________________
__________________________________________________________

Noxious weed species present (record locations on map or GPS):
__________________________________________________________
__________________________________________________________
__________________________________________________________

Additional notes:
__________________________________________________________
__________________________________________________________
__________________________________________________________

Vegetation Condition Score (see reverse):  ____________

Notes:
(Has the composition of vegetation changed, including plant diversity? If so, how? Describe any evidence
of vegetation disturbance or relevant climate factors. If the vegetation score is less than 3.0, provide
explanation, or recommendations, or both.)
## Condition of Vegetative Cover (indicate number in each row that best represents current conditions):

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition of Plant Cover (estimated visually)</td>
<td>Annual weeds dominant; nonweedy perennial species &lt;20% of total cover</td>
<td>Annual weeds abundant and expanding; nonweedy perennial species 20%–40% of total cover</td>
<td>Annual weeds present and expanding; nonweedy perennial species 40%–60% of total cover</td>
<td>Some weeds present; nonweedy perennial species 60%–80% of total cover</td>
<td>No obvious weeds; nonweedy perennial species exceeding 80% of total cover</td>
</tr>
<tr>
<td>Total Plant Cover (visual estimate)</td>
<td>Canopy cover less than 30%</td>
<td>Canopy cover 30%–50%</td>
<td>Canopy cover 50%–70%</td>
<td>Canopy cover 70%–90%</td>
<td>Canopy cover over 90%</td>
</tr>
<tr>
<td>Bare Soil</td>
<td>Mostly bare soil</td>
<td>Large areas of bare soil</td>
<td>Moderate areas of bare soil</td>
<td>Few areas of bare soil</td>
<td>No obvious areas of bare soil</td>
</tr>
<tr>
<td>Diversity of Dominant Species</td>
<td>One species dominant across site</td>
<td>2–3 species dominant across site, one or both of which are weedy; species occur in patches</td>
<td>2–3 species dominant across site, both of which are nonweedy; species evenly distributed with some monoculture patches</td>
<td>More than 3 species dominant across site, at least 2 of which are nonweedy perennials; few patches of monocultures</td>
<td>More than 4 nonweedy perennial species dominant across site; few to no patches of monocultures</td>
</tr>
<tr>
<td>Diversity of Trace Species</td>
<td>0–1 nonweedy trace species observed on cover</td>
<td>2 nonweedy trace species observed</td>
<td>3–4 nonweedy trace species observed</td>
<td>5–6 nonweedy trace species observed</td>
<td>7 or more nonweedy trace species observed</td>
</tr>
<tr>
<td>Plant Residue</td>
<td>No plant residue on soil surface</td>
<td>1%–10% of soil surface covered with plant residue</td>
<td>10%–20% of soil surface covered with plant residue</td>
<td>20%–30% of soil surface covered with plant residue</td>
<td>30%–70% plant residue on soil surface</td>
</tr>
<tr>
<td>Standing Dead Vegetation (visual estimate)</td>
<td>Standing dead &gt;25%</td>
<td>Standing dead 15%–25%</td>
<td>Standing dead 5%–15%</td>
<td>Standing dead &lt;5%</td>
<td>No obvious standing dead</td>
</tr>
<tr>
<td>Erosion</td>
<td>Sheet erosion visible; rills/gullies present or blowouts or dunes forming</td>
<td>Sheet erosion visible; some small rills present or soil swept from onsite causing burial or abrasion of vegetation</td>
<td>Sheet erosion not obvious; no visible rills or rills stabilized or soil swept from offsite causing burial or abrasion</td>
<td>No obvious sheet erosion; rills not present or fully stabilized or some soil deposition from off site without burial or abrasion</td>
<td>No visible signs of current or past sheet or wind erosion</td>
</tr>
<tr>
<td>Disturbance</td>
<td>Evidence of mass disturbance to several species of vegetation (fire, animal damage, etc.)</td>
<td>Evidence of some disturbance to several species of vegetation or major disturbance to one species</td>
<td>Evidence of minor disturbance to one or two species of vegetation; localized to individual patches</td>
<td>Evidence of minor damage to individual plants only; disturbance not sitewide</td>
<td>No evidence of disturbance to any plant species or individual plants</td>
</tr>
</tbody>
</table>

**Add up all columns for total condition score:**

\[
\text{Total} = (\text{Column 1} \times 1) + (\text{Column 2} \times 2) + (\text{Column 3} \times 3) + (\text{Column 4} \times 4) + (\text{Column 5} \times 5)
\]

**Divide total by 9 to calculate vegetative cover condition score =**