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Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites

U.S. Department of Energy

Office of Legacy Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
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Work Performed by S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

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Glossary

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

Administrative Record—A hard copy file available for public inspection that contains documents that form the basis of a response action. The 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.

Asbestos—A silicate mineral that is harmful to human health and is specifically defined and regulated under the Toxic Substances Control Act.

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.

Biological Technical Assistance Group—An advisory group consisting of representatives from the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency (EPA), the Utah Department of Environmental Quality, and DOE. This group evaluates and makes technical recommendations concerning the Monticello ecosystem.

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

CERCLA 5-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; LM staff member (other than the on-site Monticello LM Representative).

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 Monticello LM Project Manager—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.

Controlled distribution document—Any document for which distribution and status are to be kept current by the issuer to ensure that authorized holders and users of the document have available the most up-to-date version.

Delta Scintillometer—The EL0018B delta-gamma scintillometer. The instrument measures gamma activity in units of counts per second (cps), which may be converted to equivalent picocuries per gram (pCi/g) Ra-226 by using a conversion factor specific to the instrument. 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 one cubic yard.

DOE-LM Monticello Project Manager—A DOE-LM employee assigned the overall responsibility for managing the Monticello project.

DOT radioactive material (DOT-RAM)—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 Bq/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.

EPA standard—The EPA "Radium in Soil Standard" in Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192) states that the Ra-226 concentration in soil shall not exceed 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. As a conservative approach, only the 5 pCi/g surface standard will be applied during LTS&M activities. Normal background in the Monticello area is 1.0 pCi/g, making the standard 6.0 pCi/g.

Field Office—The building location in Monticello, Utah, of the office for the Monticello LM Representative and the Administrative Record and Information Repository record collections. The address of this office is 7031 South Highway 191, 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).

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 5-year review and write the CERCLA 5-year review report. The contractor Monticello LM Project Manager selects the team with concurrence of the DOE-LM Monticello Project Manager.

Gamma scintillometer—An Eberline Model E-600 ratemeter 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 that may be converted to microroentgens per hour (μR/h).

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—A 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 collection is located at the DOE-LM office in Grand Junction, Colorado. A duplicate copy is maintained 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 ground water 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.

Low specific activity (LSA)—LSA material is defined by DOT to include several distinct categories. For this document the DOT definition of LSA-1 [49 CFR 173.403, (I) and (iv)] is used. LSA definition (I) is: "Ores containing only naturally occurring radionuclides (e.g., uranium, thorium) and uranium or thorium concentrates of such ores." LSA definition (iv) is "Mill tailings, contaminated earth, concrete, rubble, other debris and activated material in which the Class 7 (radioactive material) is essentially uniformly distributed and the average specific activity does not exceed 10^{-6}A2/g." The A2 value is obtained from 49 CFR 173.435 and refers to the maximum activity (in becquerels) allowed in a certain type of packaging.

LM—See Office of Legacy Management

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. The collection is stored at the DOE-LM office in Grand Junction, Colorado, pending records disposition schedules or transfer to a federal records center.

LM Records Coordinator—A designated member of the Grand Junction Records Operations staff who maintains the active LM site records by bar-coding, filing, record research, and record check out/in.

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.

LM Site File Plan—A revisable document that defines project records, file organization, records coordinators, file locations, and file transfer instructions. The LM 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 LM Representative—Monticello, Utah, based contractor employee residing in the Monticello area and on call 24 hours a day, 7 days a week. A backup person is available to perform the duties required of the representative 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 ground water. 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 ground water system are expected to restore ground water 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 ground water. The Monticello permeable reactive barrier contains zero-valent iron as the reactive medium to treat the primary ground water contaminants, which are arsenic, molybdenum, selenium, uranium, and vanadium.

Photographic material—Digital camera images stored on a computer disc (CD) or compact disc, or 35-mm negatives from 35-mm print camera images that are suitable for photographic records; self-developing film shall not be used for record material.

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.

Polychlorinated biphenyl (PCB)—Any of several 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 property is identified as MS–00176–VL.

Protectiveness statement—A statement in the CERCLA 5-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 Ra-226 concentrations exceeding 130 pCi/g is used, handled, or stored.

Radiological as-built—Engineering drawings, located in the Monticello LM Representative'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 and who must be qualified in accordance with the applicable *Radiation Protection Program Plan* (DOE 2003b).

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 Ra-226 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 LM Representative 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 millsite, 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—A computer-based information management system that provides data on record responsibility, location, storage, access, and disposition and record retrieval capabilities through application of bar code technology.

Reportable quantity—Quantity of material defined in Table 1, Appendix A, of 49 CFR 172.101 and referenced under 40 CFR 302.4, that if released must be reported to EPA.

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.

End of current text

Acronyms

AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CoC	contaminants of concern
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DOT-RAM	U.S. Department of Transportation-radioactive material
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
FY	fiscal year
GJO	Grand Junction Office
GWRA	ground water restricted area
HDPE	high density polyethylene
IR	Information Repository
JSA	job safety analysis
LCRS	Leachate Collection and Removal System
LDS	Leak Detection System
LM	U.S. DOE Office of Legacy Management
LSA	low specific activity
LTS&M	Long-Term Surveillance and Maintenance
MMTS	Monticello Mill Tailings Site
MOU	Memorandum of Understanding
MRAP	Monticello Remedial Action Project
MVP	Monticello Vicinity Properties
NPL	National Priorities List
OU	Operable Unit
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PRB	permeable reactive barrier
QA	quality assurance
Ra-226	radium-226
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
ROD	record of decision
RW II	Radiological Worker II (Training)
RWP	radiological work permit
SARA	Superfund Amendments and Reauthorization Act
SFMP	Surplus Facilities Management Program
SOARS	System Operations and Analysis at Remote Sites (DOE-LM remote monitoring project)
SWP	safe work permit
TSF	Temporary Storage Facility

UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UMT	uranium mill tailings
UMTRCA	Uranium Mill Tailings Radioactive Control Act

Units of Measure Abbreviations

Bq	becquerel
Bq/g	becquerel per gram
cm	centimeter
cm^2	square centimeter
cpm	counts per minute
cps	counts per second
dpm	disintegrations per minute
dpm/cm^2	disintegrations per minute per square centimeter
ft	feet
gpad	gallons per acre per day
gpd	gallons per day
m^2	square meter(s)
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mm	millimeter(s)
mrem/h	millirem per hour
ppm	parts per million
pCi/g	picocuries per gram
pCi/L	picocuries per liter
µg/L	micrograms per liter
µL	microliters
µR/h	microroentgens per hour

Executive Summary

Radioactively contaminated properties at the National Priorities List (NPL) sites (Monticello Mill Tailings Site and Monticello Vicinity Properties), located in and near Monticello, Utah, have been remediated by the U.S. Department of Energy (DOE) in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986. In October of 2001, long-term surveillance and maintenance (LTS&M) activities were initiated because contamination remains in the on-site disposal cell, in the soil at other locations where supplemental standards have been applied, and in ground water and surface water.

DOE Office of Legacy Management will conduct LTS&M activities, with oversight by the U.S. Environmental Protection Agency Region VIII and the Utah Department of Environmental Quality, to ensure that the selected remedies remain protective of human health and the environment. LTS&M activities at the Monticello NPL sites are applicable to

- Routine inspection, operation, and maintenance of the on-site permanent disposal cell and associated leachate detection and management system,
- Routine inspection of all properties affected by land and water use restrictions (institutional controls) that were implemented to prevent exposure to residual contamination in soil and ground water,
- Radiological monitoring of earthwork beneath city streets and utility corridors and management of recovered radiologically contaminated material,
- Semi-annual monitoring of ground water and surface water and annual evaluation and reporting of the progress of water quality restoration,
- Annual site inspections, and
- CERCLA 5-year reviews (begun in 1997) to monitor and document the effectiveness of the selected remedies.

This LTS&M Plan, an update and consolidation of previous long-term stewardship plans for the Monticello sites, identifies the activities, procedures, contingency response actions, and reporting/documentation requirements for long-term management of the repository and contamination left in place at the sites.

End of current text

1.0 Basis and Regulatory Requirements

This Long-Term Surveillance and Maintenance (LTS&M) Plan identifies those activities, and the detailed implementation procedures for those activities, that the U.S. Department of Energy Office of Legacy Management (DOE-LM) [formerly the Grand Junction Office (GJO)] will carry out at the Monticello Mill Tailings Site (MMTS) and the Monticello Radioactively Contaminated Properties (Monticello Vicinity Properties [MVP]). This introductory section addresses the basis and regulatory requirements of LTS&M at these sites as well as pertinent background information and current site status.

1.1 Purpose and Scope

Consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements, radioactively contaminated properties at the MMTS and MVP have been remediated by DOE in accordance with the requirements of CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 U.S.C. §9604 et seq.). These remedial actions are protective of the anticipated future land use; however, they do not allow for unlimited use and unrestricted exposure (UU/UE) in all areas. In October 2001, LTS&M activities were initiated because contamination remains in the on-site disposal cell, in the soil and sediment at other locations where supplemental standards have been applied, and in ground water and surface water. Some of the wastes located at the Monticello National Priorities List (NPL) sites will remain hazardous for several thousand years.

As defined by the DOE guidance document, *Long-Term Stewardship Planning Guidance for Closure Sites* (DOE 2002), long-term stewardship refers to all activities necessary to ensure protection of human health and the environment. Such activities include, but are not limited to, "all engineered and institutional controls designed to contain or to prevent exposure to residual contamination and waste, surveillance activities, record-keeping activities, inspections, ground water monitoring, ongoing pump and treat activities, repository cap repair, maintenance of entombed buildings or facilities, maintenance of other barriers and contained structures, access control, and posting signs." The term "stewardship" has been superseded by the term "surveillance and maintenance" in this document and by DOE policy. The term "surveillance and maintenance" now includes the same activities formerly defined by the term "stewardship" and encompasses the activities of an Operations and Maintenance Plan under CERCLA.

The NPL sites consist of (1) the MMTS, which includes the property where the former Monticello uranium- and vanadium-ore processing mill was located, various peripheral properties near or adjacent to the former mill, and the on-site disposal cell; and (2) the MVP, comprising 424 private and publicly owned properties remediated in and near the city of Monticello. Objectives for performing LTS&M at the Monticello project site include the following:

- Ensure that remedies selected for the MMTS and MVP are effective and remain protective of human health and the environment,
- Ensure appropriate and adequate documentation of the activities performed and maintenance of site records, and

- Support transfer of information to stakeholders, including the public, the U.S. Environmental Protection Agency (EPA), and the Utah Department of Environmental Quality (UDEQ).

These objectives will be met by the provisions of this plan by:

- Operating, inspecting, and maintaining all engineered controls.
- Conducting maintenance, inspection, and enforcement of the land and ground water use restrictions and other institutional controls necessary for the protectiveness of the remedies.
- Conducting long-term monitoring of ground water, surface water, biota, or other media necessary to demonstrate the performance, effectiveness, or protectiveness of the remedies.
- Identifying and implementing actions to optimize remedies and LTS&M activities.
- Implementing contingency actions in the event they are required.
- Identifying and meeting applicable or relevant and appropriate requirements (ARARs) for the post-remedial action site conditions.
- Ensuring that budgeting, funding, and personnel requirements appropriate to sustain LTS&M needs are met.
- Ensuring that public involvement, including education, outreach, notice, and informational systems, is appropriate to sustain the long-term effectiveness of the remedies.
- Ensuring that information and records management requirements are appropriate and designed to be sustained over the long term.
- Developing all plans, manuals, and reports, including annual inspection and CERCLA 5-year review reports, which are required to conduct the LTS&M activities and document that the remedies remain protective of human health and the environment.

1.1.1 Responsibilities

This LTS&M Plan is effective upon acceptance by EPA and UDEQ pursuant to the consultation provisions of the *Federal Facilities Agreement* (FFA) (DOE 1998). 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 statutorily mandated CERCLA 5-year review 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 Monticello-based DOE representatives (contractor employees) responsible for executing procedures in this plan.

1.1.2 Monticello LTS&M Plan Summary

This LTS&M Plan consolidates and supersedes prior versions of all Monticello LTS&M plans, manuals, and documents listed in Table 1–1. This LTS&M Plan is a compendium of procedures and referenced project documents intended to implement the overall LTS&M requirements that define the LTS&M tasks for postclosure care at the Monticello NPL sites. Table 1–1 lists the superseded documents by title, publication number, and revision date.

Table 1–1. List of Monticello LTSM Plans superseded by the Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites

Document Title	Document Number	Revision Date
Operable Unit I Millsite Remediation Surveillance and Maintenance Plan	E02712AA	Draft March 1995
Monticello Long-Term Surveillance and Maintenance Plan, Chapter 3, "Repository Site LTSM Plan"	E04329AA	Draft September 1998
Monticello Mill Tailings Site, Application for Supplemental Standards, Government-Owned Properties in Monticello, Utah, DOE ID Nos. MP−00391–VL, MP–01041–VL, and MP–01077–VL, Appendix E, "Long-Term Surveillance and Maintenance Plan"	GJO–98–66–TAR	May. 1999
Monticello Mill Tailings Site, Operable Unit II, Application for Supplemental Standards for Upper, Middle, and Lower Montezuma Creek, Volume I, Appendix C, "Long-Term Surveillance and Maintenance Plan for Operable Unit II Soil and Sediment Area"	GJO–98–58–TAR	May 1999
Monticello Vicinity Properties, Application for Supplemental Standards for City of Monticello Streets and Utilities, Appendix E, "City of Monticello Streets and Utilities Long-Term Surveillance and Maintenance Plan"	GJO–98–68–TAR	May 1999
Monticello Vicinity Properties, Application for Supplemental Standards for DOE ID No. MS–00176–VL, Appendix E, "Long-Term Surveillance and Maintenance Plan"	GJO–96–4–TAR	May 1999
Monticello Vicinity Properties, Application for Supplemental Standards, Highways 191 and 666 Rights-of-Way Within the City Limits of Monticello, Appendix E, "Highways 191 and 666 Rights-of-Way Long-Term Surveillance and Maintenance Plan"	GJO–96–8–TAR	May 1999
Monticello Long-Term Surveillance and Maintenance Administrative Manual	DOE-LM/GJ920-2005	Rev. 1 September 2005
Monticello Long-Term Surveillance and Maintenance Operating Procedures for the Monticello Mill Tailings Site Repository and Millsite—Volume I	GJO-2001-201-TAR	April 2002
Monticello Long-Term Surveillance and Maintenance Operating Procedures for Supplemental Standards Properties—Volume II	GJO–2001–223–TAR	April 2002
Monticello Long-Term Surveillance and Maintenance Operating Procedures for Surface and Ground Water—Volume III	DOE-LM/GJ900-2005	September 2005
Monticello Long-Term Surveillance and Maintenance Operating Procedures for Annual Inspections and CERCLA Five-Year Reviews—Volume IV, April 2002	GJO-2001-222-TAR	revised September 2005

Consolidation of pertinent information in the documents listed in Table 1–1 produced this LST&M Plan for the Monticello NPL sites, comprising the six major sections and associated appendixes described below:

- Section 1.0, "Basis and Regulatory Requirements," describes the purpose and scope of this document, site activities leading up to LTS&M, the legal and regulatory basis for LTS&M activities, and provides the framework for implementing the LTS&M activities.
- Section 2.0, "LTS&M Administrative Policies and Procedures," identifies summary information relevant to the project scope, personnel responsibilities, community involvement, and procedures that apply to document control, records management, health and safety, training, and quality assurance (QA).
- Section 3.0, "LTS&M Procedures for DOE-Owned Property," addresses the detailed procedures for conducting and documenting LTS&M activities at the DOE-owned property, including the Monticello on-site disposal cell, Pond 4, the Temporary Storage Facility (TSF) and ancillary facilities within the repository area boundary fence.
- Section 4.0, "LTS&M Procedures for Non-DOE-Owned Properties," contains procedures for conducting and documenting LTS&M activities at public and private properties, including the former millsite, where contamination has been left in place at levels that do not allow unlimited and unrestricted exposure or that have other special restrictions.
- Section 5.0, "LTS&M Procedures for Operable Unit III, Surface Water and Ground Water," addresses the operating procedures for LTS&M activities associated with surface water and ground water, performance evaluation of the surface water and ground water remedy of monitored natural attenuation, and the permeable reactive barrier (PRB). The PRB is a treatability study that is jointly funded by DOE and EPA.
- Section 6.0, "LTS&M Procedures for Annual Inspections and CERCLA 5-Year Reviews," identifies procedures for conducting, documenting, and reporting the annual inspections and CERCLA 5-year reviews to ensure the selected remedies remain protective of human health and the environment.

Appendixes are:

- Appendix A—Monticello LTS&M Project Organization and Key Personnel
- Appendix B—Document Control and Records Management Procedures
- Appendix C—Site Specific Emergency Response and Hazard Survey Information
- Appendix D—Photographs of Utah and San Juan County-Listed Noxious Weeds and Undesirable Weeds
- Appendix E—Repository and Pond 4 Groundwater Contingency Plan
- Appendix F—Radiological Survey Procedures
- Appendix G—Uranium Scanning Procedure
- Appendix H—Procedures for the Transportation of Radioactive Materials
- Appendix I—Ground Water Management Policy for the MMTS and Adjacent Areas

- Appendix J—Ground Water Remedy Performance Evaluation Plan
- Appendix K—MMTS and MVP Site Inspection Checklists

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.

1.2 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, Utah (see Figure 1–1). Monticello is the county seat for San Juan County. As of year 2000, the population of Monticello was approximately 1,900 residents. Figure 1–1 also identifies MMTS and MVP site boundaries and the operable units (OUs) within the MMTS. Properties comprising the MVP are either privately owned (residential, commercial, or vacant) or owned by the City of Monticello or the Utah Department of Transportation (UDOT). As shown in Figure 1–1, property ownership by DOE is limited to the repository and an adjacent parcel to the east, following the transfer of approximately 380 acres of former DOE-owned property to the City of Monticello in June 2000 per covenant deferral (DOE 2000). The affected properties of that transaction are identified in Figure 1–1.

1.3 Site Operational History

In 1942, the U.S. Government through its agent, the Defense Plant Corporation, constructed the Monticello Mill at a former uranium and vanadium ore buying station, which had been constructed in 1940. The purpose of the mill was to produce vanadium and uranium for military purposes. Various government agencies operated the mill until 1948 when it was obtained by the U.S. Atomic Energy Commission. The mill was operated through 1959 under cost type contracts until operations were terminated on January 1, 1960. Ore was processed to recover vanadium at Monticello from 1942 to 1944, in 1945 and 1946, and again from 1948 to 1960 when both uranium and vanadium were recovered. The ore-buying station opened in 1940 and closed in 1962. Mill tailings are the solid waste by-product of the processed ore, often containing potentially hazardous radiologic and non-radiologic constituents.

Between 1961 and 1965, various measures were taken to dismantle the mill, dispose of equipment and scrap, bury contaminated materials, grade and cover the impounded tailings and other contaminated materials with soil, and revegetate the site. A portion of the millsite (about 10 acres), including a few intact administrative buildings, was transferred to the Bureau of Land Management in 1962. The remainder, including the tailing piles (approximately 68 acres), remained in the custody of the Atomic Energy Commission and its successor agencies, first the U.S. Energy Research and Development Administration and later DOE. In 1974 and 1975, mill foundations were demolished and buried and the area was graded and revegetated. A fence was constructed around the millsite to prevent public access to contaminated materials.

During the operation of the mill approximately 900,000 tons of ore were processed. The tailings were locally impounded in piles at four locations adjacent to Montezuma Creek. Tailings carried

by wind or Montezuma Creek spread contamination to nearby properties. Throughout the operating period, mill tailings were commonly used in Monticello as fill for open lands; backfill around water, sewer, and electrical lines; sub-base for driveways, sidewalks, and concrete slabs; backfill against basement foundations; and as sand mix in concrete, plaster, and mortar.

1.4 Site Remedial Action History

In 1978, Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA). Title I of UMTRCA provided funding authorization for DOE to clean up 22 abandoned, privately owned uranium mill tailings sites. The Monticello site was not on that list. Title II of UMTRCA amended the Atomic Energy Act of 1954 to give the U.S. Nuclear Regulatory Commission regulatory authority over the reclamation phase of then currently licensed and privately owned uranium millsites. Although the Monticello Site was a uranium mill, it did not satisfy the legislative definition under UMTRCA owing to its federal ownership.

DOE, under the authority of the Atomic Energy Act of 1954, initiated the Surplus Facilities Management Program (SFMP) in 1978 to ensure safe caretaking and decommissioning of government facilities that had been retired from service but that still had radioactive contamination at the facilities. Prior to establishing the SFMP, DOE began radiological surveys throughout the city of Monticello in 1971 to identify the nature and extent of millsite-related radiological contamination. In 1980, the Monticello Millsite was accepted into the SFMP for remedial action, and the Monticello Remedial Action Project (MRAP) was established to conduct those remedial actions.

As a result of the early surveys, EPA identified two sites (the Randall House and the Montgomery Ward catalogue store located within one-half mile of each other in Monticello) for planned removal action. Of the homes surveyed by DOE, the Randall House and the Montgomery Ward store were the worst in terms of overall health risks. DOE determined that the Montgomery Ward store and the Randall House had been constructed prior to the Atomic Energy Commission's purchase of the Monticello uranium and vanadium mill, and therefore DOE did not have the authority to conduct remedial action at these sites. EPA prepared an Action Memorandum requesting a Planned Removal; however, the proposal was denied in June 1982. EPA then proposed the properties for listing on the NPL in early 1983, but neither property met the scoring criteria for inclusion on the NPL. In 1983, revisions to wording in the National Contingency Plan made them eligible for cleanup under removal authorities. Subsequently, the request for removal authority was resubmitted and was approved in October 1983. Removal action at the two properties was completed in 1984.

In 1983, remedial activities for the vicinity properties were separated from MRAP with the establishment of the Monticello Radioactively Contaminated Properties site (also known as the Monticello Vicinity Properties [MVP]) and the MMTS. The MVP and MMTS were later placed on the NPL pursuant to CERCLA and SARA. As owner and past operator of the site, DOE was identified as the potentially responsible party. DOE was tasked with funding and performing the remedial actions necessary at the MVP and MMTS as well as ensuring protection of human health and the environment into the future.

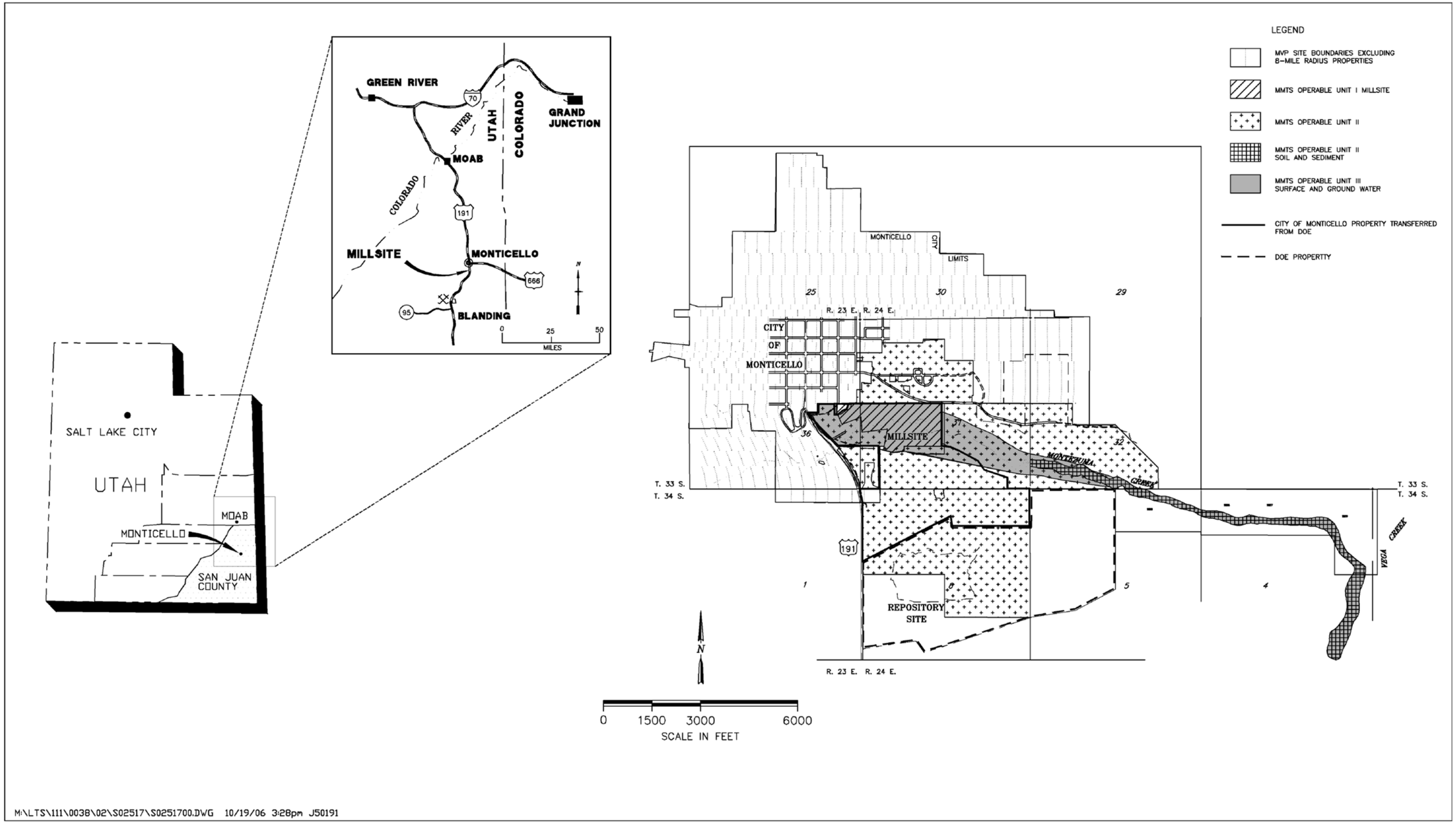

Figure 1–1. Location and Features of Monticello MMTS and MVP Sites

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1.4.1 Monticello Radioactively Contaminated Properties NPL Site

Following its establishment in 1983, the MVP site was listed on the NPL on June 10, 1986, and was remediated pursuant to a Record of Decision (ROD) (DOE 1989) dated November 29, 1989. The selected remedy for cleanup of the MVP site was excavation of tailings, ore, and related by-product material from vicinity properties; temporary storage on the Monticello millsite; and final disposal in the same repository prescribed for materials from the Monticello millsite. Because mill tailings from the Monticello millsite were used for construction purposes, cleanup activities included demolition of sidewalks, patios, sheds, and other improvements. Affected properties were backfilled, graded, and reconstructed. Approximately 150,000 cubic yards of contaminated materials were temporarily placed on the millsite and ultimately disposed of with contaminated millsite material. Remediation of the MVP site was completed in June 1999. A total of 424 properties were ultimately remediated under the MVP Project. The MVP site was deleted from the NPL on February 28, 2000.

1.4.2 Monticello Mill Tailings NPL Site

The MMTS was placed on the NPL in November 1989. Remediation of the MMTS was administratively divided into two OUs: Former Millsite OU I and Peripheral Properties OU II. A Remedial Investigation/Feasibility Study—Environmental Assessment was conducted pursuant to CERCLA and the National Environmental Policy Act, and the ROD for OUs I and II (DOE 1990) was signed in 1990. The following remedies were selected:

- OU I, Monticello Millsite Tailings and Millsite Property—This OU comprises the 78-acre former millsite, tailings impoundment areas on the millsite, and storage areas on the millsite property for tailings-contaminated materials removed from the vicinity properties and peripheral properties. Construction of the on-site repository (permanent disposal cell) and its leachate collection system is also included in this OU. Components of the OU I cleanup remedy include relocating contaminated materials from the millsite to the disposal cell, revegetation after removal of the tailings, realignment of Montezuma Creek, and reestablishment of wetland areas. Of primary importance, Title 40 *Code of Federal Regulations* Part 192 (40 CFR 192), "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," requires a repository design that is effective for up to 1,000 years to the extent reasonably achievable, and in any case, for at least 200 years.
- OU II, Peripheral Properties—This OU consists of 33 private properties and one former DOE-owned property peripheral to the millsite that were contaminated by windblown tailings and by soil and sediment transported downstream of the millsite and deposited in and adjacent to Montezuma Creek. Subpart B of 40 CFR 192 prescribes the cleanup standards for soils. Other components of the peripheral property cleanup remedy include revegetation after removal of the tailings and use of institutional controls where supplemental standards were applied (see Section 1.4.3), such as limitations on access or use. Soil and sediment contamination along Montezuma Creek was remediated as a non-time-critical removal action following the completion of an engineering evaluation and cost analysis in 1998. Partial deletion of MMTS OU II, consisting of 22 non-surface and ground water impacted peripheral properties, from the NPL occurred in October 2003. Remaining on the MMTS NPL are 13 properties located within OUs I and II, including the surface water and ground water associated with these properties (OU III). Deletion of the remaining

13 MMTS properties from the NPL is dependent on meeting the remediation goals for OU III surface water and ground water.

- OU III, Monticello Surface Water and Ground Water—OU III was not part of the original NPL listing. OU III was designated following the completion of the ROD in 1990, when DOE, with concurrence of EPA and UDEQ, determined that selection of a final remedy for surface water and ground water should be deferred until surface remedial actions were completed at the millsite. In 1998, DOE, with the concurrence of EPA and UDEQ, implemented an interim remedial action (DOE 1998b) that included restricting the use of contaminated ground water, a treatability study of in situ ground water treatment through a PRB, and continued monitoring and characterization of the ground water. The interim remedial action was completed, and a ROD (DOE 2004b) for OU III was signed in June 2004. The selected remedy for OU III is monitored natural attenuation with institutional controls. Natural hydrological and geochemical processes identified in the OU III ground water system are expected to restore water quality to remediation goals by the year 2045. Until that time, monitoring of surface water and ground water, annual reports, and CERCLA 5-year reviews will evaluate ground water and surface water restoration. Institutional controls have been implemented to make certain the selected remedy remains protective of human health and the environment. In addition, as set forth in the ROD for OU III (DOE 2004b), if the selected remedy does not remain protective of human health and the environment, or if monitoring results indicate that remediation goals cannot be achieved in the allotted time (by year 2045), contingency remedies will be evaluated and will be implemented if determined necessary.

Remediation of the millsite began in 1991 with the construction of access controls and the removal and abandonment of selected monitoring wells on the former millsite. Construction of the repository began in October 1995. Placement of contaminated materials in the on-site disposal cell began in June 1997 and was completed in September 1999. Construction of the disposal cell cover was completed in February 2000. The disposal cell leachate collection and removal system (LCRS), which was in operation with the onset of tailings placement, currently removes water that drains from the wastes contained in the disposal cell. The liquid is conveyed to Pond 4, which is an evaporation pond designed to remain in operation until water ceases to drain from the disposal cell. Pond 4 is expected to remain in service for as many as 20 years, depending on the transient drainage rate from the disposal cell.

Waste materials in the disposal cell consist primarily of uranium mill tailings from the millsite, vicinity properties, and peripheral properties. The primary contaminant of concern is radium-226. Radium-226 has a radioactive half-life of 1,622 years and produces radon-222. Radon, a gas, and its decay products pose an inhalation health risk to humans. Other materials include milling by-product materials, millsite building and other 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. This material will be managed in accordance with the operating procedures in Section 3.0.

1.4.3 Supplemental Standards Properties

Regulations codified in 40 CFR 192.21 allow contaminated material to be left in place in specific cases if attaining prescribed cleanup standards will cause excessive risk of injury, excessive environmental harm, or unreasonably high costs compared with the health benefits to be gained. The site-specific remediation standards, called supplemental standards, are applied to areas where contaminated material is left in place. Supplemental standards have been implemented at a number of MMTS and MVP properties, which are identified in Section 4.0 of this plan.

1.5 Current Site Conditions

The federal government, through DOE-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 millsite buildings, and contaminated materials from remediated vicinity and peripheral properties in the on-site disposal cell. Regulated nonradiological hazardous materials that were encountered during remedial action were treated and disposed of either in the disposal cell or at off-site EPA-approved disposal facilities.

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

1.6 Current Regulatory Requirements

Implementation and adherence to the specifications of this plan are applicable to four broad categories of LTS&M activities at the MMTS and MVP sites:

- Operation and maintenance of the on-site disposal cell, associated leak detection and leachate collection and recovery systems, Pond 4, and the TSF.
- Surveillance of properties at which contamination was left in place (supplemental standards properties) and the former millsite. Supplemental standards properties include Monticello city streets and utility corridors, private and City-owned peripheral properties, and UDOT rights-of-way.
- Monitoring OU III ground water and surface water and evaluating the performance of the selected remedy.
- Conducting annual inspections and CERCLA 5-year reviews to monitor and document the effectiveness of the selected remedies.

Key regulatory requirements pertaining to the respective category of LTS&M activity are described below. These descriptions are not inclusive of all ARARs identified in the various RODs that are no longer relevant due to completion of the respective task.

1.6.1 General Regulatory Requirements for Operations and Maintenance Activities

The disposal cell contents are not regulated under the Resource Conservation and Recovery Act (RCRA), but RCRA postclosure disposal cell monitoring and maintenance requirements are applicable. The RCRA ground water protection standard (40 CFR 264 Subpart F) sets forth the general ground water monitoring requirements for the disposal cell as adopted in the *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998 and Appendix E). Routine operations and maintenance activities will otherwise ensure compliance with the ARARs associated with the design and function of the repository.

1.6.2 General Regulatory Requirements for Soil

The soil was generally cleaned up in accordance with 40 CFR 192. Though this standard is not strictly applicable to Monticello, the Monticello site was sufficiently similar to the applicable sites that the same criteria were considered relevant and appropriate to this site. Section 192.02 gives the general standards, and 192.12 (a and b) gives the specific standards. The standard is "(a) concentration of radium 226 in land averaged over 100 square meters (m^2) shall not exceed the background level by more than—

(1) 5 pCi/g [picocuries per gram] 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 prescribed conditions the Sections 192.20 and 192.21 give alternative criteria for supplemental standards to be applied to areas meeting certain conditions. A number of such areas (e.g., upland areas densely vegetated by piñon and juniper trees, and the floodplain of OU II soil and sediment properties) were identified at Monticello.

1.6.3 General Regulatory Requirements for Surface Water and Ground Water

The selected remedy for OU III is monitored natural attenuation. Monitored natural attenuation is anticipated to restore surface and ground water to acceptable levels by 2045. Ground water monitoring is required by the ROD to measure the progress of water quality restoration. The principal ARARs for the impacted surface and ground water at the Monticello Millsite are drinking water standards defined as maximum contaminant levels (MCLs) under the Safe Drinking Water Act, and Utah water quality standards. A site-specific risk assessment was used to establish the standards for OU III contaminants of concern not covered by these ARARs. The contaminants of concern and the regulatory standards for OU III ground water and surface water are listed in Table 1–2 and Table 1–3.

Table 1–2. Operable Unit III Ground Water Remediation Goals

Contaminant of Concern	Remediation Goal[a]	Remediation Goal Reference or Basis
Arsenic	10 µg/L	Safe Drinking Water Act
Manganese	880 µg/L	Risk based, developed by UDEQ
Molybdenum	100 µg/L	40 CFR 192
Nitrate (as nitrogen)	10 mg/L	Safe Drinking Water Act
Selenium	50 µg/L	Safe Drinking Water Act
Uranium[b]	30 µg/L	Safe Drinking Water Act
Vanadium	330 µg/L	EPA Region III Risk based
Uranium-234/Uranium-238[c]	30 pCi/L	40 CFR 192
Gross alpha	15 pCi/L	Safe Drinking Water Act

[a]Source: DOE 2004b (ROD)
[b]Based on metal toxicity.
[c]Based on radiological dose.
µg/L = micrograms per liter; mg/L = milligrams per liter; pCi/L = picocuries per liter.

Table 1–3. Operable Unit III Surface Water Remediation Goals Adopted From Utah Surface Water Standards

Contaminant of Concern	Remediation Goal[a,]
Arsenic	10 µg/L[b]
Nitrate (as nitrogen)	4 mg/L[b]
Selenium	5 µg/L[b]
Gross alpha	15 pCi/L[b]
Uranium[c]	30 pCi/L[c]

[a]µg/L = micrograms per liter; mg/L = milligrams per liter; pCi/L = picocuries per liter.
[b]Source: DOE 2004b (ROD)
[c]Effective since OU III ROD (2004).

The objective for ground water monitoring is to ensure that monitored natural attenuation will lead to the applicable goals within an acceptable period. Ground water within the alluvial aquifer does not presently pose a threat to human health because it is not used for any purpose. Aquifer yield is poor and municipal water of superior quality is available. Furthermore, institutional controls are in place to prohibit the use of contaminated ground water in the alluvial aquifer.

The PRB and an auxiliary ground water treatment cell 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 5-Year Reviews and Annual Inspections

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 unlimited use and

unrestricted exposure be reviewed every 5 years to ensure protection of human health and the environment. Therefore, CERCLA 5-year reviews are required by statute for the MVP site and the MMTS. The cycle of CERCLA 5-year reviews of the MMTS and MVP began in 1997.

This document is consistent with EPA's *Comprehensive Five-Year Review Guidance* (EPA 2001a) and the March 2005 Supplement, *Evaluation of Institutional Controls* (EPA 2005). DOE will continue to revise or update its reviews to be consistent with the most recent guidance available. EPA guidance for conducting CERCLA 5-year reviews is available on the Internet at http://cfpub1.epa.gov/superapps/index.cfm/fuseaction/pubs.default/pubs.cfm.

DOE will conduct annual inspections in September of each year to identify and correct potential problems and to use as the basis for the 5-year review.

1.6.5 Institutional Controls

Institutional controls currently in effect at the Monticello NPL sites are administrative requirements that limit the use of land and water resources on specific properties where soil was either contaminated and left in place pursuant to supplemental standards or was underlain by contaminated ground water. A summary of the types of institutional controls at the site and the specific restriction for the given property is provided as Table 1–4. Continued effectiveness of the controls requires periodic surveillance of the affected properties according to the procedures and frequencies provided in this plan. The corresponding locations and boundaries of the properties listed in the table, as well as specific LTS&M tasks associated with administering the institutional controls, are presented in Section 4.0 and Section 6.0.

Table 1–4. Summary of Current MMTS and MVP Institutional Controls

DOE Property ID	Covenant Deferral Property Restrictive Easement[a]					State Engineer Ground Water Restricted Area[b]	Supplemental Standards Properties Restrictive Easements[c]				Other Supplemental Standards Institutional Controls
	Public day-use recreation	No habitable structures	No camping	No soils removal from the property	No wells in the alluvial aquifer	No wells in the alluvial aquifer	No construction of habitable structures	No removal of contaminated soils	No camping	Special zoning district for building permit	No unauthorized removal of soils
MP−00181[d]	X	X	X		X	X					
MP−00893[d]	X	X	X		X	X					
MP−00391[e]	X	X	X	X			X	X	X		
MP−01077[e]	X	X	X	X	X		X	X	X		
MP−01040 (North Portion)	X	X	X								
MP−01041[e]	X	X	X	X			X	X	X		
MP−01042	X	X	X								
MG−00951[f]						X	X	X			
MG−01084[f]						X	X	X			
MG−00990[f]						X	X	X			
MG−01033[f]						X	X	X			
MG−01026[f]							X	X			
MG−01027[f]							X	X			
MG−01029[f]							X	X			
MG−01030[f]							X	X			
MS−00176[g]							X	X		X[h]	
MP−00211						X				X[h]	
MP−00179						X					
MP−00947						X					
City Streets & Utilities											X[h]
Highways 191 & 491											X[h]

[a]Properties transferred from DOE to City of Monticello
[b]Properties within the Ground Water Restricted Area
[c]Restrictions apply to designated portions of the listed properties as identified in deed restrictions and shown in Figure 4−1.
[d]Former millsite properties
[e]Government-owned piñon/juniper supplemental standards properties (MP−01042 is a non-supplemental standards property transferred to the City)
[f]Upper, Middle, and Lower Montezuma Creek supplemental standards properties
[g]Privately owned piñon/juniper supplemental standards property
[h]Radiological control performed on all excavations

End of current text

2.0 LTS&M Administrative Policies and Procedures

The administrative practices established for the Monticello LTS&M project have been developed to implement DOE authorized procedures, identify and assign responsibilities, and standardize administrative systems and the documentation required in conducting the monitoring, inspection, review, and reporting requirements documented in this LTS&M Plan. Included in this section is general information about the project organization and contact information, scheduled LTS&M activities, 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.

2.1 Organizational Resources and Contact Information

In December 1988, EPA, UDEQ, and DOE entered into an FFA (DOE 1998) that defines the roles and responsibilities of the parties for response action at the MMTS and the MVP. DOE is a responsible party with respect to past releases at the Monticello sites. DOE is the lead agency and performs response actions pursuant to Section 120 of CERCLA. EPA and UDEQ provide oversight of the response actions as described in the FFA. Since 2003, the DOE LTS&M sites are administered under DOE-LM.

The roles, responsibilities, and management relationship among DOE, EPA, and UDEQ are defined in Section VIII of the FFA (DOE 1998) and summarized below:

- DOE is the responsible party with respect to present and past releases at the Monticello site and is responsible for developing and implementing the response actions that will be protective of human health and the environment in accordance with the FFA.
- The State of Utah is a signatory to the FFA and participates in the planning, selection, and implementation of the remedial action, including but not limited to, review of and comment on all applicable data, development of studies, reports, action plans, and ARARs.
- EPA shares responsibilities with the State and is designated as the lead agency with ultimate responsibility and authority for oversight of the activities performed under the FFA.

References are made to various DOE and contractor personnel in this plan. Table A–1 in Appendix A contains the organization information and names of the individuals currently filling these positions. Direct lines of authority within the contractor's organization for managing and implementing the Monticello LTS&M project are as follows:

- The Monticello LM Task Order Manager reports to the LM Programs and Projects Manager and is responsible for the overall project management and support.
- The Monticello LM Site Manager, hereafter referred to as the Site Manager, reports to the Monticello LM Task Order Manager and has been delegated task order management responsibilities in administration of the project scope, schedule, resources, and task activities for the Monticello LTS&M sites.
- The Monticello LM Representative works under direction of the Site Manager in carrying out the requirements imposed through this LTS&M Plan.

Figure A−1 in Appendix A shows the Monticello LM project organization, including the interaction between the various organizations (e.g., DOE, EPA, UDEQ, UDOT, city of Monticello, and the contractor).

2.1.1 Contact Information

Location and contact information for persons of responsibility in implementing this plan and local resources associated with supplemental standards activities are identified below.

DOE-LM Contact Information

Ray Plieness, Deputy Director, Office of Site Operations
US DOE Office of Legacy Management
2597 B ¾ Road
Grand Junction, CO 81503
Phone: (970) 248-6001 Fax: (970) 248-6040

Jalena Maestas, DOE-LM Monticello Project Manager
US DOE Office of Legacy Management
2597 B ¾ Road
Grand Junction, CO 81503
Phone: (970) 248-6016 Fax: (970) 248-6040

DOE-LM 24-Hour Emergency Contact
(970) 248-6070

Toll free number (877) 695-5322

Contractor Contact Information

Michael C. Butherus, Task Order Manager
US DOE Office of Legacy Management
2597 B ¾ Road
Grand Junction, CO 81503
Phone: (970) 248-6332

Timothy Bartlett, Site Manager
US DOE Office of Legacy Management
2597 B ¾ Road
Grand Junction, CO 81503
Phone: (970) 248-7741

Monticello LM Representatives
US DOE Office of Legacy Management
Monticello Field Office
1665 S. Main Street
P.O. Box 909
Monticello, UT 84535
Fax: (435) 587-2780

Joe Slade (Lead) Office: (435) 587-2902 or
Cell: (435) 459-4128

Todd Moon Office: (435) 587-3115 or
Cell: (435) 459-4980

City of Monticello and San Juan County Contact Information

Trent Schafer, City Manager
City Offices
17 N. 100 East
Monticello, Utah 84535
(435) 587-2271

San Juan County Recorder
117 S. Main St.
Monticello, Utah 84535
(435) 587-3228

San Juan County Sheriffs Office
297 S. Main Street
Monticello, Utah 84535
(435) 587-2237

Utah Department of Transportation (UDOT) Contact Information

Hugh Kirkham (Price District Director)
940 South Carbon Ave.
Price, Utah 84501-0903
(435) 636-1470

Chet Johnson (Station Supervisor)
Monticello Shed No. 4423
697 East Center Street
(formerly 701 E. Hwy. 491)
Monticello, Utah 84535
(435) 587-2620

UDOT Port of Entry
Kelvin Thacker
1965 East Center Street
(formerly E. Hwy. 491)
Monticello, Utah 84535
(435) 587-2662

2.2 Scheduled LTS&M Activities

The Site Manager is responsible for conducting the scheduled activities listed in Table 2–1. This table also includes a cross-reference to the LTS&M Plan section where the activity is discussed in detail.

The Monticello LM Representative is responsible for conducting the activities listed in Table 2–2. These are either regularly scheduled activities or activities triggered by natural events such as a significant precipitation event. This table includes a cross-reference to the section where the activity is discussed in detail.

2.3 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 contractor community relations lead:

- Maintains the community contacts database and provides copies of the current Key Contacts for the Monticello MMTS and MVP sites to the Information Repository (IR) Coordinator when requested for updates to the IR record collection.
- Participates in the CERCLA 5-year review process by placing public announcements in local newspapers, soliciting feedback from interested citizens, and conducting interviews with designated community members.

2.4 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 Section 4.4 and Appendix B.

2.4.1 Records Management

All records created in support of LTS&M at the Monticello NPL sites shall be managed in accordance with DOE-LM requirements and policy for record and non-record (i.e., working copies) material. The records system employed is initiated through a Site File Plan that identifies project tasks and associated record categories and identifies records custodians, storage location, and retention schedules. Electronic search, sort, and retrieval of records is made possible through the use of database software and bar code technology.

As new records are identified the Site Manager is responsible for notifying the LM Records Lead and ensuring that appropriate changes are included in the Site File Plan. The LM Records Lead administers the maintenance of and revisions to the Monticello LTS&M Site File Plan. The current Site File Plan is included as an example in an attachment to the Document Control and Records Management Procedure in Appendix B.

Table 2–1. Site Manager Scheduled Activities

Activity	Reference		Comments
	Section	Page No.	
Quarterly			
LCRS and LDS water management reporting	3.3.5 & 3.3.6	3−19 & 3−20	Send report to DOE-LM Monticello Project Manager, EPA and UDEQ
Spring and Fall of Each Year			
Information Repository Update	2.4.2 Appendix B	2-6 B−7 & B−8	Send updated index annually to DOE, EPA, and UDEQ (April)
Ground and Surface Water monitoring	5.3	5−6 through 5−10	Sampling occurs in April and October
Annually			
Public Roads and Utility Corridor Surveillance	4.2.3.1	4−11	Contact UDOT for planned highway projects (July)
Ground Water and Surface Water Data Summary and Performance Evaluation	5.4	5−10 & 5−11	Report due in September at or prior to annual inspection
Biomonitoring Task	5.5	5−11 & 5−12	Program directives and reporting
PRB and Auxiliary Treatment System	5.6	5−12 & 5−13	Annual reporting and inspection
Contact Utah State Engineer regarding well drilling applications	6.1.2	6−3	Occurs during Annual Inspection planning
Administrative Reviews	6.1.3	6−4	Conducted in September of each year. Checklist available (Appendix K)
Annual Inspection of Field Documentation	6.1.4	6−4 & 6−5	Conducted in September of each year. Checklist available (Appendix K)
MMTS Annual Inspection	6.1.5	6−5 through 6−8	Conducted in September of each year. Checklist available (Appendix K)
MVP Annual Inspection	6.1.6	6−9	Conducted in September of each year. Checklist available (Appendix K)
Annual Inspection for Monticello Surface Water and Ground Water	6.1.7	6−8 & 6−9	Conducted in September of each year. Checklist available (Appendix K)
Annual Inspection of inactive wells	6.1.7.2	6−9	Performed within a month of the annual review site inspection
PRB and Treatment Cell	6.1.7.3	6−9	Conducted in September of each year. Checklist available (Appendix K)
Prepare Annual Inspection Report	6.1.8	6−11 & 6−12	Report due in December
Update As-Built Drawings	Appendix B	B−12 & B−13	Submit to Technical Support beginning of CY (Jan-Feb)
Every 5 Years Beginning 2007			
5-year Survey of Disposal Cell Settlement Plates	6.1.5.1	6−6	Completed July 2006, next survey scheduled 2010
CERCLA 5-year review of MMTS and MVP	6.2.3	6−13 through 6−23	Annual Inspection Checklists available (Appendix K)
Prepare and submit CERCLA 5-Year Review Report	6.2.3.10 & 6.2.3.11	6−23 through 6−26	Draft Report due in March (6 months after the site inspection)

Table 2–2. Monticello LM Representative Responsibilities

Activity[a,b]	Reference		Comments
	Section	Page No.	
Weekly			
Water Level Monitoring of Disposal Cell and Pond 4 LCRS and LDS	3.3.2	3−17	
Disposal Cell LDS and LCRS Monitoring	3.3.3	3−17 & 3−18	
Pond 4 LCRS and LDS Monitoring	3.3.4	3−18 & 3−19	
LCRS + LDS water management reporting	3.3.5	3−19 & 3−20	
Public Roads and Utility Corridor Surveillance	4.2.3.1	4−10 through 4−11	Excavation schedule and inspections
MP−00211−VL Surveillance	4.2.5.1	4−14 & 4−15	Excavation schedule
Monthly			
Disposal Cell Surveillance	3.2.2	3−8 through 3−10	Checklist available
Meteorological Monitoring	3.2.2.2	3−12	Print report send to Site Manager
Pond 4 Monthly Surveillance	3.2.3	3−13	Checklist available
Disposal Cell and Pond 4 Water Level Monitoring Report	3.3.5 & 3.3.6	3−19 & 3−20	Print and summarize report - send to Site Manager
LCRS + LDS water management reporting	3.3.5 & 3.3.6	3−19 & 3−20	Print report send to Site Manager
MS−00176−VL Surveillance	4.2.4.1	4−13 & 4−14	
Quarterly			
Repository Area Surveillance	3.2.2	3−10 & 3−11	Checklist available
Temporary Storage Facility Inspection	3.4.3	3−21	Checklist available
City-Owned (former DOE) Properties	4.2.2	4−9 & 4−10	
Public Roads and Utility Corridor Surveillance	4.2.3.1	4−11	Hwy 191 east/west embankments at Montezuma Creek
MP−00211−VL Surveillance	4.2.5.1	4−14 & 4−15	
Spring and Fall of Each Year			
Montezuma Creek Restrictive Easement Area	4.2.6.1	4−15 & 4−16	
Ground Water Restricted Area Surveillance	4.2.7.1	4−17	
Annually			
Update As-Built Drawings	4.2.1 Appendix B	4−9 B−12 & B−13	Send Red-line drawing set to Site Manager (January-February)
Property MS-00176-VL Surveillance	4.2.4.1	4−13 & 4−14	In **May** verify property ownership and re-zoning or building permit applications
Montezuma Creek Restrictive Easement Area	4.2.6.1	4−19	
Triggered by 25-Year Storm Event or Periods of Significant Rainfall			
Repository Site Surveillance	3.2.2.3	3−12	
City-owned and Land-use restricted property surveillance	4.3.1	4−18 & 4−19	Soil erosion, gulling, and stream channel changes (storm event inspections do not apply to MP−01042−VL)

[a]Additional surveillance, inspection, and monitoring may be required based on work on progress as prescribed in Section 3.0 and Section 4.0.
[b]Additional or associated recordkeeping requirements are addressed in Section 4.4 and in Appendix B.

2.4.2 Administrative Record and Information Repository

In compliance with CERLA requirements an Administrative Record (AR) and IR records collection have been established for the Monticello NPL Sites. The collection is maintained in duplicate, with one set at the Monticello Field Office and the second set in the Technical Library at the DOE-LM office in Grand Junction, Colorado. The Site Manager is responsible for the AR/IR records collection. These responsibilities include:

- Designating a coordinator to manage the collections,
- Identifying the relevant documents to include in the collections,
- Ensuring that updates are completed on a semiannual basis (i.e., October and April),
- Ensuring that documents are easily retrievable and readily available, and
- Ensuring that the integrity of the indexes and record collection is maintained.
- Ensuring the current AR/IR indexes are posted on the Monticello Site LM webpage.

2.4.3 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 DOE-LM Monticello Project 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 *Monticello Site Management Plan* (DOE 2003a) and/or DOE deliverables schedules. Interim changes to field sampling activities may be documented and authorized for use in accordance with the Program Directive procedures identified in Appendix B.

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, and
- The material is distributed to designated recipients.

2.4.3.1 LTS&M Record Books

Record books will be used to provide a history of the record books that have been developed and completed over the life of the project and for use in documenting the various surveillance and inspections required by the plan. The following record books are established by this plan:

- Site Manager'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−VL)
- 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 (OU II soil and sediment) properties, supplemental standards property MS–00176–VL, and properties included in the ground water restricted area, as designated by the State Engineer)

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

DOE has authorized the use of the following Contractor manuals that address DOE-LM requirements and have been developed to standardize practices and procedures that apply to DOE-LM project activities (Table 2–3).

Table 2–3. Contractor Key Documents for DOE-LM Sites

Manual Number	Manual Title
STO 1	*Quality Assurance Manual*
STO 2	*Health and Safety Manual*
STO 3	*Site Radiological Control Manual*
STO 203	*Health and Safety Procedures Manual*
STO 4	*Training Manual*
STO 9	*Records Management Manual*

2.4.4 Key Project Documents

Table 2–4 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. Requirements derived from these documents are incorporated into the procedures in Sections 3.0 through 6.0. A copy of each of these documents is available at the field office through the AR/IR document collection, through controlled distribution to the Monticello LM Representative, or through the DOE LM website (http://www.lm.doe.gov) "Program Documentation" or "Land and Site Management" links.

Table 2–4. List of Key Monticello Project Documents

Available Location		Section Reference and Document Title
Reference Number [a]	Other[b]	
Section 1.0		
AR117		U.S. Department of Energy, 1988. *Federal Facility Agreement*
AR216		*Declaration for the Record of Decision and Record of Decision Summary, Monticello Remedial Action Project, Monticello Millsite. August 1990*
AR316		*Monticello Vicinity Properties Project, Declaration for the Record of Decision and Record of Decision Summary*, DOE/ID/12584-58, November 1989
IR693		*Monticello Site Management Plan, Draft Final* GJO-2003-493-TAC
OU III AR 611		August 1998. *Record of Decision for an Interim Remedial Action at the Monticello Mill Tailings Site, Operable Unit III - Surface Water and Ground Water, Monticello, Utah,* GJO-98-51-TAR. August 1998.
OU III AR 678		*Record of Decision for the Monticello Mill Tailings (USDOE) Site, Operable Unit III, Surface Water and Ground Water, Monticello, Utah,* DOE-LM/GJ629-2004. May 2004.
Section 2.0 Administrative Procedures		
	LM Website	*Legacy Management CERCLA Sites Quality Assurance Project Plan*, DOE-LM/GJ1232-2006 includes Monticello Site Specific section
	LM Website	Administrative Record and Information Repository Indexes
	LM Website	*Sampling and Analysis Plan for U.S. Department of Energy Legacy Management Sites* (DOE-LM/GJ1197-2006)
Section 3.0 Monticello LTS&M Disposal Site		
IR728		*Monticello Long-Term Surveillance and Maintenance Plan*, Chapter 3, Repository Site LTSM Plan
IR666		*Repository and Pond 4 Groundwater Contingency Plan-Final*, MAC-MRAP 3.5.8
IR729		*Repository Final Design Construction Specifications (includes as-built modifications)*
IR730		*Repository Final Design As-Built Drawing Set.*
Section 4.0 LTS&M for the Former Millsite and Supplemental Standards Properties		
IR620		*U.S. Department of Energy Memorandum of Understanding between the US DOE and UDOT*
IR641		*Cooperative Agreement (DE-FC13-99GJ79485) between the U.S. DOE and the City of Monticello*
IR512		*Monticello Vicinity Properties, Application for Supplemental Standards, Highways 191 and 666 Rights-of-Way Within the City Limits of Monticello*, GJO–96–8–TAR
IR537		*Final Covenant Deferral Request for Transfer of Federal Property in Monticello, Utah,* GJO-2000-140-TAR
IR514		*Monticello Vicinity Properties, Application for Supplemental Standards for City of Monticello Streets and Utilities*, GJO–98–68–TAR
IR515		*Monticello Vicinity Properties, Application for Supplemental Standards for DOE ID No. MS–00176–VL*, GJO–96–4–TAR
IR513		*Monticello Mill Tailings Site, Application for Supplemental Standards, Government-Owned Properties in Monticello, Utah, DOE ID Nos. MP–00391–VL, MP–01041–VL, and MP–01077–VL*, GJO–98–66–TAR
IR517		*Monticello Mill Tailings Site, Operable Unit II, Application for Supplemental Standards for Upper, Middle, and Lower Montezuma Creek, Volume I,* GJO–98–58–TAR
Section 5.0 LTS&M for OU III Surface Water and Ground Water		
IR697		*Monticello Mill Tailings Operable Unit III Post-Record of Decision Monitoring Plan*
Section 6.0 Procedures for Annual Inspections and CERCLA 5-Year Reviews		
	EPA document	Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P and Supplement for the Evaluation of Institutional Controls (March 2005)

[a]Reference number is the file number within the Information Repository or Administrative Record collections.
[b]LM website: http://www.lm.doe.gov. Refer to "Program Documentation" or "Land and Site Management" links.
[c]In 2004 the highway number for 666 was changed to 491.

2.5 Health and Safety

The Monticello LM Representative is the designated Site Safety Supervisor and has the authority to enforce safety requirements for all activities conducted by contractor personnel in support of Monticello LTS&M activities, including work conducted by subcontractors on DOE property.

LTS&M activities will be performed in accordance with company policies, health and safety regulations (e.g., OSHA), and DOE-approved health and safety procedures as developed and maintained by the current contractor. Table 2–5 summarizes routine tasks, recognized hazards, and controls or protective equipment required for the safe performance of the work associated with the Monticello LTS&M operations. Additional requirements identified through a Job Safety Analysis (JSA), Safe Work Permits (SWP), or Radiological Work Permit (RWP), may be developed to control hazards for tasks that are not addressed in Table 2–5. The contractor Health and Safety group manages and maintains current JSAs, SWPs, and RWPs at the site and uses them in worker briefings. Site specific information relevant to emergency contacts, local medical or emergency resources, and hazard survey information is included in Appendix C.

2.6 Training

The Site Manager is responsible for providing the Monticello LM representatives, and other affected staff with initial orientation to the requirements and processes established within this plan. As revisions to this LTS&M Plan occur, the Site Manager 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 LM Representative 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.

2.6.1 Training Requirements

Training requirements for personnel are keyed to the individual tasks identified in Sections 3.0 through 5.0. These training requirements are summarized in Table 2–6 through Table 2–10. There are no training requirements specific to Section 6.0 inspections and reviews, however inspection personnel who enter the TSF or repository manholes must be Radiological Worker II (training course numbers HS113 or HS117) qualified or be escorted by a DOE-LM representative who is.

The contractor's Training group maintains and tracks training records for Monticello LM personnel, including project-required training provided to city of Monticello and UDOT employees. The training records are available and can be verified by contacting the contractor's Training staff at (970) 248-6797. Informational copies of training status reports for Monticello City workers and subcontractors who have received training through the contractor's training group, will be sent, as requested, to the Monticello LM Representative. The Monticello LM Representative will retain copies of current training reports, received from the Training group, and will use the information to verify required training for noncontractor personnel.

Table 2–5. Task-Specific Safety Analysis

Task	Task Description	Hazard Identification	Hazard Controls or Protective Equipment
Inspections	Routine inspections of the Repository, former Millsite, and Supplemental Standards Properties (walking and driving)	• Uneven terrain • Biological hazards • Electrical hazards • Motor vehicle operation	• General awareness of the physical area, potential for insect bites/stings, and inclement weather conditions • Conduct vehicle inspections, wear seat belt, and practice defensive driving techniques.
Radiological Monitoring	Excavations at supplemental standards properties NOTE: Radiological scanning is of the spoils from excavations. Personnel do not enter excavations or perform the scans during equipment operations.	• Ionizing radiation • Slips, trips, falls • Electrical hazards • Motor vehicle operations	• Radiological controls and ALARA practices • General awareness of the physical area, potential for insect bites/stings, and inclement weather conditions • Conduct vehicle inspections, wear seat belt, and practice defensive driving techniques
Repository Maintenance	Repairs to fencing and signs	• Uneven terrain • Biological hazards • Electrical hazards • Equipment and hand tools	• General awareness of the physical area, potential for insect bites/stings, and inclement weather conditions • Inspect and operationally check equipment/ tools before using • Leather or sturdy cotton gloves depending on the task
	Weed control (chemical spraying)	• Chemical exposure • Wind conditions	• MSDS sheet for the material used • Stay upwind of spray
	Weed control (mechanical) - fire/string trimmer	• Wind conditions • Eye/foot injuries • Noise	• Avoid burning in excessive dry and breezy conditions • Inspect and operationally check equipment before use • Leather or sturdy cotton gloves depending on the task • Hearing protection
	Supervise subcontractor using heavy equipment	• Heavy equipment operations hazards • Noise	• Stay outside of operational range and maintain eye contact with the equipment operator • Hearing protection
Office Maintenance	Repairs to and replacement of general office equipment	• Equipment and hand tools • Electrical hazards • Ladders • Lifting and carrying heavy or bulky loads	• Inspect and operationally check equipment before use • Shut breaker or Lock-out/Tag-out as appropriate • Maintain 3 point contact. Use proper set up for extension ladders • Use proper lifting techniques and others to assist or mechanical means for loads greater than 50 lbs

Table 2−5 (continued). Task-Specific Safety Analysis

Task	Task Description	Hazard Identification	Hazard Control or Protective Equipment
Water Sampling	LDS/Pond 4 (LTSM)	• Entering manholes • Ladders • Slips, trips, falls • Electrical hazards • Lifting and carrying heavy or bulky loads • Working over or near ponds	• Forced air ventilation of manholes before entering • Implement buddy system • Maintain 3 point contact • General awareness of the physical area, and inclement weather conditions. • Use proper lifting techniques and others to assist or mechanical means for loads greater than 50 lbs • Water safety equipment available • Implement buddy system
	Surface Water and Stream flow measurements (OU III) Note: Detailed hazard analysis and controls for OU III sampling are discussed in the standard operating procedures appended to the OU III Annual Monitoring plan.	• Uneven terrain • Biological hazards • Electrical hazards • Equipment and hand tools • Motor vehicle operation	• General awareness of the physical area, potential for insect bites/stings, and inclement weather conditions • Inspect and operationally check equipment/ tools before using • Conduct vehicle inspections, wear seat belt, and practice defensive driving techniques
	Ground water sampling and water level measurements (OU III)	• Uneven terrain • Biological hazards • Electrical hazards • Equipment and hand tools • Lifting and carrying heavy or bulky loads • Motor vehicle operation	• General awareness of the physical area, potential for insect bites/stings, and inclement weather conditions • Inspect and operationally check equipment/ tools before using • Use proper lifting techniques and others to assist or mechanical means for loads greater than 50 lbs • Conduct vehicle inspections, wear seat belt, and practice defensive driving techniques

Table 2–6. Key to LTS&M Training Matrix Tables

Course Number [a]	Course Abbreviation	Course Name	Summary	Renewal Frequency
IT048	NA	LTS&M Briefing	Overview of the Monticello LTS&M project, and information relevant to the specific project activities that will be performed.	One time presentation – supplemented with routine safety briefings
NA	NA	LTS&M Training	General and ongoing reviews and familiarization with LTS&M requirements and procedures initiated by the Site Manager, for designated staff use in implementing the Monticello LTS&M Plan.	As information and requirements change
HS109 HS111	GRT GERT	General (Employee) Radiological Training	Provides general information about radioisotopes, access control, and protection. (HS111 GERT is designated for contractor employees; all noncontractor persons will receive the equivalent information in HS109 GRT.)	One time presentation – supplemented with routine safety briefings
HS113 HS117	RW II	Radiological Worker II	Training required for persons and workers who have or will have the potential to encounter radiologically contaminated materials, postings, and activities associated with handling and managing these types of materials.	16 hour initial training (HS113) and associated refresher (HS117) every 2 years
RT003	RCT	Radiological Control Technician	Qualified through training to perform Health and Safety functions associated with radiological controls and monitoring. Once qualified, technician participates in ongoing proficiency training.	Every 2 years
HS150 HS151	SSS	Site Safety Supervisor[b]	Consists of 11 modules and provides designated individuals with training in a variety of industrial hygiene and safety standards. Initial course (HS 150) 24 hrs; refresher (HS 151) completed through computer-based training modules.	24 hour initial training (HS150) and associated refresher (HS151) every 2 years
RT308 RT309	NA	Scintillometer Training	Includes training in the operation and use of the scintillometer instruments [SC-132 (RT 308) and Delta (RT 309)], ancillary equipment, data forms, functional testing and methods used in performing and documenting radiological surveys.	One time training – briefings provided when changes to equipment, forms, etc. occur
NA	PID	NA	OJT[c] provided by H&S staff in the operation and use of a photoionization detector (PID) and associated documentation for field screening organic vapors.	One time briefing
HM100, 115, 116, 210, 211, 212 and 400	HazMat	DOE-DOT Hazardous Materials and Shipping training modules	These refer to Hazardous Materials training course modules (HM100, HM 115, etc.). HM 400, "Hazardous Materials Transportation," provides an overview of hazardous materials transportation requirements. HM 116, "HazMat Transportation Security Awareness," identifies security measures relevant to transporting hazardous materials. Completion of HM 100, HM 115, HM 116, qualifies the individual as a HazMat Driver. Completion of HM 116, 210, 211, 212 qualifies the individual as a Certified Shipper.	Every 3 years

[a]Abbreviations used in course numbers are: IT = Informal Training (e.g., IT048), HM = Hazardous Materials (HazMat) (e.g., HM100), RT = Radiological Training (e.g., RT003), HS = Heath and Safety (e.g., HS150)
[b]Although not listed as a requirement for any of the sections or subsection in Table 2–7 through Table 2–10, Site Safety Supervisor Training is required of the Monticello LM Representative position and is general to all activities undertaken through DOE task orders for Monticello LTS&M.
[c]OJT = on the job training

Table 2–7. Training Matrix for Section 3.0, "LTS&M Procedures for the Disposal Cell, Pond 4, and Temporary Storage Facility"

Section Reference[a]	Monticello LM Representative	Site Manager	City Worker/Carrier Operator	
			<130 pCi/g[b]	> 130 pCi/g[b]
Section 3.1—Overview and Design Summary	LTS&M Briefing			
Section 3.2—Routine Repository and Pond 4 Surveillance	RCT Qualified (RT003) LTS&M Training			
Section 3.3—Disposal Cell and Pond 4 LCRS and LDS Operations	RCT Qualified (RT003) LTS&M Training DOE-approved procedures for water sampling (if sampling occurs)			
Section 3.4—Temporary Storage Facility Operation and Maintenance	LTS&M Training RCT Qualified Scintillometer Training (RT308 and RT309)	RW II (HS113/117)	LTS&M Briefing GRT (HS109)	LTS&M Briefing RW II (HS113/117)

[a]Training is not required for escorted visitors or UDOT workers. LTSM briefings will be provided as appropriate.
[b]pCi/g = picocuries per gram as radium-226

Table 2–8. Training Matrix for Section 4.0, "LTS&M Procedures for Non-DOE-Owned Property"

Section Reference[a]	Monticello LM Representative	Contractor Environmental Specialist	City Worker/Carrier Operator	
			< 130 pCi/g[b]	> 130 pCi/g[b]
Section 4.1-4-2—Section Overview, Scope, and Responsibilities	LTS&M Briefing			
Section 4.3—Routine Surveillance Procedures	LTS&M Training RCT Qualified (RT003)			
Section 4.4—Radiologically Contaminated Material	LTS&M Training RCT Qualified (RT003) Scintillometer training (RT308 and RT309)	LTS&M Training RWII (HS113/117)	LTS&M Briefing GRT (HS109)	LTS&M Briefing RW II (HS113/117)
Section 4.5—Suspected Hazardous Substances	LTS&M Training RCT Qualified (RT003) PID Training - OJT	40 CFR 260−299 49 CFR 106−180 40 CFR 300−399 40 CFR 761−763		

[a]Training is not required for escorted visitors or UDOT workers. LTSM briefings will be provided as appropriate.
[b]pCi/g = picocuries per gram as radium-226

Table 2–9. Training Matrix for Water Sampling associated with Section 3.0 and Section 5.0

Section Reference[a]	Ground Water and Surface Water Samplers
Section 3.3.3—Action Levels and Response Actions for the Disposal Cell LDS/LCRS	LTS&M Briefing
Section 3.3.4—Action Levels and Response Actions for Pond 4 LDS/LCRS	JSA briefing for entry into non-permitted confined spaces (i.e., disposal site manholes)
Section 5.2—Water Quality and Hydrologic Monitoring	Current DOE approved procedures applicable to water sampling

[a]Training is not required for escorted visitors. LTSM briefings will be provided as appropriate.

Table 2–10. Training Matrix for Appendix F, "Radiological Survey Procedures;" Appendix G, "Uranium Scanning Procedure;" and Appendix H, "Procedures for the Transportation of Radioactive Materials"

Section Reference[a]	Monticello LM Representative	Contractor Environmental Specialist	Worker/Carrier Operator	
			<130 pCi/g[b]	> 130 pCi/g[b]
Appendix F, "Radiological Survey Procedures" and Appendix G, "Uranium Scanning Procedure"	LTS&M Training RCT Certified	RW II (HS113/117) HM 400 and HM 116	LTS&M Briefing GRT (HS111)	LTS&M Briefing RW II (HS113/117)
Appendix H, "Procedures for the Transportation of Radioactive Materials"	LTS&M Training RCT (RT 003) HazMat Driver (HM 100, 115, 116)	LTS&M Briefing RW II (HS113/117) DOE-DOT HazMat Certified Shipper/Driver (HM 115, 116, 210, 211, 212)	LTS&M Briefing GRT (HS111)	LTS&M Briefing RW II (HS 113/117) HazMat Driver (HM 100, 115, 116)

[a]Training is not required for escorted visitors or UDOT workers. LTSM briefings will be provided as appropriate.
[b]pCi/g = picocuries per gram as radium-226

2.6.2 Monticello LM Representative Minimum Requirements

At a minimum, the Monticello LM Representative will have current certification as a Radiological Control Technician (RCT), be qualified as a Site Safety Supervisor through training and as authorized by the Health and Safety Manager, have general knowledge of hazardous materials management, and will have working knowledge of the LTS&M operating procedures within this Plan.

2.6.3 Environmental Specialist Minimum Requirements

The Environmental Specialist providing support to the project through the contractor's Compliance organization will be qualified in DOE-DOT HAZMAT Certified Shipper/Driver courses and will have knowledge of CFRs pertaining to Hazardous Waste (40 CFR 200−299, CERCLA 40 CFR 300−399), Toxic Substances Control Act (40 CFR 761−763), and U.S. Department of Transportation (DOT) regulations (49 CFR 106−180).

2.7 Quality Assurance

QA Program requirements based on DOE Order 414.1C serve as the basis for the Management, Performance, and Assessment elements that are implemented for Monticello LTS&M project tasks. Table 2–11 identifies the current DOE-approved QA elements that apply to Monticello LTS&M activities.

Table 2–11. Quality Management System Requirements

Applicable QA Program Criteria and QA Instructions (QAIs)	
Management	
Criterion 1	**Quality Assurance Program**
QAI 1.1	QA Program Implementation
QAI 1.2	Development and Approval of QA Program Documents
QAI 1.3	Administrative and Technical Planning
QAI 1.4	QA Review of Documents That Implement the QA Program
QAI 1.5	Program Directives
Criterion 2	**Personnel Training and Qualification**
Criterion 3	**Quality Improvement**
QAI 3.1	Lessons Learned
QAI 3.2	Nonconformance Reporting, Disposition, and Closure
Criterion 4	**Documents and Records**
Performance	
Criterion 5	**Work Processes**
QAI 5.1	Instructions and Procedures
Criterion 6	**Design**
QAI 6.1	Design of Data Collection Programs
Criterion 7	**Procurement**
Criterion 8	**Inspection and Acceptance Testing**
Assessment	
Criterion 9	**Management Assessment**
QAI 9.1	Management Assessments
Criterion 10	**Independent Assessment**
QAI 10.1	Internal Independent Assessments
QAI 10.2	Surveillances
QAI 10.3	External Assessment Tracking and Response

The *Legacy Management CERCLA Sites Quality Assurance Project Plan* (DOE 2006b) has been developed to be consistent with DOE quality management system requirements (i.e., DOE Order 414.1C), 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 DOE-LM and subject to regulation by EPA. The QA Project Plan (DOE 2006b) has been prepared to assure that the administrative and technical work will be of sufficient quality to satisfy project objectives.

The QA Project Plan addresses both general and site-specific QA requirements. The general requirement may include

- QA Project Plan basis
  - —Purpose and scope
  - —Quality management system requirements and implementing documents
  - — QA Project Plan review, revision, and distribution
- Project management requirements
  - —Planning
  - —Quality objectives and criteria for measurement data
  - —Training
  - —Documentation and records
  - —Management of work processes and instructions, including:
    - inspections
    - corrective actions
    - reviews
    - control and use of measuring and test equipment
    - systems for purchased items and services
- Data Generation and Acquisition
- Quality Improvement, Assessment, and Oversight
- Data Validation and Usability

The Monticello-specific tabbed section of the document incorporates site-specific information such as:

- Project organization
- Regulatory interfaces
- Problem definition/background
- Status of the LTS&M Plan
- Quality objectives and criteria for measurement data
- Sampling process design
- Site-Specific Methods

3.0 LTS&M Procedures for DOE-Owned Property

This section provides the detailed plan by which DOE will conduct LTS&M activities at the DOE repository properties (repository). The repository comprises (1) the permanent disposal cell and associated 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 TSF, and (6) all other DOE property and support facilities within the DOE repository boundary (see Figure 3–1).

Site activities are divided into routine surveillance and maintenance of the surface conditions (Section 3.2), operation and management of the LCRS and LDS (Section 3.3) and TSF (Section 3.4). Information is provided to direct the on-site LM Representative 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 EPA and UDEQ, when required.

3.1 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 design of the disposal cell meets both the Utah Hazardous Waste Management Rules for disposal cell liners (*Utah Administrative Code* [UAC] R315-8) and the EPA minimum technology requirements for a RCRA Subtitle C cover, with project-specific enhancements.

The surface of the disposal cell covers approximately 90 acres; a clean-fill berm and runoff collection ditches define its perimeter. The disposal cell cover relies on the water storage capacity of a 5.5-foot (ft)-thick, fine-textured soil layer (sponge layer) overlying a sand-and-gravel capillary barrier (12 inches thick) to store precipitation while plants are dormant, and on evapotranspiration to remove stored water during the growing season. A gravel admixture in the upper 8 inches controls erosion and, functioning as a mulch, enhances seedling emergence and plant growth. The soil depth adequately protects the underlying RCRA components of the cover (compacted soil layer and synthetic geomembrane) from frost damage. 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 as an added deterrent should deeper burrowers, such as prairie dogs, move into the area in response to climate change. Fine-textured soil fills the interstices of the cobble layer. The topsoil layer has physical and hydraulic properties similar to those of the soil sponge and is capable of sustaining a diverse plant community. Figure 3–2 shows a sectional schematic view of the disposal cell cover. Nine settlement plates constructed into the cover are used in qualitatively assessing disposal cell performance (see Figure 3–1 for plate locations). 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.

The disposal cell is divided into two separate cells, east and west, each with an independent LCRS and LDS for collecting liquids that may drain from the encapsulated material. The liner system (see Figure 3–3) in each cell constitutes, from top to bottom, the primary LCRS, a

primary composite liner, an LDS, and a secondary composite liner. The entire system rests on a 12-inch-thick layer of prepared native soil. Each composite liner consists of a 60-mil (0.06-inch) high-density polyethylene (HDPE) geo-membrane overlying a geo-synthetic clay liner (GCL). 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 geo-net 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 3–4 is a schematic view of the disposal cell (and Pond 4) 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 present in the tailings when originally placed in the disposal cell, and water added during placement of the tailings, is expected to drain for as many as 20 years from the time of final tailings encapsulation in 1999. 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 specified in UAC R315-8. The liner system (see Figure 3–2) consists of a composite primary liner (HDPE membrane overlying geo-synthetic clay liner) that overlies a geo-net LCRS that is underlain by a secondary HDPE liner. The secondary HDPE liner is underlain by a geo-net LDS that in turn overlies a second composite liner. The LCRS and LDS sumps are equipped with a submersible pump to return 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, sensors, and communication devices to monitor water levels in the sumps, operate the pumps, and transmit the monitoring and pumping information to a computer database maintained at the DOE-LM office in Grand Junction, Colorado. These hardware and software components comprise the site “telemetry system” and allow remote viewing of the monitoring data in real time or historically. Access to the LCRS and LDS monitoring stations permits manual operation of the pumps and manual recording of flow meter information should that become necessary. Two inspection ports (see Figure 3–1) provide access for camera inspection of the central collection pipes of the disposal cell LCRS.

A complete set of the construction design plan specifications for the Monticello repository is located at the information repository at the Monticello Field Office and at the DOE-LM office in Grand Junction, Colorado.

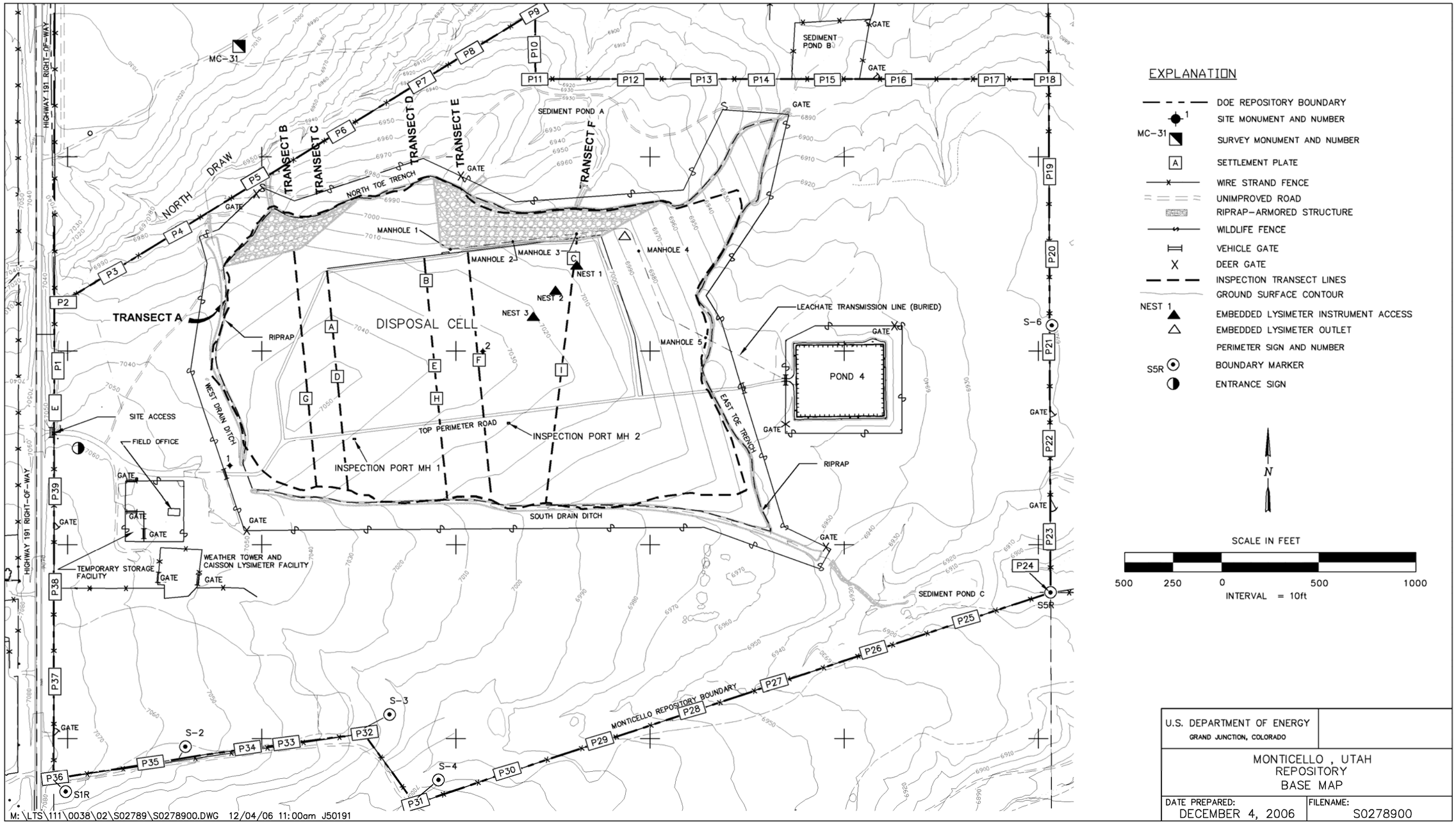

Figure 3–1. Monticello, Utah, Repository Base Map

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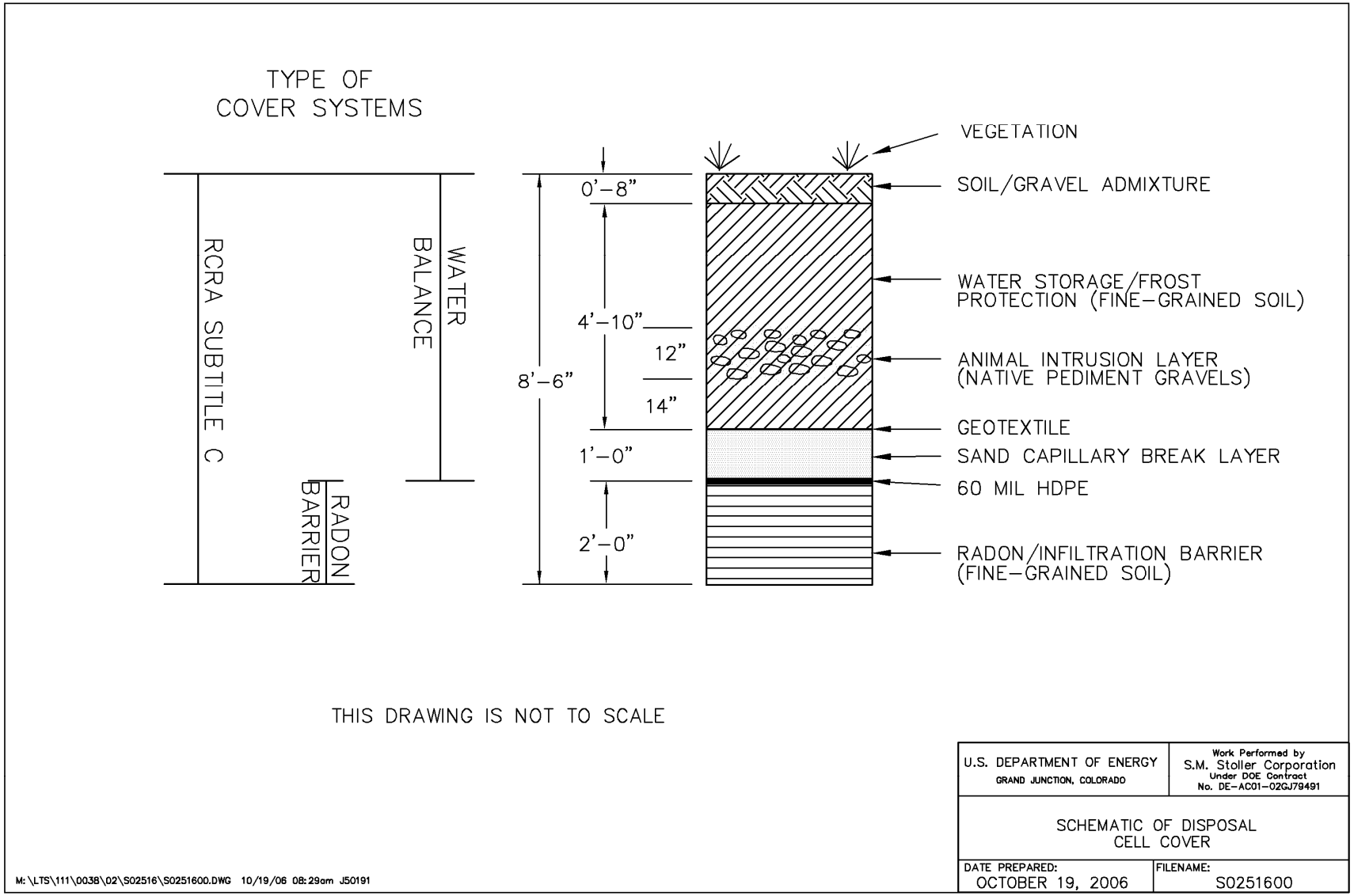

Figure 3–2. Schematic of Disposal Cell Cover Design

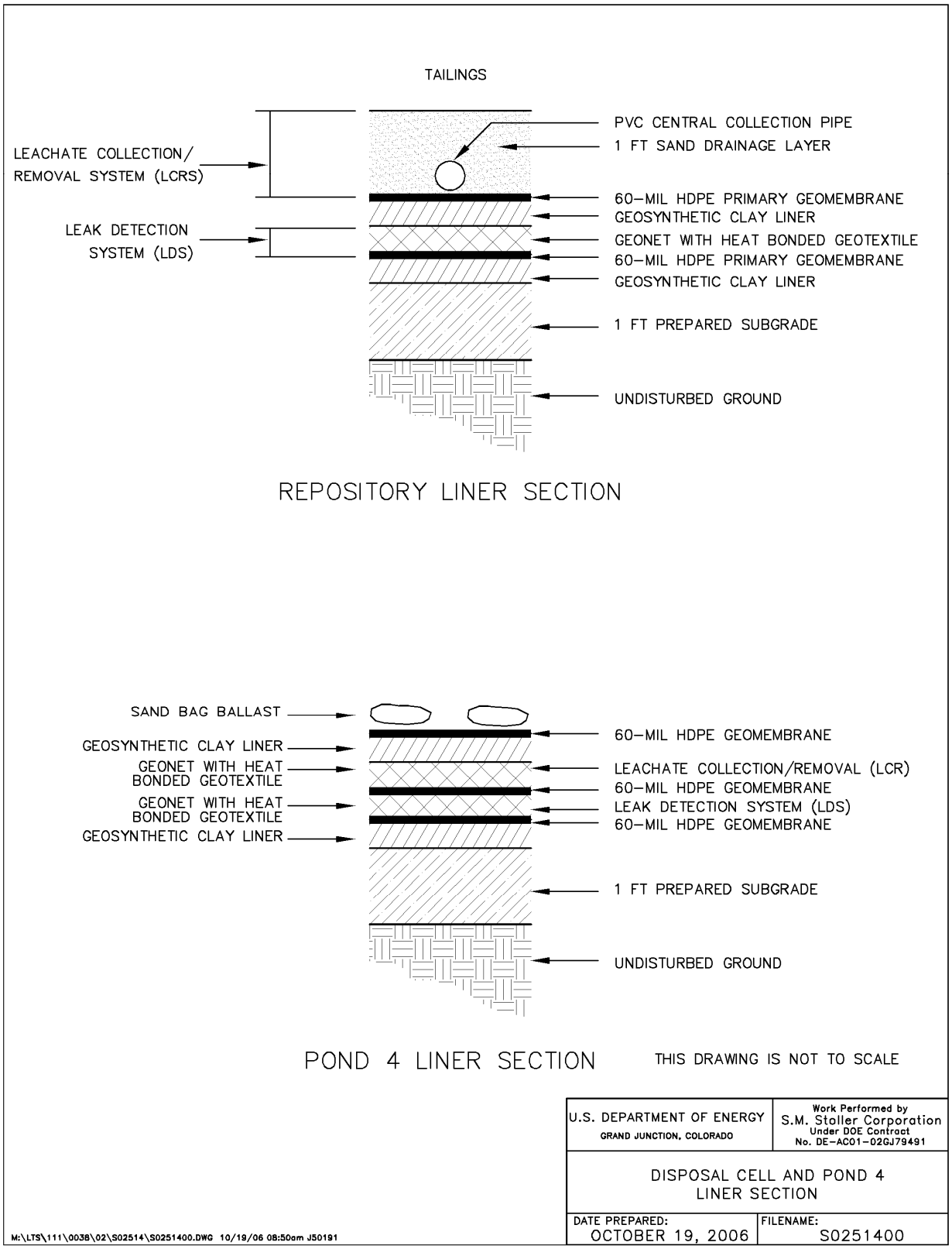

Figure 3–3. Disposal Cell and Pond 4 Liner Sections

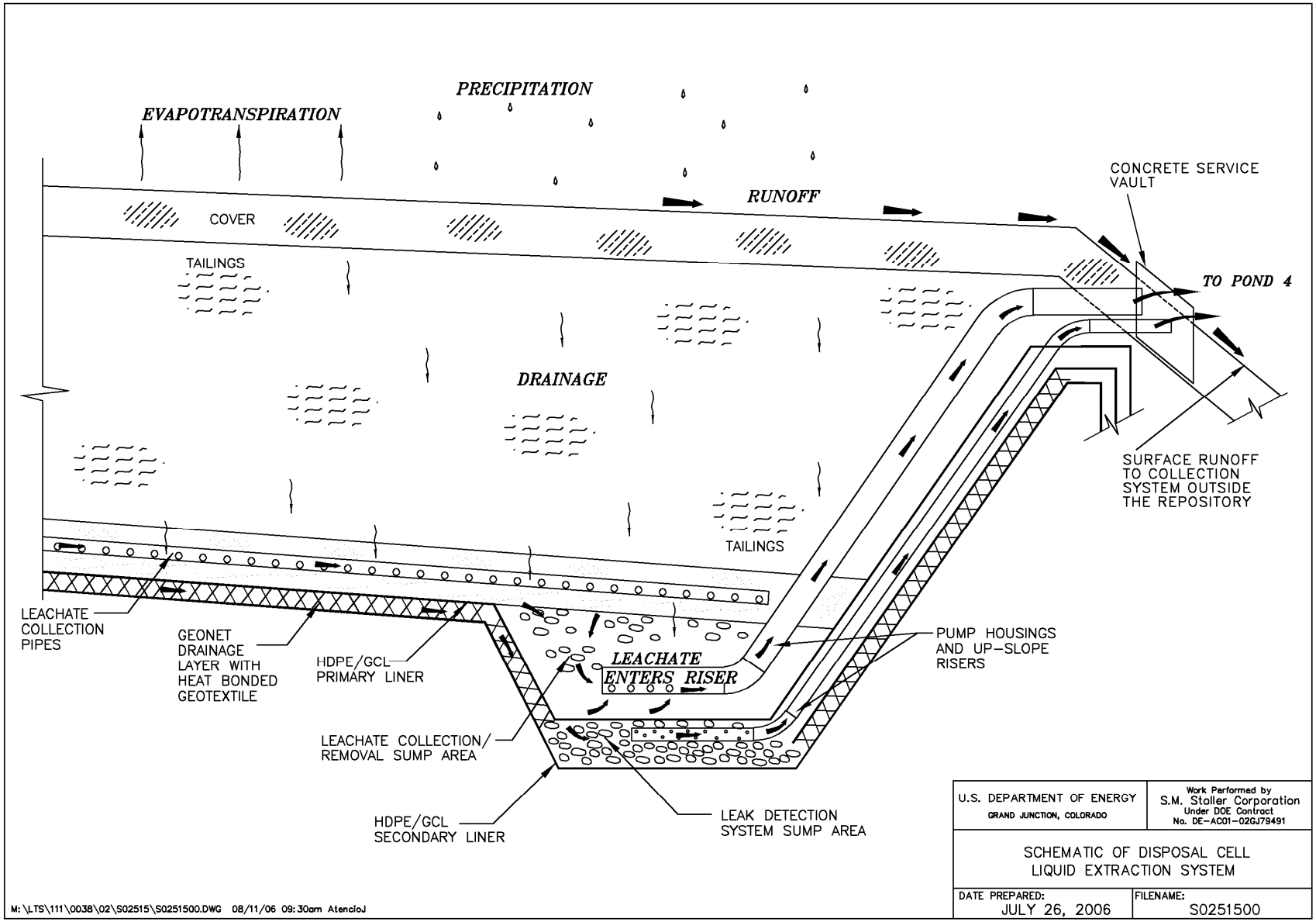

Figure 3–4. Schematic of Disposal Cell Liquid Extraction System

3.2 Routine Surveillance of the Monticello Repository

This section describes routine surveillance by the on-site LM Representatives 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, 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 5-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 Section 6.0).

3.2.1 Responsibilities

Monticello LM Representative—Responsible for (1) conducting routine surveillance and reporting of repository site conditions, (2) conducting routine custodial maintenance, and (3) notifying the Site Manager of maintenance requiring subcontractor services or additional resources to those available on site.

Site Manager—Responsible for (1) ensuring that routine surveillance is conducted in accordance with procedures described below, (2) procuring resources beyond those of the Monticello LM Representative for maintenance items as needed, and (3) informing the DOE-LM Monticello Project Manager of conditions requiring additional resources or possible regulatory guidance.

3.2.2 Repository Area Surveillance Procedure

The Monticello LM Representative 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 in the checklist on Figure 3–5. Routine surveillance will include visual inspection primarily for evidence of desiccation or settlement (such as fissures), wind scouring or gully erosion, down-slope movement of rock armoring, general health of vegetation, cover disturbance by burrowing animals, undesirable vegetation, human trespass, and intact fencing and signage.

The Monticello LM Representative shall monitor the condition of the disposal cell and surrounding area on a **monthly** basis as follows:

- Obtain a copy of the surveillance checklist (Figure 3–5).
- 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 (see Figure 3–1) and visually inspect items on the checklist.
- Photograph erosion features within the fenced site boundary and record them in the Repository Site record book.

Repository Area Surveillance Checklist

_____ Monthly Surveillance _____ Quarterly Surveillance (Feb., May, Aug., Nov.)

_____Storm Event Triggered Surveillance due to ____ inches of rainfall over the past 24 hours.

Inspection Item	Acceptable (Yes/No)	Comments and Recommendations
Condition of:		
Fences and gates	_____	_____
Roads[a]	_____	_____
Signs	_____	_____
Site monuments	_____	_____
Drainage ditches[a]	_____	_____
Manholes	_____	_____
Vegetation	_____	_____
Evidence of erosion of:		
Top of disposal cell[a]	_____	_____
Disposal cell sideslopes[a]	_____	_____
Ditches	_____	_____
Surrounding area	_____	_____
Evidence of:		
Vandalism	_____	_____
Intrusion by livestock	_____	_____
Burrowing animal damage	_____	_____
Intrusion by humans	_____	_____
Accumulation of trash	_____	_____

Additional Quarterly Surveillance Requirements

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

Condition of:		
Settlement plate structures	_____	_____
Manholes[b]	_____	_____
Sediment Ponds	_____	_____
Evidence of:		
Structural Instability	_____	_____

Additional Comments

_____

_____

_____

Signature_____ Date _____

Monticello LM Representative

[a]Inspections required following a significant storm event

[b]Open to inspect quarterly

Figure 3–5. Example Repository Area Surveillance Checklist

- 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:

  —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 a signed photocopy of the checklist in the Monticello Field Office and provide the original to the Site Manager.

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 3–1, 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. Appendix D provides color photographs of the Utah- and San Juan County-listed noxious and undesirable weeds.
- On Transect A (perimeter of the disposal cell) give particular attention to the steep, rock-armored slopes (see Figure 3–1) for evidence of instability (displaced riprap, knickpoints, intrusion points, 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 field marked and located on a map to easily find the area of concern during follow-up visits.
- Inspect all manhole exteriors for damage. Open manhole covers and inspect for damage (manhole locations are shown in Figure 3–1).
- Inspect the condition of the settlement plate surface completions.

- Record the results/observations of the surveillance on the checklist at the time of inspection, noting that Transects A–F were inspected.
- Maintain a signed copy of the checklist in the on-site Field Office and provide the signed original to the Site Manager.

3.2.2.1 Entering Manholes

There are five manholes within the repository area. Manhole 1 and Manhole 3 in Figure 3–1 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 and maintenance, and data collection. The remaining manholes (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 provide access for camera inspection of the central collection pipes of the disposal cell LCRS. Only Manholes 1 and 3 require routine access.

The interior of Manholes 1 and 3 are non-permit required confined spaces; and are designated radioactive controlled areas. 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. The LM Representative, acting as RCT and Site Safety Supervisor, shall ensure adherence to the following entry and exit procedures for Manholes 1 and 3.

To enter Manhole 1 or 3, the Monticello LM Representative shall:

- Open the cover of the manhole and secure the latch.
- Ensure that a qualified co-worker with a communication device (radio or cell phone) remains outside of the manhole to assist in an emergency.
- While outside of the manhole, ventilate the manhole airspace by placing the 8-inch exit duct of the ventilation fan into the manhole at the level where work will be conducted. Ensure that the intake of the fan remains outside of the manhole. Plug the fan into the electrical outlet provided near the top of the manhole and ventilate for a minimum of 15 minutes. This procedure is also addressed in the current job safety analysis kept at the on-site LM Field Office.
- Entry into the manhole is allowed only if the oxygen concentration is greater than 19.5 percent oxygen by volume. Oxygen content of the manhole atmosphere is determined using an appropriate measuring device (MSA Combustible Gas and Oxygen Alarm meter, or equivalent). The operating procedure for the instrument is retained at the on-site LM Field Office.
- If the oxygen concentration is less than or equal to 19.5 percent, ventilating the manhole with the fan is to continue. Upon obtaining greater than 19.5 percent oxygen, personnel may enter the manhole.
- Follow the appropriate procedures for entry into a radioactive controlled area.
- The fan shall remain in operation at all times while personnel are in the manhole. In addition, the Monticello LM Representative shall continue monitoring the oxygen content

to ensure that it exceeds 19.5 percent. If the oxygen content falls below 19.5 percent, all personnel shall be evacuated immediately from the manhole.

- Conduct work in the manhole as necessary.
- Follow the appropriate procedures for exiting a radioactive controlled area.
- Upon exit, remove ventilation equipment, and close and lock the manhole cover.

Note: Entry and exit procedures specific to radioactive controlled areas are included in the current DOE-LM-approved radiological control manuals. Updated manuals are provided to all RCT personnel.

Note: Manholes 2, 4, and 5 are permit-required confined spaces. Manholes 2, 4, and 5 will not be entered without first meeting the appropriate entry requirements as determined through the Health and Safety Manager. In the event that entry into Manholes 2, 4, and 5 is necessary, the on-site representative will notify the Site Manager. The Site Manager will inform the Health and Safety Manager of the need to initiate the process of permitting the entry.

3.2.2.2 Meteorological Monitoring

The Monticello LM Representative shall monitor meteorological conditions (wind speed, wind direction, temperature, barometric pressure, and precipitation) using the on-site automated weather station. 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 Site Manager. A reference copy is retained at the site.

3.2.2.3 Repository Surveillance Triggered by a Storm Event

In addition to routine (i.e., **monthly** and **quarterly**) monitoring, the Monticello LM Representative shall conduct a surveillance of the repository after each 25-year storm event. After significant precipitation events, the Monticello LM Representative shall check the rain gauge at the TSF.

If 2.8 inches or more of rain falls within a 24-hour period (equivalent to a 25-year storm event), ***then***

—Obtain a copy of the checklist provided in Figure 3–5.

—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.

3.2.3 Pond 4 Monthly Surveillance

The Monticello LM Representative shall monitor the condition of Pond 4 on a **monthly** basis as follows:

- Obtain a copy of the checklist in Figure 3–6. 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

  —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. These plants are listed and shown in Appendix D.
- Evaluate the need for maintenance actions. Conduct minor maintenance actions as appropriate. Notify the Site Manager 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 Site Manager.

3.2.4 Corrective Action

The Monticello LM Representative shall conduct or report necessary maintenance activities identified as a result of monthly and quarterly surveillances. The Monticello LM Representative 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 burning or removing tumbleweeds.

The Monticello LM Representative 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 LM Representative will (1) notify the Site Manager of maintenance requiring outside resources (for example, repair of significant erosion) who will then initiate the procurement process for any necessary repairs, and (2) notify the Site Manager of other evidence of site degradation (for example, poor plant health on the disposal cell cover) who will then notify the DOE-LM Monticello Project Manager to determine the appropriate corrective action in consultation with EPA and UDEQ.

Monthly Pond 4 Surveillance Checklist

Level of Water in Pond 4 _____

Inspection Item	Acceptable (Yes/No)	Comments & Recommendation
Condition of:		
Fences, gates, and locks	_____	_____
Roads	_____	_____
Signs	_____	_____
Visible piping	_____	_____
Visible liner and anchors	_____	_____
Rescue equipment	_____	_____
Evidence of erosion of:		
Top of Pond 4 berm	_____	_____
Pond 4 sideslopes	_____	_____
Ditches	_____	_____
Surrounding area	_____	_____
Seepage from Pond 4	_____	_____
Overtopping of Pond 4	_____	_____
Evidence of:		
Vandalism	_____	_____
Intrusion by wildlife	_____	_____
Intrusion by humans	_____	_____
Accumulation of trash	_____	_____

Additional Comments

_____

_____

_____

_____

_____

Monticello LM Representative _____ Date_____

Figure 3–6. Example Checklist for Monthly Pond 4 Surveillance

3.2.5 Emergency Measures

Extreme natural events or purposeful intrusion at the site may warrant emergency action. Because the Monticello LM Representative is on site during normal working hours, it is anticipated that he/she will be directly aware, or informed by the general public, of an emergency situation. In emergency situations, the Monticello LM Representative shall follow the requirements of the current DOE-approved LM project safety plan available at the Field Office. At a minimum, this will require placing a call to the 24-hour telephone number at the DOE-LM Office in Grand Junction ([970]-248-6070) for notification. Telephone numbers for the Monticello LM Representatives (cellular and Monticello Field Office) and the DOE Grand Junction 24-hour telephone number are posted at the Repository entrance gate and on the Pond 4 gate for use by the general public. See also Section 2.1.1 of this plan for additional contact information.

The Monticello LM Representative will document any emergency condition in the Repository Site record book. The information recorded should include the identity of the individual(s) reporting the conditions, nature of the conditions, immediate actions taken, and as appropriate, any notifications made to local entities and contractor management.

3.2.6 Notifications

The Monticello LM Representative shall notify the Site Manager of any emergency situations. The Site Manager will notify the DOE-LM Monticello Project Manager. DOE will notify EPA and UDEQ **within 24 hours** upon discovery of an emergency or situations that potentially affect the integrity of the site. The Monticello LM Representative will document, in the Repository Site record book, any directions (e.g., additional actions or notifications to be made) resulting from the initial notification to the Site Manager.

3.2.7 Summary of Repository Surveillance and Reporting Requirements

As described in this section, the 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 Site Manager (reference copies maintained at the site).
- Monthly summary report of meteorological monitoring data submitted to the Site Manager; reference copy maintained at the site.
- Results of inspections or actions taken due to special event conditions.

3.3 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 the site-specific action levels are triggered. All LCRS and LDS action levels, approved by EPA and UDEQ, are formally developed in *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998), included as Appendix E to this plan. The action levels 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. Action levels and appropriate response actions are identified for the disposal cell and Pond 4 in Sections 3.3.3 and 3.3.4, respectively.

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 DOE-LM office in Grand Junction, Colorado. The Monticello telemetry system is integrated with the DOE-LM SOARS (System Operations and Analysis at Remote Sites) system, which allows real-time desktop viewing of data logging installations deployed at numerous DOE-LM facilities, including the Monticello site. In the event of a failure of the Monticello repository telemetry system, on-site 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 3−1.

Table 3–1. Normal Operating Conditions for LCRS and LDS Sumps

Operating Parameter	Repository: height above base of sump (feet)		Pond 4: height above base of sump (feet)		Comment
	LCR	LDS	LCR	LDS	
Sump ceiling	3.0	3.0	2.5	1.5	Sump dimensions from as-built drawings.
High water level alert	2.9	2.9	2.4	1.5	Identifies pump or pump control failure.
Pump on water level	2.8	2.8	2.3	1.4	Maintain water level below sump ceiling.
Pump off water level	0.7	0.7	1.0	0.8 approx	Maintain 0.1 foot water top of above pump intake
Low water level alert	0.3	0.3	0.5	0.5	Identifies possible leakage through sump liner.
Sump capacity (gallons)	2,000	324	145	50	Sump capacities from design calculations.

Note: Pond 4 LDS is not equipped for automated pump operation. LTSM operators will manually activate Pond 4 LDS pump when water level reaches to 0.1 foot of sump ceiling. Pumping will discontinue when the water level reaches pump intake.

3.3.1 Responsibilities

Monticello LM Representative—Responsible for 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.

Site Manager—Responsible for ensuring that LCRS and LDS operational procedures are implemented by the Monticello LM Representative, and for implementing appropriate response actions when established action levels are exceeded.

DOE-LM Monticello Project Manager—Responsible for interfacing with EPA and UDEQ.

3.3.2 Disposal Cell and Pond 4 LCRS and LDS Operation

To operate the disposal cell and Pond 4 LCRS and LDS, the Monticello LM Representative shall:

- On a **weekly** basis, the on site operator shall confirm that the telemetry system is functioning properly and document the information in the appropriate record book.
  - —If the system has failed, the operator will immediately notify the Site Manager 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 Site Manager of anomalous monitoring data (for example, abrupt increase in disposal cell or Pond 4 water levels or pumping rates).
- Follow the appropriate response actions in Section 3.3.3 through 3.3.6.

3.3.3 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 3–1).

3.3.3.1 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.

3.3.3.2 Water in the Disposal Cell LDS Is Less Than the Action 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 LM Representative 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 Site Manager will be notified.

- The Site Manager shall confirm the leakage rate and notify the DOE-LM Monticello Project Manager.
- The DOE-LM Monticello Project Manager will notify EPA and UDEQ of leakage into the LDS.
- At the direction of DOE and in consultation with EPA and UDEQ, the Site Manager 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 DOE-LM-approved sampling and analysis protocol and on a review of historical information on wastes placed in the disposal cell and tailings pore fluid composition.

3.3.3.3 Water in the Disposal Cell LDS Is Greater Than the Action 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 3.3.3.2 will be followed, and
- At the direction of DOE and in consultation with EPA and UDEQ, the Site Manager will implement the appropriate contingency actions identified in *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998) (see Appendix E of this plan).

3.3.4 Action Levels and Response Actions for Pond 4 LCRS and LDS

The established action-level leakage rate for the Pond 4 LCRS and LDS are 851 gpad (2,000 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.

3.3.4.1 Water in Pond 4 LCRS Is Less than the Action Leakage Rate

The Monticello LM Representative will recirculate any water collected in Pond 4 LCRS to Pond 4 by pumping.

3.3.4.2 Water in Pond 4 LCRS Is Greater Than the Action Leakage Rate

If the rate of leachate inflow into the LCRS is greater than the action level:

- The Monticello LM Representative will confirm that leachate is entering the LCRS by checking the LCRS pump, controls, and meter for proper operation. Deficiencies will be identified and corrected at that time, if possible, and the Site Manager will be notified.
- The Site Manager shall confirm the leakage rate and notify the DOE-LM Monticello Project Manager.
- The DOE-LM Monticello Project 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 Site Manager will implement the appropriate contingency actions identified in *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998) (see Appendix E of this plan). These actions do not include water quality sampling.

3.3.4.3 No Water in Pond 4 LDS

If the Pond 4 LDS remains dry on a consistent basis, DOE may contact EPA and UDEQ to discuss changing the monitoring frequency.

3.3.4.4 Water in Pond 4 LDS Is Less Than the Action Leakage Rate

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

- The Monticello LM Representative will check LDS pump, controls, and flow meter for proper operation, correct deficiencies as required, and notify the Site Manager of the condition.
- The Site Manager shall confirm the leakage rate and notify the DOE-LM Monticello Project Manager.
- The DOE-LM Monticello Project Manager will notify EPA and UDEQ of leakage into the LDS.
- At the direction of DOE and in consultation with EPA and UDEQ, the Site Manager will develop an appropriate sampling and analysis plan to characterize the composition of the LDS liquid. **Note:** The plan will be based on the then-current DOE-LM-approved sampling and analysis protocol and on review of historical information on wastes placed in the disposal cell and tailings pore fluid composition.

3.3.4.5 Water in Pond 4 LDS Is Greater Than the Action 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:

- Response actions identified in Section 3.3.4.4 will be followed, and
- At the direction of DOE and in consultation with EPA and UDEQ, the Site Manager will implement the appropriate contingency actions identified in *Repository and Pond 4 Groundwater Contingency Plan* (DOE 1998) (see Appendix E of this plan).

3.3.5 LCRS and LDS Water Management Reporting Requirements

Once **each quarter**, the Monticello LM Representative will prepare and submit to the Site Manager 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 exceedences, and response actions. The Site Manager will report LCRS and LDS water management information to the DOE-LM Monticello Project Manager for forwarding to the regulators on a **quarterly** basis.

3.3.6 Summary of Repository Operating and Reporting Requirements

- Weekly documentation by the Monticello LM Representative of disposal cell and Pond 4 LCRS and LDS telemetry system operation.
- Weekly tabulation and graphing by the Monticello LM Representative of disposal cell and Pond 4 LCRS and LDS monitoring data.
- Prompt notification by the Monticello LM Representative of system failure or anomalous data to the Site Manager.
- Quarterly reporting of monitoring results to the Site Manager. Quarterly reporting by Site Manager 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.

3.4 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 LTS&M office (see Figure 3–1). The TSF 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 and is designed for access by dump trucks and front-end loaders. The area also has a support building for tool storage and drums for temporary storage of radiologically contaminated material that contains other hazardous substances (mixed waste). Mixed waste recognition criteria and management practices are provided in Section 4.3.3 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 on-site response actions at CERCLA sites, as specified at 40 CFR 300.440(e). If mixed waste is encountered, the Site Manager will direct an Environmental Specialist to develop a management plan specific to that waste to address the substantive requirements for the transportation, temporary storage, inspections, markings, and ultimate disposal.

3.4.1 Responsibilities

Monticello LM Representative—Responsibilities include (1) ensuring that all personnel entering the TSF are trained and/or escorted in accordance with the entry requirements listed in Table 2−5 of this plan, (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 record-keeping 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 LM Representative or Environmental Specialist in transporting and handling radiologically contaminated TSF materials.

Site Manager—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 LM Representative.

Environmental Specialist—DOE contractor personnel 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 Ra-226 concentrations equal to or greater than 130 pCi/g.

3.4.2 TSF Entry and Exit

The Monticello LM Representative 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 LM Representative is not present.
- Ensure that all persons entering the TSF complete the required information in the entry log of the TSF Record Book. Figure 3–7 shows the template for the entry log.
- Record entries in the TSF Record Book legibly and with indelible ink.
- Upon exiting the TSF, note the time in the entry log section of the TSF Record Book.
- Lock the gate after exiting the TSF.

3.4.3 TSF Inspections

On a **quarterly** basis and following a significant weather event, the Monticello LM Representative 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 TSF Record Book to ensure that radiological monitoring has been conducted and documented in accordance with Section 3.4.5.
- Record results of the inspection and applicable notations in Inspection Report section of the TSF Record Book (see Figure 3–8).

Monticello Long-Term Surveillance and Maintenance
Temporary Storage Facility Record Book
Entry Log

Name (Print)	Company	Date	Time In	Time Out	Purpose/Comment

Monticello Long-Term Surveillance and Maintenance
Temporary Storage Facility 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 postings 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 3–8. TSF Record Book Inspection Report

3.4.4 Radiological Control

The entire TSF is a controlled area. The TSF perimeter fence shall be posted with signs containing the following information: "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 DOE-LM-approved Radiological Control Manual maintained by the contractor.

The TSF is divided into:

- A concrete bin where radiologically contaminated material is stored.
- A drum storage area.
- A storage shed for storage of nonradiologically contaminated 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 Ra-226. 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 on-site LM Representative shall post and manage the soil contamination area, or contamination area, as appropriate, in accordance with specific procedures included in the current DOE-LM-approved Radiological Control Manual. Updated manuals are provided to all RCT personnel.

3.4.5 Radiological Monitoring of the TSF

The Monticello LM Representative 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 material for storage and after transporting stored material off site. The TSF perimeter and affected work areas will be surveyed and the results documented on radiological survey form shown in Figure 3–9.

  —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 TSF Record Book. Retain the original survey form for processing with Health and Safety radiological records.

Radiological Survey Map

Page 1 of _____

RWP No._____ Purpose Scan for contamination levels Technician _____ Date_____

Address/Building No. Monticello TSF Storage Area Reviewer _____ Date_____
(print and sign)

Time _____ Site ID No. _____

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

No.	Instrument Model	Serial No.	Probe Model	Probe Serial No.	Calibration/Correction Factor
1	Ludlum L - 12	S -	Ludlum 44 - 9	S -	
2					
3					

Standarized Symbols for Surveys

- ▢ = Tape press (4"x4") (no. inside)
- ○ = Smears (no. inside)
- ○ = Large area smears
- △ = Air samples (no. inside)
- ▭ = Neutron readings in mrem/hr unless otherwise noted
- — = Gamma readings in μrem/hr unless otherwise noted (beta readings also)
- * = Contact readings (dose rate)
- HS = Hot spot
- SOP = Step-off pad
- K = Reading at knee level (when sources from overhead)
- H = Reading at head level (when sources from overhead)
- - - - - = Contaminated area
- XXXXX = Radiation area
- -x-x-x- = Contaminated/radiation area
- RM = Radioactive material area
- ⊗ = Floor drain
- ccpm or ncpm = Corrected or net cpm (gross back-ground) for direct frisk, alpha or beta/ gamma specified
- # = Direct frisk

Highest Dose Rates

General Area _____
Contact _____

Highest Contamination Level

Fixed _____
Loose _____

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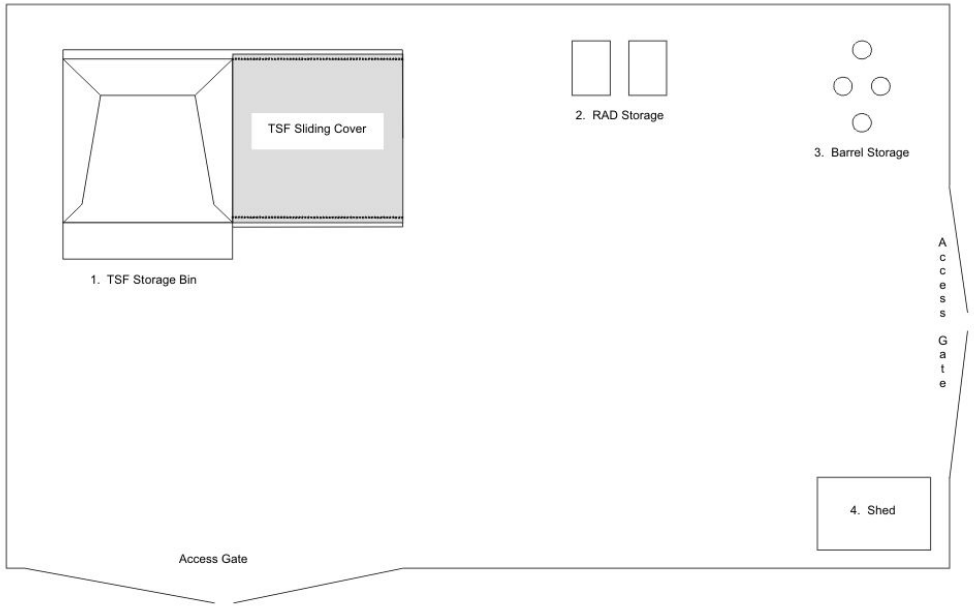

File Index No._____

Figure 3–9. Radiological Survey Form

Radiological Survey Map (continued)

Page 2 of _____

Item Surveyed	Location Surveyed	Direct Survey			Smear Survey			Release (Yes/No) (C/UC)[c]	Inst. No. Used	Remarks (Released to)
		Gross Count Rate (cpm)	Net Count Rate (cpm)[a]	Total Activity[b] (dpm/100 cm^2)	Gross Count Rate (cpm)	Net Count Rate (cpm)[a]	Total Activity (dpm/100 cm^2)			
1	TSF Storage									
2	RAD Storage									
3	Barrel Storage									
4	Shed									

Remarks _____

[a]Net count rate = gross count rate minus background count rate. [b]See Table 2–2 ofSite Radiological Control Manual (STO 3). [c]C = conditional release; UC = unconditional release.

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Figure 3−9 (continued). Radiological Survey Form

3.4.6 TSF Waste Types

The Monticello LM Representative shall ensure that only the following material is transferred to and stored at the TSF:

- Radiologically contaminated material.
- Mixed waste as directed by the Environmental Specialist.

3.4.6.1 Mixed Waste TSF Management

The Monticello LM Representative shall adhere to the management plan that will be developed by the Environmental Specialist in accordance with Section 4.3.3 of this plan, "Suspected Mixed Waste," for recognition, transfer, storage, and management of mixed waste.

3.4.7 Transfers of Radiologically Contaminated Material to the TSF

Before transferring radiologically contaminated material from supplemental standards areas to the TSF, the Monticello LM Representative 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 Ra-226, the material is DOT Radioactive Material (RAM) and is subject to DOT shipping regulations. If material exceeding 27 pCi/g Ra-226 is to be taken to the TSF, the Monticello LM Representative will first notify the Site Manager, who will then enlist the support of an Environmental Specialist or DOT certified shipper to perform the calculations of bulk and average activity and to prepare the appropriate documentation by the procedures provided in Appendix H. The Monticello LM Representative will provide the Environmental Specialist or DOT certified shipper with the necessary specific activity measurement results, in pCi/g Ra-226, and the associated volumes of material, as recorded in the appropriate supplemental standards record book and/or the delta scintillometer field data form (see Appendix F). Material that is not DOT regulated (< 27 pCi/g Ra-226) will be transported to the TSF using the "best management practice" guidelines provided in Appendix H to prevent dispersal of contamination to the environment and unnecessary exposure. Section 4.2 contains detailed radiation control procedures for supplemental standards areas.

Authorized city of Monticello workers, under the direction and presence of the Monticello LM Representative, will:

- Transfer all radiologically contaminated material to the concrete bin except for known mixed waste materials (see Section 4.3.3).
  - —Transfer of small, localized quantities of radiologically contaminated material or point sources (i.e., ore) may be transported and transferred by the LM Representative if the material is properly contained during transport.
- When radiologically contaminated material with Ra-226 concentrations less than 130 pCi/g are transferred,
  - —Clean out the transport vehicle and equipment used to transfer the material with a broom to the extent that 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 Ra-226 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. The Radiological Control Manager is identified in Appendix A. **Note**: The Monticello LM Representative 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 TSF Record Book, including volume and activity of the material transferred (see Figure 3–10).

3.4.8 Transfers of Radiologically Contaminated Material from the TSF to the Grand Junction Disposal Site

When the concrete bin approaches 75 percent 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 Disposal Site near Whitewater, Colorado, is the facility designated for disposal of radiologically contaminated material from the TSF.

The Monticello LM Representative shall:

- Notify the Site Manager that the concrete bin is approaching 75 percent of capacity.
- Contact the Utah Division of Radiation Control to provide a courtesy notification of the impending shipment.
- Coordinate with the City for availability of City workers and equipment to load the trucks once a transport subcontractor has been procured.
- Oversee on-site activities during the transfer of TSF material to the transport vehicles.
- Make applicable material transfer notations in the Material Transfer section of the TSF Record Book.

Upon notification by the Monticello LM Representative that the TSF is approaching 75 percent capacity, the Site Manager will enlist an Environmental Specialist or DOT certified shipper to perform the calculations of bulk and average activity and to prepare the appropriate documentation by the procedures provided in Appendix H. The Monticello LM Representative will provide the Environmental Specialist or DOT certified shipper with the necessary specific activity measurement results, in pCi/g Ra-226, and the associated volumes of material, as recorded in the appropriate supplemental standards record book and/or the delta scintillometer field data form (see Appendix F) and/or the TSF Material Transfer Log (Figure 3–10). The Environmental Specialist or DOT certified shipper may request the Monticello LM Representative to additionally scan the stockpiled material in the TSF. The Site Manager or designee will procure a qualified transport subcontractor to haul the material from the TSF to the Grand Junction Disposal Site, or other off-site permanent disposal facility, once the appropriate shipping requirements are determined. Material that is not DOT regulated (<27 pCi/g Ra-226) will be transported from the TSF using the “best management practice” guidelines provided in Appendix H to prevent dispersal of contamination to the environmental and unnecessary exposure.

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

Estimated Volume in Cubic Yards	Activity in pCi/g Ra-226[a]
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Comments:_____

_____

_____

_____

[a](from appropriate supplemental standard property record book)

Signature of DOE-LM Representative_____

Figure 3–10. TSF Material Transfer Log

End of current text

4.0 LTS&M Procedures for Non-DOE-Owned Property

This section identifies the LTS&M activities that DOE will conduct at the former DOE-owned properties that were deeded to the city of Monticello in June 2000 (DOE 2000), and at other privately owned or municipal MMTS and MVP properties requiring LTS&M. Table 4–1 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 4–1.

Table 4–1. Non-DOE-Owned Properties Requiring LTS&M

MMTS City-Owned Non-Supplemental Standards Properties			
MP−00181 and MS−00893 (former millsite)	MP−01040 (north portion only)	MP−01042	MP−00211
MMTS City and Privately Owned Supplemental Standards Properties			
MP–00391[a]	MP–01041[a]	MG–01026[b]	MG–01030[b]
MP–00951[b]	MP–01077[a]	MG–01027[b]	MG–01033[b]
MP–00990[b]	MP–01084[b]	MG–01029[b]	
MMTS Privately Owned Non-Supplemental Properties			
MP−00179 and MP−00947			
MVP Supplemental Standards Properties			
MS–00176[b]	City Street and Utility Rights of Way	UDOT Highways 191 and 491 (formerly 666) Rights Of Way within the City	

[a]City property
[b]Private property

4.1 Institutional Controls

Each property identified in Table 4–1 is affected by one or more institutional control that restricts land or ground water use, or both, as summarized in Table 4–2. The five categories of institutional control applied to the Monticello NPL sites are (1) restrictive easements on City-owned property transferred from DOE, (2) radiological control at public road and utility excavations, (3) zoning restrictions, (4) restrictive easements on privately owned property, and (5) a ground water restricted area. DOE will conduct specific LTS&M activities to ensure that these controls remain effective in protecting human health and the environment. Each control is summarized under the following subheadings.

4.1.1 Restrictions on City Properties Transferred from DOE

The transfer of approximately 380 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. To protect public health, DOE placed a restrictive easement on the transferred property where the underlying ground water 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 4–2, removal of soil and use of the shallow aquifer is prohibited on specific parcels. A land-use map illustrating the applicable restrictions to the

Table 4–2. Summary of Current MMTS and MVP Institutional Controls

DOE Property ID	Covenant Deferral Property Restrictive Easement[a]					Ground Water Restricted Area[b]	Private Property Restrictive Easements				Other
	Public Day - use Recreation	No habitable structures	No camping	No soils removal from the property	No wells in the alluvial aquifer	No wells in the alluvial aquifer	No construction of habitable structures	No removal of contaminated soils	No Camping	Special Zoning District for building permit	No unauthorized removal of soils
MP−00181[c]	X	X	X		X	X					
MP−00893[c]	X	X	X		X	X					
MP−00391[d]	X	X	X	X			X	X	X		
MP−01077[d]	X	X	X	X	X		X	X	X		
MP−01040 (North Portion)	X	X	X								
MP−01041[d]	X	X	X	X			X	X	X		
MP−01042	X	X	X								
MG−00951[e]						X	X	X			
MG−01084[e]						X	X	X			
MG−00990[e]						X	X	X			
MG−01033[e]						X	X	X			
MG−01026[e]							X	X			
MG−01027[e]							X	X			
MG−01029[e]							X	X			
MG−01030[e]							X	X			
MS−00176[f]							X	X		X[g]	
MP−00211						X				X[g]	
MP−00179						X					
MP−00947						X					
City Streets & Utilities											X[g]
Highways 191 & 491											X[g]

[a]Properties transferred from DOE to city of Monticello
[b]Properties within the Ground Water Restricted Area
[c]Former Millsite properties
[d]Government-owned Piñon/Juniper Supplemental Standards Properties (MP−01042 is a non-Supplemental Standards Property transferred to the City)
[e]Upper, Middle, and Lower Montezuma Creek Supplemental Standards Properties
[f]Privately owned Piñon/Juniper Supplemental Standards Property
[g]Radiological control performed on all excavations

transferred properties is provided as Figure 4–2. Consistent with the conditions of the transfer, the former millsite 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 (Figure 4–3).

4.1.2 Restrictions on Public Roads and Utilities

Within this category are the properties historically known as "City Streets and Utilities", and "Highways 191 and 491 Rights-of-Way". These are supplemental standards properties (DOE 1999b and 1999c, respectively) that are managed by controlling residual radioactive material encountered during City or UDOT excavations within Monticello city limits. Under the Cooperative Agreement with the City of Monticello (DOE 1999d) 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.

Institutional controls affecting these properties include DOE-conducted scans of the highway, city street, and utility excavations for radioactive material. Radiologically contaminated material (≥ 5 pCi/g Ra-226) encountered in a City excavation is removed and transferred to the TSF, or is stockpiled temporarily at City-owned property MS−01006−VL, a vacant parcel south off Highway 491 at the city limits (see Figure 4–1 for location). At the option of UDOT, through a Memorandum of Understanding between DOE and UDOT (DOE 1999e), radiologically contaminated material may be returned to the UDOT excavation as fill, transferred directly to the TSF by City workers and equipment, or to property MS−01006−VL for temporary stockpiling and later transfer to the TSF by the City.

4.1.3 Zoning Restrictions

As part of the supplemental standards application for MS−00176−VL (DOE 1999f), this property was assigned a special zoning designation through the Monticello Planning Commission (Zoning Ordinance 2002-4). The designation (Overlay Zone OL-1) requires the owner to obtain a special 2-part building permit. The first part allows excavation of the building footprint. The second allows construction of the structure only if the Monticello DOE-LM Representative has signed Part 1 of the permit indicating that a radiological survey has been completed and that neither the footprint area or spoils pile are radiologically contaminated; or, if radiologically contaminated material was present the material was removed to the TSF. The property deed was annotated to identify the zoning restriction.

Property MP−00211−VL is City property adjoining the northern boundary of the former millsite (Figure 4–1). This property is not a supplemental standards property; however, at one location on the property, uranium in soil exceeds the EPA Region III standard for residential use (uranium concentration ≥230 mg/kg [EPA 2006]). Zoning Ordinance 2003-2 was designated for this property to prevent construction of a habitable structure where uranium exceeds this standard. The ordinance designated the property to be within Overlay Zone OL-1 and requires DOE to conduct a radiological survey of any proposed footprint of a habitable structure and to notify the City of the results. If uranium concentrations do not exceed the standard, and the Ra-226 standard is also achieved, a building permit may be issued.

4.1.4 Land Use Restrictions on Private Property

Eight private properties traversed by Montezuma Creek that were remediated to supplemental standards (DOE 1999g) are affected by a restrictive easement. The properties, shown in Figure 4–1 and Plates 5 and 6, are 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. The restrictive easements, negotiated by the U.S. Army Corps of Engineers, were applied to the portion of these properties where contaminated soil and sediments were left in place, generally within the 50 to 100 ft wide floodplain of Montezuma Creek. The affected areas are sometimes referred to as Upper, Middle, and Lower Montezuma Creek; or, in previous documents as the "OU II Soil and Sediment Properties." Construction of habitable structures within, and soil removal from, the easement area 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 affected properties are collectively referred to as the "Montezuma Creek Easement Area" for the remainder of this plan.

4.1.5 Ground Water Restricted Area

The use of contaminated water within OU III is prohibited through a ground-water management policy (State of Utah 1999) issued and administered by the State Engineer's Office. A copy of the policy, effective May 21, 1999, is included as Appendix I to this plan. The policy states that applications to appropriate water from the shallow alluvial aquifer in the ground water restricted area (GWRA) for domestic purposes (see Figure 4–1) 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 ground water contamination, including those parcels identified in Section 4.1.1 where a water use restriction was applied as a condition of the land transfer.

4.2 Routine Surveillance Procedures

This section describes the procedures and contingency actions for routine LTS&M activities on all non-DOE-owned property for which institutional controls apply at the Monticello NPL sites. The section is organized according to the category of institutional control and the affected properties. Specific LTS&M activities apply to each category, and contingency actions associated with the land use restrictions for public roads and utility corridors and supplemental standards properties are summarized in Figure 4–4.

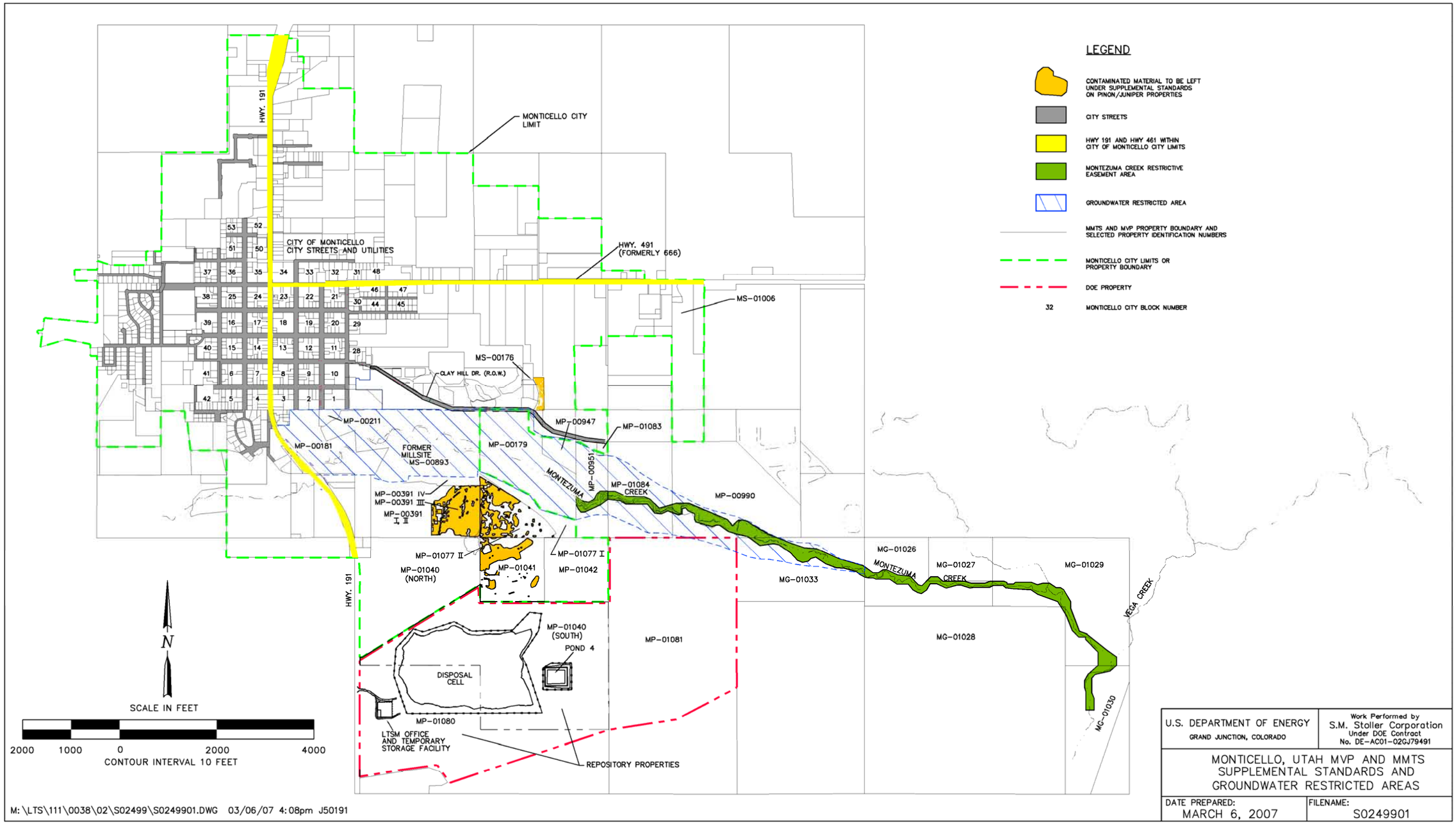


Figure 4–1. MMTS and MVP Supplemental Standards and Ground Water Restricted Areas

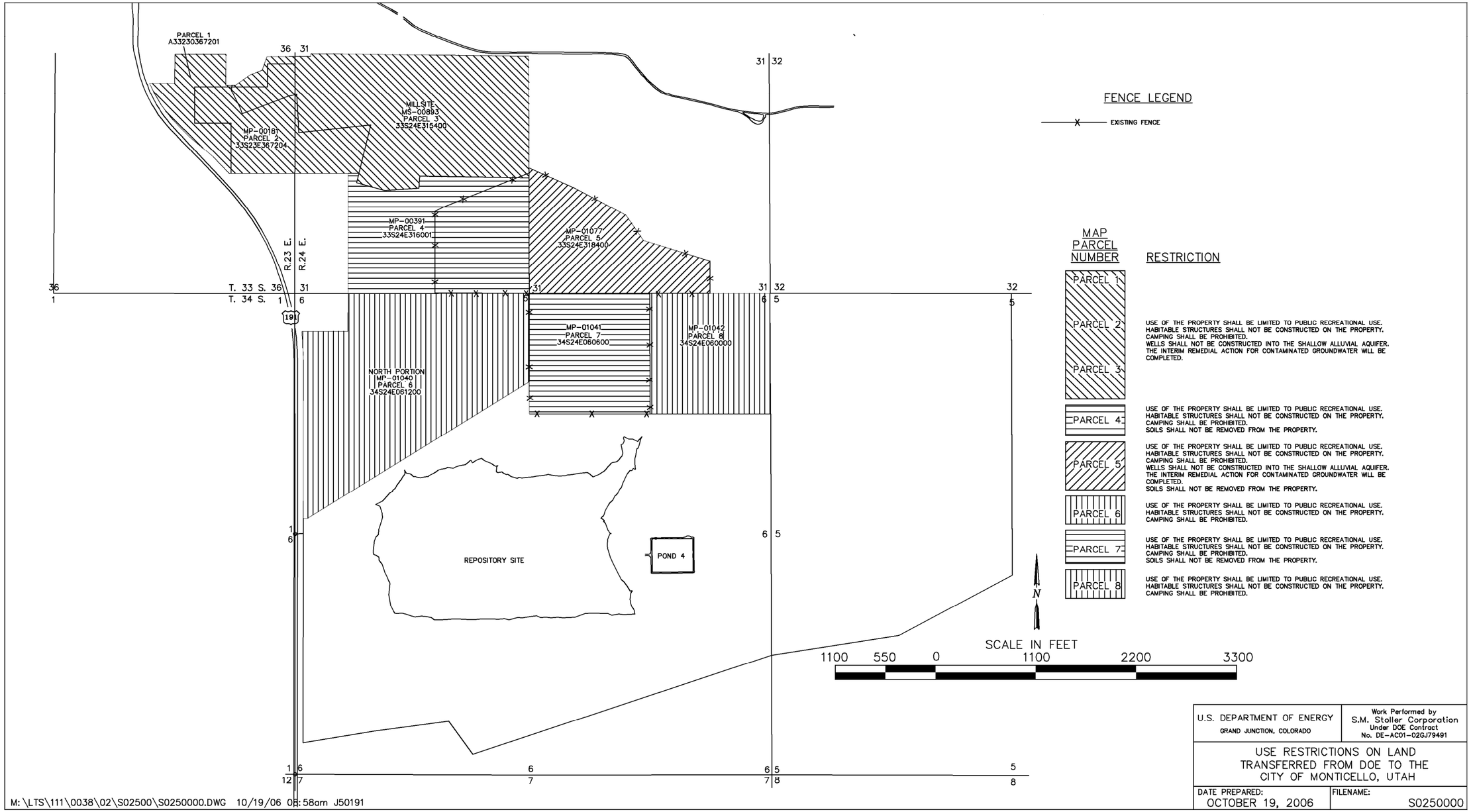


Figure 4–2. Use Restrictions on Land Transferred from DOE to the City of Monticello, Utah

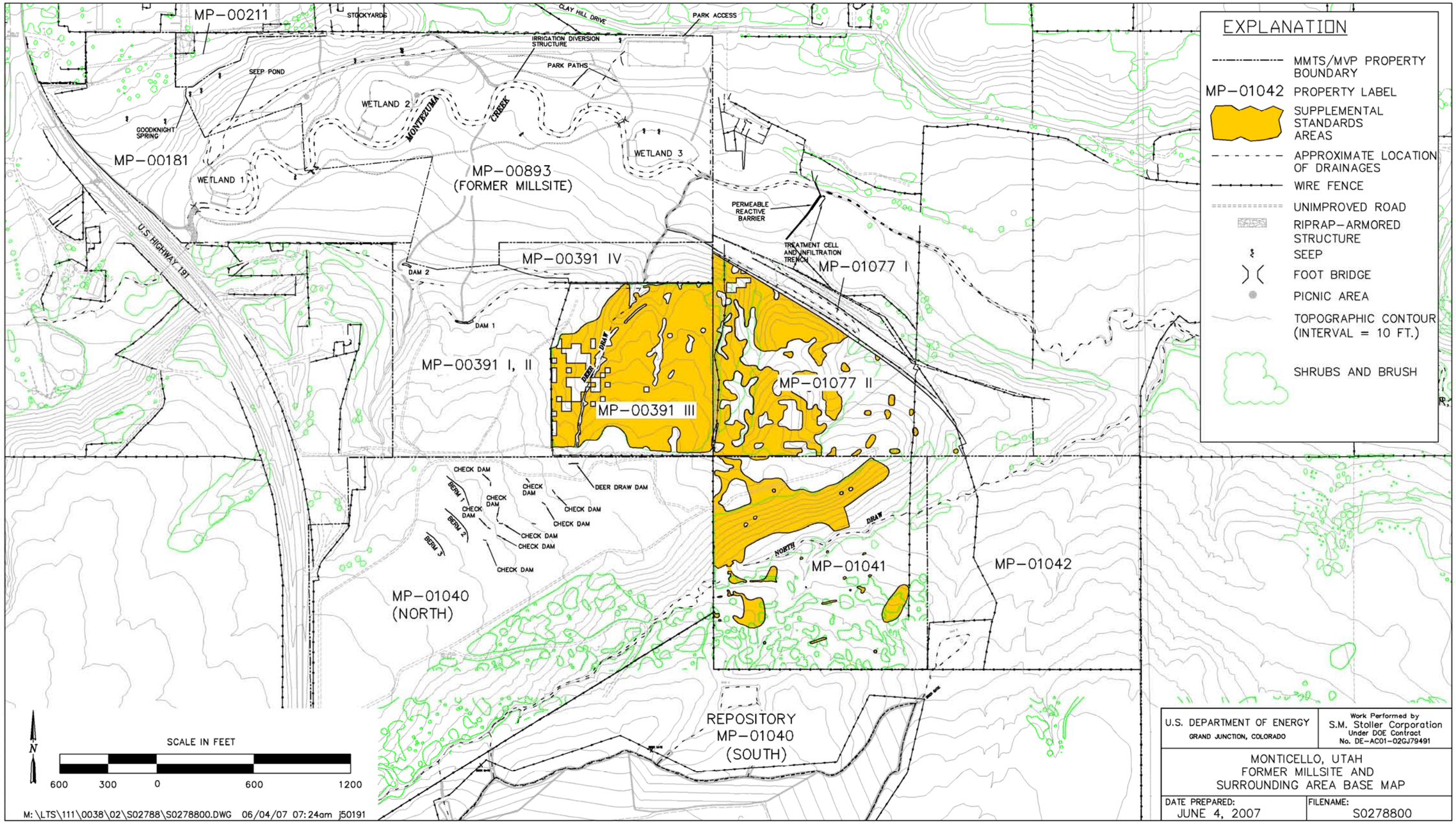
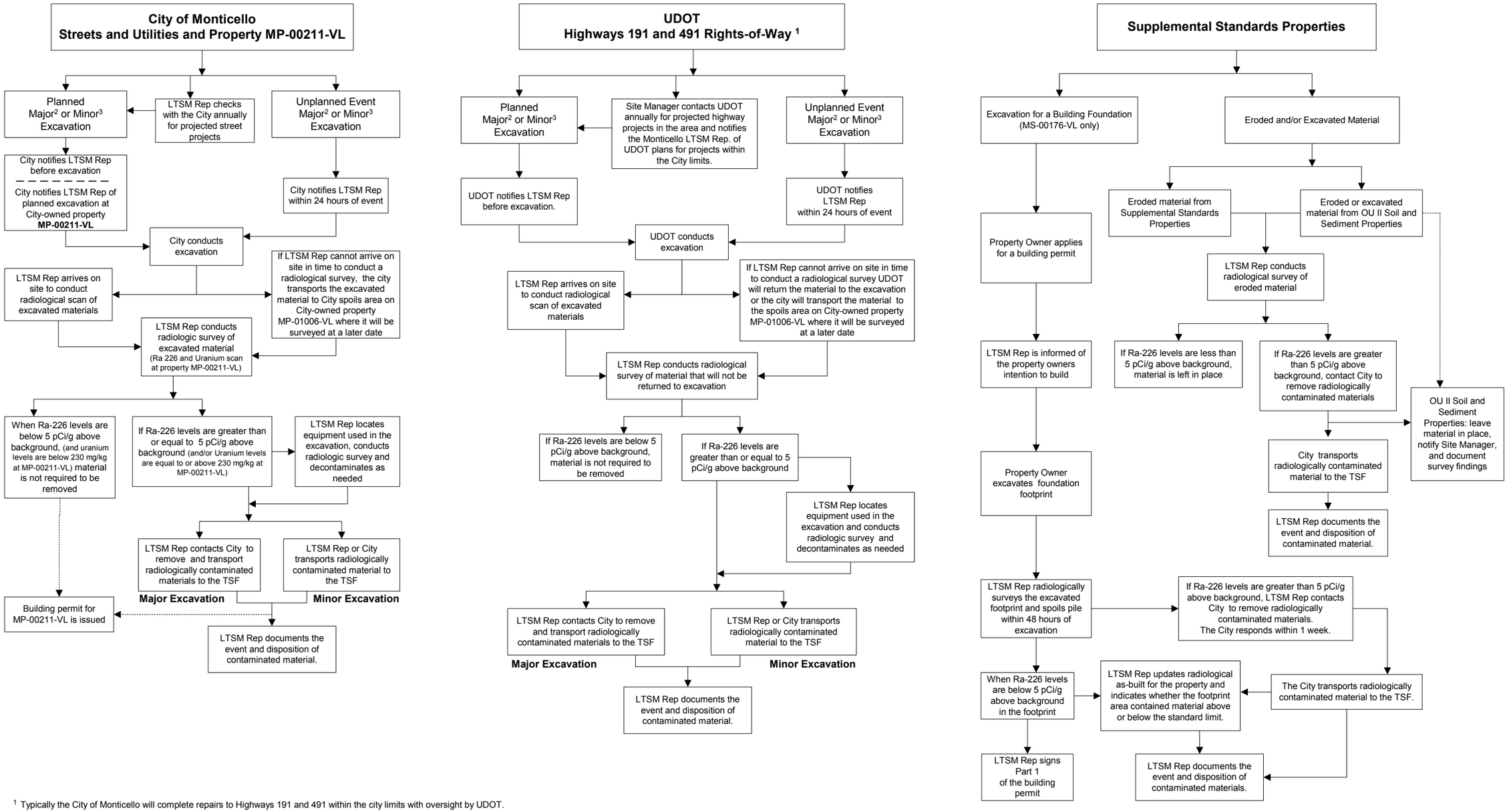


Figure 4–3. Monticello, Utah, Former Millsite and Surrounding Area Base Map



[1] Typically the City of Monticello will complete repairs to Highways 191 and 491 within the city limits with oversight by UDOT.

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

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

Figure 4–4. Contingency Actions

4.2.1 Responsibilities

Monticello LM Representative—Is responsible for conducting and documenting routine surveillance, inspections, radiological surveys, uranium scans, updating the radiological as-built drawings (refer to Appendix B), and making appropriate contacts and notifications.

City/UDOT Workers—Are responsible for complying with Monticello LM Representative instructions for handling and transporting radiologically contaminated materials and will comply with the associated health and safety requirements for personal protective equipment and monitoring.

Site Manager—Ensures that routine surveillance and management of radiological materials are conducted in accordance with these procedures and ensures proper notification of institutional control violations.

Radiological Control Manager—Is responsible for directing activities and reviewing documentation associated with radiological contamination having Ra-226 concentrations equal to or greater than 130 pCi/g.

Environmental Specialist—Consults with project staff and coordinates activities associated with suspect hazardous substances and transportation of TSF managed materials.

DOE-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 city, county, or state entities.

City of Monticello—Is responsible for coordinating city street excavations with the Monticello LM Representative 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 DOE LM Representative.

4.2.2 City-Owned Properties Transferred from DOE

Properties MP−00181−VL and MS−00893−VL are non-supplemental standards properties comprising the former millsite. Properties MP–00391−VL (Phase III), MP–01077−VL, and MP−01041 are supplemental standards properties historically referred to as government-owned piñon/juniper properties. Property MP−01042−VL and MP−01040−VL (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 institutional controls are effective.
- Quarterly inspection of the wetland areas and Montezuma Creek on the former millsite to ensure that man-made damage is not occurring.

- Contingency actions to address any violation of the institutional controls.
- Documentation, notification, and reporting.
- Inform the City of maintenance issues on the affected property.

4.2.2.1 LTS&M Checklist for City-Owned Properties

The Monticello LM Representative 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−VL, MS−00893−VL, or MP−01077−VL.

  —No soil removal from properties MP−00391−VL, MP−01041−VL, or MP−01077−VL (inspect for excavations).

  —No damage by human activity to wetland areas along Montezuma Creek.
- Record inspection results in the City-owned Properties record book in accordance with record-keeping requirements identified in Section 4.4 and Appendix B.

  If noncompliance activities are noted, ***then***

  —The Monticello LM Representative will inform the Monticello City Manager and the Site Manager of the violation or damage.

  —The Site Manager will inform the DOE-LM Monticello Project Manager of the violation.

  —The DOE-LM Monticello Project Manager will notify the City Manager, EPA, UDEQ, and the National Park Service of the violation, as deemed appropriate.

4.2.3 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 Ra-226 from planned and unplanned excavations to the TSF, except as noted.
- Documentation, notification, and reporting.

4.2.3.1 Surveillance for Public Roads and Utilities

The Monticello LM Representative 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). All scheduled excavations are reported in the Blue Stakes excavation safety program. Access this program

by calling the Monticello City Manager at 587-2271 and requesting the excavations planned for the week.

- 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. 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 embankment at Montezuma Creek to determine if erosion or unauthorized excavations have occurred. Eroded material and unplanned excavations will be scanned.
- On an **annual basis**, the Site Manager or designee will contact UDOT, 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 LM Representative 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. 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 record-keeping requirements identified in Section 4.4 and Appendix B.

4.2.3.2 Radiological Control for Roadways and Utilities

- At open-area excavations (e.g., road surface excavations):
  - —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.
  - —Segregate any material with Ra-226 concentration that equals or exceeds 5 pCi/g from uncontaminated material. To minimize TSF management, consider surveying each loader bucket of material.
- 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.
- For mapping purposes, survey the sidewall faces and bottom of the open-area and trench excavations. **Note:** Radiologically contaminated material in sidewall faces and bottom of the excavation will not be removed if it is beyond the limits of the intended excavation. Record the following information on the site map (see Appendix F, Figure F−3).
  - —Gamma range for the excavated area (highest, lowest, and average reading observed).
  - —Delta measurement at the highest gamma location within the excavated area (inside the trench).
  - —Depth of the excavated area.

—Identification numbers and calibration dates of the instruments used during the verification survey.

—Date of the survey.

- At City excavations:

  —***If*** radiologically contaminated materials are found and the specific activity is less than 27 pCi/g Ra-226, ***then*** instruct city of Monticello workers to transport the material to the TSF (see Appendix H for general transport guidelines).

  —***If*** radiologically contaminated material exceeds 27 pCi/g Ra-226, see Section 3.4.7, and notify the Site Manager.

- At UDOT excavations:

  —***If*** radiologically contaminated materials are found in sufficient quantity, ***then*** UDOT may elect to have the material transferred to the TSF. The Monticello LM Representative 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 less than 27 pCi/g Ra-226 (see Appendix H for general transport guidelines).

  —***If*** radiologically contaminated material exceeds 27 pCi/g Ra-226, see Section 3.4.7, and notify the Site Manager.

- At the Highway 191 east and west embankments across Montezuma Creek

  —***If*** soil has been significantly eroded or excavation is apparent, ***then*** 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 4.4 and Appendix B.

- Radiologically contaminated material exceeding 27 pCi/g Ra-226 must be transported in accordance with DOT regulations. Refer to Section 3.4.7 and Appendix H for guidelines and requirements of transporting DOT regulated and unregulated contaminated material.

4.2.3.3 Emergency Handling of Excavated Material

Under emergency conditions (e.g., severe erosion, water line break), whether a City or UDOT excavation, City workers may stockpile excavated materials at the spoils storage area on property MS−01006−VL (see Figure 4–1 for location) for later radiological scanning by the LM Representative when the material is suitably dry. After the scan, the material will either be transported to the TSF if Ra-226 concentration exceeds 5 pCi/g (about 150 counts per second), 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 Ra-226 concentrations exceed 5 pCi/g in the stockpiled material (excluding localized contamination or point sources), the Monticello LM Representative 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 record-keeping requirements identified in Section 4.4 and Appendix B.

4.2.4 Property MS–00176–VL

The LTS&M strategy for property MS–00176–VL (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.

4.2.4.1 LTS&M Checklist for Property MS−00176–VL

The Monticello LM Representative 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. **Note:** Radiologically contaminated materials will be chased in a vertical direction only, not in a lateral direction beyond the excavation. **Note:** If spoils are not scanned during excavation, the Monticello LM Representative 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 (<5 pCi/g Ra-226), the Monticello LM Representative will sign Part 1 of the 2-part building permit, allowing construction to proceed.

—If radiologically contaminated materials ≥ 5 and <27 pCi/g Ra-226 are encountered, the Monticello LM Representative will notify the City and instruct the City workers to remove the materials to the TSF (see Appendix H for general transport guidelines).

—Materials with greater than 27 pCi/g Ra-226 will be transported in accordance with DOT regulations. Refer to Section 3.4.7.

- Record the survey data on the radiological as-built drawing for property MS–00176–VL 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 record-keeping requirements identified in Section 4.4 and Appendix B.

4.2.5 Property MP−00211−VL

The LTS&M strategy for property MP−00211−VL is

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

4.2.5.1 LTS&M Checklist for Property MP−00211−VL

The Monticello LM Representative shall take the following actions:

- On a **weekly** basis, identify planned excavations on the property. All scheduled excavations are reported in the Blue Stakes excavation safety program. Access this program by calling the Monticello City Manager at 587-2271 and requesting the excavations planned for the week.
- 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, ***then*** 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, ***then:***

  —Halt construction work when the excavation is complete.

  —Scan the excavated area and the spoils pile for uranium in accordance with the procedures in Appendix G. (***Note:*** The uranium scanning procedure includes scanning for Ra-226.)

  —Notify the Site Manager of the uranium concentration and whether a habitable structure may be constructed.

If the uranium concentration in the soil within the proposed footprint of the structure is less than 230 mg/kg, and the Ra-226 concentration is less than 5 pCi/g above background, ***then*** notify the City that they may issue the building permit and that construction may resume.

If the ***uranium*** concentration in the soil within the proposed footprint of the structure is 230 mg/kg or greater, or the Ra-226 concentration is 5 pCi/g above background or greater, ***then:***

—Notify the City that additional soil must be removed prior to issuance of a building permit.

—Direct the City to transport the material to the TSF if the uranium concentration in the spoils pile is 230 mg/kg or greater, or the Ra-226 concentration is 5 pCi/g above background or greater. Materials with greater than 27 pCi/g Ra-226 will be transported in accordance with DOT regulations. Refer to Section 3.4.7.

- Record the survey data on the radiological as-built drawing for property MS–00211–VL 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 record-keeping requirements identified in Section 4.4 and Appendix B.

4.2.6 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.

4.2.6.1 LTS&M Checklist for Montezuma Creek Restrictive Easement Area

The Monticello LM Representative shall take the following actions:

- On an **annual basis**, determine if property ownership or habitation has changed and, if so, inform the new owner and occupant of the land use restriction that applies to the property.
- 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 man-made disturbances to the land. **Note**: Water quality monitoring is conducted each spring and fall for OU III. Observations from sampling teams may be used by the Monticello LM Representative in documenting the conditions in the restrictive easement area west of location SW92-08 (see Figure 5−2). Water quality monitoring is not conducted in the restrictive easement area east of location SW92-08. The observations reported by sampling personnel will not substitute for vigilance by the Monticello LM Representative in completing the required inspection activities.

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

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

—Contact the Site Manager (who will then notify the DOE-LM Monticello Project Manager) of the violation and landowner response.

—Document the conditions observed, property owner contact, and notification made to the Site Manager 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, ***then*** attempt to locate the material.

If the material can be located, ***then:***

—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 Site Manager.

If the material is contaminated, ***then:***

—Notify the Site Manger of the results of the radiological survey. The Site Manager will inform the DOE-LM Monticello Project Manager. The DOE-LM Monticello Project 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, ***then*** note this fact in the Private Property Restricted Areas record book.

If the activity has not been discontinued, ***then*** note this fact in the Private Property Restricted Areas record book and contact the Site Manager, who in turn will inform the DOE-LM Monticello Project Manager.

—The DOE-LM Monticello Project Manager may serve legal notice through the appropriate DOE protocols following consultation with EPA and UDEQ.

4.2.7 Ground Water Restricted Area

The LTS&M strategy for properties within the GWRA is

- Ensure that domestic use of alluvial aquifer ground water 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 ground water restricted area.

4.2.7.1 LTS&M Checklist for Ground Water Restricted Area

The Monticello LM Representative shall

- Inspect each property within the restricted area (see Figure 4–1) in the **spring and fall** for evidence of water well drilling in and near the GWRA.
- Inform new property owners or occupants of the ground water use restriction that applies to the property if ownership or occupancy is noted to change.

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

  —The Monticello LM Representative will contact the landowner or driller and determine the zone of completion and construction of the well.

  —The Monticello LM Representative will notify the Site Manager and document the conditions observed, property owner contact, and notification made to the Site Manager in the appropriate City-owned or Private Property Restricted Areas record book in accordance with the recordkeeping requirements in Section 4.4 and Appendix B.

  —The Site Manager will contact the State Engineer to confirm that the well complies with the requirements of the ground water management policy [Appendix I]).

  If the well is in violation of the policy, the Monticello LM Representative will notify the landowner or driller of the violation and request that drilling cease immediately or domestic use be discontinued. The Site Manager will instruct the Monticello LM Representative 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, ***then*** the Monticello LM Representative will note this fact in the appropriate City-owned or Private Property Restricted Areas record book.

  If the activity has not been discontinued, ***then*** the Monticello LM Representative will note this fact in the record book and contact the Site Manager, who in turn will inform the DOE-LM Monticello Project 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 4.4 and Appendix B.

4.3 Requirements for Non-Routine Conditions

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

4.3.1 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 LM Representative shall check the rain gauge at the TSF and at the DOT Port of Entry on Highway 491.

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, ***then:***

- 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−VL to determine if soil has been eroded off site 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 4–1) 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, ***then***:

- 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 4.4 and Appendix B.

If the surveyed material is radiologically contaminated, ***then***:

- 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 Section 4.4 and Appendix B.
- Contact the City to transport radiologically contaminated material to the TSF (**Note**: Montezuma Creek restrictive easement area material will not be transferred to the TSF unless directed by the DOE-LM Monticello Project Manager, in consultation with EPA and UDEQ).

- Handle and transport radiologically contaminated materials to the TSF in accordance with the transportation requirements in Appendix H and TSF entry, exit, and materials transfer requirements in Section 3.4.

4.3.2 Special Radiological Control Procedures

This section addresses radiological control procedures that will be followed when material is encountered that has Ra-226 concentrations of 130 pCi/g or greater. The Monticello LM Representative 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, ***then*** no further action is required.
- ***If*** the material is radiologically contaminated and has Ra-226 concentrations less than 130 pCi/g, ***then*** The Monticello LM Representative shall transport the material in accordance with the transport and TSF placement requirements provided in Section 3.4.7.
- ***If*** the material is radiologically contaminated and has Ra-226 concentrations of 130 pCi/g or greater, ***and*** is "Easily Removed Material" (see definition in Glossary), ***then*** refer to Section 4.3.2.1.
- ***If*** the material is radiologically contaminated and has Ra-226 concentrations of 130 pCi/g or greater, ***and*** is "Difficult-to-Remove Material" (see definition in Glossary), ***then*** refer to Section 4.3.2.2.

4.3.2.1 Radiologically Contaminated Material with Ra-226 Concentration of 130 pCi/g or greater; Easily Removed Material

When localized radiological contamination or point sources (e.g., ore) are identified, it may be collected, containerized, and transported to the TSF by the LM representative. The Monticello LM Representative 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 personal protective equipment (PPE)

  —Plastic bag

  —Duct tape

  —Disposable rubber overshoes and gloves

  —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 (***Note:*** The whole body frisk should take at least 2 to 3 minutes) and

  —Verify that the frisking instrument is in service, set to the proper scale, and the audio output can be heard during frisking.

  —Frisk the hands before picking up the probe.

  —Perform the frisk in the following order:

  1. Head (pause at mouth and nose for approximately 5 seconds)
  2. Neck and shoulders
  3. Arms (pause at each elbow)
  4. Chest and abdomen
  5. Back, hips, and seat of pants
  6. Legs (pause at each knee)
  7. Shoe tops
  8. Shoe bottoms (pause at sole and heel)

  —Hold probe less than ½ inch from the surface being surveyed for beta and gamma contamination, approximately ¼ inch for alpha contamination.

  —Move probe slowly over the surface, approximately 2 inches per second.

  —If the count rate increases during frisking, pause for 5 to 10 seconds over the area to provide adequate time for instrument response.

  —***If*** a whole body frisk for personnel contamination indicates possible skin or clothing contamination in excess of 5,000 disintegrations per minute (dpm)/100 square centimeters (cm^2), ***then*** follow the procedure for personnel skin and clothing decontamination in the current DOE-approved Health and Safety Procedures Manual maintained by the contractor.
- Sign out on the Radiological Access and Frisking Log sheet.
- Perform a radiological contamination survey of all potentially contaminated equipment and materials in accordance with the procedure for contamination surveys and equipment and material release in the current DOE-approved Health and Safety 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 Health and Safety Procedures Manual, decontaminate the equipment or material in accordance with instructions provided by the Radiological Control Manager.
- Transport the material to the TSF in accordance with the transportation requirements referenced in Section 3.4.7 and follow TSF entry, exit, and materials transfer requirements in Section 3.4.

4.3.2.2 Radiologically Contaminated Materials with Ra-226 Concentration Greater Than or Equal to 130 pCi/g; Difficult To Remove Material

When contaminated materials having Ra-226 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 having a volume greater than 1 cubic yard), the Monticello LM Representative shall

- Contact the City for assistance in removing the material.
- Post the area containing the contamination as a "Contamination Area" in accordance with the current DOE-LM-approved health and safety procedures.
- Ensure that workers are properly trained to remove radiologically contaminated materials having Ra-226 concentrations of 130 pCi/g or greater (see Table 2−6 in Section 2.6, "Training").
- 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 the haul truck.
- 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 following the sequence described in Section 4.3.2.1.
- Ensure that each worker signs out on the Radiological Access and Frisking Log sheet.
- Perform a radiological contamination survey of all potentially contaminated equipment and materials in accordance with the current DOE-approved Health and Safety 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 Health and Safety Procedures Manual, decontaminate the equipment or material in accordance with instructions provided by the Radiological Control Manager.
- Transport the material to the TSF in accordance with the transportation requirements referenced in Section 3.4.7 and follow TSF entry, exit, and materials transfer requirements in Section 3.4.

4.3.2.3 Documentation and Review

The Monticello LM Representative 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 Section 4.4 and Appendix B.

- Submit documentation associated with radiologically contaminated materials having Ra-226 concentrations of 130 pCi/g or greater to the Radiological Control Manager for supervisory review and sign-off.
- Record the applicable file code on each record generated by this procedure.

4.3.3 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 material encountered on supplemental standards properties.

4.3.3.1 Responsibilities

DOE-LM Monticello Project Manager—Will notify EPA and UDEQ when suspected mixed waste is confirmed.

Site Manager—Is responsible for

- Contacting the Health and Safety 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 DOE-LM Monticello Project Manager when suspected mixed waste is confirmed.

Environmental Specialist—Is responsible for developing and implementing the sampling and waste management plan for suspected mixed waste.

Monticello LM Representative—Is responsible for requesting assistance from the Site Manager for sampling, characterizing, and implementing the appropriate management of any suspected or confirmed mixed waste.

4.3.3.2 Recognition and Management of Suspected Mixed Waste

The Monticello LM Representative is 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 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, ***then*** cease all work and isolate the area with a barricade (e.g., construction fence, rope, or warning tape)

  —Contact the Site Manager to obtain assistance of an industrial hygienist to determine the appropriate PPE. Appropriate PPE will be selected on the basis of field evidence and knowledge of the type of suspected contaminant.

  —The Monticello LM Representative will don appropriate PPE and conduct a radiological survey and, as appropriate, PID screening of the suspect material (for example, organic vapors of 5 parts per million [ppm] or greater detected using a photoionization detector [PID] at the air/soil interface in freshly disturbed soil). Upon completion of the survey, leave the PPE in the controlled area to be managed with the suspected hazardous substance.

  If the material is ***not*** radiologically contaminated, ***then*** allow the work to proceed.

  If the material ***is*** radiologically contaminated, ***then*** excavate the material and transport it to the TSF, where it will be isolated until further characterization.
- The Site Manager will notify an Environmental Specialist to develop and implement a sampling and analysis plan to classify the waste. When analytical results are received, the Environmental Specialist 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 LM Representative will be notified to manage the material consistent with the appropriate radiological management procedures.

  —***If*** the material contains a regulated hazardous substance, ***then*** the Monticello LM Representative will be notified to implement the waste-specific compliance strategy under instruction and oversight from the Environmental Specialist, to include the ultimate disposal of the waste.
- The Monticello LM Representative will note all observations and actions directed by the Site Manager and Environmental Specialist related to identification, sampling, stockpiling, storage, and management of suspected or confirmed hazardous materials in the appropriate record book and drawings in accordance with Section 4.4 and Appendix B recordkeeping requirements. 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), and

  —A summary of the survey results, including the drawing number that was updated.

4.4 Recording Field Data

Field observations and radiological measurements made during all routine or non-routine surveillance and monitoring activities are recorded by the Monticello LM Representative in the record book for the respective property, on the appropriate radiological as-built drawing, and/or on the applicable form for the activity. Record-keeping 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 LM representative 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 checklists, drawing updates, or radiological survey forms referenced under the respective LTS&M activity.

- 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 institutional controls, including dates and times of contact with property owners, notification made to the Site Manager, 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/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.

End of current text

5.0 LTS&M Procedures for Operable Unit III, Surface Water and Ground Water

The *Record of Decision for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface Water and Ground Water, Monticello, Utah* (DOE 2004b), June 2004, specifies yearly monitoring and surveillance for OU III to ensure that the remedy remains protective of human health and the environment and that the progress of water quality restoration is adequately evaluated. The selected remedy for OU III consists of:

- Monitored natural attenuation of surface water and ground water, including comprehensive water quality and hydrologic monitoring to evaluate remedy effectiveness. Specifically included as part of monitored natural attenuation is a phased approach to evaluate selenium concentration trends and the potential impacts of selenium on ecological receptors (biomonitoring).
- Continued implementation and enforcement of the institutional controls that restrict use of the contaminated shallow alluvial aquifer, and the restrictive easement that prohibits removal of contaminated soil and sediment from the Montezuma Creek floodplain.
- Decommissioning the permeable reactive barrier (PRB) when treatment is no longer effective or excessive ground water mounding occurs.

Long-term monitoring and enforcement of institutional controls will continue until the site remediation goals for surface water and ground water are met. Natural hydrological and geochemical processes identified in the OU III ground water system are expected, using ground water modeling, to restore water quality to those goals by year 2045 (DOE 2004a). Until that time, annual reports and CERCLA 5-year reviews will evaluate ground water and surface water restoration progress and the effectiveness of the institutional controls. In addition, as set forth in the ROD for OU III, if the selected remedy does not remain protective of human health and the environment, or if the monitoring results indicate that the remediation goals cannot be achieved in the allotted time (by year 2045), contingency remedies will be evaluated and will be implemented if determined necessary.

This section describes the activities associated with water quality monitoring, maintenance of the associated network of monitoring wells, and management of the PRB. LTSM requirements associated with the institutional controls within OU III are provided in Sections 4.1, 4.2.6, and 4.2.7 of this plan. Specific field and laboratory procedures for OU III long-term monitoring are provided in *U.S. Department of Energy Office of Legacy Management Sampling and Analysis Plan* (DOE 2006c) and *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan* (DOE 2004c).

5.1 Hydrogeological Setting

Operable Unit III of the MMTS lies within the regional setting of the broad, nearly flat surface of the Great Sage Plain, which is about 7,000 feet (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). Montezuma Creek forms at the

confluence of North and South Creeks a short distance upstream of the millsite. A municipal reservoir (Loyd's Lake or Monticello Reservoir), located about 1-mile upstream of the millsite, 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 is used for agriculture. Eastward, the creek has incised a deep canyon into the local bedrock formations. Montezuma Creek is a limited source of 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. Ground water 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. Top of bedrock is generally within 15 ft of ground surface in the valley floor and the saturated thickness of the aquifer averages about 5 ft. Ground water 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 millsite. 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 millsite, the alluvial aquifer is recharged by underflow from the west and by considerable anthropogenic sources along the north margin of the millsite, where perennial seeps and wetland vegetation are common. On the millsite, 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 ground water sinks. A downstream outlet connects each wetland to Montezuma Creek.

Where the natural alluvial channel is resumed at the east end of the millsite, the aquifer is 200 to 300 ft wide (north to south). The aquifer narrows considerably about one 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 ground water to the creek. In addition, the Dakota Sandstone aquitard is absent in this reach, allowing for the discharge of ground water from the Burro Canyon aquifer to the overlying alluvium, and subsequently to Montezuma Creek. This hydrologic boundary prevents further eastward advancement of contaminated ground water. The Burro Canyon Formation is fully penetrated by the canyon in the reach of Montezuma Creek referred to as "Middle Montezuma Creek" in Figure 5–1. Numerous springs from the Burro Canyon aquifer are evident in this reach near the contact with the underlying Morrison Formation.

5.1.1 OU III Ground Water Treatment System

As part of an OU III treatibility study, a permeable reactive barrier (PRB) was installed in 1999 for in situ, passive ground water treatment. The reactive portion of the PRB, containing zero-valent iron as the treatment medium, is about 100 ft in length across the aquifer, by 6 ft thick

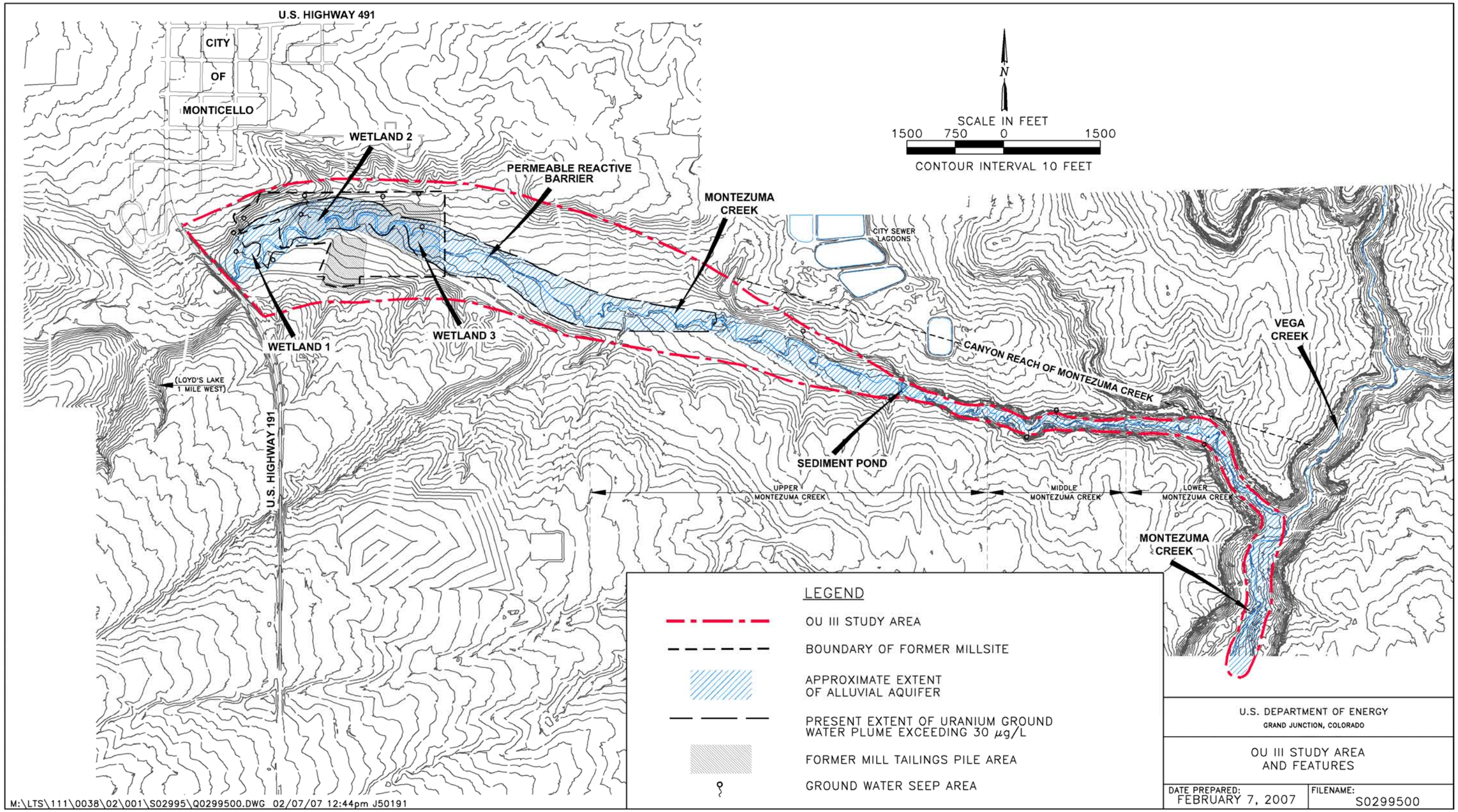


Figure 5–1. OU III Study Area and Features

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parallel to ground water flow, by about 13 ft deep to bedrock. Low-permeability slurry walls extend out from the PRB to direct ground water to the reactive zone. These walls do not reach the lateral margins of the aquifer and so some untreated ground water flows around the outer ends. Partly because of excessive mineral precipitation in the PRB, an ex situ treatment system was installed at the PRB in 2005 at the location shown in Figure 5–2 to provide supplemental ground water treatment. This second system extracts ground water from the near-upgradient area of the PRB and pumps it through a serviceable cell containing zero-valent iron. Treated water from the cell is returned to the aquifer by way of an infiltration trench located immediately east of the PRB. The DOE LM Environmental Sciences Laboratory (ESL), Grand Junction, Colorado, conducts operation and monitoring of the auxiliary treatment system in cooperation with the OU III project. The system is designed to accept enhancement, such as addition extraction wells or treatment cell.

5.2 Contaminants of Concern and Water Quality Remediation Goals

OU III contaminants of concern (COCs) and the corresponding remediation goal and rationale for ground water and surface water are presented in Table 5–1. Gross beta does not have a remediation goal because there is no activity-based standard for this constituent, and risk factors to derive a risk-based goal are radioisotope-specific.

Table 5–1. Contaminants of Concern, Ground Water Remediation Goals, and Surface Water Remediation Goals

COC[a]	OU III Ground Water Remediation Goal [a,b]	Surface Water Remediation Goals [a,c]
Arsenic	10 µg/L[d]	10 µg/L
Manganese	880 µg/L[e]	-------
Molybdenum	100 µg/L[f]	-------
Nitrate (as N)	10,000 µg/L[d]	4,000 µg/L
Selenium	50 µg/L[d]	5 µg/L
Uranium - metal toxicity	30 µg/L[d]	-------
Vanadium	330 µg/L[e]	-------
Uranium-234/238 - radiological dose	30 pCi/L[f]	-------
Gross alpha activity	15 pCi/L[d,g]	15 pCi/L[h]
Gross beta activity	-----	-----

[a] Source: DOE 2004b.
[b] µg/L = micrograms per liter; pCi/L = picocuries per liter.
[c] State of Utah standard for surface water.
[d] EPA Maximum Contaminant Level (MCL).
[e] Based on OU III human health risk assessment.
[f] UMTRA maximum concentration limit.
[g] Excluding uranium and radon.
[h] Excluding uranium and radon for MMTS OU III.

5.2.1 Extent of Contamination

As of October 2006, the approximate extent of ground water contamination by uranium, the most pervasive site-related contaminant, is depicted on Figure 5–1. Maximum concentrations of uranium in ground water at that time were 800 to 900 µg/L and generally occurred only in the

area upgradient of the PRB, but also occurred locally at well P92-06. The remaining COCs are present at much lesser concentrations relative to the respective remediation goal and are limited to the area near and upgradient of the PRB. Decreasing concentration trends for several COCs, including uranium, are evident in the monitoring data since the completion of source removal in 1999. Burro Canyon ground water is not contaminated because of the intervening Dakota Sandstone, where present, and because of upward flow in the Burro Canyon aquifer, where the Dakota Sandstone is absent.

With respect to OU III surface water standards, as of October 2006, there was no contamination of Montezuma Creek by site-related constituents. Ground water discharge accounts for uranium concentrations in Montezuma Creek to exceed background values throughout much of OU III. Discharge of ground water also results in relatively high uranium concentrations in Wetland 3, as well as for lesser contamination by arsenic, nitrate, and selenium. These constituents are diluted to acceptable levels before the water enters the creek. Among the remaining COCs that do not have a surface water standard, manganese, molybdenum, and vanadium are present at low concentrations that exceed background values but are much less that the respective ground water standard.

5.3 Water Quality and Hydrologic Monitoring Scope

The established network of ground water monitoring wells and surface water locations are visited in October and April of each year, at which time water samples are collected, the water level in each well is measured, and surface water flow at designated locations is measured. Figure 5–2 and Figure 5–3 depict the scope of the surface and ground water monitoring since post-OU III ROD monitoring began in October 2004. Monitoring in October is slightly more comprehensive in scope than in April. In April, several alluvial wells located beyond the extent of contamination, and numerous bedrock wells, are not sampled. April and October sampling events were selected to characterize site conditions during seasonal periods of high and low flow, respectively, in the hydrologic system.

The selected alluvial well locations encompass the full extent of the contaminant plume. In addition, background water quality is monitored at the west end of the millsite. Other selected wells are monitored to verify that the Burro Canyon aquifer remains uncontaminated by site-derived constituents. Continued surface water monitoring (water quality and flow rates) enables the effect of ground water interaction on surface water quality within OU III to be assessed and to verify compliance with the applicable standards. Water quality at the PRB will be monitored to assess performance of the treatment technology until it is decommissioned. Figure 5–4 shows the location of all PRB monitoring wells and the respective treatment zones.

5.3.1 Responsibilities

Regarding long-term water quality and hydrologic monitoring activities, the Site Manager is responsible for

- Scheduling field personnel to conduct ground water and surface water monitoring.
- Ensuring the proper entry of monitoring data into the project database.

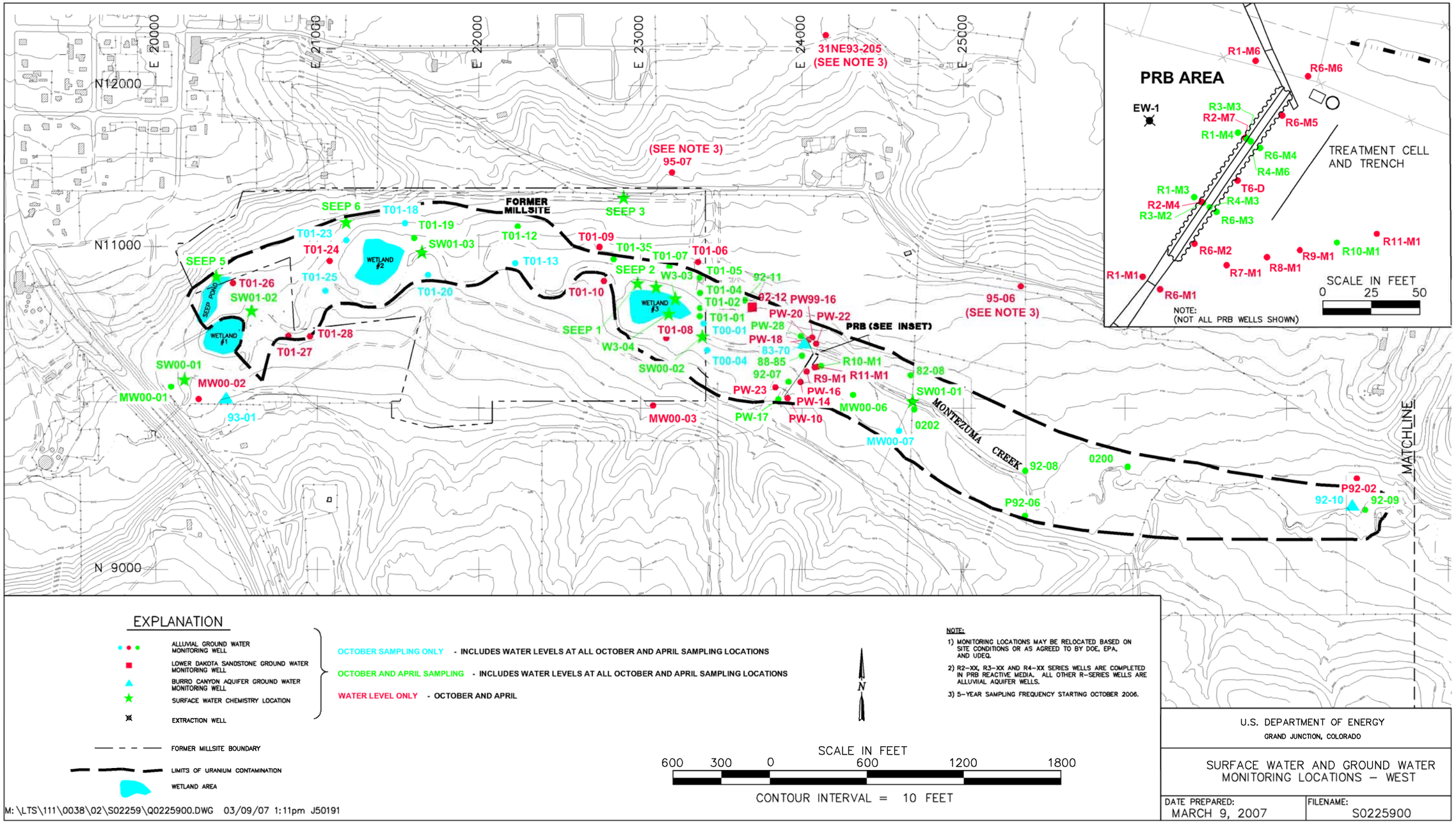

Figure 5–2. Ground Water and Surface Water Monitoring Network—West

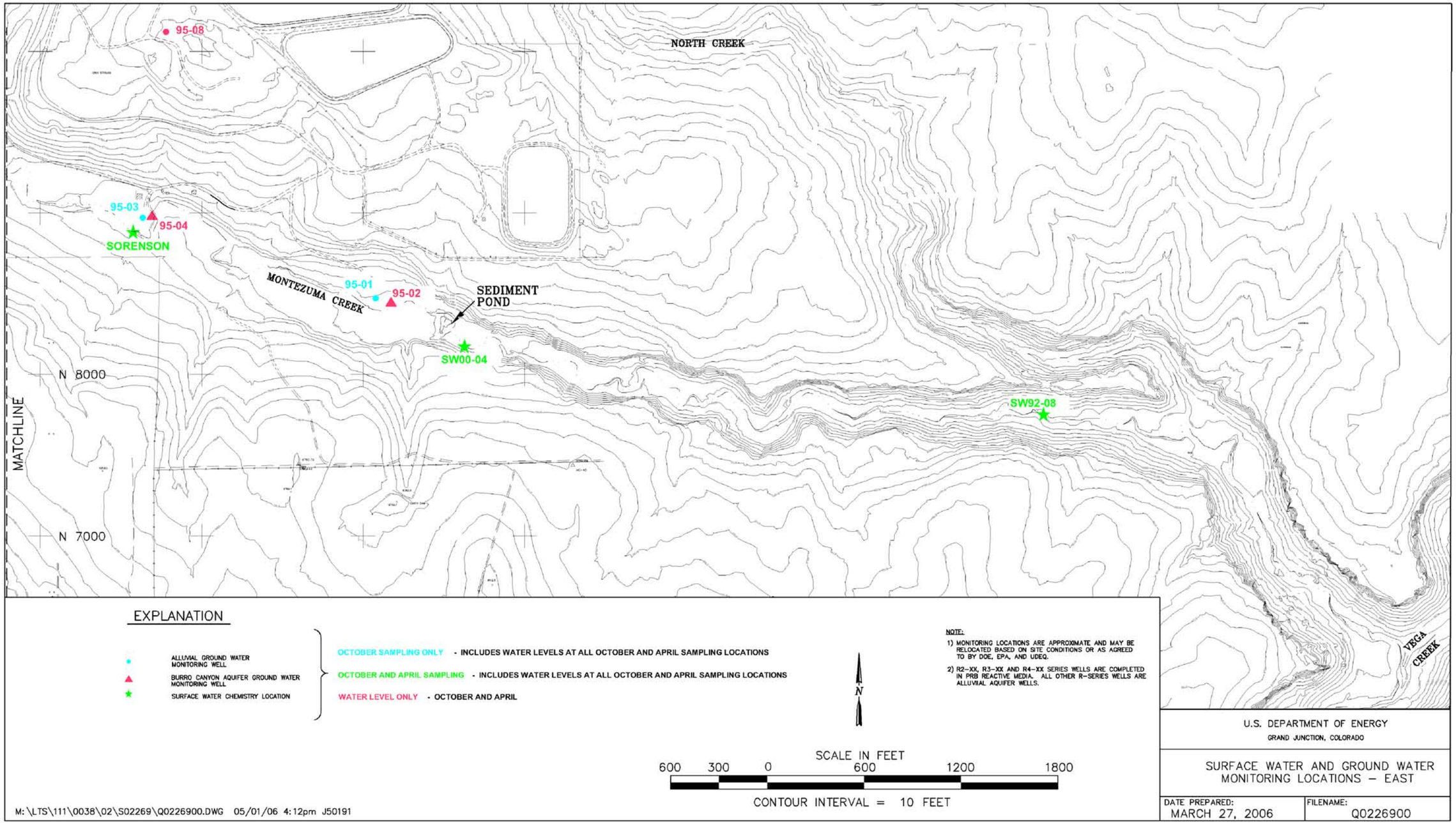

Figure 5–3. Ground Water and Surface Water Monitoring Network—East

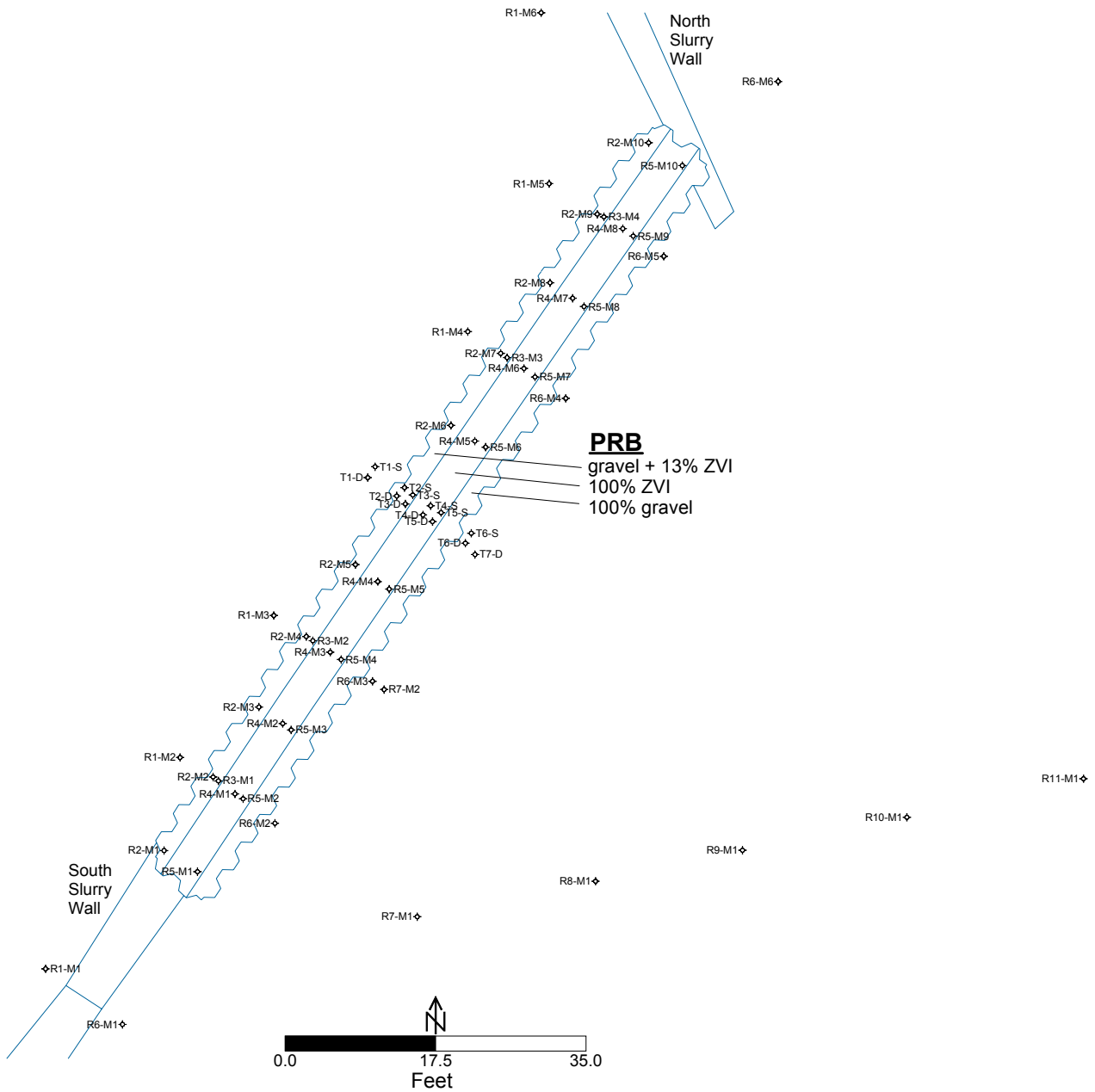

Figure 5–4. PRB Ground Water Monitor Wells and Media Zones

- Ensuring that water quality and hydrologic monitoring results are evaluated and presented in an annual data summary report for OU III.
- Ensuring that the scope of long-term monitoring remains adequate for assessing the progress of aquifer and surface water restoration.
- Revising the scope of monitoring, with regulatory and DOE concurrence, subject to changing site conditions.
- Developing and issuing Program Directives to address interim changes for OU III monitoring.
- Annually reviewing the site-specific monitoring requirements of the SAP (DOE 2006c) and updating as needed.

5.4 Evaluating and Reporting Remedy Performance

Appendix B of the ROD for OU III, included as Appendix J to this plan, is the performance evaluation plan for OU III surface and ground water quality restoration. The performance evaluation plan specifies that water quality and hydrologic monitoring results will be reviewed and reported annually, and that the progress of ground water restoration will be assessed at that time and compared to concentration trends predicted by ground water modeling. The method of comparison is described in detail in the performance evaluation plan (Appendix J). In this comparison, the aquifer is divided into five regions of similar hydrogeology or extent of contamination. Among selected monitoring wells, an average uranium concentration is computed for each region and sampling event. Graphical results illustrate the variation in mean uranium concentration over time per region. An uncertainty range of ±30 percent of the average is applied to each point. The method of computing this empirical range, from among numerous monitoring wells sampled since 1992, is also provided in Appendix J. Model-predicted concentrations (also in Appendix J) for the corresponding well groups are similarly averaged, normalized to calendar date (model time zero is October 2002), and graphed (see Appendix J for examples).

The performance evaluation plan states that as of October 2004, if for any region of the aquifer the model average is less than the observed average minus 30 percent for three consecutive semi-annual sampling events, aquifer restoration is not progressing as expected. If restoration progress is consistently less than predicted for a region or regions of the aquifer, DOE will develop an alternate method, with concurrence from EPA and UDEQ, for analyzing the concentration trends as part of the then-current CERCLA 5-year review. The method and results will be documented in a separate report and summarized in the CERCLA 5-year review report and in the OU III annual reports.

5.4.1 Responsibilities

The Site Manager is responsible for evaluating and reporting remedy performance and for ensuring that a data summary report is completed and distributed to EPA and UDEQ. The current monitoring data will be available to site inspectors at the time of the annual MMTS inspections.

5.4.2 Data Summary Report

The data summary report will include data from the previous year's October monitoring event and from the current year's April monitoring event. The annual data summary report will comprise:

- **Water quality monitoring results**—Results of the alluvial aquifer, Burro Canyon aquifer, and surface water monitoring will be presented and evaluated.
- **Hydrologic monitoring results**—Ground water elevations and stream flow measurements will be presented and evaluated.
- **Biomonitoring results**—Biomonitoring results will be included until biomonitoring is no longer required, as determined by the Biological Technical Assistance Group (BTAG).
- **Remedy performance evaluation**—Remedy effectiveness will be evaluated through a comparison of uranium concentration trends in ground water to trends predicted by ground water modeling. The annual report will address possible causes of deviant trends if observed.

The data summary report shall contain current and historical analytical results for alluvial and bedrock formation ground water samples, analytical results for surface water samples, time-concentration plots for surface water and ground water at selected monitoring locations, ground water level monitoring results and hydrographs, stream flow monitoring results, and biomonitoring results if that task is ongoing.

5.5 Biomonitoring

Biomonitoring is conducted to evaluate the potential risk to ecological receptors from exposure to selenium in OU III. Biomonitoring was initiated in 2004 in response to rising selenium concentrations at several ground water and surface water monitoring locations. The selenium is suspected to originate from shale and mudstones beds of the Mancos Shale and Dakota Sandstone. These materials were freshly exposed over much of the millsite during remediation and later covered by the reconstructed aquifer. Rising selenium concentrations in surface water and ground water were noted soon afterward at downgradient locations near the excavations. Off-site contributions from bedrock are also apparent. Despite declining concentration trends for selenium in ground water and in Montezuma Creek to below the respective remediation goals, concentrations at some locations, particularly at Wetland 3 seeps, occur above toxicity thresholds for avian receptors.

Biomonitoring is focused on the constructed wetlands on the former millsite and the constructed sediment retention pond on Montezuma Creek, located about 1 mile downgradient (east) of the former millsite. Biomonitoring includes field surveys to identify potentially sensitive ecological receptors, and collecting samples of water, sediment, and aquatic insects for analysis of selenium. Biomonitoring is implemented in a phased approach according to established trigger level concentrations in the various media as summarized in Table 5–2. Biomonitoring activities are determined cooperatively through the Biological Technical Assistance Group (BTAG), consisting of representatives of DOE, EPA, UDEQ, and the U.S. Fish and Wildlife Service. Biomonitoring activities are implemented through program directives prepared by the Site Manager or designee.

Table 5–2. Schedule of Biomonitoring Activities (Source: DOE 2004b)

Biomonitoring Task	FY 2004	FY 2005	FY 2006	Out Years
Sediment/surface water sampling	X	X	X	T
Wildlife survey		X		
Macroinvertebrate sampling		X	T_1	T_1
Other media (TBD)			T_2	T_2

TBD=to be determined by the Biological Technical Assistance Group.
T= only if trigger level exceeded. Trigger level for sediment = 4 mg/kg Se, trigger level for water = 5 µg/L Se.
T_1=only if trigger level exceeded. Trigger level for soil/sediment = 4 mg/kg Se.
T_2=only if trigger level exceeded. Trigger Level for macroinvertebrate tissue = 7 mg/kg Se.

5.5.1 Responsibilities

The Site Manager is responsible for

- Convening the BTAG to determine future scope based on results of previous phases of biomonitoring.
- Preparing Program Directives to direct biomonitoring activities.
- Scheduling personnel to conduct biomonitoring activities.
- Preparing reports of the biomonitoring results and distributing the reports among the BTAG for review and evaluation.
- Summarizing the status and results of biomonitoring in the annual report for OU III.

Biomonitoring is expected to continue until sufficient information is available to determine that risk is either acceptable or warrants consideration of a corrective action.

5.6 Management Strategy for the Permeable Reactive Barrier and Auxiliary Treatment System

The ROD for OU III allows DOE to operate the PRB without modification or replacement until treatment is no longer effective or when ground water mounding becomes excessive, at which time DOE may decommission the PRB. Construction of the auxiliary treatment system in June 2005 was completed as a continuation of the OU III treatibility study of ground water remediation using zero-valent iron. The treatibility study includes options to expand the capacity capture of the auxiliary treatment system. Such an expansion is planned for spring 2007 with the addition of a second cell and increased pumping rate. Operation and maintenance of the auxiliary system is the responsibility of the ESL in consultation with the Site Manager. Installation of the treatment cell received concurrence from EPA and UDEQ, with partial funding by EPA.

5.6.1 Decommissioning the PRB and Auxiliary Treatment System

Decommissioning the PRB and auxiliary treatment system will be directed by a decommissioning plan prepared in advance. The plan will specify the details of construction activities, health and safety, mitigation of contaminant release to ground water during excavation, waste characterization and disposal, site restoration, and compliance with ARARs. The zero-valent iron reactive media will be tested by the accepted method at the time of

decommissioning to determine if it is a characteristic hazardous waste. The radioactivity of the media will also be tested. Results of these tests will determine worker health and safety requirements during decommissioning, and the waste transport and disposal requirements. The excavation will be backfilled with coarse gravel to near ground surface and then overlain with fine-textured soil. The slurry walls will not be removed. The cost to remove and dispose of the PRB in year 2014 was estimated to be $100,000 to $600,000 (DOE 2004a), depending on the waste classification of the zero-valent iron reactive media.

5.6.2 Responsibilities

The Site Manager is responsible for

- Implementing an annual inspection of the PRB and maintaining surface components of the PRB.
- Reporting PRB monitoring results in the annual ground water data summary report.
- Providing recommendations to DOE for enhancing or decommissioning the PRB.
- Developing and implementing a plan to decommission the PRB when determined necessary by DOE.

5.7 Well Abandonment

Ground water monitoring wells associated with OU III will require eventual decommissioning (abandonment). Well abandonment will proceed in phases as sufficient numbers of wells become eligible as aquifer restoration proceeds and data needs are diminished. When remediation goals are attained at a given well and expected to remain so, the well will be considered for removal from active monitoring status or for abandonment. The decision by DOE to de-activate or abandon monitoring wells will be made with the concurrence of EPA and UDEQ. DOE will notify EPA and UDEQ of scheduled well abandonment activities prior to abandonment. Well abandonment will conform to the substantive requirements of the Utah Well Drilling Standards. Well abandonment will be documented in annual OU III data summary reports or in the CERCLA 5-year review reports.

End of current text

6.0 LTS&M Procedures for Annual Inspections and CERCLA 5-Year Reviews

This section provides the information required for conducting and reporting the annual inspections and CERCLA 5-year reviews for the Monticello NPL sites (MMTS and MVP). DOE has conducted annual inspections at these sites since 2001, and 5-year reviews since 1997. The CERCLA 5-year reviews are required by statute when (1) "upon completion of the remedial action, hazardous substances, pollutants, or contamination will remain on site, and (2) when the ROD was signed on or after October 17, 1986 (the effective date of SARA) and the remedial action was selected under CERCLA §121. The MMTS and MVP NPL sites meet both of these conditions. Currently, there is no provision for discontinuation of 5-year reviews. Annual inspections are performed by DOE-LM to identify and correct potential deficiencies in LTS&M operations at an early stage. DOE-LM performs these periodic inspections and reviews at the Monticello NPL sites with the overall objective of ensuring that the selected remedies remain protective of human health and the environment.

Components of the remedies that are addressed in the annual inspections and 5-year review include, but are not limited to, routine operation and maintenance of the remaining engineered structures (surface water control features and sediment control ponds on DOE property, passive ground water treatment systems, the on-site disposal cell, Pond 4, TSF, fencing, gates, and signage). DOE also implements the Supplemental Standards program by monitoring and ensuring proper management of those properties at which radioactively contaminated material was left on site pursuant to 40 CFR 192. The Supplemental Standards program is implemented in part through a cooperative agreement with the City of Monticello and a Memorandum of Understanding with the Utah Department of Transportation. Record-keeping activities, public participation, and monitoring of the institutional controls implemented at the Monticello NPL sites are included as part of the periodic reviews.

6.1 Annual Inspections

This procedure applies to the annual inspection of the MMTS and MVP sites. Discussion of the more frequent routine inspections conducted by DOE at these sites is addressed in Sections 3.0 and 4.0 of this plan. Annual inspections performed by DOE-LM are designed to

- Ensure that routine surveillance, maintenance, and monitoring is adequate at the Monticello NPL sites.
- Ensure that the institutional controls remain relevant and effective.
- Evaluate the condition of areas of special concern (e.g., disposal cell cover, monitoring wells, drainage controls, PRB, vegetative restoration).
- Identify LTS&M deficiencies and recommend corrective action.
- Provide data for CERCLA 5-year reviews (**Note**: the annual inspection immediately preceding the 5-year report period must be conducted within 6 months of the submittal date for the CERCLA 5-year review report.)

The site-specific areas where remedial actions have been undertaken, and/or where contamination has been left in place pursuant to supplemental standards, have specific

requirements for inspection, review, record keeping, and reporting. The annual inspection and annual inspection report document the status of the selected remedies at the following properties.

MMTS

- The on-site repository containing 2.54 million cubic yards of radioactively contaminated material and debris; appurtenant facilities, including the LCRS and the LDS, Pond 4 and its LCRS and LDS system; the TSF; sediment ponds and drainage structures; site access controls; and signage.
- Non-DOE-owned lands transferred to the City of Monticello. Included are the restored wetlands and Montezuma Creek, the former millsite area, and other peripheral properties known previously as "government-owned piñon/juniper properties."
- Privately owned peripheral properties (i.e., OU II Soil and Sediment Properties) adjacent to and downstream the former millsite.
- OU III Ground Water Restricted Area.
- City-owned property MP−00211.

MVP

- City of Monticello streets and utilities.
- Highways 191 and 491 rights-of-way.
- MS–00176–VL (privately owned supplemental standards property).

6.1.1 Responsibilities

DOE-LM Monticello Project Manager—Will be ultimately responsible for conducting the annual inspection and submitting the annual inspection report to EPA and UDEQ.

Site Manager—The Site Manager shall ensure that the annual inspection is conducted when scheduled and that the annual inspection report is submitted to DOE within 4 months of the inspection.

Monticello LM Representative—The Monticello LM Representative is responsible for providing the inspection team with documentation of LTS&M activities that were conducted on site during the previous year. The Monticello LM Representative is also responsible for ensuring that all safety procedures are followed during the annual inspection.

Chief Inspector—The Chief Inspector is responsible for planning and conducting the inspection, and for writing the annual inspection report. Throughout the review and inspection process the Chief Inspector may delegate the review, inspection, and documentation responsibilities to other team members.

Inspection Team Members—Team members to the annual inspection are responsible for completing delegated reviews and inspections and documenting the results.

6.1.2 Annual Inspection Planning

The Site Manager shall appoint a Chief Inspector to plan and conduct the annual inspection and to prepare the annual inspection report. The annual inspection is generally scheduled in September to coincide with the FFA biannual meeting and at a time that is seasonally advantageous to field work. Annual inspections involve reviewing the work performed on-site by the Monticello LM Representative in the past year and conducting a physical inspection of the site with a qualified team to document current site conditions.

The following tasks will be completed in preparing for the annual inspection:

- Review previous site inspection reports and maps, recent FFA quarterly reports, and any maintenance or corrective action performed over the past year.
- Assemble the necessary equipment and field checklists to complete the inspections.
- Review recent OU III water quality data for concentration trends and contaminant distribution.
- Verify the names and telephone numbers of the parties with whom access or notification agreements have been executed.
- Verify the following DOE 24-hour telephone number and appropriate local agency telephone numbers and contacts:

DOE-LM Monticello Project Manager	(970) 248-6016
DOE–LM Office in Grand Junction, Colorado	(970) 248-6000
DOE–LM Office in Grand Junction Security Personnel (staffed 24 hours/day)	(970) 248-6070
Monticello-LM Site Manager	(970) 248-7741
Monticello Field Office	(435) 587-2098
Monticello LM Representative (Lead)	(435) 587-2902 or (435) 459-4128
Monticello LM Representative	(435) 587-3115 or (435) 459-4980
Monticello City Police	(435) 587-2615
Monticello Fire Department	911 or (435) 587-2500
Monticello City Manager	(435) 587-2271
San Juan County Sheriff	911 or (435) 587-2237
San Juan County Recorder	(435) 587-3228
Utah Department of Transportation	(435) 587-2620 (Monticello)

- Schedule the site inspection. Notify EPA and UDEQ at least 2 weeks prior to the site visit and invite their participation.
- Contact the State Engineer's office to obtain information regarding well permit applications within the Ground Water Restricted Area during the past year or those that are pending.
- Verify annual contact with UDOT regarding planned highway projects in Monticello for the current UDOT fiscal year.

6.1.3 Administrative Reviews

During the inspection the following documentation reviews will be completed:

- Review site-specific requirements in the Sampling and Analysis Plan (DOE 2006c) (e.g., locations, frequencies, analytes), and annually updating the requirements, as needed.
- Review the records created by the Monticello LM Representative regarding routine surveillance observations for the period since the last annual inspection. These records include:

  —As-built drawings.

  —Record books (Repository Site, TSF, City-Owned Properties, Public Roads and Utilities, and Private Property Restricted Areas).

  —Repository and Pond 4 LCRS and LDS documentation.

  —Transport manifests and TSF documentation.

  —Training documentation
- Administrative Record.
- Information Repository.
- Deed restrictions on record in the San Juan County Recorder's office.

6.1.4 Annual Inspection of Field Documentation

To generate and preserve an accurate record of the annual inspection field activities, a designated member or members of the team shall:

- Record date, location, weather conditions, noteworthy observations, and sufficient background information to support the development of a complete and accurate annual inspection report.
- Record observations in a reportable form. Methods of recording observations include

  —Notations on maps and drawings.

  —Hand-written notes and measurements in the Site Manager's record book. **Note:** The book used to record annual inspection observations shall be separate from the LTS&M record books kept by the Monticello LM Representative for routine surveillance observations.

  —Photographs and an accompanying photograph log describing photograph subjects and locations.

  —Other methods as appropriate.
- Complete the applicable portions of the appropriate annual inspection checklist provided in Appendix K).

- Collect and maintain records in accordance with Appendix B, "Document Control and Records Management Procedures."
- Prepare a summary report for submittal to EPA and UDEQ within 3 months of the annual inspection.

6.1.5 MMTS Annual Inspection Procedures

Procedures specific to the respective MMTS properties, including the disposal cell and associated support facilities, are provided in Sections 6.1.5.1 through 6.1.5.5.

6.1.5.1 Disposal Cell

- Review monthly monitoring records of the disposal cell LCRS to ensure that records are consistent with the requirements specified in Section 2.0.
- Review monthly monitoring records of the disposal cell LDS to ensure that records are consistent with the requirements specified in Section 2.0.
- To the extent possible, physically inspect the disposal cell LCRS and LDS sumps and systems. The leachate transmission line (including the manholes) between the disposal cell and Pond 4 will be walked and inspected for evidence of leakage or deterioration.
- Monitor the site perimeter and transects for damage or evidence of disturbance to the following:

  —Site perimeter roads.

  —Fences, gates, and locks.

  —Permanent site surveillance features (e.g., site markers, survey monuments, boundary monuments).

  —Site area vegetation; general plant health and presence of undesirable species, with particular emphasis to the disposal cell growth.

  —Stabilized surfaces (look for evidence of sedimentation or erosion).

  —Drainage/runoff ditches/sediment basin (ponds).
- Review records for maintenance and repairs.
- Walk the transects along the engineered components (diversion channels, disposal cell side slopes, crest, and cover) identified on Figure 3−1 and examine for evidence of:

  —Structural instability due to differential settlement, subsidence, cracking, sliding, or creep.

  —Erosion as evidenced by the development of rills or gullies.

  —Sedimentation or debris.

  —Rapid deterioration of riprap caused by weathering or erosion.

  —Removal of rock or other disposal cell material.

  —Seepage.

—Human or animal intrusion (inadvertent or deliberate).

—Animal burrowing.

—Vandalism.

—Human or animal trail development.

—Unwanted volunteer plant growth.

- Review the most recent settlement plate data to determine if any significant settlement has occurred. **Note:** Starting in 2006, settlement plate surveys are conducted every 5 years in July preceding the 5-year review.
- During the disposal cell cover inspection, remove the caps of the nine settlement plates to determine integrity of the plates.

6.1.5.2 Pond 4

- Review records of monthly monitoring of the Pond 4 LDS to ensure that records are consistent with the requirements specified in Section 2.0.
- Inspect Pond 4 from all sides for evidence of failed or breached liner. Evidence would include liner bubbling, visible tears, eroded anchor trenches, debris in the pond, and seeps or leaks outside of the pond.
- Physically inspect the Pond 4 LDS sump pump and system to the extent possible.
- Physically inspect the safety features (fencing, rescue equipment, gates, locks, etc.) associated with the pond.

6.1.5.3 Temporary Storage Facility

- Monitor the TSF and check the following items:

  —Fence, gates, locks, and signage.

  —Storage container integrity.

  —Absence of spills from all containers.

  —Entrance logbook available and current.

  —Material transfer records are properly documented in the TSF record book and are traceable to the annotated as-built drawings.

  —Shipping documents for shipments of material regulated by UDOT.
- Check to make certain that persons entering the site were either properly trained or escorted.

6.1.5.4 City of Monticello Property

This section addresses the properties that were transferred from DOE to the City of Monticello through the Lands to Parks Program (DOE 2000). The properties include properties MP−00391 Phase II, MP−01077 Phase II, MP−01041, MS−00893 and MP−00181 (former millsite area),

MP−01040 (north portion), MP−01042, and the remainder of properties MP−00391 and MP−01077. Maps and descriptions of these properties are provided in Section 4.0.

- Visually inspect the following features:
  - —Access gates
  - —Access roads
  - —Signage (if any)
  - —Perimeter fence (around the supplemental standards area piñon/juniper area)
- Look for and make note of
  - —Intrusion by livestock.
  - —Trash accumulation.
  - —Earth movement, erosion, or changes in nearby stream and drainage control channels that could affect the property.
  - —New construction or development that could affect the property.
- Evaluate the need for maintenance, particularly sign replacement and fence repairs.
- Verify that land use is consistent with the terms of the Final Covenant Deferral Request (DOE 2000).
  - —Verify that no habitable structures have been built.
  - —Verify that land is used for public recreation except that there is no overnight camping.
  - —Verify that human-caused damage to the wetland areas is not occurring.
  - —Verify no new wells have been or are being constructed into the alluvial aquifer.

6.1.5.5 Restrictive Easement Area Properties

Privately owned properties comprising the restrictive easement area properties (formerly the "OU II Soil and Sediment Area") include MP−00951−VL, MP−00990−CS, MP−01084−VL, MG−01026−VL, MG−01027−VL, MP−01029−VL, MG−01030−VL, and MG−01033−VL. A restrictive easement negotiated by the Army Corps of Engineers limits the use of the portion of each of these private properties cleaned up to supplemental standards.

During the annual inspection the lead inspector or designee shall determine if there have been any violations of the easements by:

- Inspecting the properties for evidence of construction of habitable structures or excavation and removal of contaminated materials from the restrictive easement area of each property.
- Inspecting for significant natural or man-made disturbances of land.
- Inspecting those portions of the properties that were noted as areas of potential concern in the routine surveillance records or in previous annual inspection reports.
- Verifying current property ownership, habitation, and land use. If any have changed, ensure that the Monticello LM Representative has informed the new owner or occupant of

the land use restrictions associated with the property. Changes of ownership shall be documented in the annual inspection report and in the Private Property Restricted Areas record book.

- Inspecting the properties for significant erosion in the restrictive easement area.

6.1.6 MVP Annual Inspection Procedures

Annual inspections of MVP properties (Monticello city streets and utilities, Highways 191 and 491 rights-of-way, and privately owned property MS–00176–VL) are conducted and documented by the Chief Inspector or designee concurrent with the MMTS annual inspection. Maps and descriptions of these properties are provided in Section 4.0 and attached plates.

6.1.6.1 City Streets and Utilities

- Visually inspect the sites of excavations that were conducted since the last annual inspection. Look for evidence of erosion or further disturbance.
- Inspect streets at random for unmonitored excavations.

6.1.6.2 Highways 191 and 491 Rights-of-Way

- Visually inspect the sites of excavations that were conducted since the last annual inspection. Look for evidence of erosion or further disturbance.
- Visually inspect the embankment of Highway 191 at the Montezuma Creek crossing for evidence of excavation or severe erosion.

6.1.6.3 Privately Owned Piñon/Juniper Property (MS–00176–VL)

- Check with the San Juan County Court House to verify that the zoning and ownership for this property have not changed.
- Ensure that the Monticello LM Representative has determined if property ownership or habitation has changed. If either property ownership or habitation on the property has changed, ensure that the new owner or occupant has been informed of the land use restrictions associated with the property.

6.1.7 Annual Inspection for Monticello Surface Water and Ground Water

The purpose of annual inspections specific to OU III is to ensure that ground water use restrictions remain effective and to evaluate the condition of monitoring wells, surface water stations, and the PRB.

6.1.7.1 Ground Water Restricted Area

During the annual inspection, the lead inspector will determine compliance with the ground water use restriction by:

- Checking with the Utah State Engineer to determine if any well permit applications were approved within the Ground Water Restricted Area. The lead inspector will also visit the location of any newly installed well and determine whether water from the shallow alluvial

aquifer is used for human consumption and was installed in compliance with the *Ground Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas* (Appendix I).

- Confirming that property owners or occupants are aware of the ground water use restriction.
- Interviewing the Monticello LM Representative to confirm that any water well drilling activities were conducted in accordance with the ground water management policy.
- Physically inspecting the Monticello Ground Water Restricted Area (see Figure 4−1 and Figure 6–1) for evidence of new well installation or evidence of existing wells having been retrofitted for human consumption (i.e., wells have been connected to a habitable structure). Existing well locations are indicated on Plate 7.

The lead inspector will include the results of the inspection in the annual inspection report. The Site Manager will follow the notification requirements of Section 4.2.7 if conditions of the ground water management policy are in violation.

6.1.7.2 Inspection of Wells

Each OU III monitoring well, except some located within the PRB, are currently active and are inspected during the April and October monitoring events. As part of the annual inspection, the lead inspector or designee shall inspect the surface components of the inactive wells for security and physical integrity. Any well condition needing repair or maintenance will be noted in the annual inspection report. Corrective actions will be tracked and completed in a timely manner.

Physical integrity includes observations of repairs since the last inspection, as well as damage that may have occurred through natural causes (e.g., erosion, freeze/thaw cycles), animal or rodent intrusion, or human activity (vandalism, vehicle, or equipment damage). The locations of the OU III monitoring wells are identified on Plate 7 and in Figures 5−1 and 5−2.

The lead inspector will verify that wells scheduled for abandonment since the last annual inspection have been abandoned. A list of wells abandoned since the last annual inspection shall be included in the annual inspection report.

6.1.7.3 Permeable Reactive Barrier and Treatment Cell

The lead inspector shall inspect the PRB and auxiliary treatment system for damage or ponded water or saturated soil conditions. Inspection items shall include the treatment system electrical panel, antenna, fence enclosure, and the well pads of the PRB. Excavations or deep tire ruts shall be noted, if present. Include the results of the inspection in the annual inspection report and make a corrective recommendation if unacceptable conditions are observed.

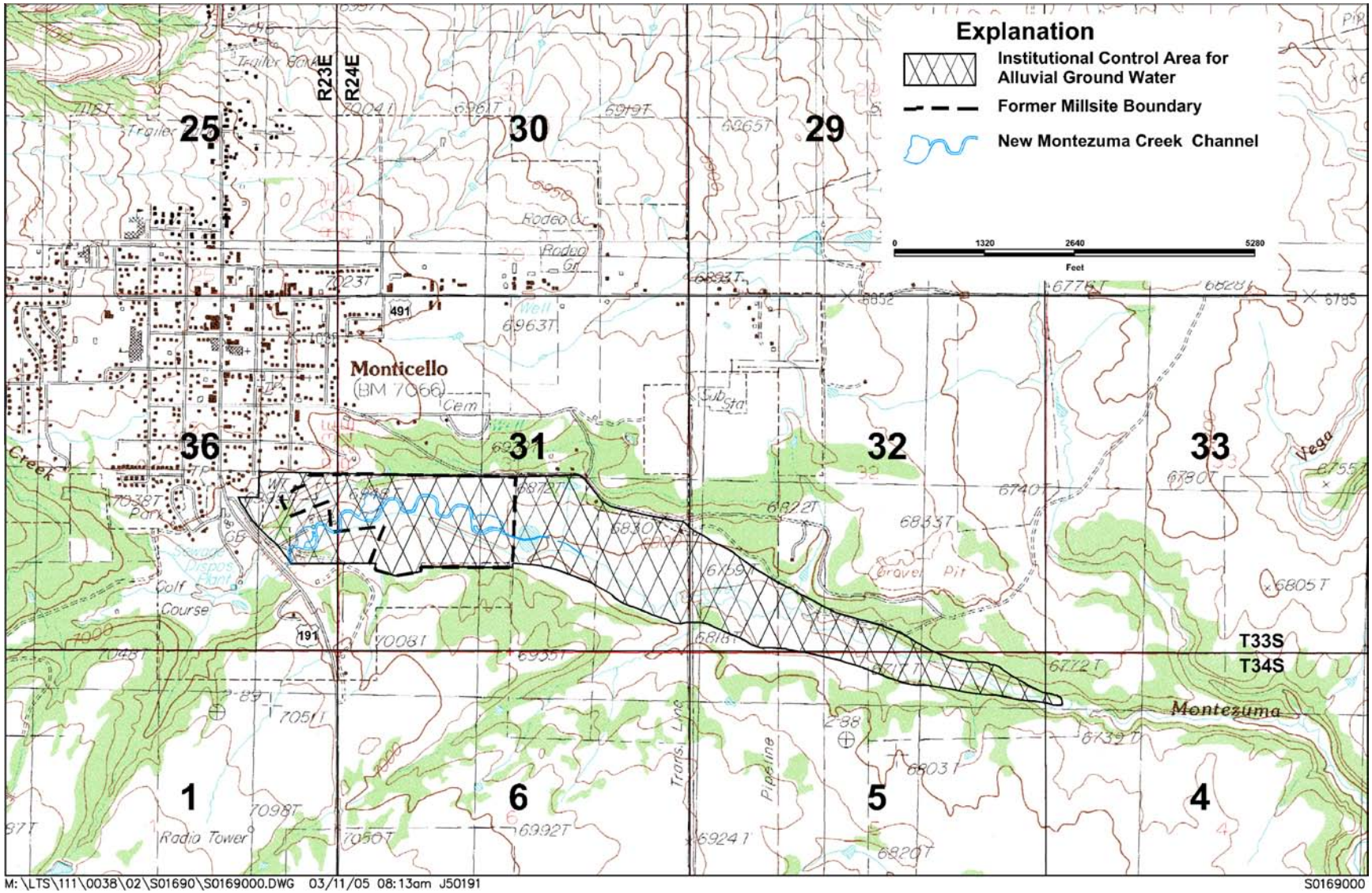

Figure 6–1. Monticello Ground Water Restricted Area

6.1.8 Annual Inspection Report

Within the calendar year of the annual site inspection, DOE will document the findings of the inspection in an annual inspection report. The purpose of preparing an annual inspection report is to document the continued performance of the selected remedies and compliance with institutional controls for those properties. The reports are a means of providing site status to stakeholders and will provide a year-to-year site history that can be used for trend analysis. The reports also represent a readily accessible record of activities that have been implemented or should be implemented to maintain site integrity. In addition, the reports allow DOE to evaluate whether its LTS&M activities are conducted at an appropriate level of effort to ensure protection of human health and the environment and to facilitate the CERCLA 5-year review. The annual report will be distributed to EPA, UDEQ, other interested stakeholders, and the information repository.

Typical content of the annual reports will be:

- Evaluation of current site conditions and assessment of whether the selected remedy continues to be protective of human health and the environment;
- Evaluation of institutional controls for effectiveness;
- Recommendations for further/future monitoring, maintenance, or corrective action (with schedule) if necessary;
- Items of interest for subsequent inspections;
- Results of specific monitoring defined by the individual LTS&M plans;
- Photographs of items of particular interest; and
- Recommendations for changes to LTS&M plans, if necessary.

The annual inspection reports will be organized as follows:

Summary—Summarizes any significant observations or states that there were no significant observations.

Introduction—Identifies the purpose of the report; identifies inspectors and date of inspection; identifies regulations/plans that define inspection requirements; identifies individuals contacted in conjunction with the inspection; identifies the purpose of the inspection; states other pertinent information that may not be included above.

Results of the Inspection—Separate subsections pertaining to the Monticello disposal cell, Pond 4, and the supplemental standards properties should be included. Each subsection will describe relevant observations made during the inspection, including references to photographs, maps, drawings, measurements, and features of special interest, as necessary.

Conclusions and Recommendations—Both general and specific conclusions regarding the Monticello disposal cell, Pond 4, and the supplemental standards properties performance since the previous annual inspection should be cited. Recommendations should be specific; for example, maintenance actions that should be performed, the need for formal agency

correspondence to resolve observed abuses of site controls, or recommended changes in inspection procedure.

Photographs and Photograph Log—If photographs are included in the report, a log referencing the photograph subject, perspective (if useful), and frame number or digital designation shall be included.

The appendix will include copies of the annual checklists that were completed.

6.2 CERCLA 5-Year Reviews

CERCLA Sections 104, 120, Executive Order (EO) 12580, and the National Contingency Plan establish the respective federal department or agency roles and responsibilities for conducting 5-year reviews. EO 12580 Sections 2(d) and (g) give the authority to conduct 5-year reviews at the MVP and MMTS sites to DOE and EPA. EPA has authorized DOE to conduct the 5-year reviews at MVP and MMTS through the FFA. EPA retains final responsibility to ensure that 5-year reviews conducted by DOE adequately address the protectiveness of remedies.

Pursuant to CERCLA Sections 104 and 121 and the FFA, EPA's *Comprehensive Five-Year Review Guidance* (EPA 2001) and supplement for the *Evaluation of Institutional Controls* (EPA 2005) will be used in conducting CERCLA 5-year reviews. DOE will revise its review process as updated guidance becomes available. EPA CERCLA 5-year review guidance is available at http://cfpub1.epa.gov/superapps/index.cfm/fuseaction/pubs.default/pubs.cfm.

The purpose of the 5-year review is to determine whether the remedy at the site continues to be protective of human health and the environment. The 5-year review report may need to recommend that the remedy be re-evaluated, or that an additional response action be considered. For example, the review may determine that the remedy will not meet cleanup levels for a contaminant of concern, or a new contaminant, source, or pathway of exposure may be discovered. Finally, the 5-year review may recommend that the remedy be re-evaluated when a contaminant, source, or pathway has not been sufficiently addressed, or when ARARs have changed. The first CERCLA 5-year review for the Monticello NPL sites was completed in 1997.

The results of the review are presented in a 5-year review report. The 5-year review report shall:

- State whether the remedy is currently protective or is expected to be protective.
- Document any deficiencies identified during the review.
- Recommend specific actions to ensure that a remedy will be or will continue to be protective.

The annual inspection reports and 5-year review reports prepared for the Monticello sites have been developed to address site-specific conditions in a format consistent with current EPA guidance (EPA 2001a).

6.2.1 Scope

The scope of the 5-year review is site specific. Because there are two separate NPL sites at Monticello, two separate 5-year reviews will be conducted—one for the MMTS and one for the MVP site. Information collection is a primary activity of the 5-year review. Three basic tasks are performed: a document review (Section 6.2.3.4), interviews (Section 6.2.3.5), and a site inspection (Section 6.2.3.6).

The 5-year reviews for the Monticello sites are conducted to ensure that the institutional controls that restrict land and water use remain relevant and are effectively enforced, and that changing site conditions or administrative requirements do not adversely impact the protectiveness of the remedies. For the MMTS, the contamination left in place that prevents unlimited use and unrestricted exposure, and is the focus of the reviews, includes, for the MMTS, waste contained in the on-site disposal cell (included in OU I), contaminated soil in OU I and OU II supplemental standards areas, and contaminated ground water in the alluvial aquifer of OU III; and for the MVP, properties comprising OU H (Monticello City Streets and Utilities, Highways 191 and 666 Rights-of-Way, and private property MS−00176−VL).

6.2.2 Responsibilities

DOE-LM Monticello Project Manager—Is ultimately responsible for the CERCLA 5-year review report and for submitting the report to EPA and UDEQ.

Site Manager—Is responsible for designating a Chief Inspector, assembling a team to conduct the 5-year review, and ensuring that the team develops an acceptable and technically correct report. The Site Manager may delegate any portion of the 5-year review to the team members.

Monticello LM Representative—Is responsible for assisting the 5-year review team. The Monticello LM Representative will provide access to information necessary to conduct the review, accompany the review team on site inspections, and ensure that the review team adheres to safety requirements during the site inspections. The Monticello LM Representative is not a member of the review team.

LTS&M 5-year review team—Is responsible for conducting the 5-year review and providing the Chief Inspector with sufficient documentation and supporting information for the 5-year review report.

Community Relations Specialist—Is responsible for informing the community at the outset of the 5-year review, conducting interviews as part of the review process, and for providing the community with a summary of the results following the final report in accordance with the current 5-year review guidance.

6.2.3 Procedure

A 5-year review will be conducted for the MVP site and MMTS. The results will be documented in separate site-specific reports that will be submitted 6 months after the fourth-year annual inspection (e.g., annual inspections conducted in September 2006, 2010, 2014).

6.2.3.1 Establish a 5-Year Review Team

The Site Manager will select a 5-year review team and assign a Chief Inspector. At a minimum, the review team will consist of an environmental specialist, a QA specialist, and a public relations specialist. The members of the review team may vary from one review to the next. The Monticello LM Representative will accompany the review team on inspections and provide documentation; however, as previously noted, a Monticello LM Representative shall not be selected as a review team member.

Table 6–1 provides examples of potential team members for the Monticello MVP and MMTS CERCLA 5-year reviews; however, the Site Manager is not required to choose from and is not restricted to this list.

Table 6–1. Potential Members of the Monticello LTS&M 5-Year Review Team

• Site Manager • Biological Technical Assistance Group Members • Federal and State Natural Resource Trustees • State and/or local regulatory agency representatives • Other federal agency representatives (e.g., U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Agency for Toxic Substances and Disease Registry) • State Engineer • Technical Experts —Construction representative —Engineers (e.g., civil, geotechnical, structural, chemical, process) —Hydrogeologist —Chemist —Risk assessor —Biologist —Ecologist/ecological risk assessor —Attorney/legal advisor —Environmental regulatory specialist

6.2.3.2 Develop a Review Schedule

The Chief Inspector shall establish a review schedule that includes the tasks associated with the review and identifies the team members assigned to each task. The following tasks are associated with the review:

- Inform the community/public outreach
- Document review
- Interviews
- Annual site inspection
- Develop 5-year review report
- Conclusions
- Recommendations

- Protectiveness statement
- Provide opportunity for public and regulatory agency review

In addition to these tasks, the Chief Inspector shall assign tasks associated with potential problems that may be identified in annual inspections or discovered by the Monticello LM Representative.

6.2.3.3 Inform the Community

Because the 5-year reviews are used to communicate the status and protectiveness of the remedy, the community shall be notified at the outset of the 5-year review process. The notification shall consist of a public notice placed in two local newspapers: the San Juan Record and the Blue Mountain Panorama. The notification should state

- The site name, its location, and web address.
- The lead agency conducting the review.
- A brief description of the selected remedy.
- A summary of contamination addressed by the selected remedy.
- How the community can contribute during the review process.
- A contact name and telephone number for further information.
- The scheduled completion date of the 5-year review.

After the 5-year review report is completed, a brief summary shall be placed in each newspaper. The summary should include

- The site name, its location, and web address.
- The lead agency conducting the review.
- A brief description of the selected remedy.
- A summary of contamination addressed by the selected remedy as provided in the initial notice.
- A brief summary of the results of the 5-year review.
- The protectiveness statements.
- A brief summary of data and information that provided the basis for determining protectiveness, issues, recommendations, and follow-up actions directly related to the protectiveness of the remedy.
- Locations where the draft 5-year review is available for public review.
- Dates of the public comment period, if applicable.
- Contact information where community members can obtain more information, inquire about the results, or provide written or verbal comments.
- The date of the next 5-year review or, if applicable, a statement and supporting rationale that 5-year reviews will no longer be required.

The review team member who prepares this summary shall review the most recent EPA 5-year review guidance to ensure that communication with the community is adequate.

6.2.3.4 Document Review

The document review is the foundation of the 5-year review. The review team member(s) assigned to this task shall review the following documents:

- RODs—The RODs shall be reviewed to determine the remedial action objectives and cleanup levels to be achieved.
- *Federal Register*—The *Federal Register* shall be reviewed to determine if any cleanup standards have been changed that could affect the protectiveness of the remedy.
- Monticello LTS&M Plan for the Monticello NPL Sites.
- Documents in the Monticello LM Representative's office (e.g., weekly inspections, monthly inspections, radiological as-built drawings, LCRS and LDS monitoring records for Pond 4 and the disposal cell, record books).
- Previous annual inspection reports.
- Most recent 5-year review report.
- Current monitoring plan for OU III.
- Previous annual reports for OU III ground water and surface water. If the reports indicate that performance criteria for the ground water remedy have not been attained as described in Section 5.0 and Appendix J of this plan, the ground water data will be evaluated, in concurrence with EPA and UDEQ, in the 5-year review by a technically valid method other than the primary method specified in the OU III ROD. Methodology and results of this alternate data evaluation will be documented in the 5-year review report and the affected annual reports.

6.2.3.5 Interviews

Interviews are conducted to identify successes and problems with remedy implementation and to develop an understanding of site status. The following is a list of potential interviewees:

- LTS&M staff
- Local municipal workers (e.g., City Manager, maintenance supervisor)
- Organizations implementing or overseeing institutional controls (e.g., local building department, State Engineer)
- Community action groups or associations (e.g., Victims of Mill Tailings Exposure)
- Residents/business owners located near the site
- Any other pertinent organizations or individuals

In planning interviews, the team member assigned to this task should assess what the interviews need to cover, how much detail is necessary, and who can best address each issue. The interview

should be designed to collect additional information on the following subjects, as needed, to supplement other sources of information:

- The implementation and functioning of the remedies.
- The integrity of access restrictions.
- The implementation and enforcement of institutional controls.
- Potential changes in land use.
- Changes in surface water and/or ground water use.
- Early indicators of potential remedy failure.
- Any concerns of site neighbors.

The scope of interview questions will vary depending on the party being interviewed. For example, a resident will typically be asked general questions. The Monticello LM Representative will typically be asked detailed questions concerning the remedy function. The Chief Inspector is responsible for determining the extent and scope of each interview on a case-by-case basis.

Questions to ask MMTS neighbors could include:

- Do you feel well informed about the current activities and conditions at the millsite?
- Do you know what public activities are allowed at the millsite?
- Do you know what property is owned by the City of Monticello and what property is owned by DOE?
- Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

Potential questions to ask the Monticello LM Representatives could include:

- Have any problems been encountered that required, or will require, changes to the LTS&M Plan, operating procedures, or that may require changes to the remedy?
- Is the current budget adequate to conduct all required maintenance activities?
- Have there been unexpected LTS&M difficulties or costs at the repository, millsite, city streets and utilities, or Highways 191 and 491 since start-up or in the last 5 years? If so, please give details.
- Have there been opportunities to optimize the operation, maintenance, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.
- Do you have any comments, suggestions, or recommendations regarding the LTS&M Plan or other aspects of the project?
- Have there been any significant changes in the LTS&M requirements, maintenance schedules, or sampling routines since start-up or in the last 5 years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
- Was the use of City of Monticello workers and equipment effective in handling any radioactive material that was encountered?

Questions to ask the City of Monticello administration could include:

- What is your impression of the project? (general sentiment)
- Do you have any specific problems complying with the terms of the cooperative agreement?
- Are there any plans to change the recreational use of the former millsite? If so, have these plans been submitted to the National Park Service?
- Are you aware of any projects or activities that could disturb the wetland areas along Montezuma Creek?
- Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
- What effect have site operations had on the surrounding community?
- Is there a continuous on-site LM presence? If so, is the work carried out in a professional and competent manner?
- Do you feel well informed about the site's activities and progress?
- Adequacy of DOE in working with excavations and removal of material at street, highway, and utility rights-of-way.
- Have there been communications or activities (site visits, inspections, reporting activities, etc.) conducted by the City of Monticello regarding the various project areas (e.g., former millsite, supplemental standards properties, restrictive easement areas)? If so, please give purpose and results.
- Have there been any complaints, violations, or other incidents related to the site requiring a response by the City of Monticello? If so, please give details of the events and results of the responses.

Interviews may be conducted in person, by telephone, or by a mailed survey.

6.2.3.6 Site Inspection

The 5-year review team will visually confirm and document the conditions of the site, the remedy, and the surrounding area during the site inspection. Interviews may also be conducted during the site inspection. The annual site inspection conducted in September preceding the due date of the 5-year review will be used as the inspection for the Monticello NPL sites 5-year reviews.

Site inspection activities are separated into several tasks:

- Interviews
- Review of documents and records
- Review of system operation and maintenance (O&M) costs
- Inspection of access
- Inspection of institutional controls

- Inspection of ground water/surface water remedies
- Inspection of general site conditions
- Overall observations

For the MMTS, the inspection procedure will include, at a minimum, a review of all the items identified in Section 4.0. The Chief Inspector may expand the inspection to include additional items that require investigation.

For the MVP site, the inspection will include a review of radiological information recorded on the radiological as-built drawings from scanning of excavations conducted on City of Monticello property or UDOT rights-of-way adjacent to MVP site properties. This radiological information should be assessed to determine the potential presence of previously undiscovered contamination. The Monticello LM Representative will provide this information to the CERCLA 5-year review team.

Inspection checklists are provided in Appendix K and should be completed during the CERCLA 5-year review. These checklists serve as guides for planning, documenting, and conducting the site inspection.

6.2.3.7 Conclusions

The conclusions of the 5-year review will include an identification of remedy deficiencies, recommendations and follow-up actions, and a determination of whether the remedy is expected to be protective of human health and the environment. The review team arrives at these conclusions by assessing the information collected during the document review, interviews, site inspection, and other activities. The evaluation should focus on answering the following three questions:

- ***Question A***—Is the remedy functioning as intended by the decision documents?
- ***Question B***—Are the assumptions used at the time of remedy selection still valid?
- ***Question C***—Has any other information come to light that could call into question the protectiveness of the remedy?

DOE will consult the most recent EPA 5-year review guidance for a detailed method of how to assess the remedy using these three questions.

6.2.3.8 Recommendations

Documented recommendations for correcting each deficiency should be developed. The first priority should be to make recommendations and ensure their implementation to correct deficiencies that currently impair protectiveness. These recommendations should be identified as "follow-up actions" in the 5-year review report. Follow-up actions should be completed to ensure long-term protectiveness of the remedy or to bring about protectiveness of a remedy that is currently not protective. The review team may make additional recommendations that do not directly relate to achieving or maintaining the protectiveness of the remedy.

The following are examples of the types of recommendations that are generally considered appropriate as part of a 5-year review:

- ***Need for Additional Response Actions***—Additional response actions may be necessary if new risk information indicates that a remedy is not protective, or a treatment process is not achieving soil or surface water and ground water cleanup levels. DOE and/or EPA may implement such further response anytime pursuant to CERCLA Sections 104 or 106 authority. Conducting further investigation and implementing additional response actions can be recommended in the 5-year report.
- ***Optimization of Response Action***—Where the areal extent of the ground water plume has decreased, and samples from some monitoring wells no longer have contaminant concentrations above remediation goals, the sampling plan may be revised to eliminate these wells from the sampling routine or reduce the frequency of their sampling.
- ***Ensure Enforcement of Access and Institutional Controls***—If site trespassing is evident, the 5-year report could include a recommendation to repair the fence and evaluate the need for additional security measures.

For each recommendation, the report should identify the party responsible for implementation, the agency with oversight authority, and a schedule for completion. Any recommendation that needs to be addressed to achieve protectiveness as a follow-up action should be clearly identified. Table 6–2 is an example of the format that can be used in the 5-year review report for documenting both recommendations and follow-up actions.

Table 6–2. Table for Listing Recommendations and Follow-Up Actions

Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Action Affects Protectiveness (Y/N)	
				Current	Future

Some actions can be implemented directly on the basis of the 5-year review report, whereas others will require further documentation. For instance, if the repair of fencing is listed as a follow-up action, no further documentation is required. However, if evaluation or altering the remedy is recommended, a recommendation to pursue this change using an Explanation of Significant Difference or ROD amendment should be made.

6.2.3.9 Protectiveness Statement

Protectiveness statements document that the remedies implemented are or are not protective of human health and the environment. Separate protectiveness statements for each OU should be made. An additional protectiveness statement covering all of the remedies at the site should also be made. Each statement should be accompanied by a discussion explaining and supporting the protectiveness determination. Table 6–3 provides current EPA guidance on developing protectiveness statements. Answers to questions listed in this table will require substantive explanation. Refer to the *Comprehensive Five-Year Review Guidance* (EPA 2001), including applicable supplements for a discussion of each question and how the determination of

protectiveness is made. The key ARARs for the Monticello NPL sites that should be considered when determining protectiveness are listed in Table 6–4.

To be consistent with EPA's recommendation for specific language in protectiveness statements, DOE–LM will use the language from Table 6–5 for protectiveness statements for individual OUs. The language referenced in Table 6–5 applies to the operating or construction-complete status of the remedial actions for all OUs of the Monticello NPL sites.

Table 6–3. Three Questions Used to Determine Whether a Remedy is Protective

When you ask:	You should consider
Question A: Is the remedy functioning as intended by the decision documents?	• Performance standards (e.g., cleanup levels, plume containment, pumping rates) are or will likely be met. • There are problems with the remedy that could ultimately lead to the remedy not being protective or suggest protectiveness is at risk (e.g., shrubs or bushes growing on a landfill cover that was designed to have a grass vegetative cover, extent of plume not fully delineated). • Access (e.g., fencing, security guards) and institutional controls needed at the particular stage of the remediation are in place and prevent exposure. • Other actions (e.g., removals) necessary to ensure that there are no exposure pathways that could result in unacceptable risks have been implemented. • Maintenance activities (e.g., pumping and treating, monitoring slurry walls, mowing cover), as implemented, will maintain the effectiveness of response actions.
Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?	• There are changes in standards identified as ARARs in the ROD, newly promulgated standards, and/or changes in to be considered (TBCs) identified in the ROD, that could call into question the protectiveness of the remedy. • There are changes in land use or the anticipated land use on or near the site. • New human health or ecological exposure pathways or receptors have been identified. • New contaminants or contaminant sources have been identified. • There are unanticipated toxic by-products of the remedy not previously addressed by the decision documents. • There are changes in the physical site conditions. • There are changes in the toxicity factors for contaminants of concern.
Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	• Ecological risks have been adequately addressed at the site, and there is a plan to address them through a future action. • The site was subject to natural disasters, such as a 100-year flood.

Table 6–4. Key ARARs

Regulatory Requirement	Citation	Repository and Pond 4	Millsite and Government Properties	Soil and Sediment Properties	OU III
Clean Water Act	33 USC 1251−1376 40 CFR Part 131	Yes	Yes	Yes	Yes
National Emission Standards for Radon Emissions from Department of Energy Facilities	40 CFR Part 61 Subpart Q	Yes	No	No	No
Resource Conservation and Recovery Act	40 USC 6901 40 CFR Parts 260−280	Yes	No	No	No
Uranium Mill Tailings Radiation Control Act	42 USC 2022 42 USC 7901−7942 40 CFR Part 192.02, 192.12, 192.20(a)(2)&(3), 192.21, and 192.22	Yes	Yes	No	No
Archaeological and Historic Preservation Act	16 USC 469 40 CFR 6.301(c)	No	Yes	No	No
Fish and Wildlife Coordination Act	16 USC 661−666 40 CFR 6.302(g)	No	No	Yes	Yes
Endangered Species Act	16 USC 1531-1543 50 CFR Parts 17, 402 40 CFR 6.302 (h)	No	No	Yes	Yes
Statement of Procedures on Floodplain Management	40 CFR Part 6 Appendix M	No	Yes	No	No
Procedures for licensing well drillers and water-well drilling standards; standards for drilling, construction, and abandonment of wells	73-3-25, U.C.A. R625-4, U.A.C.	No	Yes	Yes	Yes
Relocation of Natural Streams: procedures and standards governing rechanneling of stream beds	73-3-29, U.C.A. R625-5 U.A.C.	No	Yes	Yes	Yes
Utah Occupational Safety and Health Standards	Title 35, Chapter 9. U.C.A. R500, U.A.C.	Yes	No	No	No
Definitions for Water Pollution Rules and General Requirements	Title 26, Chapter 11, U.C.A. R448-1. U.A.C.	Yes	Yes	No	No
Standards for Quality for Water of the State	Title 26, Chapter 11, U.C.A. R448-2. U.A.C.	Yes	Yes	Yes	Yes
Ground Water Protection	Title 26, Chapter 11, U.C.A. R448-6. U.A.C.	Yes	Yes	Yes	Yes

Notes: U.A.C. = *Utah Administrative Code*
U.C.A. = *Utah Code Annotated*

Table 6–5. Protectiveness Statements

If the remedial action at the OU is:	then use this statement
operating or completed and...	
protective	"The remedy at OU X is expected to be protective upon completion or is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled."
protective in the short-term	"The remedy at OU X currently protects human health and the environment because (describe the elements of the remedy that protect human health and the environment in the short term). However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness (describe the actions needed)."
not protective	"The remedy at OU X is not protective because of the following issue(s) (describe each issue). The following actions need to be taken to ensure protectiveness (describe the actions needed)."
protectiveness deferred	"A protectiveness determination of the remedy at OU X cannot be made until further information is obtained. Further information will be obtained by taking the following actions (describe the actions). It is expected that these actions will take approximately (insert time frame) to complete, at which time a protectiveness determination will be made."

6.2.3.10 Develop 5-Year Review Report

After collecting and evaluating site information, the review team will write a 5-year review report. Five-year review reports document the results of the review and summarize deficiencies, recommendations, and follow-up actions and document protectiveness statements. Reports also provide background information necessary to understand the review analysis and discuss the findings of review activities.

Five-year review reports should be written for the general public as well as for lead and support-agency managers. Therefore, the 5-year review report should be written with the assumption that the reader will be someone unfamiliar with the site. The report should clearly present all of the information needed to understand the past activities at the site and the current status of all remedial actions.

Table 6–6 provides the format and summarizes the contents of the 5-year review report. The signature page will have concurrence lines to be signed by the Regional Administrator of EPA Region 8, the Director of UDEQ, and the DOE-LM Monticello Project Manager. The Chief Inspector shall ensure that the report provides the necessary information as shown in the table. This table is consistent with the *Comprehensive Five-Year Review Guidance* (EPA 2001). A detailed description of each section is provided in the guidance document.

Table 6–6. Summary of the Contents of a 5-Year Review Report

General Report Format

- Title page with signature and date
- Completed 5-year review summary form
- List of documents reviewed
- Site maps
- List of tables and figures
- Interview report (as appropriate)
- Site inspection checklist
- Photos documenting site conditions

Introduction

- The purpose of the 5-year review
- Authority for conducting the 5-year review
- Who conducted the 5-year review (DOE is the lead agency) and when
  - —Organizations providing analyses in support of the review (e.g., the Technical Assistance contractor supporting the lead agency)
  - —Other review participants or support agencies
- Review number (e.g., first, second)
- Trigger action and date
- Number, description, and status of all operable units at the site

Site Chronology

List all important site events and relevant dates (e.g., date of initial discovery of problem, dates of pre-NPL responses, date of NPL listing)

Background

- General site description (e.g., size, topography, and geology)
- Former, current, and future land use of the site and surrounding areas
- History of contamination
- Initial response (e.g., removals)
- Basis for taking remedial action (e.g., contaminants)

Remedial Actions

- Regulatory actions (e.g., date and description of RODs, Explanations of Significant Difference, Administrative Orders on Consent, Consent Decrees and Action Memorandums)
- Remedial action objectives
- Remedy description
- Remedy implementation (e.g., status, history, enforcement actions, performance)
- Systems operations/operations & maintenance (O&M)
  - —Systems operations/O&M requirements
  - —Systems operations/O&M operational summary (e.g., history, modifications, problems, and successes)
  - —Summary of costs of system operations/O&M effectiveness (i.e., are requirements being met and are activities effective in maintaining the remedy?)

Table 6−6 (continued). Summary of the Contents of a 5-Year Review Report

Progress Since Last 5-Year Review (if applicable)

- Protectiveness statements from last review
- Status of recommendations and follow-up actions from last review
- Results of implemented actions, including whether they achieved the intended effect
- Status of any other prior issues

Five-Year Review Process

- Administrative Components
  —Notification of potentially interested parties of initiation of review process
  —Identification of 5-year review team members (as appropriate)
  —Outline of components and schedule of the 5-year review
- Community Involvement
  —Community notification (before and after review)
  —Other community involvement activities (e.g., notices, fact sheets, as appropriate)
- Document review
- Data review
- Site inspection
  —Inspection date
  —Inspection participants
  —Site inspection scope and procedures
  —Site inspection results, conclusions
  —Inspection checklist
- Interviews
  —Interview dates and locations
  —Interview participants (name, title, etc.)
  —Interview documentation
  —Interview summary

Technical Assessment

- Answer Question A: Is the remedy functioning as intended by the decision documents?
  —Remedial action performance (i.e., is the remedy operating as designed?)
  —System operations/O&M
  —Cost of system operations/O&M
  —Opportunities for optimization
  —Early indicators of potential issues
  —Implementation of institutional controls and other measures
- Answer Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?
  —Changes in standards, newly promulgated standards, TBCs
  —Expected progress toward meeting RAOs
  —Changes in exposure pathways
  —Changes in land use
  —New contaminants and/or contaminant sources
  —Remedy by-products
  —Changes in toxicity and other contaminant characteristics
  —Risk recalculation/assessment (as applicable)

Table 6−6 (continued). Summary of the Contents of a 5-Year Review Report

- Answer Question C: Has any other information come to light that could call into question the protectiveness of the remedy?
  —New or previously unidentified ecological risks
  —Natural disaster impacts
  —Any other information that could call into question the protectiveness of the remedy
- Technical Assessment Summary

Issues

- Issues identified during the technical assessment and other 5-year review activities
- Determination of whether issues affect current or future protectiveness
- A discussion of unresolved issues raised by support agencies and the community (states, tribes, other Federal agencies, local governments, citizens, potentially responsible parties, other interested parties), if applicable

Recommendations and Follow-up Actions

- Required/suggested improvements to identified issues or to current site operations
- Note parties responsible for actions
- Note agency with oversight authority
- Schedule for completion of actions related to resolution of issues

Protectiveness Statements

- Protective statements for each OU. (If the remedy is not protective of human health and the environment, have you provided supporting discussion and information in the report to make this determination, such as current threats or level of risk?)
- Comprehensive protectiveness statement covering all of the remedies at the site (if applicable)

Next Review

- Expected date of next review
- If 5-year reviews will no longer be done, provide a summary of that portion of the technical analysis presented in the report that provides the rationale for discontinuing 5-year reviews

6.2.3.11 Submittal of 5-Year Review Report

The Site Manager shall submit the CERCLA 5-year review report to the DOE-LM Monticello Project Manager. The DOE-LM Monticello Project Manager will submit the report to the Regional Administrator of EPA Region 8 for concurrence. The DOE-LM Monticello Project Manager will also submit the report to the Director of UDEQ for concurrence. The report will be submitted to EPA and UDEQ in a timely fashion with an appropriate schedule for review consistent with the FFA time frames specified for primary documents.

Once the report is finalized it will be distributed to EPA, UDEQ, interested stakeholders, and the information repository. At that time, DOE will also prepare a summary of the 5-year review findings for publication in the San Juan County local newspapers.

7.0 References

Several references, available for review at the Monticello Field Office by the general public, EPA, and UDEQ, are applicable to LTS&M activities conducted at Monticello. The references, available from the Information Repository, are listed in the index to the *Information Repository for the U.S. Department of Energy Monticello Mill Tailings Site/Monticello Vicinity Properties, Subject Index*.

10 CFR 835. U.S. Department of Energy, "Occupational Radiation Protection," Subpart H, "Records," *Code of Federal Regulations*, January 1, 2006.

36 CFR 1228. "Disposition of Federal Records," Subpart B, "Scheduling Records," *Code of Federal Regulations*, July 27, 2002.

40 CFR 192. U.S. Environmental Protection Agency,"Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations*, July 1, 2005.

40 CFR 200−299. "Hazardous Waste."

40 CFR 260−299. "Resource Conservation and Recovery Act," Subtitle C.

40 CFR 300. "Protection of the Environment," National Contingency Plan, *Code of Federal Regulations*, 1999.

40 CFR 300−399. Subchapter J, "Superfund, Emergency Planning, and Community Right-to-Know Programs."

40 CFR 761. "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

40 CFR 763. "Asbestos."

49 CFR 106−180. "DOT Regulations."

15 U.S.C. 2601, et seq., "Toxic Substances Control Act."

42 U.S.C. §4321 et. seq. "National Environmental Policy Act," Public Law 91-90, *United States Code*, January 1, 1970.

42 U.S.C. §9601, et seq., Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Chapter 103 January 5, 1999.

42 U.S.C. §6901, et seq., Resource Conservation and Recovery Act of 1976, as amended.

42 U.S.C. §9604, et seq., Superfund Amendments and Reauthorization Act of 1986, Chapter 103, January 5, 1999.

44 U.S.C. §3301, et seq., Disposal of Records, Chapter 33, January 5, 1999.

State of Utah. "Utah Hazardous Waste Management Regulations," Utah Administrative Code (UAC) R315-8.

DOE (U.S. Department of Energy), 1988. *Federal Facility Agreement*, U.S. Environmental Protection Agency, Region VIII, State of Utah Department of Health, and U.S. Department of Energy agreement pursuant to Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986, February 24.

DOE (U.S. Department of Energy), 1989. *Monticello Vicinity Properties Project Declaration for the Record of Decision and Record of Decision Summary*, DOE/ID/12584-58, November.

DOE (U.S. Department of Energy), 1990. *Monticello Mill Tailings Site Declaration for the Record of Decision and Record of Decision Summary*, DOE/ID/12584-50, August.

DOE (U.S. Department of Energy), 1996. *Five-Year CERCLA Reviews (Type Ia) for the Monticello Mill Tailings NPL Site and the Monticello Vicinity Properties NPL Site*, U.S. Environmental Protection Agency, Region VIII, Hazardous Waste Management Division, April.

DOE (U.S. Department of Energy), 1997. DOE Order 232.1A, *Occurrence Reporting and Processing of Operations Information*, July 31.

DOE (U.S. Department of Energy), 1998a. *Repository and Pond 4 Groundwater Contingency Plan-Final,* MAC-MRAP 3.5.8, prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, February.

DOE (U.S. Department of Energy), 1998b. *Record of Decision for an Interim Remedial Action at the Monticello Mill Tailings Site, Operable Unit III - Surface Water and Ground Water, Monticello, Utah*, GJO-98-51-TAR, August.

DOE (U.S. Department of Energy), 1999a. *Monticello Mill Tailings Site, Application for Supplemental Standards, Government-Owned Properties in Monticello, Utah, DOE ID Nos. MP–00391–VL, MP–01041–VL, and MP–01077–VL,* GJO–98–66–TAR, Appendix E, "Long-Term Surveillance and Maintenance Plan," prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 1999b. *Monticello Vicinity Properties, Application for Supplemental Standards for City of Monticello Streets and Utilities,* GJO–98–68–TAR, Appendix E, "City of Monticello Streets and Utilities Long-Term Surveillance and Maintenance Plan," prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 1999c. *Monticello Vicinity Properties, Application for Supplemental Standards, Highways 191 and 666 Rights-of-Way Within the City Limits of Monticello,* GJO–96–8–TAR, Appendix E, "Highways 191 and 666 Rights-of-Way Long-Term Surveillance and Maintenance Plan," prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 1999d. *U.S. Department of Energy Cooperative Agreement between U.S. DOE and the City of Monticello,* August.

DOE (U.S. Department of Energy), 1999e. *U.S. Department of Energy Memorandum of Understanding between U.S. DOE the Utah Department of Transportation,* August. (**Note:** last updated in April 2007 and extended to year 2016.)

DOE (U.S. Department of Energy), 1999f. *Monticello Vicinity Properties, Application for Supplemental Standards for DOE ID No. MS–00176–VL,* GJO–96–4–TAR, Appendix E, "Long-Term Surveillance and Maintenance Plan," prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 1999g. *Monticello Mill Tailings Site, Operable Unit II, Application for Supplemental Standards for Upper, Middle, and Lower Montezuma Creek, Volume I*, GJO–98–58–TAR, Appendix C, "Long-Term Surveillance and Maintenance Plan for Operable Unit II Soil and Sediment Area," prepared by MACTEC Environmental Restoration Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 2000. *Final Covenant Deferral Request for Transfer of Federal Property in Monticello, Utah*, GJO-2000-140-TAR, prepared for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

DOE (U.S. Department of Energy), 2001. *2001 Annual Inspection of the Monticello Mill Tailings Site and Monticello Vicinity Properties Site*, prepared by MACTEC Environmental Services, LLC for the U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, December.

DOE (U.S. Department of Energy), 2002a. *2002 Annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites*, prepared by S.M. Stoller Corp. for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, December.

DOE (U.S. Department of Energy), 2002b. *Five-Year Review Report, Second Five-Year Review Report for Monticello Radioactively Contaminated Properties, Monticello, Utah, San Juan County, Utah*, GJO-2002-335-TAR, prepared by MACTEC-ERS for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, June.

DOE (U.S. Department of Energy), 2002c. *Five-Year Review Report, Second Five-Year Review Report for Monticello Mill Tailings, (U.S. Department of Energy) City of Monticello, San Juan County, Utah*, GJO-2002-336-TAR, prepared by MACTEC-ERS for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, June.

DOE (U.S. Department of Energy), 2002d. *Long-Term Stewardship Planning Guidance for Closure Sites*, August.

U.S. Department of Energy, 2003a. *Monticello Site Management Plan, Draft Final* GJO-2003-493-TAC, Rev. 06, prepared by S.M. Stoller Corporation for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado, October.

DOE (U.S. Department of Energy), 2003b. *Radiation Protection Program Plan*, GJO-2003-395-TAC, Revision 3, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

DOE (U.S. Department of Energy), 2003c. Trip report for the *2003 Annual Inspection of the Monticello Mill Tailings and Monticello Radioactively Contaminated Properties Sites*, prepared by S.M. Stoller Corp. for the U.S. Department of Energy, Office of Legacy Management, Grand Junction, Colorado, November.

DOE (U.S. Department of Energy), 2004a. *2004 Annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites*, prepared by S.M. Stoller Corp. for the U.S. Department of Energy, Office of Legacy Management, Grand Junction, Colorado, October.

DOE (U.S. Department of Energy), 2004b. *Monticello Mill Tailings Site, Operable Unit III—Final Remedial Investigation Addendum and Focused Feasibility Study*, GJO−2003−413−TAC, prepared for the U.S. Department of Energy, Grand Junction, Colorado, January.

DOE (U.S. Department of Energy), 2004c. *Record of Decision for the Monticello Mill Tailings Site (US DOE), Operable Unit III—Surface Water and Ground Water, Monticello, Utah,* DOE-LM/GJ629-2004, prepared for the U.S. Department of Energy, Grand Junction, Colorado, May.

DOE (U.S. Department of Energy), 2004d. *Monticello Mill Tailings Site Operable Unit III Post-Record of Decision Monitoring Plan*, Draft Final, DOE−LM/GJ684−2004, prepared by S.M. Stoller Corporation for the U.S. Department of Energy Grand Junction, Colorado, Office of Legacy Management, August.

DOE (U.S. Department of Energy), 2005. *2005 Annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Site,* DOE-LM/GJ1065-2005, prepared by S.M. Stoller Corp. for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado, December.

DOE (U.S. Department of Energy), 2006a. *Legacy Management CERCLA Sites Quality Assurance Project Plan*, DOE-LM/GJ1232-2006, U.S. Department of Energy, Grand Junction, Colorado, July.

DOE (U.S. Department of Energy), 2006c. *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*, DOE-LM/GJ1197-2006, U.S. Department of Energy, Grand Junction, Colorado, October.

EPA (U.S. Environmental Protection Agency), 1991. *Structure and Components of Five-Year Reviews*, OSWER Directive 9355.7–02, Office of Solid Waste and Emergency Response, Hazardous Site Control Division, Washington, D.C., May 23.

EPA (U.S. Environmental Protection Agency), 2000. *Quality Assurance Project Plan for Alternative Cover Assessment Project at the Uranium Mill Tailings Disposal Cell, Monticello, Utah*, U.S. Environmental Protection Agency National Risk Management Research Laboratory, Cincinnati, Ohio.

EPA (U.S. Environmental Protection Agency), 2001a. *Comprehensive Five-Year Review Guidance,* OSWER Directive 9355.7-03B–P, Office of Solid Waste and Emergency Response, Hazardous Site Control Division, Washington, D.C., April.

EPA (U.S. Environmental Protection Agency), 2001b. *Requirements for Quality Assurance Project Plans*, EPA QA/R-5.

EPA (U.S. Environmental Protection Agency), 2002. *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, EPA/240/R-02/009, Office of Research and Development, December.

EPA (U.S. Environmental Protection Agency), 2005. Supplement to the Comprehensive Five-Year Review Guidance: *Evaluation of Institutional Controls*, OSWER Directive 9355.7-12, Office of Solid Waste and Emergency Response, Hazardous Site Control Division, Washington, D.C., March.

EPA (U.S. Environmental Protection Agency), 2006. Human Health Risk Assessment Risk-Based Concentration Table, April 2006 update, available on the Internet at http://www.epa.gov/reg3hwmd/risk/human/index.htm.

STO 1. *Quality Assurance Manual*, continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

STO 2. *Health and Safety Manual*, continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

STO 3. *Site Radiological Control Manual*, continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

STO 4. *Training Manual*, continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

STO 9. *Records Management Manual*, continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

STO 203. *Health and Safety Procedures Manual*, , continuously updated, prepared by S.M. Stoller Corporation for the U.S. Department of Energy, Grand Junction, Colorado.

State of Utah, 1999. Department of Natural Resources Division of Water Rights. *Ground Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas*, May.

Appendix A

Monticello LTS&M Project Organization and Key Personnel

Appendix B

Document Control and Records Management Procedures

Appendix C

Site Specific Emergency Response and Hazard Survey Information

Appendix D

Photographs of Utah and San Juan County-Listed Noxious Weeds and Undesirable Weeds

Photographs taken from:
Weeds of the West,
Tom D. Whitson, Editor
published by The Western Society of Weed Science, Newark, California
9th Edition, 2002

Appendix E

Repository and Pond 4 Groundwater Contingency Plan (February 1998)

Note: Appendices to this plan are not included

Appendix F

Radiological Survey Procedures

Appendix G

Uranium Scanning Procedure

Appendix H

Procedures for the Transportation of Radioactive Materials

Appendix I

Ground Water Management Policy for the MMTS and Adjacent Areas

Appendix J

Ground Water Remedy Performance Evaluation Plan

Appendix K

MMTS and MVP Site Inspection Checklists