Flatirons Range, Rocky Flats Site, Colorado

Ground sampling at Amchitka, Alaska, Site

Grand Junction, Colorado, Disposal Site overlook

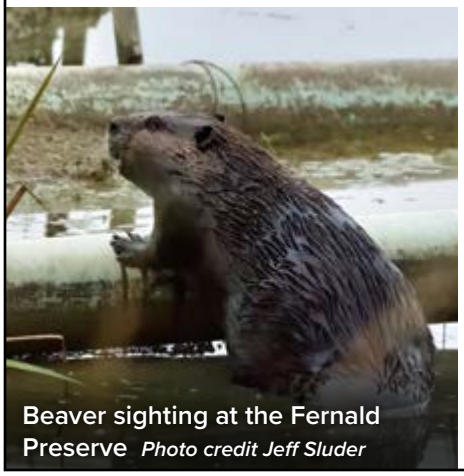
Weldon Spring Interpretive Center ribbon cutting

Summary of Annual Site Environmental Reports

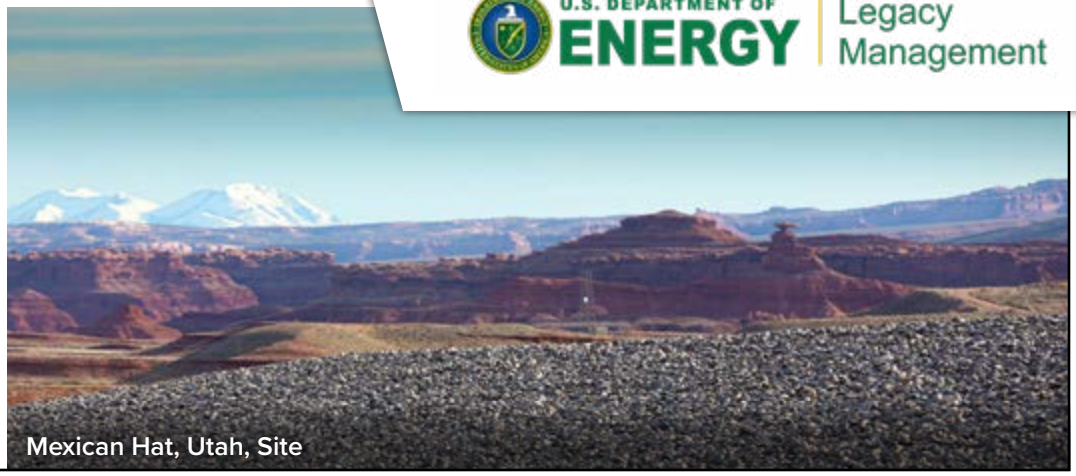
Calendar Year 2022

U.S. DEPARTMENT OF ENERGY | Legacy Management

Drone above target at GJDS



Beaver sighting at the Fernald Preserve *Photo credit Jeff Sluder*



Mexican Hat, Utah, Site

Public and Stakeholder Feedback

For more information on Office of Legacy Management activities, or to provide comments and feedback on the content of this report, contact:

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Abbreviations

ACM	asbestos-containing material
AEA	Atomic Energy Act
AEC	U.S. Atomic Energy Commission
AFFF	aqueous film-forming foam
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
ASER	Annual Site Environmental Report
AS&T	Applied Studies and Technology
BLM	U.S. Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COC	contaminant of concern
CWA	Clean Water Act
CXE	Categorical Exclusion Evaluation
CY	calendar year
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DRUM	Defense-Related Uranium Mines
EA	Environmental Assessment
ECHO	Enforcement and Compliance History Online
EHS	extremely hazardous substance
EISA	Energy Independence and Security Act
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
EPEAT	Electronic Product Environmental Assessment Tool
ESA	Endangered Species Act
EV	electric vehicle
FDEP	Florida Department of Environmental Protection
FFCA	Federal Facility Compliance Act

FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
FYR	Five-Year Review
GCAP	Groundwater Compliance Action Plan
GEMS	Geospatial Environmental Mapping System
HFC	hydrofluorocarbon
HSWA	Hazardous and Solid Waste Amendments
ISO	International Organization for Standardization
LEHR	Laboratory for Energy-Related Health Research
LEW	Low Erosivity Waiver
LM	Office of Legacy Management
LMBC	LM Business Center
LMFSC	LM Field Support Center
LMOC	LM Operations Center
LMS	Legacy Management Support
LTS&M	long-term surveillance and maintenance
MBTA	Migratory Bird Treaty Act
MED	Manhattan Engineer District
µg/L	micrograms per liter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLN	National Laboratory Network
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NWCG	National Wildfire Coordinating Group
NWPA	Nuclear Waste Policy Act
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OU-1	Operable Unit 1
PA	Performance Assurance
PCB	polychlorinated biphenyl
PCC	PFAS Coordinating Committee
PFAS	per- and polyfluoroalkyl substances

PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POC	point of compliance
ppt	parts per trillion
P&T	pump-and-treat
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RPP	Radiation Protection Program
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SLERA	screening-level ecological risk assessment
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
ULP	Uranium Leasing Program
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	U.S. Army Corps of Engineers
USC	*United States Code*
USFWS	U.S. Fish and Wildlife Service
V&V	verification and validation

1.0 Reporting Requirement

U.S. Department of Energy (DOE) Order 231.1B Admin Chg 1, *Environment, Safety and Health Reporting*, requires each DOE site to prepare an Annual Site Environmental Report (ASER) documenting the site's environmental conditions and the reporting requirements specified in Attachment 2 of the DOE order. The ASER is submitted to the Office of Environmental Protection and Environment, Safety and Health Reporting annually and is available to the public. DOE's *Guidance for Preparation of the 2022 Department of Energy Annual Site Environmental Reports* (DOE 2023) recognizes that Office of Legacy Management (LM) sites have unique characteristics and suggests two alternatives to the preparation of the ASER. LM has opted for the scaled-down report (alternative 1) to meet the intent of DOE Order 231.1B Admin Chg 1 and provide a summary of LM's programmatic and site-specific environmental activities for calendar year (CY) 2022. When practical, this report provides website links where documents are publicly accessible. The links may go to the most recent document versions rather than those in effect for the ASER reporting period.

1.1 Public and Stakeholder Outreach and Feedback

This ASER provides stakeholders and the public a description of the environmental conditions and regulatory compliance status at LM sites and of LM's programmatic environmental activities. LM welcomes feedback and is committed to continuous improvement of environmental activities, including proactive community, public, and stakeholder engagement and outreach.

Contact public.affairs@lm.doe.gov for more information on LM activities or to provide comments and feedback on the content of this report.

2.0 Introduction

LM was established in 2003 to manage DOE's postclosure responsibilities at sites under its care and ensure the future protection of human health and the environment at those sites through long-term surveillance and maintenance (LTS&M). The histories of the legacy sites vary, as do the regulatory regimes under which the sites are managed. Publicly available LTS&M Plans or equivalent documents are prepared for the sites and include site descriptions, site histories, the nature and extent of contamination, site closeout conditions, present and future monitoring and surveillance programs, and institutional controls.

In 2022, LM managed the long-term care of 101 sites. Site counts are updated annually in the LM *Site Management Guide* (LM-Guide-3-20.0-1.0); this ASER was aligned with the June 2022 guide. The most recent guide is available at https://www.energy.gov/lm/downloads/site-management-guide.

Table 1 provides a summary of the site counts. As active remediation of additional DOE sites is completed, the sites will be transferred to LM for long-term care. Additional information on transferring sites is provided in the LM *Site Management Guide.* The regulatory or programmatic framework and the number of sites managed under each framework during the reporting period are described below and on the Legacy Site Programmatic Framework page of the LM public website. Figure 1 shows the percentage of LM sites by regulatory or programmatic framework.

Table 1. LM Site Count by Regulatory or Programmatic Framework

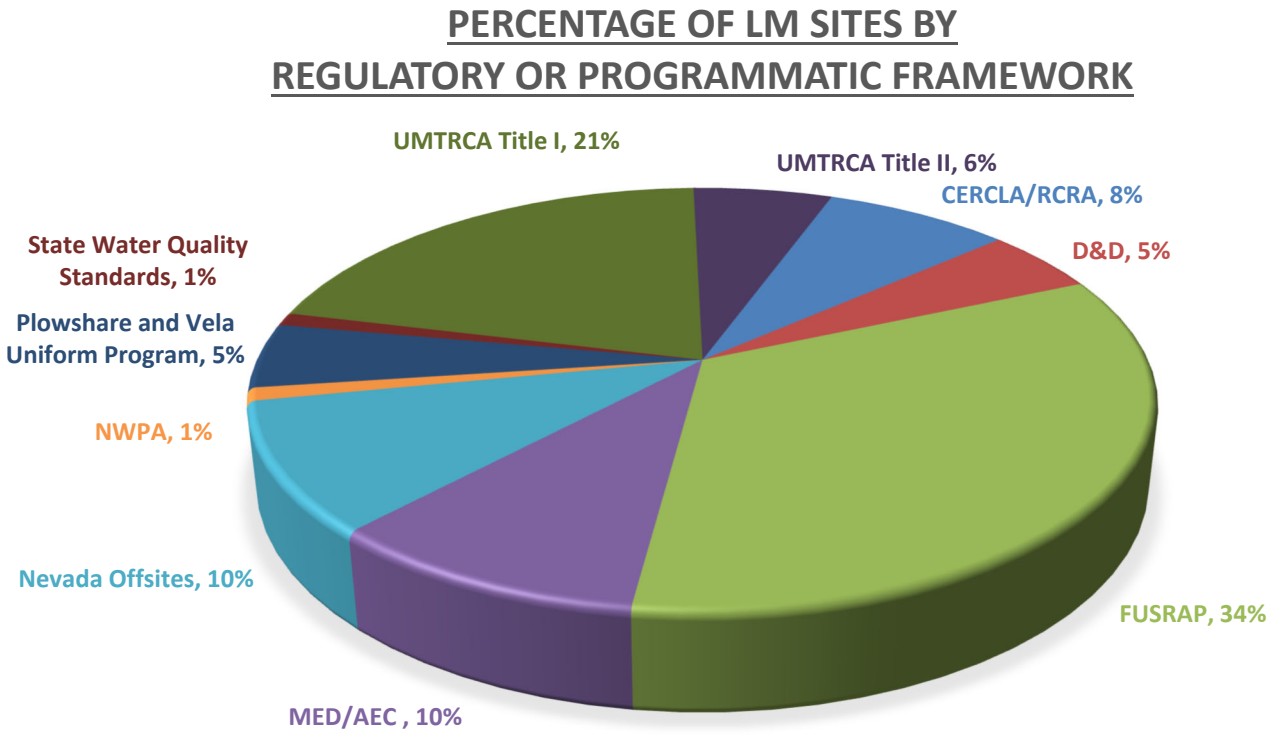
Regulatory or Programmatic Framework	Site Count Through December 2022
Comprehensive Environmental Response, Compensation, and Liability Act / Resource Conservation and Recovery Act (CERCLA/RCRA)	8
Decontamination and Decommissioning (D&D)	5
Formerly Utilized Sites Remedial Action Program (FUSRAP)	34
Manhattan Engineer District / U.S. Atomic Energy Commission (MED/AEC)	10
Nevada Offsites (NVOS)	10
Nuclear Waste Policy Act (NWPA)	1
Plowshare and Vela Uniform Program	5
State Water Quality Standards	1
Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I	21
UMTRCA Title II	6
Total	**101**

2.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Resource Conservation and Recovery Act (RCRA) Sites

LM managed eight sites during the reporting period where remediation was conducted in accordance with CERCLA, RCRA, or both. Federal milling, processing, research, or nuclear weapons-manufacturing operations at these sites resulted in radiological contamination, chemical contamination, or both.

2.2 Decontamination and Decommissioning (D&D) Sites

DOE established the D&D Program for the remediation of surplus DOE facilities. Five D&D sites have been transferred to LM. Four of these sites are former nuclear power plants, and the fifth was a uranium ore pilot processing plant and shipping center.



Abbreviations: AEC = U.S. Atomic Energy Commission; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; D&D = Decontamination and Decommissioning; FUSRAP = Formerly Utilized Sites Remedial Action Program; MED = Manhattan Engineer District; NWPA = Nuclear Waste Policy Act; RCRA = Resource Conservation and Recovery Act; UMTRCA = Uranium Mill Tailings Radiation Control Act

Figure 1. Percentage of LM Sites by Regulatory or Programmatic Framework

2.3 Formerly Utilized Sites Remedial Action Program (FUSRAP) Sites

The U.S. Atomic Energy Commission (AEC), predecessor to DOE, established FUSRAP to remediate sites where radioactive contamination remained from the Manhattan Engineer District (MED) projects and early AEC operations. In the 1970s and 1980s, DOE assessed more than 600 candidate facilities and determined that an initial 46 were eligible for remediation under FUSRAP. Additional sites were determined to be eligible after the program was originally established, and several otherwise ineligible sites were designated for remediation by Congress. DOE remediated 25 of these sites between 1974 and 1997, when Congress (through the Energy and Water Development Appropriations Act for fiscal year [FY] 1998) directed the U.S. Army Corps of Engineers (USACE) to assume responsibility for the remediation of the remaining FUSRAP sites. Of the initial list of 25 sites, several sites required further remediation by the USACE in subsequent years. USACE's remediation is subject to the administrative, procedural, and regulatory provisions of CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan.

LM determines whether a site is potentially eligible for FUSRAP, refers sites to USACE for further investigation and possible designation, and manages long-term stewardship of remediated sites. USACE maintains each site for 2 years after remediation is complete and then transfers the long-term stewardship responsibilities of the site to LM. Most FUSRAP sites were remediated for unrestricted use, so long-term stewardship is limited to managing site records and responding to stakeholder inquiries. Long-term stewardship at other completed FUSRAP sites includes surveillance and maintenance activities, maintaining institutional controls, and conducting regular site inspections. LM managed 34 FUSRAP sites during the reporting period; the number will increase as USACE completes the cleanup of remaining sites.

2.4 Manhattan Engineer District / U.S. Atomic Energy Commission (MED/AEC) Legacy Sites

MED/AEC sites were associated with MED's efforts to develop the first nuclear weapons during World War II and with other work overseen by AEC. LM is responsible for records management and stakeholder support of 10 remediated MED/AEC sites.

2.5 Nevada Offsites

LM managed 10 sites during the reporting period under the Nevada Offsites Program, including sites where underground nuclear tests and experiments were performed outside of the Nevada National Security Site (formerly called the Nevada Test Site). Underground nuclear testing was conducted for various purposes, including stimulating natural gas production and cataloging seismic detonation signatures. Three sites in Nevada are managed under the regulatory authority of a Nevada-administered Federal Facility Agreement and Consent Order, and the remaining seven sites are managed in collaboration with each host state's environmental agency.

2.6 Nuclear Waste Policy Act (NWPA) Section 151 Site

Under the U.S. Nuclear Regulatory Commission (NRC) Site Decommissioning Management Program, owners can transfer certain sites with low-level radioactive contamination remaining after site remediation to the federal government under Section 151 of the NWPA. LM managed one NWPA Section 151 site for LTS&M during the reporting period.

2.7 Plowshare and Vela Uniform Program

The Plowshare Program (1957–1975) was designed to test peaceful applications of nuclear devices. Peaceful applications included civil works and industrial projects (e.g., construction of dams, harbors, canals, highways, and railroads).

The Vela Uniform Program (1963–1971) was designed to develop technologies for detecting underground or underwater nuclear detonations. Several tests were conducted using nuclear and nonnuclear explosives to analyze seismic activities associated with different types of explosives or other seismic activities such as earthquakes.

More than 150 Plowshare and Vela Uniform Program proposed project sites were previously identified by the DOE Office of Environmental Management. Most of these proposed projects never occurred; only 30 sites had activities with the potential for remaining liabilities. These

30 sites were grouped by purpose: Non-Nuclear Explosive Tests, Non-Nuclear Civil Works Projects, Canceled Nuclear Tests (some activities occurred but planned nuclear tests were canceled), and other (geothermal energy experiment). LM evaluated these sites for potential environmental liabilities and safety hazards before accepting them for long-term management. Following the completion of maintenance activities, LM's management of the sites will consist of preserving records and responding to public inquiries. LM managed five sites during the reporting period. Four are individual sites, and one consisted of records-only management of 166 Plowshare and Vela Uniform project sites.

The Plowshare and Vela Uniform Program sites do not require LTS&M activities, only temporary reporting requirements (e.g., revegetation monitoring until success criteria are achieved). Activities may include assessing site conditions, eliminating remaining environmental impacts and safety hazards, managing site records, responding to stakeholder inquiries, and maintaining information on the program fact sheet and website.

2.8 State Water Quality Standards Site

LM is responsible for records management and stakeholder support of one site—the Geothermal Test Facility, California, Site. It was remediated to state requirements only, and no federal requirements apply. For this site, DOE completed the cleanup activities based on the California Regional Water Quality Control Board order. The U.S. Bureau of Land Management (BLM) then relinquished the land and terminated the right-of-way.

2.9 Uranium Mill Tailings Radiation Control Act (UMTRCA) Sites

UMTRCA (Title 42 *United States Code* Section 7901, as amended [42 USC 7901 et seq.]) addresses the remediation, control, and regulation of uranium mill tailings at uranium mill sites addressed under Title I and Title II.

- Title I of UMTRCA identified uranium ore-processing sites requiring remediation with inactive uranium processing licenses before January 1, 1978. The responsibility for remediation was assigned to DOE. Uranium mill tailings and associated contaminated material are stored in disposal cells both onsite and offsite at Title I sites. LM managed 21 UMTRCA Title I sites during the reporting period.
- Title II of UMTRCA identified the operation, decommissioning, reclamation, and long-term surveillance requirements for uranium mill sites under specific license on or after January 1, 1978. These sites were commercially owned and regulated under NRC license. Once the owner completes NRC-approved reclamation, DOE accepts title to the site for long-term custody and care. LM managed six reclaimed UMTRCA Title II sites during the reporting period; the number will increase as additional sites are transferred from the licensee to LM for LTS&M.

2.10 Additional LM Programs and Facilities

In addition to postclosure site responsibilities, LM manages the following programs and facilities (Section 3.0 provides specific activities for the reporting period):

- **Radiometric Calibration Facilities:** LM maintains five facilities used to calibrate instruments for measurements of uranium, thorium, and potassium. LM grants access to these facilities to non-LM users.
  - The primary calibration facilities are at the:
    - Grand Junction Regional Airport in Grand Junction, Colorado.
    - Grand Junction, Colorado, Decontamination and Decommissioning Site.
  - Secondary facilities are in:
    - Grants, New Mexico.
    - George West, Texas.
    - Casper, Wyoming.
  - Additional information is available at https://www.energy.gov/lm/services/calibration-facilities.
- **Uranium Leasing Program (ULP):** LM manages the ULP and administers 31 uranium mining lease tracts within the Uravan Mineral Belt in southwestern Colorado. Administrative duties include ongoing monitoring and oversight of leaseholders' activities and annual inspections to identify and correct safety hazards and environmental compliance issues.
  - Additional information is available at https://www.energy.gov/lm/services/property-management/uranium-leasing-program.
- **Defense-Related Uranium Mines (DRUM) Program:** LM established this program in 2017 under the authority of the National Defense Authorization Act for FY 2013. LM implements the program by conducting verification and validation (V&V) activities at more than 3400 DRUM Program sites, most of which are in Arizona, Colorado, New Mexico, Utah, and Wyoming. V&V activities include mine location reconciliation; field inventory of mine-related features; collection of radiological data (gamma radiation surveys), soil samples, and water samples (when applicable); determination of reclamation or remediation status; and risk screening to determine potential physical safety hazards and risks to human health. The DRUM Program also partners with other agencies to complete mine safeguarding activities, including closing mine openings by installing devices such as gates or filling the opening and, when necessary, removing structures and materials of no historical value to protect public safety, human health, and the environment.
  - Additional information is available at https://www.energy.gov/lm/defense-related-uranium-mines-program.
- **Applied Studies and Technology (AS&T) Program:** An overriding LM goal is to "incorporate advances in science and technology to improve our capabilities" in advancing protection of human health and the environment. AS&T is a core component of LM's efforts to fulfill this goal by incorporating improvements in scientific understanding and technology applications with management strategies to decrease long-term costs. AS&T conducts

studies to fulfill these objectives and to continually improve the quality of LTS&M and the cost effectiveness, sustainability, and protectiveness of environmental remedies at LM sites. These studies include working with other federal agencies, the environmental community, universities, national laboratories, and the international scientific community so that LM can stay informed about emerging engineering and scientific advancements that support ongoing LM studies and promote data sharing, discourse, and scientific achievements.

  - Additional information is available at https://www.energy.gov/lm/services/applied-studies-and-technology-ast.

- **LM National Laboratory Network (NLN) Program**: This program collaborates with DOE's national laboratories and LM's strategic partner (the Legacy Management Support [LMS] contractor) to accelerate LM's ability to assess and deploy technology and expertise to sustainably manage the use of legacy land and assets. This collaboration assists LM to reduce budget expenditures and improve stakeholder confidence utilizing the expertise of DOE's national laboratories. LM signed a Memorandum of Understanding formally establishing Savannah River National Laboratory as the lead national laboratory providing technical support to LM's management of remediated sites around the United States.
- **LM Business Center (LMBC) at Morgantown, West Virginia:** This facility is certified by the National Archives and Records Administration as an official repository for the storage of federal records. The facility is environmentally controlled and capable of storing approximately 150,000 cubic feet of physical records, including a climate-controlled vault for microfilm, negatives, photographs, and other media.

  - Additional information is available at https://www.energy.gov/lm/services/records-management.

- **LM Occupied Facilities:** LM executes its mission and programmatic activities from 10 occupied facilities in the following locations:

  - Fernald Preserve, Ohio
  - LM Field Support Center (LMFSC) at Grand Junction, Colorado
  - Monticello, Utah
  - LMBC at Morgantown, West Virginia
  - Pinellas County, Florida
  - Tuba City, Arizona (this site transitioned to an unoccupied facility in June 2022)
  - Washington, D.C.
  - Weldon Spring, Missouri
  - LM Operations Center (LMOC) at Westminster, Colorado
  - Window Rock, Arizona

Note

Temporary accommodations are used by field staff during part of the year at the Grand Junction, Colorado, Disposal Site and at the Mound, Ohio, Site. Although these locations are used part of the year, the staff there are accounted for at one of the other 10 occupied sites.

3.0 Summary of General Environmental Reporting

3.1 Oversight

DOE assigns an LM site manager, program manager, or facility manager to each LM site or activity to oversee the scope, schedule, and budget of work; address stakeholder concerns; and ensure that activities are compliant and protective of human health and the environment. This LM manager reviews all reports associated with their respective sites or activities to ensure data are accurately reported.

3.2 Summary of Site-Specific Activities

LM categorizes sites based on the level of actual or anticipated LTS&M activities associated with the site. In general, fewer activities and less environmental monitoring are performed at the lower category sites, resulting in less documentation and reporting. However, a site's category can change depending on site conditions (e.g., changes in groundwater remediation strategies or regulatory requirements).

Appendix A summarizes the monitoring and associated reporting for each site; sites geographically grouped as one in the LM *Site Management Guide* are addressed individually in the tables. Most of the information in the tables is available on site-specific websites accessible at https://www.energy.gov/lm/sites/lm-sites and from the site-specific links in Appendix A of this report. Additional reporting information is available upon request.

Note

Site counts for CY 2022 were determined using the June 2022 LM Site Management Guide*. Any LM* Site Management Guide *issued after June 2022 may not align with these numbers due to changes in site conditions or site status.*

The three categories of LM sites and site counts, according to the LM *Site Management Guide*, are as follows:

- Category 1 sites
  - Category 1 sites are listed in Table A-1 of Appendix A of this ASER and include 44 LM sites.
  - LM activities include records-related activities and stakeholder support. Historical site information is available online and accessible for stakeholders.
  - LM is not required to routinely inspect or sample these sites for environmental monitoring data, and there are no annual reporting requirements.
- Category 2 sites
  - Category 2 sites are listed in Table A-2 of Appendix A of this ASER and include 49 LM sites.
  - LM activities may include:
    - Conducting required inspections (typically annually) and maintenance.
    - Sampling for environmental monitoring data, as required.

- Addressing potential environmental liabilities and safety hazards.
- Managing site records and providing support on stakeholder inquiries and requests for information. Historical site information and monitoring results are accessible online for stakeholders.
- Implementing and managing administrative controls (e.g., access agreements or land use control through federal ownership) and institutional controls.
- Preparing inspection, monitoring, and compliance reports, as required.

- Category 3 sites
  - Category 3 sites are listed in Table A-3 of Appendix A of this ASER and include nine LM sites.
  - In addition to the activities listed above for Category 2 sites, LM activities at Category 3 sites can include:
    - Operating and maintaining active remedial action systems (e.g., pump and treatment systems for contaminated groundwater).
    - Inspection and verification of integrity of engineered or institutional barriers.

The following LM facility and program activities were performed in 2022 in addition to work completed at the categorized sites:

- Radiometric calibration facility activities:
  - Completed facility maintenance, annual inspections, and records-related activities.
- ULP activities:
  - Continued monitoring the reestablishment of vegetation associated with the reclamation of the Burro Mines Complex that was completed in 2021 on lease tract C-SR-13 in San Miguel County, Colorado. In October 2022, it was determined that revegetation had been established in compliance with the general permit to discharge stormwater associated with construction activities (Colorado Discharge Permit COR400000) and the permit was terminated effective November 1, 2022.
  - Prepared and submitted the ULP annual, biennial, and triennial briefing letters in support of the 2014 ULP Programmatic Agreement.
  - Prepared the annual status and activities report summarizing LM activities for the ULP during the calendar year.
  - Reviewed and approved lessee proposed activities for ULP Lease Tracts C-JD-6, C-JD-7, C-JD-8, C-SM-18, and C-SR-11. The activities are associated with the lessee's reclamation responsibilities for active mining permits.
- DRUM Program activities:
  - Completed field V&V of 317 BLM, U.S. Forest Service, and state lands mines in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Also began field V&V work on the Navajo Nation in October, completing field V&V of 13 mines.
  - Prepared summary reports for each mine or group of mines to be transmitted to the appropriate agency.

- — Partnered with other agencies to complete mine safeguarding activities that include filling or blocking hazardous mine openings (e.g., adits), installing minor devices such as gates, and removing structures and materials of no historical value to protect public safety, human health, and the environment.

- Nevada Offsites, Plowshare, and Vela Uniform Program activities:
  - — Completed mud pit cap and road repairs at the Amchitka, Alaska, Site. Completed inspections and geotechnical investigations of mud pit caps.
  - — Conducted historical research to obtain additional information about the sites.
  - — Installed an interpretive sign at the Pre-Schooner, Idaho, Site.
- AS&T Program activities include program wide support as well as site-specific studies:
  - — Completed the following projects:
    - ➢ Legacy model, which assessed the impacts to LM of maintaining legacy models (used in the LM program), established a clear goal for improving LM's processes for transitioning site models, and provided recommendations on how LM can be more effective and efficient.
    - ➢ LTS&M sampling optimization software evaluation. LTS&M obligations require cost-effective and sustainable practices to be developed and implemented.
  - — Continued disposal cell cover studies, in collaboration with other agencies and universities, with focus on enhancing LM's understanding of how natural processes affect long-term disposal cell performance. Some of the studies completed in 2022 include:
    - ➢ Effects of soil-forming processes on cover engineering properties.
    - ➢ Enhanced cover assessment projects.
    - ➢ Soil water balance model evaluation.
    - ➢ Uranium mill tailings monitoring initiative.
    - ➢ Disposal cell erosion risk evaluation.
  - — Supported collaboration between LM and the NLN to develop long-term strategies for high-risk LM sites to reach end states that minimize site-specific risks, lower LM's liability, increase stakeholder confidence, and prioritize resources.
  - — Continued uncrewed aircraft system multispectral calibration study in collaboration with the University of Arizona.
  - — Continued long-term study at the Monticello, Utah, Disposal and Processing Sites of synthetic aperture radar.
  - — Prepared an internal annual report documenting application of AS&T project outcomes to improve LTS&M and reduce costs.
  - — Continued to assist the Office of Environmental Management with their plans to change the cell cover at the Crescent Junction Disposal Cell (Moab, Utah, Disposal/Processing Site) from a rock cover to an evapotranspiration cover.
  - — Provided technical details and support to Lawrence Berkley National Lab to assess LM's resiliency at sites with high risk of impacts from climate change.

— Provided project planning support for the:

- Bluewater, New Mexico, Disposal Site
- Church Rock, New Mexico, Disposal Site
- Homestake – Grants Site (Grants, New Mexico, Disposal Site)
- Shiprock, New Mexico, Disposal Site


Note

For more details on these projects, please see the Applied Studies and Technology Fiscal Year 2022 Annual Briefing, October 2022. *Completed project final documents can be found on the AS&T Reports page of the LM public website.*

4.0 Summary of Environmental Management System (EMS) and Sustainability

As required by previous DOE orders and DOE Order 436.1, *Departmental Sustainability*, LM has had a fully implemented EMS since October 2005. LM has declared full implementation of the EMS every 3 years starting in 2009, with the latest declaration on August 19, 2021. LM's EMS is a comprehensive system to incorporate life-cycle environmental considerations into all aspects of the LM mission to maximize beneficial resources, minimize wastes and adverse environmental impacts, and meet or exceed compliance with applicable regulations and DOE requirements. The EMS is the platform for adhering to, implementing, and tracking environmental requirements for compliance and sustainability. The LM EMS is consistent with the framework of International Organization for Standardization (ISO) standard 14001:2015, *Environmental Management Systems—Requirements and Guidance for Use*; the Integrated Safety Management System requirements of DOE Policy 450.4A MinChg 1, *Integrated Safety Management Policy*; the *Worker Safety and Health Program (10 CFR 851)* (LMS/POL/S14697), and Title 10 *Code of Federal Regulations* Section 851 (10 CFR 851).

The LM EMS public website describes the EMS and provides links to many of the documents and reports identified in this section at https://www.energy.gov/lm/services/joint-environmental-management-system-ems.

The following programmatic documents describe LM's EMS and are accessible on the LM EMS public website on the "Guiding Documents and Links" webpage at https://www.energy.gov/lm/services/joint-environmental-management-system-ems/guiding-documents-and-links:

- *LM Environmental and Energy Policy* (LM-Procedure-1-24-1.0)
- *Environmental Management System/Energy Management Description* (LM-Procedure-3-20-12.0, LMS/POL/S04346)

4.1 Performance Measures

The documents listed in this section define reporting and performance measures for various EMS program elements and detail progress toward meeting performance goals and objectives. Some of these documents are available on the LM EMS public website on the "EMS Goals/Progress/Plans/Reports" webpage at https://www.energy.gov/lm/services/joint-environmental-management-system-ems/ems-goalsprogressplansreports including:

- *FY 2023 LM Site Sustainability Plan* (DOE 2022b): LM reports past performance and future plans for meeting sustainability goals in the Site Sustainability Plan. This plan helps DOE meet its sustainability requirements outlined in DOE Order 436.1 and the *Fiscal Year 2023 Site Sustainability Plan Guidance* (DOE 2022a).
- Annual Energy Data Report: This annual report contains information on electronics stewardship, energy and water usage, waste diversion data, renewable energy generation, greenhouse gas emissions, high-performance sustainable buildings, and sustainability projects. Information is entered into the DOE Sustainability Dashboard.
- *2019–2023 Significant Environmental Aspects* (LMS/S24255): This document describes the four categories of significant environmental aspects from LM operations, including land use, resource consumption, waste management, and releases to the environment. Environmental aspects are the attributes of project and program activities, products, and services that interact with the environment that may create a significant impact if not controlled.

Other reporting mechanisms for the EMS include:

- *Energy Independence and Security Act (EISA) Section 432 Report*: EISA Section 432 (PL 110-140) requires federal agencies to identify "covered facilities" (defined by DOE guidance) that constitute at least 75% of the agency's total facility energy use. Comprehensive energy and water evaluations of 25% of covered facilities are reported each year, and an evaluation of each covered facility is completed once every 4 years. Information is uploaded annually to the DOE Sustainability Dashboard.
- EMS Facility Data Report: The report is completed in the DOE Environmental Management System Site Information Database. The database collects environmental performance, status of EMS and Executive Order goals, EMS best management practices (BMPs) and lessons learned, and challenges in meeting goals.
- Facilities Information Management System updates: This system collects information about real property attributes and use, including compiling a list of assets excluded from the energy intensity reduction goal. The database also stores data on buildings assessed against the high-performance and sustainable building goals.
- Federal Automotive Statistical Tool updates: This tool collects data about current and past federal fleet fuel use, inventory, and acquisitions.

4.2 Accomplishments, Awards, and Recognition

LM received the following awards and recognitions for EMS-related activities:

- The Electronic Product Environmental Assessment Tool (EPEAT) Purchaser Award for the eighth consecutive year. The Green Electronics Council awards organizations with an EPEAT Purchaser Award for excellence in sustainable procurement of electronic equipment. LM was awarded the highest rating of 5 stars.

- The DOE Sustainability Performance Divisions *High-Performance Sustainable Building Award* for the Weldon Spring, Missouri, Site Interpretive Center.
- A DOE *GreenSpace Award* for the Weldon Spring Interpretive Center
- Three DOE Sustainability Performance Divisions *Sustainable Climate-Ready Site Program Pilot Awards* for the following sites:
  - Weldon Spring Site
  - Shirley Basin South, Wyoming, Disposal Site
  - Shirley Basin South and Weldon Spring sites (combined award)

5.0 Summary of Environmental Compliance

The following sections summarize compliance with applicable regulations and the related 2022 reporting. Because LM manages sites under different regulatory frameworks, postclosure environmental requirements vary based on activities being conducted. Changes and updates made to Executive Orders (EOs), DOE orders, state, local, and tribal regulations are reviewed and tracked for LM sites and identified for evaluation in the *LMS Environmental Compliance Regulatory Review Quarterly Report*.

5.1 Environmental Remediation and Waste Management Compliance

5.1.1 CERCLA

CERCLA was enacted by Congress in 1980 to enforce cleanup and reporting requirements that apply to abandoned or uncontrolled hazardous waste sites. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). Typically, the lead agency at a federal facility (e.g., DOE) initiates a response action under CERCLA if there is a release or a substantial threat of a release of a hazardous substance into the environment. Remedial actions have been completed at LM CERCLA sites regulated by the U.S. Environmental Protection Agency (EPA) or state agencies, or both, with the expectation of long-term monitoring and active groundwater remediation at several sites. The status of the activities at each site is available on site-specific links provided in Appendix A of this report. A Five-Year Review report (see Table A-2 and Table A-3 of this report) is required for a CERCLA site with remaining residual contamination to evaluate whether the remedy at the site remains protective of human health and the environment.

- CERCLA Five-Year Reviews were completed in CY 2022 for the following:
  - Rocky Flats, Site, Colorado
  - Monticello disposal and processing sites
- CERCLA Five-Year Reviews were initiated in CY 2022 for the following sites:
  - Addendum to Monticello site Five-Year Review
  - Colonie, New York, Site (FUSRAP site)
  - Addendum to Rocky Flats Site Fifth CERCLA Five-Year Review

Note

The Colonie, New York, Site is not a non-National Priority List site, the required Five-Year Review Report is called a Long-Term Periodic Review.

5.1.2 RCRA

RCRA was enacted by Congress in 1976 to govern the management of solid and hazardous waste and establish standards by which waste generators and treatment, storage, and disposal facilities are regulated. RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments (HSWA). Among other requirements, HSWA mandated waste minimization, corrective action, and land disposal restrictions for hazardous waste. RCRA is an applicable or relevant and appropriate requirement (ARAR) at many LM sites.

The following activities were performed in compliance with RCRA:

- Maintained a very small-quantity generator status at each site generating hazardous waste, with the exception of the Piqua, Ohio, Decommissioned Reactor Site, where site demolition was initiated in 2022.
- Obtained an EPA identification number as a small quantity generator of hazardous waste for the Piqua site for waste associated with the Piqua Site Demolition Project. Approximately 800 pounds of lead solder waste was generated during CY 2022 and temporarily accumulated onsite.
- Transported hazardous waste from the LMFSC to an approved local, county-run hazardous waste collection facility for disposal.
- Collected and transported, a lab pack containing hazardous waste from Fernald Preserve, Ohio, Site. The lab pack was taken by a vendor to an EPA permitted treatment, storage, and disposal facility for disposal.
- Managed waste from each site generating universal waste for offsite disposition at approved recycling or disposal facilities.
- Maintained an EPA identification number for the LMBC and paid annual waste generator's fee.
- Maintained an active RCRA HSWA corrective action permit issued by the State of Florida for the Pinellas County, Florida, Site. The permit includes requirements for remedial action at the site under the state's Global Risk-Based Corrective Action regulations. The HSWA corrective action permit was reissued in October 2021.
    - Florida Department of Environmental Protection (FDEP) completed an inspection on June 14, 2022. The site was in compliance and there were no findings.

5.1.3 Federal Facility Compliance Act (FFCA)

Enacted in 1992, FFCA amended RCRA with the objectives of (1) bringing all federal facilities into compliance with applicable federal and state hazardous waste laws, (2) waiving federal sovereign immunity under those laws, and (3) allowing the imposition of fines and penalties. The FFCA gives EPA authority to issue administrative compliance orders to federal agencies that are in violation of hazardous waste laws and requires EPA to conduct annual inspections of RCRA Part B-permitted federal treatment, storage, and disposal facilities.

- Programmatic and site-specific policies, plans, and procedures are maintained for LM sites, as needed, to comply with all applicable requirements under the FFCA. Examples include the programmatic *Environmental Protection Manual* (LMS/POL/S04329) and *Environmental Instructions Manual* (LMS/POL/POL/S04338), which include RCRA waste management instructions and procedures.

5.1.4 Toxic Substances Control Act (TSCA)

TSCA was enacted in 1976 and regulates the control (i.e., manufacturing, use, distribution in commerce, abatement, and disposal) of toxic substances, including polychlorinated biphenyls (PCBs), asbestos, lead, mercury, and radon. LM's management of some older buildings may require assessment and abatement of TSCA-regulated substances, especially asbestos.

The following activities were performed in compliance with TSCA:

- Made notification to EPA of PCB waste activity using EPA Form 7710-53 for PCB-containing ballast and capacitor waste associated with the Piqua Site Demolition Project.
- Submitted "PCB Certification for Subtitle D Facilities and Subtitle C Non-TSCA Facilities" to EPA in April 2022 for disposal of PCB bulk product waste associated with the Piqua Site Demolition Project at the Waste Management Inc. Stony Hollow Landfill.
- Submitted "Notice of Demolition and Renovation/Abatement" to the Ohio Environmental Protection Agency (Ohio EPA) Division of Air Pollution Control for regulated asbestos-containing material (ACM) abatement activities associated with the Piqua Site Demolition Project.
- Generated 203 pounds of PCB waste items (ballasts and capacitors) from the Piqua Site Demolition Project that were transported to a permitted TSCA PCB storage facility in November 2022.
- Generated 1,149 tons of PCB bulk product waste associated with building demolition at the Piqua site that were transported to a Subtitle D landfill (Waste Management's Stony Hollow Landfill) in accordance with TSCA regulations.
- Generated 1.18 tons of friable ACM waste and 17.7 tons of nonfriable ACM waste associated with building demolition at the Piqua site. That waste was transported to a Subtitle D landfill (Waste Management's Stony Hollow Landfill) in accordance with Ohio EPA regulations.
- Did not generate or dispose of any TSCA regulated waste from any other LM sites in 2022.

5.1.5 Radioactive Waste Management

The type of radioactive waste generated at an LM site is dependent on the source and characteristics of the radioactivity and the regulatory drivers associated with radioactive material at the site. For example:

- Radioactive waste generated at an UMTRCA site is characterized as one of the following:
  - Residual radioactive material (UMTRCA Title I site)
  - Atomic Energy Act (AEA) Section 11e. (2) byproduct material (UMTRCA Title II site)
- Radioactive waste generated at a CERCLA or RCRA site is typically characterized as one of the following:
  - Low-level radioactive waste
  - Naturally occurring radioactive material
  - AEA Section 11e. (2) byproduct material

Management and disposal requirements differ for these specific waste types. Radioactive wastes are managed in accordance with the AEA; UMTRCA; 10 CFR 40, "Domestic Licensing of Source Material"; and DOE Order 435.1 Chg 2, *Radioactive Waste Management.* The following are site-specific activities related to radioactive waste management:

- Grand Junction, Colorado, Disposal Site: LM continues to operate and receive radioactive materials at this site, which is used for the permanent disposal of residual radioactive materials described in Sections 101 and 102 of Title I of UMTRCA and other radioactive materials as described in the disposal facility waste acceptance criteria. On December 27, 2020, the *Consolidated Appropriations Act, 2021* (PL 116–260) was signed by the President of the United States reauthorizing the disposal cell to remain open until it reaches capacity or until September 30, 2031, whichever comes first. LM will continue to operate the disposal cell and plan closure activities to meet the new extended timeline.
  - No radioactive materials were received for disposal at the Grand Junction disposal site during CY 2022.
- Fernald Preserve site: Continued to generate and store low-level radioactive materials from maintenance activities and radioactive debris found during site inspections.

5.2 Air Quality and Protection Compliance Status

5.2.1 Clean Air Act (CAA)

The CAA was enacted in 1970 to control sources of air pollution from the following three categories: new and existing sources subject to ambient air quality regulations through source-specific emission limits; new sources subject to more stringent control technologies and permitting requirements; and specific air pollution problems, including hazardous air pollutants and visibility impairment that are subject to National Emission Standards for Hazardous Air Pollutants. A comprehensive operating permit program was established in 1990 to consolidate all applicable requirements for a given source of air pollution under one program. Title V regulations and permits are a part of this program. LM completed the following activities in 2022 under the CAA:

- Submitted annual fee to continue operating an emergency generator at the LMBC.

5.2.2 Hydrofluorocarbon (HFC) Phasedown

The "American Innovation and Manufacturing Act of 2020," also called the AIM Act, (42 USC7675) outlined the requirements to phasedown HFC consumption and production to 15% by 2035. EPA began implementation of the requirements in October 2021. LM has reviewed the current uses and inventory of HFCs at LM sites. Uses include commercial refrigerators, freezers, and drinking fountain coolers. As these items are replaced, LM will seek items with alternative coolant sources.

5.3 Water Quality and Protection Compliance Status

5.3.1 Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES)

The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating water quality standards for surface waters. Under the CWA, EPA's NPDES permit program controls discharges. In 2022, multiple LM sites maintained NPDES permits. These NPDES permits include industrial wastewater discharge permits as described below. NPDES permits for stormwater discharges associated with construction activity were also obtained at several LM sites with construction activity, as described in Section 5.3.4.

- At the Fernald Preserve site, sampling of nonradiological pollutants is conducted and results reported monthly in compliance with an NPDES permit administered by the state. Until June 1, 2022, the site operated under a permit that took effect on March 1, 2015. A new permit was approved and took effect on June 1, 2022.
- At the Mound site, an NPDES permit covers discharge of treated groundwater under a CERCLA authorization demonstrating compliance with the CWA. Operation of the pump-and-treat (P&T) Record of Decision remedy for Operable Unit 1 (OU-1) was shut off on September 15, 2014, with regulatory approval, to allow for an undisturbed evaluation of treatment zones during the enhanced attenuation field demonstration involving the injection of edible vegetable oil into the groundwater. No discharge has occurred since the P&T was shut off. Monthly electronic discharge reports are submitted to Ohio EPA documenting no discharge.
- At the Weldon Spring Site, an NPDES permit is maintained with the Missouri Department of Natural Resources. This permit covers discharges from the Leachate Collection and Removal System and is maintained as a contingency to current disposal methods. No discharges have occurred under this permit.
- At various LM sites, pest management programs are implemented in accordance with EPA's Pesticide General Permit, issued under the CWA NPDES program, or a state-issued general permit for geographic areas where EPA is not the NPDES permitting authority. Such permits regulate point-source discharges of residue-producing biological and chemical pesticides.

5.3.2 CWA Section 404 Permits

Section 404 of the CWA establishes a program to regulate the discharge of dredge and fill material into waters of the United States including wetlands. LM evaluates all projects to ensure any work along creeks, wetlands, streams, drainage ditches, reservoirs, ponds, and lakes is conducted in compliance with CWA Section 404.

- The Many Devils Wash Groundwater Remediation System Decommissioning Project at the Shiprock Disposal Site operated under Section 404 Nationwide Permit 13 – Bank Stabilization.

5.3.3 CWA Oil Pollution Prevention

Spill Prevention, Control, and Countermeasure (SPCC) Plans maintained in accordance with 40 CFR 112 were required at the following LM sites in CY 2022.

- An SPCC plan was developed, implemented, and maintained in accordance with 40 CFR 112 for the Fernald Preserve Onsite Workspace Project in May 2022.
- An SPCC plan was developed, implemented, and maintained in accordance with 40 CFR 112 for the Amchitka Island, Alaska, Site Mud Pit Cap Repair Investigation.

5.3.4 CWA Stormwater Management and EISA Section 438

A stormwater management program was established by the CWA to reduce runoff and improve water quality. An NPDES permit for stormwater discharges associated with construction activity is required for projects disturbing 1 acre or more. Under Section 438 of the EISA, federal agencies are required to reduce stormwater runoff from federal facility development and redevelopment projects with a footprint exceeding 5000 square feet to maintain or restore predevelopment hydrology. A federal facility is any building constructed, renovated, leased, or purchased by the federal government. Federal agencies can comply using a variety of stormwater management practices often referred to as "green infrastructure" or "low impact development" practices, including, for example, reducing impervious surfaces and using vegetative practices, porous pavements, cisterns, and green roofs.

LM evaluated all federal facility building development and redevelopment projects to ensure compliance with EISA Section 438, if applicable. The following projects required evaluations to ensure compliance with EISA Section 438:

- Demolition of the administrative building and reactor control building and redevelopment of property at the Piqua site.
- Onsite Workspace Project at the Fernald Preserve site.

LM evaluates all construction projects to ensure that NPDES permit coverage is obtained for stormwater discharges associated with construction activity disturbing 1 acre or more and that construction and postconstruction stormwater management standards are met and erosion controls implemented as required by the NPDES permit. The following projects required stormwater permitting due to construction activities in 2022:

- At the Burro Mines Complex, Uranium Lease Tract C-SR-13, LM continued monitoring reestablishment of vegetation during CY 2022 associated with the reclamation of the Burro Mines Complex. In October 2022, it was determined that revegetation had been established in compliance with the general permit to discharge stormwater associated with construction activities (Colorado Discharge Permit COR400000) and the permit was terminated effective November 1, 2022.
- A Notice of Intent to operate under the Ohio EPA General Permit Authorization for Storm Water Discharges Associated with construction activity was submitted and approved by Ohio EPA in May 2022 for the Onsite Workspace Project at the Fernald Preserve site. In accordance with the general permit, the *Fernald Preserve, Fernald, Ohio, Storm Water Pollution Prevention Plan* (LMS/FER/S03161) (SWPPP), was prepared and implemented

for the Onsite Workspace Project. Weekly and post-rain event inspections were conducted in accordance with the SWPPP.

- At the Weldon Spring Site, land disturbance stormwater general permits were obtained from the Missouri Department of Natural Resources and St. Charles County on March 14, 2022, and September 19, 2022, respectively, for the demolition of the former Interpretive Center. Demolition began on November 16, 2022. In accordance with the general permit, an SWPPP was prepared and implemented; stormwater inspections were conducted weekly and after every storm event.
- The Many Devils Wash Groundwater Remediation System Decommissioning Project at the Shiprock site operated under a Low Erosivity Waiver (LEW) issued by EPA Region 9. The LEW is a waiver allowing permitting authorities to waive sites from NPDES permit requirements that do not have adverse water quality impacts. Although not required, an SWPPP was developed and utilized during the project.
- As a BMP a SWPPP was developed and in place during CY 2022 for the Piqua Site Demolition Project.

5.3.5 Safe Drinking Water Act (SDWA)

The SDWA, enacted in 1974, authorized EPA to regulate contaminants in drinking water and required EPA to establish national standards to be implemented and enforced by authorized states.

SDWA is an ARAR for many LM sites with respect to groundwater contamination. ARAR information is detailed in the environmental monitoring reports for each site, if applicable.

- Most occupied LM sites and facilities have service connections to municipal drinking water systems, provided by the local utility company, which are operated and maintained in accordance with the SDWA.
  - At the Tuba City, Arizona, Disposal Site, an onsite groundwater well provides water for use in sinks, toilets, a shower, and outside spigots, and bottled water is provided for drinking water. However, because the Tuba City site has less than 15 service connections and is unoccupied more than 300 days per year, it is not considered a public water system, and it is not subject to SDWA standards.

5.3.6 Per- and Polyfluoroalkyl Substances (PFAS) and Other Emerging Contaminants

PFAS

PFAS are a group of more than 9000 manmade fluorinated compounds with more than 200 uses, including aqueous film-forming foam (AFFF), metal processing, uranium isotope separation, and other MED applications. Additionally, PFAS were used in household products, floor sealants, plumber's tape, pipe dope, high-density polyethylene containers, and many other consumer products. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are the two most widespread and studied PFAS.

Emerging contaminants, such as PFAS, 1,4-dioxane, perchlorates, and vapor intrusion chemicals, present unique issues and challenges due to their persistence in the environment, resistance to typical environmental degradation processes, and potential adverse effects on the environment

and human health. A summary of activities related to PFAS and other emerging contaminants completed in 2022 at LM sites is provided below.

EPA and states have begun to promulgate regulations that establish analytical measuring and monitoring procedures for PFAS chemicals, identify treatment processes for removal in surface and groundwaters, and establish standards to protect human health and the environment. EPA regulatory developments related to PFAS in 2022 included:

- Issuing an EPA memorandum in April addressing PFAS discharges in EPA-issued NPDES permits and a companion EPA memorandum issued in December providing guidance to states on how to address PFAS discharges in state-issued NPDES permits.
- Adding five new PFAS chemicals to the list of risk-based regional screening levels for site cleanups in May 2022.
- Lowering the Health Advisory Levels for PFOA and PFOS and issuing the Health Advisory Levels for GenX chemicals hexafluoropropylene oxide dimer acid and its ammonium salt, perfluorobutanesulfonic acid, and potassium perfluorobutane sulfonate in June.
- Issuing a final rule to identify five new PFAS chemicals subject to Toxics Release Inventory (TRI) reporting in July.
- Issuing a proposed rule to designate PFOA and PFOS as CERCLA hazardous substances in August.

DOE developments in 2022 related to PFAS and the implementation of the September 2021 policy memorandum issued by Deputy Secretary David Turk, *Addressing Per- and Polyfluoroalkyl Substances at the Department of Energy* included:

- Finalizing the PFAS Coordinating Committee (PCC) Charter in March. The PCC, composed of senior-level representatives from all DOE program offices with PFAS equities including LM, works with DOE program offices to appropriately characterize historic PFAS use and releases at the site level.
- Launching the DOE PFAS Website and issuing the DOE PFAS Strategic Roadmap. The PFAS Strategic Roadmap describes how DOE will identify the use and possible environmental release of PFAS from its current and past activities, as well as the actions DOE will take to ensure protection of workers, the public, and the environment.
- Releasing the *Initial Assessment of Per- and polyfluoroalkyl Substances at Department of Energy Sites*, also called the PFAS Initial Assessment Report, in November. The PFAS Initial Assessment Report captures current knowledge of historical and ongoing uses of PFAS at DOE sites, presence of PFAS in the environment and drinking water, and stakeholder/regulatory engagement. A PFAS survey tool was developed and completed by 53 DOE sites, including 7 LM CERCLA/RCRA sites to capture this information.

The following LM sites have been contacted by EPA or state regulators, or both, and are engaged in activities associated with determining the presence of PFAS:

- Rocky Flats site: The Rocky Flats Plant housed a fire department and metallurgical facilities when it was operational, and these are potential sources of the PFAS detected at the site. The plant also had metal plating and other metallurgical research, development, and processing activities, including plutonium-machining and -forming processes. PFAS have been detected

in Rocky Flats site groundwater, surface water, and landfill leachate. Sampling and analysis at three monitoring wells, two surface water locations, influent to one groundwater and one groundwater/landfill leachate treatment system, and one landfill seep began in 2019 using a modified version of EPA method 537 to analyze PFOA and PFOS. In August 2021, the number of sample locations was increased from 8 to 12 and the target analytes from 2 to 28 PFAS. Quarterly sampling for PFAS continued through CY 2022. The highest PFAS concentrations have been detected in samples from the former Rocky Flats Fire Department and associated training area, where PFOA and PFOS levels have been as high as 130 parts per trillion (ppt) and 310 ppt, respectively. Refer to the:

  - Rocky Flats Site, Colorado, page of the LM public website for quarterly and annual PFAS monitoring reports.
  - Appendix C of the PFAS Initial Assessment Report for the Rocky Flats PFAS assessment summary.

- Additionally at the Rocky Flats Site, PFAS were assessed in the 2022 CERCLA Five-Year Review (FYR) as an emerging contaminant. The following recommendations were made in the EPA acceptance letter: (1) continue the collection and evaluation of water samples for PFAS for eight quarters, (2) prepare and implement a plan that identifies the data and information required to support an assessment of potential PFAS risk to human receptors and a PFAS screening-level ecological risk assessment (SLERA); and (3) complete an assessment of potential PFAS risk to human receptors and a PFAS SLERA.
- Fernald Preserve site: The presence of PFAS was addressed in both the August 2016 CERCLA *Fourth Five-Year Review Report for the Fernald Preserve* (LMS/FER/S13683) and the *Fifth Five-Year Review Report for the Fernald Preserve* (LMS/FER/S33442) issued in September 2021. A records search following the 2016 CERCLA FYR revealed that the former Fernald Materials Production Center stored approximately 50 gallons of AFFF and used less than 25 gallons of AFFF from 1976–1990. The usage was isolated to the former fire training facility, which underwent extensive soil removal during the CERCLA cleanup. In August 2022, an *Evaluation Report for Uses of Per- and Polyfluoroalkyl Substances in Historical Processes at the Feed Materials Production Facility, Fernald, Ohio* (LMS/FER/41372), was submitted as an FYR deliverable. Potential uses in historical processes at the Fernald Materials Production Center in the report included firefighting foam; laboratory-related supplies; lubricants and greases; pipes, pumps, fittings, and liners; sealants; and water and effluent treatment. No manufacturing of PFAS chemicals or large-scale uses of PFAS-containing liquid chemicals were identified in the evaluation. Refer to the Fernald Preserve, Ohio, Site page of the LM public website for CERCLA FYR reports and associated deliverables. Refer to Appendix C of the PFAS Initial Assessment Report for the Fernald Preserve site PFAS assessment summary.
- Mound site: A records search following the 2016 CERCLA FYR revealed the Mound site historically used very small quantities of PFAS as mass spectroscopy standards, which were completely consumed during analysis, and that no historical fire suppression systems onsite contained AFFF. During the 2021 CERCLA *Fifth Five-Year Review for the Mound, Ohio, Site, Miamisburg, Ohio* (LMS/MND/S31971), EPA recommended that the use of three emergent contaminants, perchlorate, 1,4-dioxane, and PFAS, in critical operations be evaluated. The records search, which was completed in March 2022 as an Addendum to *A Summary of the Per- or Polyfluorinated Alkyl Substances Records Search for Indications of Use at the Mound, Ohio, Site* (LMS/MND/S15235), revealed that chemicals and products

purchased and used as process materials, plating additives, plastic materials, lubricants, and the like may have contained low concentrations of unnamed PFAS; purchase and use of 3 gallons of the PFAS perfluoro polyether as a lubricant for high-temperature pumps was confirmed; and materials that may have been used containing PFAS were likely disposed of in the former OU-1 landfill. Refer to the Mound, Ohio, Site page of the LM public website for CERCLA FYR reports and associated deliverables. Refer to Appendix C of the PFAS Initial Assessment Report for the Mound PFAS assessment summary.

- Pinellas County site: FDEP requested LM conduct a records search for PFAS in 2019. This records search, which included querying 188 PFAS search terms, indicated no documented use of AFFF or PFAS-containing materials at the site. During a meeting in April 2021 with FDEP, a historical fire training facility at the Pinellas County site was identified as a possible historical PFAS usage source. This historical fire training facility had been identified in a Remedial Feasibility Investigation as a solid-waste management unit. There were no investigations or discussions with FDEP or other stakeholders in 2022 related to PFAS. Refer to the *Draft Summary Report for Uses of PFAS Initial Assessment Report at the Pinellas County, Florida Site* (LMS/PIN/43719). LM has also provided FDEP with updated information (which indicated 99.5% of the site structures were protected by water systems and not AFFF).
- Laboratory for Energy-Related Health Research (LEHR), California, Site: A PFAS records search performed by LM in 2019 indicated no records of current or historical firefighting foams or PFAS usage. In the June 2021 *Second Five-Year Review Report, Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis* (LMS/LEH/S30753), LM committed to continue to monitor EPA and State of California policy changes on PFAS. Refer to Appendix C of the PFAS Initial Assessment Report for the LEHR PFAS assessment summary.

1,4-Dioxane

1,4-dioxane is an emerging contaminant due to its widespread use as a stabilizer in certain chlorinated solvents, paint strippers, greases, and waxes and its resistance to biodegradation in groundwater. The following LM sites have been contacted by EPA or state regulators, or both, and are engaged in activities associated with determining the presence of 1,4-dioxane:

- Rocky Flats site: Evidence indicates that the former Rocky Flats Nuclear Weapons Plant utilized and maintained an inventory of 1,4-dioxane in conjunction with a Rocky Flats contaminant of concern (COC), 1,1,1-trichloroethane (1,1,1-TCA). However, 1,4-dioxane was not determined to be an analyte of interest in the Remedial Investigation/Feasibility Study (DOE 2006) or a COC in the Comprehensive Risk Assessment and had not been analyzed in postclosure monitoring samples because it was not a targeted analyte.
- Fernald Preserve site: 1,4-dioxane was addressed in the Fifth FYR Report as being historically used during radiological analyses in the onsite laboratory using liquid scintillation counting to quantify radioisotopes. Approximately 10 milliliters of a mixture of organic solvents (including 1,4-dioxane), detergents, and fluorescence was used and consumed during the analysis. Prior to the RCRA disposal requirements, the waste would have been disposed with all other liquid laboratory waste in the general sump.
- LEHR site: 1,4-dioxane was likely used in limited quantities at LEHR in liquid scintillation cocktails. As recommended in the Second FYR, groundwater was sampled for 1,4-dioxane in all DOE area monitoring wells (except UCD1-013) during the annual groundwater

monitoring event in 2021. This sampling event, which was summarized in a report issued in April 2022, indicated no detected levels of 1,4-dioxane.

- Mound site: A records search, which was completed in March 2022 and described in the *Summary of the 1,4-Dioxane and Perchlorate Records Search for Indications of Use at the Mound, Ohio, Site* (LMS/MND/S38331) report concluded that chemicals or products that potentially contained 1,4-dioxane were purchased and used as part of research and development and production and could have been used at 32 buildings at the Mound site; 1,4-dioxane was used as a reagent and liquid scintillation medium in laboratory analyses; and that materials that may have been used with or contaminated by chemicals or products that potentially contained 1,4-dioxane were likely disposed of in the former OU-1 landfill. However, based on a review of the chemical inventories and process documents, 1,4-dioxane was purchased and used in limited amounts and consumed upon use.
- Pinellas County site: As documented in the July 2022 *Pinellas County, Florida, Site Environmental Restoration Project Environmental Monitoring Annual Progress Report for the Building 100 Area at the Young – Rainey STAR Center* (LMS/PIN/40817), groundwater at the site has been impacted by 1,4-dioxane used onsite during DOE operations. Annual groundwater sampling results for 1,4-dioxane in onsite and offsite monitoring wells since 2015 have indicated concentrations above target cleanup levels. Measured 1,4-dioxane concentrations from the March 2022 sampling event ranged between nondetect and 190 micrograms per liter (µg/L). The cleanup target level for evaluating site remediation under risk-based corrective action regulations is 32 µg/L onsite and 3.2 µg/L offsite.

Perchlorate

Perchlorate is both a naturally occurring and manmade anion commonly used in munitions, aerospace industries, and electroplating operations. Perchlorate is an emerging contaminant due to its high solubility in water and relatively stable and mobile nature in surface and subsurface aqueous systems and its ability to accumulate in food crops. The following LM site has been contacted by EPA and state regulators and is engaged in activities associated with determining the presence of perchlorate:

- Mound site: A records search, which was completed in March 2022 and described in the *Summary of the 1,4-Dioxane and Perchlorate Records Search for Indications of Use at the Mound, Ohio, Site* (LMS/MND/S38331) report concluded that chemicals or products that used perchlorate were purchased and used as part of the research, development, and production of explosive materials and devices at the Mound site and could have been used in 17 buildings at the Mound site. Materials that may have been used with or contaminated by chemicals or products that potentially contained perchlorate were likely disposed of in the former OU-1 landfill. However, based on a review of the chemical inventories and process documents, perchlorate was purchased and used in limited amounts and consumed upon use.

5.3.7 EO 11988, *Floodplain Management*

EO 11988, enacted in 1977, requires federal agencies to avoid, to the extent possible, short- or long-term work, activities, or disruptions that cause adverse impacts in floodplains and to avoid direct and indirect development in floodplain areas wherever there is a practical alternative.

- LM considers working alternatives to avoid floodplains when possible and complies with this EO and other applicable federal, state, tribal, and local requirements. None of the work conducted at LM sites in 2022 required a floodplain assessment or impacted any floodplains.

5.3.8 EO 11990, *Protection of Wetlands*

The purpose of EO 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, EO 11990 requires LM to consider alternatives to work in or near wetland sites and to limit potential damage if an activity affecting a wetland cannot be avoided. When such work is unavoidable, LM complies with requirements specific to the applicable nationwide permit and any applicable state or tribal requirements. LM promotes the ecological sustainability and enhancement of wetlands when considering the disposition and reuse of federal lands.

- Rocky Flats site staff continued wetland mitigation monitoring to document the reestablishment of mitigation wetlands.

5.4 Compliance Status of Other Environmental Statutes and Eos

5.4.1 America the Beautiful

In 2021, the White House issued EO 14008, *Tackling the Climate Crisis at Home and Abroad*. The EO set a goal of conserving 30% of land and water by 2030. The Council on Environmental Quality asked federal agencies, including DOE, to support the initiative by preparing Conservation Action Plans.

- During the reporting period, LM submitted updates to a Conservation Action Plan to the Council on Environmental Quality. The updates included information on eight ongoing conservation activities across LM sites.
  - Office of Legacy Management (LM) Dolores River Restoration Partnership
  - Office of Legacy Management (LM) Sage-Grouse Protection and Habitat Improvements
  - Legacy Management (LM) Weldon Spring Prairie Restoration
  - Office of Legacy Management (LM) Ecological Restoration: Fernald Preserve
  - Office of Legacy Management (LM) Fernald Preserve: Public Access to Trails
  - Office of Legacy Management (LM) Las Colonias Park
  - Office of Legacy Management (LM) Paddy's Run Conservation Project at Fernald Preserve
  - Office of Legacy Management (LM) Regenerative Grazing Study

5.4.2 National Environmental Policy Act (NEPA)

NEPA was enacted in 1970 to help federal officials make decisions based on an understanding of environmental consequences; to foster public participation; and to take actions to protect, restore, and enhance the environment. It requires federal agencies, including LM, to evaluate the potential environmental effects of the agencies' proposed actions.

NEPA documentation is typically not required for CERCLA sites that considered NEPA values in their decision documents. Actions at non-CERCLA LM sites are typically within categorically excluded classes of actions. The evaluations of these actions are documented with a Categorical Exclusion Evaluation (CXE) and a *NEPA Categorical Exclusion Determination Form* (LM-Form-4-20-2.0). Recent categorically excluded actions are accessible for public review at https://www.energy.gov/nepa/categorical-exclusion-determinations-legacy-management. The following is a summary of NEPA documents either completed or in progress during the reporting period:

- 42 CXEs and 3 amended CXEs were completed and approved
- The following Environmental Assessment (EA) was in progress:
  - The *Environmental Assessment of Groundwater Compliance at the Shiprock Uranium Mill Tailings Site* (DOE/EA-2108) at the Shiprock site was cancelled and the *Environmental Assessment for the Evaporation Pond at the Shiprock, New Mexico, Disposal Site* (DOE/EA-2195) was initiated and is in progress.
- Additionally, as the applicant for proposed land withdrawals, LM participated in preparing EAs for and in coordination with the BLM for the following sites:
  - Durita, Colorado, Disposal Site—in progress with the U.S. Department of the Interior
  - Split Rock, Wyoming, Disposal Site—in progress with the U.S. Department of the Interior

5.4.3 Emergency Planning and Community Right-to-Know Act (EPCRA)

EPCRA, authorized by Title III of SARA requires federal facilities that use, produce, or store extremely hazardous substances (EHSs), hazardous substances, hazardous chemicals, or toxic chemicals, or all of these, in quantities that exceed specific thresholds to report these inventories and planned or accidental environmental releases to federal, state, and local emergency planning authorities. Site-specific hazardous chemical inventory (EPCRA Tier II) and TRI reports are required to be submitted to federal, state, and local emergency planning authorities if specific reporting thresholds are exceeded.

- LM utilizes the Safety Data Sheets online system for tracking chemicals and Safety Data Sheets at LM sites and facilities.
- An internal EPCRA webpage on the LM Portal is used to maintain chemical inventory reports as well as the required documentation (reporting threshold calculations, documentation of exemptions, and so on) for evaluating the applicability of EPCRA Section 304, 311/312 and Section 313 reporting. EPCRA Tier II reports are used to provide state and local officials and the public with specific information on potential hazards associated with hazardous chemicals and EHSs present at a site. EPCRA Section 313 TRI reporting, which is required for toxic chemicals manufactured, processed, or otherwise used at a site above reporting thresholds was not required for any sites in 2022, as all sites were

below reporting thresholds. EPCRA Tier II reports were submitted for the following sites and facilities:

- LMFSC, for the storage and use of lead-acid batteries containing sulfuric acid, an EHS
- Rocky Flats site, for the use of lead-acid batteries containing sulfuric acid, an EHS
- LMBC, for the storage of lead-acid batteries containing sulfuric acid, an EHS
- Amchitka, Alaska, Site, for the storage of diesel and gasoline fuel above threshold quantities associated with the Mud Pit Cap Repair Investigation

5.4.4 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA regulates the distribution, use, and sale of pesticides and requires a certified applicator to supervise the application of "restricted use" herbicides or pesticides.

Herbicides and pesticides are used at many LM sites as part of land stewardship responsibilities. Policies, procedures, and manuals are in place to ensure that herbicides and pesticides are applied in compliance with FIFRA.

5.4.5 Endangered Species Act (ESA)

Under Section 7 of the ESA, DOE consults with the U.S. Fish and Wildlife Service (USFWS) on any action that may affect threatened or endangered species or their designated critical habitats. LM evaluates the potential presence of federally listed threatened or endangered species or their designated critical habitat during the project planning or NEPA process or whenever relevant changes in listings occur. For example, LM performs an evaluation if a candidate species is elevated to threatened or endangered status or if designated critical habitat is established that could be affected by LM activities. USFWS's Information for Planning and Consultation online tool is used to obtain information on species occurrence and habitat. If LM determines a listed species may be affected by its activities, LM initiates a Section 7 consultation with USFWS and, in cases of a formal consultation, prepares a Biological Assessment. Additional consultation with tribal authorities is required for Navajo Nation sites and may be required on other tribal lands.

Threatened or endangered species investigations or consultations occurred at the following LM sites in 2022:

- Rifle, Colorado, Processing (New) Site: A survey of Ute ladies'-tresses (*Spiranthes diluvialis*), a plant listed as threatened, was conducted. No species or its habitat were found at or near any of the locations where the proposed work activities were to occur.
- Gunnison, Colorado, Disposal Site: Routine activities, including the 2022 annual inspection and site maintenance activities, were scheduled after July 15 to protect threatened Gunnison sage-grouse (*Centrocercus minimus)* during their breeding and nesting seasons.
- Piqua site: Trees with a diameter greater than 3 inches at breast height were removed on April 1, 2022, to avoid impacts to ESA-listed bats, which can inhabit trees this size in the summer.
- Rocky Flats site: Consultations and notifications associated with project activities were completed in accordance with the site's Programmatic Biological Assessment, associated Biological Opinion, and subsequent consultations.

- DRUM Program: Time restrictions were placed on field visits based on nesting seasons of protected birds and blooming periods of threatened and endangered listed plants at mines where the species could be present and work activities could be a disturbance to the protected species. Other mitigation measures were placed on work activities to avoid disturbing listed species, such as avoiding soil sampling near cactus species and driving vehicles only on designated roads. Informal consultations with the Navajo Nation occurred to assess Navajo Nation listed species in areas of proposed work on Navajo lands.
- Shiprock, site: Completed the consultation with the Navajo Nation and USFWS on the *Biological Assessment of Threatened and Endangered Species and Biological Evaluation of Navajo Nation Listed Species for the U.S. Department of Energy Office of Legacy Management Many Devils Wash Decommissioning Project, Shiprock, New Mexico* (LMS/SHP/S35350)).

5.4.6 Invasive Species Management

In accordance with the Plant Protection Act of 2000 (7 USC 104), LM cooperates with federal, state, and local agencies, as well as farmers associations and private individuals to control, eradicate, or prevent the spread of noxious weeds. The *Procedure for Handling Herbicides at Western Legacy Management Sites* (LMS/PRO/S12853) outlines the process followed to implement treatment of invasive species at western LM sites. The *Procedure for Applying Herbicides at the Fernald Preserve, Fernald, Ohio* (LMS/FER/S08834) outlines the processes used by LMS staff for herbicide treatment of invasive species at the Fernald Preserve site. A commercial herbicide subcontractor is also used to support invasive species treatment at the Fernald Preserve site. LM also complies with EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, enacted December 5, 2016, which calls on federal agencies to prevent the introduction, establishment, and spread of invasive species and to eradicate and control populations of established invasive species.

In 2022, LM treated 41 different species of noxious weeds on 633.7 acres at 29 sites (including various ULP lease tracts). From 2021 to 2022, there was:

- Decreased acreage of noxious weeds sprayed at 15 sites.
- Increased acreage sprayed at 6 sites.
- No change in acreage sprayed at 8 sites.

Canada thistle (*Cirsium arvense*), which grows at 12 sites, was the most widespread noxious weed treated. Both hardheads (*Acroptilon repens*) and musk thistle (*Carduus nutans*), which grow at seven sites, were the next most widespread noxious weeds.

5.4.7 Migratory Bird Treaty Act (MBTA)

The MBTA prohibits possessing or destroying migratory birds or their parts, eggs, and nests without a permit from USFWS. Additionally, EO 13186*, Responsibilities of Federal Agencies to Protect Migratory Birds*, directs executive departments and agencies to take certain actions to further implement the MBTA. Most birds at LM sites are protected under this act, and compliance is often achieved by timing disruptive activities to avoid the nesting season of migratory bird species.

- Multiple LM site-specific environmental review documents and statements of work provided guidance about BMPs to protect migratory birds. Environmental reviews identified specific windows that would avoid impacts to nesting migratory birds and provisions to implement mitigation measures for activities that cannot be scheduled outside those windows.
  - Bird surveys were conducted at the Shiprock site to ensure that nesting birds would not be disturbed by LM's exploratory drilling work.
  - Large-scale mowing of grassland areas at the Fernald Preserve site is scheduled in early May and mid-August to avoid nesting bird season.
  - Two separate bird surveys were conducted at the Piqua decommissioned reactor site prior to activities related to the demolition of the buildings at the site.
  - During general surveillance and maintenance activities at LM sites field workers routinely look for and avoid bird nests, eggs, or young.
- LM reports migratory bird conservation measures to DOE Headquarters' Migratory Bird Working Group on a periodic basis. No information was requested in 2022.
- The Fernald Preserve site maintains a Nest Destruction Permit issued by the Ohio Department of Natural Resources (ODNR). This permit is for removing Canada goose (*Branta canadensis*) nests and eggs if they are determined to be a nuisance.
- Project activities at the Rocky Flats site followed the site document guidance and BMPs addressed in the *Migratory Bird Treaty Act Issues, Natural Resource Management Activities, and Maintenance and Project Activities at the Rocky Flats Site, Colorado* (LMS/RFS/S04511).

Lessee lease tract activities associated with the ULP followed the guidance and BMPs addressed in Table 4.6-1, "Measures Identified to Minimize Potential Impacts from Uranium Mining at the ULP Lease Tracts" in the *Final Uranium Leasing Program Programmatic Environmental Impact Statement – March 2014* (DOE/EIS-0472) and Appendix C, "Specific Requirements and Stipulations" in the *Uranium Mining Leases*.

5.4.8 Bald and Golden Eagle Protection Act

The "Bald and Golden Eagle Protection Act" (16 USC 668) provides additional protection to bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively) by prohibiting the "take" (e.g., possession, destruction, harassment, or disturbance) of these species without a permit from the Secretary of the Interior.

- LM site-specific environmental review documents include measures to avoid impacts to nesting bald or golden eagles at sites where they are likely to be present. The USFWS Information for Planning and Consultation website provides information on whether eagles are likely to be present at a site.
- BMPs were incorporated into DRUM Program field operations plans to avoid impacts to migratory birds and avoid specific field activities during bald and golden eagle nesting seasons.

5.4.9 National Historic Preservation Act (NHPA)

NHPA established a comprehensive national policy concerning historic and archaeological resource protection. Section 106 of NHPA compels federal agencies to consider the effect of its projects on historic and archaeological resources, even if projects are not located on its lands. Section 110 of NHPA states federal agencies must identify and manage historic properties under their jurisdiction or control. Some projects require consultation with both a State Historic Preservation Officer (SHPO) and a Tribal Historic Preservation Officer (THPO) or tribal representatives.

Section 106 Consultations:

- LM initiated and completed the Section 106 consultation process 18 times in 2022. LM consulted with:
  - Wyoming SHPO
    - In December regarding an archaeological survey at the Bear Creek, Wyoming, Disposal Site.
    - In November regarding the installation of a water line at the Bear Creek site by a tenant to support ranching operations at the site.
  - Colorado SHPO
    - In October regarding the installation of a power pole at the LMFSC.
    - In November regarding the construction of a sunshade at the LMFSC.
    - In September regarding reclamation at a ULP tract in Montrose County, Colorado.
    - In September for well drilling at the Rifle site.
    - In August regarding the installation of electric vehicle (EV) charging stations at the LMOC.
    - In August regarding the installation of EV charging stations at the LMFSC.
    - In September regarding aerial survey markers at the Gunnison site.
    - In August regarding well drilling at the Rifle site.

— West Virginia SHPO

  - In August regarding installation of EV charging stations at the LMBC.

— New Mexico SHPO

  - In April regarding using soil from a site to cover repair work at the L-Bar site.

— Missouri SHPO

  - In January regarding removing a vault from the Weldon Spring Site.

— Navajo Nation THPO

  - In October regarding installation of a water treatment unit at the Shiprock site.
  - In April regarding drilling groundwater monitoring wells at the Shiprock site.
  - In April regarding drilling groundwater monitoring wells at the Monument Valley, Arizona, Processing Site.
  - In February regarding drilling groundwater monitoring wells at the Shiprock site.

— Pueblo of Laguna THPO

  - In June regarding a DRUM V&V site visit.

- Programmatic Agreement between LM and the Navajo Nation Heritage and Historic Preservation Office was signed and is now in effect.
- Under the ULP, five reclamation projects performed by ULP lessee's (see Section 3.2) were exempt from Section 106 consultation because the projects met the exemption requirements outlined in the *Programmatic Agreement Among the U.S. Department of Energy – Office of Legacy Management, the U.S. Department of the Interior – Bureau of Land Management, Colorado State Historic Preservation Office, and the Pueblo of Zuni Regarding the Uranium Leasing Program within Mesa, Montrose, and San Miguel Counties, Colorado* (DOE 2014)

Archeological Surveys:

- One archaeological survey of approximately 187 acres was completed at the Bear Creek site in November. The work was done to support water line installation by a tenant to support ranching operations at the site.

Section 110 Activities:

- LM did not initiate or complete any Section 110 work during 2022.

5.4.10 EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

The EO establishes that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

Environmental justice is the fair treatment and meaningful involvement of all people—regardless of race, color, national origin, or income—with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no population bears a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or from the execution of federal, state, and local laws, regulations, and policies. Meaningful involvement requires that everyone has effective access to decision makers and that all communities can make informed decisions and take positive actions to produce environmental justice for themselves.

To learn more about DOE Environmental Justice goals and objectives, the *Department of Energy 2019 Environmental Justice Second Five-Year Implementation Plan* is available at https://www.energy.gov/lm/downloads/2019-environmental-justice-second-five-year-implementation-plan.

5.5 Unplanned Nonradiological Releases

This section provides information on unplanned, nonroutine releases of pollutants or hazardous substances. Unplanned radiological releases are discussed in Section 8.1.

Table 2 provides a list of unplanned releases, such as spills or leaks, that occurred during the reporting period, including the date each release occurred, the amount of material released, an explanation of the release, corrective actions taken, and reporting requirements. There were no releases that exceeded applicable reporting threshold volumes.

Table 2. Summary of Unplanned Nonradiological Releases

Site or Facility	Release	Date of Release	Volume	Reporting Required?	Immediate or Corrective Actions
Rifle, Colorado, Disposal Site	Leachate spill on the cell from discharge pipe failure	12/3/2022–12/5/2022	Approximately 1025 gallons	No	LMS staff shut down the system as soon as the spill was realized, and the pipes were repaired before the system was turned back on. The spill contaminants did not reach surface water or groundwater and most likely reinfiltrated back into the cell.
Rifle, Colorado, Disposal Site	MW03 Pipe Disconnected at Rifle Disposal Cell	12/22/2022	Approximately 271 gallons	No	LMS staff shut down the system to stop the leak. Repairs were conducted and a process improvement was started to repair the pipeline with a more robust system.
Shiprock, New Mexico, Disposal Site	Pumping system leak suspected	10/25/2022	Unknown	No	Site operations staff assessed the valve box and discovered a valve that was not fully closed.
Piqua, Ohio, Decommissioned Reactor Site	Hydraulic spill on hard surface	9/14/2022	Approximately 1.5 gallons	No	The equipment was shut down and put in a safe configuration for a pause work. The subcontractor directed cleanup using absorbent pads. The pads were disposed of in a landfill container.

Table 2. Summary of Unplanned Nonradiological Releases (continued)

Site or Facility	Release	Date of Release	Volume	Reporting Required?	Immediate or Corrective Actions
Fernald Preserve, Ohio, Site	Well 6 water leak	7/25/2022	Calculated 18,720 gallons	No	The well pump was turned off. Samples were collected from the water found ponding around the well for uranium analysis. All samples were found to be below the groundwater maximum concentration limit and site final remedial limit. Radiological Control performed a scan of the soil and surrounding areas of the well. The results noted nothing above background. The well was taken out of service.
Piqua, Ohio, Decommissioned Reactor Site	Hydraulic spill on soil and asphalt	7/20/2022	Approximately 1–2 gallons	No	The equipment was shut down and put in a safe configuration for a pause work. Absorbent pads were used to clean up wet areas, and 1/3 cubic yard of soil was removed. Pads and soil were placed in poly bags and disposed of with waste going to the landfill.
DRUM Program	Oil leak in dirt lot	4/12/2022	Approximately 2 tablespoons	No	During vehicle inspection, staff noticed a small drip of oil in the dirt under the vehicle. Contaminated soil was scooped into a container and thrown away.

5.6 Summary of Environmental Notices

This section identifies, when applicable, instances of noncompliance and enforcement actions related to operations and activities at sites under LM's management, such as notices of violation, notices of deficiency, and environmental occurrences.

- During the reporting period, no environmental notices were received from external agencies or stakeholders, nor were there any self-identified instances of noncompliance.

The EPA's Enforcement and Compliance History Online (ECHO) database was reviewed for facility information and current compliance status. Table 3 lists LM sites with a current EPA facility ID number; all sites are in good standing with no compliance violations identified.

Table 3. LM Facilities Monitored in EPA ECHO Database

ECHO Facility Name	Facility Address	Facility Registry Service ID	Program Area
U.S. DOE Mound Plant	1 Mound Road Miamisburg, OH 45342	110000850632	RCRA/CAA/CWA
U.S. DOE Weldon Spring Site	7295 Highway 94 South St. Charles, MO 63304	110017989569	CWA
U.S. DOE Pinellas Plant	7887 Bryan Dairy Road Suite 260 Largo, FL 33777	110000875465	RCRA
U.S. DOE Fernald Closure Project	7400 Willey Rd Hamilton, OH 45013	110063878111	CWA
U.S. DOE Fernald	7400 Willey Rd Hamilton, OH 45013	110039008533	CAA

6.0 Additional Natural Resources Management

In addition to the actions taken under specific regulations, as listed in Section 5.4, LM completed the following activities related to natural resource management:

- Conducted a follow-up pollinator study at the Bluewater site to document the density of monarch butterflies, a federal candidate species, and other pollinators. Also at the Bluewater site, wildlife cameras documented that an elk herd may be utilizing the site year-round. The cameras documented two additional special-status birds at the site—loggerhead shrike and mountain bluebird—and fairy shrimp were found in site ponds. Potential habitat for bats was also observed, and follow-up studies are planned.
- Installed protective cages at the Canonsburg, Pennsylvania, Disposal Site to prevent damage from deer to hundreds of planted, young riparian trees.
- Planted approximately 120 trees and shrubs in various areas at the Fernald Preserve site to increase woody plant diversity, enhance successional development of restored areas, and decrease forest fragmentation.
- Conducted monitoring at the Edgemont, South Dakota, Disposal Site and Split Rock, Wyoming, Disposal Site to evaluate rangeland health over time and impacts from grazing livestock.
- Monitored riparian areas within Uranium Lease Tract SR-13 and determined that they met all criteria for successful restoration.
- Conducted an ongoing regenerative grazing and carbon sequestration study at the Shirley Basin South site. The study involves participation with other agencies and the University of Wyoming and includes an evaluation of sustainable grazing practices by a local rancher at the site.
- Continued tracking the acreage and types of pollinator-friendly BMPs implemented at LM sites each year between May 1, 2021, and April 30, 2022. There was a slight increase in acreage in 2022 when a milkweed patch, which is prime habitat for monarch butterflies, was discovered at the Bear Creek site.

- LM renews the following permits annually:
  - Scientific Collecting Permit for wild animals at the Fernald Preserve site issued by ODNR
  - Special-Purpose Salvage Permit for the Fernald Preserve site issued by USFWS

7.0 Summary of Groundwater Protection Program

There are 44 LM sites with a groundwater protection program consisting of monitoring chemical and radiological constituents. The monitoring requirements, number of wells, frequency of sampling, and COCs are site-specific. For example, groundwater samples may be collected quarterly; semiannually; annually; or every 2, 3, 5, or 10 years. For this report, active wells are wells that are required to be sampled or monitored for some environmental purpose at some defined frequency as part of a site's groundwater monitoring network. Point of compliance (POC) wells are a subset of active wells that are either (1) identified in a site regulatory document (i.e., Long-Term Surveillance Plan or Groundwater Compliance Action Plan (GCAP), LTS&M Plan, or other decision document) or (2) are not specifically defined, but an exceedance at the location triggers some action as agreed upon by LM and the regulator (i.e., requires notification to the regulator of exceedance or requires additional follow-up sampling or monitoring for verification). There are 19 LM sites with POC wells.

Wells that are sampled or monitored for parameters other than COCs (e.g., water levels) as required by a site regulatory document are BMP wells. Many sites have wells that are sampled or monitored for some LM-identified purpose but are not required by a site regulatory document; these wells are not reported in the ASER.

Table A-4 in Appendix A of this ASER summarizes the site-specific groundwater monitoring program for applicable LM sites to include the following:

- Whether the site is sampled for radiological analytes (including uranium isotopes)
- Whether the site is sampled for nonradiological analytes (including elemental uranium)
- The site-specific sampling frequency
- A list of the COCs
- The number of active wells sampled for groundwater monitoring purposes (may include private wells in addition to DOE-owned wells)
- The number of POC wells, if applicable
- COC exceedances at POC wells sampled during the reporting period (identified in Table A-4 with bold and underlined font)

Note

COC exceedances of regulatory standards were reported for eight sites with POC monitoring wells sampled during the reporting period. Exceedances of COCs might not result in violations because violations depend on the regulatory framework for each site.

Many LM sites' regulatory agreements require an annual site-specific environmental report to be issued; each site may use a different title for its report (Annual Monitoring Report, Site Annual

Report, Site Environmental Report, and so on). These reports include details on COC exceedances, plume data, contaminant time-concentrations plots from which trending can be evaluated, and other details not discussed in this report. Table A-2 of this report indicates which types of reports a site is required to submit; however, not all reports are issued annually. Data on COC exceedances at UMTRCA processing sites and D&D sites are presented in Table A-5 as this information is not easily obtainable on the LM public website.

7.1 PFAS and Emerging Contaminants

In 2022, LM performed quarterly sampling for PFAS at the Rocky Flats site. Additionally in 2022, LM performed annual sampling for 1,4-dioxane at the Pinellas County site. For a summary of PFAS sampling conducted at the Rocky Flats site in 2022, and for more information about the 1,4-dioxane sampling conducted at the Pinellas County site, see Section 5.3.6.

No other sampling for PFAS or other emerging contaminants occurred in 2022 at LM sites.

8.0 Summary of Environmental Radiation Protection Program (RPP)

LM's RPP implements the requirements necessary to ensure radiological operations at LM sites and facilities are protective of employees, the public, and the environment. The implementing documents of the RPP include the *Environmental Radiation Protection Program Plan* (LMS/POL/S13339), the *Radiation Protection Program Plan* (LMS/POL/S04373), and the *Radiological Control Manual* (LMS/POL/S04322). The purpose of the RPP is to implement the applicable requirements of 10 CFR 835, "Occupational Radiation Protection," and DOE Order 458.1 LtdChg 4, *Radiation Protection of the Public and the Environment.*

LM implements the RPP at applicable LM sites and activities to ensure radiation exposure to workers and the public and releases of radioactivity to the environment are maintained below regulatory limits and are as low as reasonably achievable (ALARA). LM's RPP also includes ensuring that activities are conducted in accordance with the following laws:

AEA: The purpose of the AEA is to ensure the proper management of source, special nuclear, and byproduct material. The AEA and the statutes amending it delegate the control of nuclear energy primarily to DOE, NRC, and EPA. DOE established LM to ensure DOE's postclosure responsibilities are met and to provide DOE programs for LTS&M, records management, workforce restructuring and benefits continuity, property management, land use planning, and community assistance.

UMTRCA: As discussed in Section 2.6, LM manages UMTRCA Title I and Title II sites, including inspection, monitoring, and maintenance activities. Plans and reports that summarize UMTRCA activities are described below:

- Requirements for inspections, monitoring, and maintenance activities are specified in site-specific Long-Term Surveillance Plans, LTS&M Plans, and GCAPs, all of which are reviewed and agreed to by NRC (see Tables A-2 and A-3).

- Two LM-wide inspection and monitoring reports, one for Title I sites (https://energy.gov/lm/downloads/title-i-disposal-sites-annual-report-0) and one for Title II sites (https://www.energy.gov/lm/articles/annual-site-inspection-and-monitoring-report-umtrca-title-ii-disposal-sites), are compiled and submitted annually to NRC. These reports present the results of LTS&M activities at each of the UMTRCA sites as part of the general license requirements.

DOE Order 458.1 LtdChg 4, *Radiation Protection of the Public and the Environment*: Establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under DOE control.

- LM implements the *Environmental Radiation Protection Program Plan* to ensure that work involving radiological hazards complies with the requirements of DOE Order 458.1 Chg 4. The implemented processes and measures are tailored to LM activities and reflect a graded approach commensurate with the hazard or risk to the public and the environment.
- LM and the LMS contractor held two routine semiannual ALARA meetings in 2022 to allow personnel to be involved in the ALARA process, including identification of potential environmental and public impacts.
- No site-specific ALARA reviews were completed.

8.1 Unplanned Radiological Releases

There were no unplanned radiological releases in 2022.

8.2 Clearance of Property

This section summarizes the real and personal property clearance activities for LM, including application of authorized limits, type of material or property, and expected end-use scenario (e.g., disposal, recycle, reuse). This information is provided in accordance with DOE Order 458.1 LtdChg 4, which requires a summary of the clearance of property to be reported in the ASER.

The clearance of property from an LM site or project location is performed in accordance with the *Radiological Control Manual*. As such, surface contamination limits identified in Table 2 (derived from 10 CFR 835 Appendix D) of the *Radiological Control Manual* are considered preapproved authorized limits. LM does not release property to the public (e.g., vehicles, equipment, or other materials) with residual radioactivity above the preapproved authorized limits.

No DOE-owned real property was released from LM sites, offices, or facilities in 2022, other than radioactive waste shipments identified in Section 5.1. The personal property identified below was radiologically surveyed and released from various LM radiologically controlled areas:

- DOE-owned personal property (e.g., project work trucks and light equipment) and contractor- and subcontractor-owned personal property (e.g., heavy equipment, light equipment, and haul/work trucks) was released for reuse as a result of:
  - Evaporation pond sediment sampling and investigation that was performed at the Shiprock site in March and October.

— Trenching work in the City of Monticello in April and July and delivery of mill tailings excavated during the July trenching work to the site's temporary storage facility by the City of Monticello.

— Grand Junction disposal site work that was performed in October.

9.0 Summary of Fire Protection Management and Planning

In late 2021 LM began drafting an integrated site-wide fire management plan to be consistent with the *Federal Wildland Fire Management Policy* (BLM 2000). Wildland fire management plans are in place for the LM sites listed in this section. These plans describe the current site-specific fire environment and fire prevention and mitigation strategies to meet the fire protection objectives of DOE Order 420.1C LtdChg 3, *Facility Safety*. This includes compliance with the following standards of the National Fire Protection Association:

- Standard 1143, *Standard for Wildland Fire Management*, published in 2018.
- Standard 299, *Standard for Protection of Life and Property from Wildfire*, published in 1997.

Wildland fire management strategies implemented include use of fire protection equipment, vegetation management, site access controls, job safety analyses or procedures, and prescribed burns.

LM sites with wildland fire management plans include:

- Fernald Preserve.
- Grand Junction disposal site.
- Monticello disposal and processing sites.
- Rocky Flats site.
- Tuba City site.
- Weldon Spring Site.

Although unoccupied sites generally do not have wildland fire management plans because work is performed at these sites infrequently, wildland fire hazards and controls are addressed in wildland fire management plans and safety and health documents such as the *Job Safety Analysis (JSA)* form (LMS 1748). It is recognized that fires may occur when no one is onsite to make initial notifications or to give information to responders. Signs posted at unoccupied sites include a 24-hour telephone number so information can be reported. During "fire season," April through October, a weekly fire watch summary report is distributed to LMS site leads and LM site managers and other interested internal parties. The summary reports any wildfire that occurred within 20 miles of an LM site (excluding DRUM sites) and notes the fire size, fire discovery date and cause, and percent contained if available. Safety and Health personnel monitor the areas affected by wildfire smoke to reduce health risks for employees performing field work. If wildfire smoke decreases visibility to less than 5 miles in the working area or if workers have respiratory complications due to smoke inhalation, a pause work is initiated, and employees are instructed to evacuate the area and contact the lead safety supervisor or technical manager for direction.

LM Emergency Management and site management staff developed an Interagency Assistance Agreement with the U.S. Forest Service to plan and conduct prescribed burns. LM staff will not be allowed near the fire environment unless qualified through the National Wildfire Coordinating Group (NWCG) standards and hold a "Red Card" as issued by the Incident Qualification and Certification System, or if escorted by qualified fire personnel in accordance with NWCG standards.

In 2022, DOE and the U.S. Forest Service entered into an interagency agreement to conduct prescribed burns at the Fernald Preserve site. On December 2, 2022, the U.S. Forest Service conducted two prescribed burns, burning approximately 20 acres of prairie in the Former Production Area at the site.

As a result of the 2022 interagency agreement between DOE and the U.S. Forest Service for conducting prescribed burns, the U.S. Forest Service secures the required burn-ban waivers and permits for prescribed burning activities on site.

10.0 Summary of Quality Assurance

LM and the LMS contractor have implemented Quality Assurance (QA) and Performance Assurance (PA) programs to perform work in a compliant manner that consistently meets or exceeds mission objectives while minimizing potential hazards to the environment, the public, and workers. The management systems incorporate the requirements of DOE Order 414.1D LtdChg 2, *Quality Assurance*, using ISO 9001:2015, *Quality Management Systems–Requirements*, as the chosen international standard. Implementing documents include the *Quality Assurance Policy* (LM-Policy 414.1B); the *Quality Assurance Program Plan* (LM-Plan-1-10.0-1.0); and the LMS *Quality Assurance Manual* (LMS/POL/S04320).

LM performs oversight of its programs, processes, and contractors as required by DOE Order 226.1B Chg 1 (AdminChg), *Implementation of Department of Energy Oversight Policy*, to ensure that programs are achieving their intended results and outputs in a safe, compliant, and efficient manner.

QA and PA management systems ensure that requirements are identified and integrated into LM procedures and work activities are adequately described in documents such as statements of work, project-specific work plans, procedures, and other documented control measures. Assessments are performed to confirm compliance and evaluate LM and LMS contractor performance. Assessments are planned and recorded according to an annual schedule, and identified issues are tracked in the Assessment and Issue Management System.

The annual assessment schedule includes:

- External assessments conducted by DOE, program sponsors, other regulatory agencies, corporate personnel, and external agencies to ensure adequate management system implementation.
- Independent assessments conducted by QA and PA staff independent of the area or function being assessed.
- Management assessments conducted by LM or LMS contractor staff as self-assessments and surveillances.

The QA and PA program includes the identification and control of items and equipment for sampling control and analysis. Additional site-specific requirements for sampling activities at LM sites are defined in site-specific or program-specific Quality Assurance Project Plans (QAPPs), Sampling and Analysis Plans (SAPs), or in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351), also called the LM SAP. Soil and surface water samples associated with the DRUM Program are collected, managed, and analyzed in accordance with the *Defense-Related Uranium Mines Quality Assurance Program Plan* (LMS/DRM/S15867) and the *Defense-Related Uranium Mines Verification and Validation Work Plan* (LMS/DRM/S13690). These documents provide detailed procedures for sampling environmental media in a consistent and technically defensible manner. These procedures are reviewed and updated as required to ensure the most up-to-date processes are used.

Guidelines for evaluating sample collection and field measurement activities against site and program-specific requirements found in QAPPs and the LM SAP are detailed in the *Environmental Data Validation Procedure* (LMS/PRO/S15870). Validation of environmental data is performed to determine whether data meet the specific technical and quality criteria established in the applicable quality system documents and to establish the usability and extent of bias of any data not meeting those criteria. Validation can include evaluation of all activities impacting data quality. Field quality assurance processes include:

- Completing training and qualification programs.
- Following QAPPs, SAPs, procedures, or the LM SAP.
- Collecting and analyzing quality control samples, including field duplicates, equipment blanks, and trip blanks.
- Reviewing field documentation.
- Performing independent surveillances of field activities by QA and PA staff.
- Inspecting and maintaining monitoring wells.

LM uses contracted analytical laboratories and treatment, storage, and disposal facilities (TSDFs) when required and ensures these providers participate in the DOE Consolidated Audit Program or the Mixed Analyte Performance Evaluation Program. Table 4 lists all contracted analytical laboratories and TSDFs used in 2022.

Table 4. Contracted Analytical Laboratories and TSDFs

Laboratory	Location
ALS Global+ (Formerly Paragon Analytics)	4288 Glendale-Milford Road Cincinnati, OH 45242
ARS International LLC	2609 North River Road Port Allen, LA 70767
Daniel B Stephens & Associates	4400 Alameda Blvd NE Suite C Albuquerque, NM 87113
Eurofins Environment Testing	180 Blue Ravine Road Suite B Folsom, CA 95630
Eurofins TestAmerica	4995 Yarrow Street Arvada, CO 80002 13715 Rider Trail North Earth City, MO 63045 880 Riverside Parkway West Sacramento, CA 95605
GEL Laboratories LLC	2040 Savage Road Charleston, SC 29407
Huddleston-Berry Engineering	2789 Riverside Parkway Grand Junction, CO 81501
Lawrence Berkeley National Lab L08144	1 Cyclotron Road Berkeley, CA 94720
Microbial Insights INC	10515 Research Dr Knoxville, TN 37932
Mineralogy Inc.	3321 E 27th St Tulsa, OK 74114
Sanford Cohen & Associates	1608 Spring Hill Rd Suite 400 Vienna, VA 22182
Tritium Laboratory	4600 Rickenbacker CSWY Miami, FL 33149
U.S. Geological Survey	12201 Sunrise Valley DR Mail Stop 431 Reston, VA 20192
TSDF	**Location**
Alaska Demolition	2817 Rampart Drive #200 Anchorage AK 99501
Clean Harbors Grassy Mountain L.L.C.	3 Miles East 7 Miles North of Knolls Grantsville UT, 84029
Energy Solutions, Clive Disposal Facility	Interstate 80 Exit 49 Grantsville, UT 84029
Veolia ES Technical Solutions, L.L.C.	Highway 73, Port Arthur, TX 77643
Waste Management Inc.- Stony Hollow Landfill	2460 South Gettysburg Avenue, Dayton, OH 45417

11.0 References

10 CFR 40. "Domestic Licensing of Source Material," *Code of Federal Regulations*.

10 CFR 835. "Occupational Radiation Protection," *Code of Federal Regulations*.

10 CFR 851. "Worker Safety and Health Program," *Code of Federal Regulations*.

7 USC Section 104. "Plant Protection Act of 2000," *United States Code.*

16 USC 668. "The Bald and Golden Eagle Protection Act," *United States Code.*

42 USC 7675. "The American Innovation and Manufacturing Act of 2020," *United States Code.*

42 USC 7901 et seq. "Uranium Mill Tailings Radiation Control Act of 1978," as amended, *United States Code.*

2019–2023 Significant Environmental Aspects (LMS/S24255).

A Summary of the Per- or Polyfluorinated Alkyl Substances Records Search for Indications of Use at the Mound, Ohio, Site (LMS/MND/S15235).

Biological Assessment of Threatened and Endangered Species and Biological Evaluation of Navajo Nation Listed Species for the U.S. Department of Energy Office of Legacy Management Many Devils Wash Decommissioning Project, Shiprock, New Mexico (LMS/SHP/S35350).

BLM (Bureau of Land Management), 2000. *Federal Wildland Fire Management Policy*.

Defense-Related Uranium Mines Quality Assurance Program Plan (LMS/S15867).

Defense-Related Uranium Mines Verification and Validation Work Plan (LMS/13690).

DOE (U.S. Department of Energy), 2006. *RCRA Facility Investigation—Remedial Investigation/Corrective Measures Study—Feasibility Study for the Rocky Flats Environmental Technology Site*, June.

DOE (U.S. Department of Energy), 2021. *Addressing Per- and Polyfluoroalkyl Substances at the Department of Energy*, memorandum by Deputy Secretary of Energy David Turk, September 16.

DOE (U.S. Department of Energy), 2022a. *Fiscal Year 2023 Site Sustainability Plan Guidance* Sustainability Performance Division, September.

DOE (U.S. Department of Energy), 2022b. *FY 2023 LM Site Sustainability Plan,* LMS/S07225, Office of Legacy Management, December.

DOE (U.S. Department of Energy), 2023. *Guidance for Preparation of the 2022 Department of Energy Annual Site Environmental Reports,* Office of Environment, Health, Safety and Security, March.

DOE Order 226.1B Chg 1 (AdminChg), *Implementation of Department of Energy Oversight Policy.*

DOE Order 231.1B Admin Chg 1, *Environment, Safety and Health Reporting.*

DOE Order 414.1D LtdChg 2, *Quality Assurance.*

DOE Order 435.1 Chg 2, *Radioactive Waste Management.*

DOE Order 436.1, *Departmental Sustainability.*

DOE Order 420.1C LtdChg 3, *Facility Safety.*

DOE Order 458.1 LtdChg 4, *Radiation Protection of the Public and the Environment.*

DOE Policy 450.4A MinChg 1, *Integrated Safety Management Policy.*

Draft Summary Report for Uses of PFAS Initial Assessment Report at the Pinellas County, Florida Site (LMS/PIN/43719).

Environmental Assessment of Groundwater Compliance at the Shiprock Uranium Mill Tailings Site (DOE/EA-2108).

Environmental Data Validation Procedure (LMS/PRO/S15870), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Environmental Instructions Manual (LMS/POL/S04338), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Environmental Management System/Energy Management System Description (LM-Procedure-3-20-12.0, LMS/POL/S04346), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Environmental Protection Manual (LMS/POL/S04329), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Environmental Radiation Protection Program Plan (LMS/POL/S13339), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Environmental Assessment for the Evaporation Pond at the Shiprock, New Mexico, Disposal Site (DOE/EA-2195).

Executive Order 11988, *Floodplain Management.*

Executive Order 11990*, Protection of Wetlands.*

Executive Order 12898*, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

Executive Order 13186*, Responsibilities of Federal Agencies to Protect Migratory Birds*

Executive Order 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, enacted December 5, 2016

Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*

Evaluation Report for Uses of Per- and Polyfluoroalkyl Substances in Historical Processes at the Feed Materials Production Facility, Fernald, Ohio (LMS/FER/41372).

Fernald Preserve, Fernald, Ohio, Storm Water Pollution Prevention Plan (LMS/FER/S03161).

Fifth Five-Year Review Report for the Fernald Preserve (LMS/FER/S33442).

Fifth Five-Year Review for the Mound, Ohio, Site, Miamisburg, Ohio (LMS/MND/S31971).

Final Uranium Leasing Program Programmatic Environmental Impact Statement – March 2014 (DOE/EIS-0472).

Fourth Five-Year Review Report for the Fernald Preserve (LMS/FER/S13683).

ISO 9001:2015. *Quality Management Systems–Requirements*, International Organization for Standardization.

ISO 14001:2015, *Environmental Management Systems—Requirements and Guidance for Use*, International Organization for Standardization.

LM Environmental and Energy Policy (LM-Procedure-1-24-1.0).

Migratory Bird Treaty Act Issues, Natural Resource Management Activities, and Maintenance and Project Activities at the Rocky Flats Site, Colorado (LMS/RFS/S04511).

Pinellas County, Florida, Site Environmental Restoration Project Environmental Monitoring Annual Progress Report for the Building 100 Area at the Young – Rainey STAR Center (LMS/PIN/40817).

Procedure for Applying Herbicides at the Fernald Preserve, Fernald, Ohio (LMS/FER/S08834).

Procedure for Handling Herbicides at Western Legacy Management Sites (LMS/PRO/S12853), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Programmatic Agreement Among the U.S. Department of Energy – Office of Legacy Management, the U.S. Department of the Interior – Bureau of Land Management, Colorado State Historic Preservation Office, and the Pueblo of Zuni Regarding the Uranium Leasing Program within Mesa, Montrose, and San Miguel Counties, Colorado (DOE 2014).

Public Law 110-140. "Energy Independence and Security Act," Section 432, December, 2007.

Public Law 116–260. "Consolidated Appropriations Act, 2021," December 27, 2020.

Quality Assurance Manual (LMS/POL/S04320), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Quality Assurance Policy (LM-Policy 414.1B).

Quality Assurance Program Plan (LM-Plan-1-10.0-1.0).

Radiation Protection Program Plan (LMS/POL/S04373), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Radiological Control Manual (LMS/POL/S04322), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites (LMS/PRO/S04351), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Second Five-Year Review Report, Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis, LMS/LEH/S30753.

Site Management Guide (LM-Guide-3-20.0-1.0).

Summary of the 1,4-Dioxane and Perchlorate Records Search for Indications of Use at the Mound, Ohio, Site (LMS/MND/S38331).

Worker Safety and Health Program (10 CFR 851) (LMS/POL/S14697), continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Appendix A

Legacy Management Sites and Related Reports and Summary of Groundwater Monitoring Program

Table A-1. Category 1 Sites with Links to the LM Public Website

(Typically involves records-related activities and stakeholder support)

CERCLA/RCRA Sites
Maxey Flats, KY, Disposal Site https://www.energy.gov/lm/maxey-flats-kentucky-disposal-site
Nevada Offsites
Chariot, AK, Site https://www.energy.gov/lm/chariot-alaska-site
FUSRAP Sites
Acid/Pueblo Canyon, NM, Site https://www.energy.gov/lm/acidpueblo-canyon-new-mexico-site
Adrian, MI, Site https://www.energy.gov/lm/adrian-michigan-site
Albany, OR, Site https://www.energy.gov//lm/albany-oregon-site
Aliquippa, PA, Site https://www.energy.gov/lm/aliquippa-pennsylvania-site
Attleboro, MA, Site https://www.energy.gov/lm/attleboro-massachusetts-site
Berkeley, CA, Site https://www.energy.gov/lm/berkeley-california-site
Beverly, MA, Site https://www.energy.gov/lm/beverly-massachusetts-site
Buffalo, NY, Site https://www.energy.gov/lm/buffalo-new-york-site
Chicago North, IL, Site https://www.energy.gov/lm/chicago-north-illinois-site
Chicago South, IL, Site https://www.energy.gov/lm/chicago-south-illinois-site
Chupadera Mesa, NM, Site https://www.energy.gov/lm/chupadera-mesa-new-mexico-site
Columbus East, OH, Site https://www.energy.gov/lm/columbus-east-ohio-site
Fairfield, OH, Site https://www.energy.gov/lm/fairfield-ohio-site
Granite City, IL, Site https://www.energy.gov/lm/granite-city-illinois-site
Hamilton, OH, Site https://www.energy.gov/lm/hamilton-ohio-site
Indian Orchard, MA, Site https://www.energy.gov/lm/indian-orchard-massachusetts-site
Jersey City, NJ, Site https://www.energy.gov/lm/jersey-city-new-jersey-site
Madison, IL, Site https://www.energy.gov/lm/madison-illinois-site
New York, NY, Site https://www.energy.gov/lm/new-york-new-york-site
Niagara Falls Storage Site Vicinity Properties, NY, Site https://www.energy.gov/lm/niagara-falls-storage-site-vicinity-properties-new-york-site
Oak Ridge, TN, Warehouses Site https://www.energy.gov/lm/oak-ridge-tennessee-warehouses-site
Oxford, OH, Site https://www.energy.gov/lm/oxford-ohio-site
Seymour, CT, Site https://www.energy.gov/lm/seymour-connecticut-site
Springdale, PA, Site https://www.energy.gov/lm/springdale-pennsylvania-site
Toledo, OH, Site https://www.energy.gov/lm/toledo-ohio-site
Tonawanda North, NY, Site Unit 1 https://www.energy.gov/lm/tonawanda-north-new-york-site-unit-1
Tonawanda North, NY, Site Unit 2 https://www.energy.gov/lm/tonawanda-north-new-york-site-unit-2
Wayne, NJ, Site https://www.energy.gov/lm/wayne-new-jersey-site
Windsor, CT, Site https://www.energy.gov/lm/windsor-connecticut-site

Table A-1. Category 1 Sites with Links to the LM Public Website (continued)
(Typically involves records-related activities and stakeholder support)

MED/AEC Legacy Sites
Ashtabula, OH, Site https://www.energy.gov/lm/ashtabula-ohio-site
Center for Energy and Environmental Research, PR, Site https://www.energy.gov/lm/center-energy-and-environment-research-ceer-puerto-rico-sites
Columbus, OH, Site https://www.energy.gov/lm/columbus-ohio-sites
El Verde, PR, Site https://www.energy.gov/lm/el-verde-puerto-rico-site
General Atomics Hot Cell Facility, CA, Site https://www.energy.gov/lm/general-atomics-hot-cell-facility-california-site
Inhalation Toxicology Laboratory, NM, Site https://www.energy.gov/lm/inhalation-toxicology-laboratory-new-mexico-site
Missouri University Research Reactor, MO, Site https://www.energy.gov/lm/missouri-university-research-reactor-murr-missouri-site
Oxnard, CA, Site https://www.energy.gov/lm/oxnard-california-site
Vallecitos Nuclear Center, CA, Site https://www.energy.gov/lm/vallecitos-nuclear-center-california-site
State Water Quality Standards Site
Geothermal Test Facility, CA, Site https://www.energy.gov/lm/geothermal-test-facility-california-site
Plowshare/Vela Uniform Program
Plowshare/Vela Uniform Sites, NV, Records Only[a] https://www.energy.gov/lm/plowsharevela-uniform-program-sites
Pre-Schooner II, ID, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites
Utah, Utah, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites

Note:
[a] This group represents 166 individual projects but is counted as a single site or entry in the LM *Site Management Guide*.

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations

(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
CERCLA/RCRA Sites											
Laboratory for Energy-Related Health Research, CA, Site https://www.energy.gov/lm/laboratory-energy-related-health-research-lehr-california-site	x	x				x	x		x		
Nevada Offsites											
Amchitka, AK, Site https://www.energy.gov/lm/amchitka-alaska-site	x	x			x	x			x	x	x
Central Nevada Test Area, NV, Site https://www.energy.gov/lm/central-nevada-test-area-cnta-nevada-site	x	x				x			x		x
Gasbuggy, NM, Site https://www.energy.gov/lm/gasbuggy-new-mexico-site	x		x						x		x
Gnome-Coach, NM, Site https://www.energy.gov/lm/gnome-coach-new-mexico-site	x	x				x			x		x
Rio Blanco, CO, Site https://www.energy.gov/lm/rio-blanco-colorado-site		x	x						x		x
Rulison, CO, Site https://www.energy.gov/lm/rulison-colorado-site		x	x						x		x
Salmon, MS, Site https://www.energy.gov/lm/salmon-mississippi-site		x							x		x
Shoal, NV, Site https://www.energy.gov/lm/shoal-nevada-site	x	x				x			x		x
Tonopah Test Range, NV, Site https://www.energy.gov/lm/tonopah-test-range-nevada-site	x					x					

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations (continued)
(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
UMTRCA Sites											
Ambrosia Lake, NM, Disposal Site https://www.energy.gov/lm/ambrosia-lake-new-mexico-disposal-site	x	x						x			x
Bluewater, NM, Disposal Site https://www.energy.gov/lm/bluewater-new-mexico-disposal-site	x	x						x			x
Burrell, PA, Disposal Site https://www.energy.gov/lm/burrell-pennsylvania-disposal-site	x	x						x	x		x
Canonsburg, PA, Disposal Site https://www.energy.gov/lm/canonsburg-pennsylvania-disposal-site	x	x						x	x		x
Durango, CO, Processing Site https://www.energy.gov/lm/durango-colorado-disposal-and-processing-sites		x							x		x
Durango, CO, Disposal Site https://www.energy.gov/lm/durango-colorado-disposal-and-processing-sites	x	x						x	x		x
Edgemont, SD, Disposal Site https://www.energy.gov/lm/edgemont-south-dakota-disposal-site	x							x			
Falls City, TX, Disposal Site https://www.energy.gov/lm/falls-city-texas-disposal-site	x	x						x			x
Green River, UT, Disposal Site https://www.energy.gov/lm/green-river-utah-disposal-site	x	x						x			x
Gunnison, CO, Processing Site https://www.energy.gov/lm/gunnison-colorado-disposal-and-processing-sites		x							x		x
Gunnison, CO, Disposal Site https://www.energy.gov/lm/gunnison-colorado-disposal-and-processing-sites	x	x						x			x
Lakeview, OR, Processing Site https://www.energy.gov/lm/lakeview-oregon-disposalprocessing-sites		x									x
Lakeview, OR, Disposal Site https://www.energy.gov/lm/lakeview-oregon-disposalprocessing-sites	x	x			x			x			x

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations (continued)
(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
UMTRCA Sites (continued)											
L-Bar, NM, Disposal Site https://www.energy.gov/lm/l-bar-new-mexico-disposal-site	x	x			x			x			x
Lowman, ID, Disposal Site https://www.energy.gov/lm/lowman-idaho-disposal-site	x							x			
Maybell, CO, Disposal Site https://www.energy.gov/lm/maybell-colorado-disposal-site	x							x			x
Maybell West, CO, Disposal Site https://www.energy.gov/lm/maybell-west-colorado-disposal-site	x							x			
Mexican Hat, UT, Disposal Site https://www.energy.gov/lm/mexican-hat-utah-disposal-site	x				x			x			x
Monument Valley, AZ, Processing Site https://www.energy.gov/lm/monument-valley-arizona-processing-site		x			x				x		x
Naturita, CO, Processing Site https://www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites		x							x		x
Naturita, CO, Disposal Site https://www.energy.gov/lm/naturita-colorado-disposal-and-processing-sites	x							x			x
Rifle, CO, Processing (Old) Site https://www.energy.gov/lm/rifle-colorado-disposal-site-and-processing-sites		x							x		x
Rifle, CO, Processing (New) Site https://www.energy.gov/lm/rifle-colorado-disposal-site-and-processing-sites		x							x		x
Rifle, CO, Disposal Site https://www.energy.gov/lm/rifle-colorado-disposal-site-and-processing-sites	x	x						x			x
Riverton, WY, Processing Site https://www.energy.gov/lm/riverton-wyoming-processing-site		x							x		x
Salt Lake City, UT, Processing Site https://www.energy.gov/lm/salt-lake-city-utah-disposal-and-processing-sites											x

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations (continued)
(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
UMTRCA Sites (continued)											
Salt Lake City, UT, Disposal Site https://www.energy.gov/lm/salt-lake-city-utah-disposal-and-processing-sites	x							x			
Sherwood, WA, Disposal Site https://www.energy.gov/lm/sherwood-washington-disposal-site	x	x			x			x	x		x
Shirley Basin South, WY, Disposal Site https://www.energy.gov/lm/shirley-basin-south-wyoming-disposal-site	x	x						x			x
Slick Rock, CO, Processing Sites https://www.energy.gov/lm/slick-rock-colorado-disposal-and-processing-sites		x							x		x
Slick Rock, CO, Disposal Site https://www.energy.gov/lm/slick-rock-colorado-disposal-and-processing-sites	x							x			x
Spook, WY, Disposal Site https://www.energy.gov/lm/spook-wyoming-disposal-site	x							x			x
FUSRAP Sites[e]											
Bayo Canyon, NM, Site[d] https://www.energy.gov/lm/bayo-canyon-new-mexico-aggregate-area-and-fusrap-sites											
Colonie, NY, Site[f] https://www.energy.gov/lm/colonie-new-york-site	x	x				x	x		x		x
New Brunswick, NJ, Site https://www.energy.gov/lm/new-brunswick-new-jersey-site											
Painesville, OH, Site https://www.energy.gov/lm/painesville-ohio-site											
Tonawanda, NY, Site https://www.energy.gov/lm/tonawanda-new-york-site											

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations (continued)
(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
D&D Sites											
BONUS, PR, Decommissioned Reactor Site https://www.energy.gov/lm/bonus-puerto-rico-decommissioned-reactor-site	x					x					
Grand Junction, CO, Site https://www.energy.gov/lm/grand-junction-colorado-site	x	x		x		x			x	x	x
Hallam, NE, Decommissioned Reactor Site https://www.energy.gov/lm/hallam-nebraska-decommissioned-reactor-site	x	x				x			x		x
Piqua, OH, Decommissioned Reactor Site https://www.energy.gov/lm/piqua-ohio-decommissioned-reactor-site	x					x			x		
Site A/Plot M, IL, Decommissioned Reactor Site https://www.energy.gov/lm/site-aplot-m-illinois-decommissioned-reactor-site	x	x				x			x		x
Nuclear Waste Policy Act Section 151 Site											
Parkersburg, WV, Disposal Site https://www.energy.gov/lm/parkersburg-west-virginia-disposal-site	x	x				x			x		x
MED/AEC Legacy Site											
Burris Park, CA, Site https://www.energy.gov/lm/burris-park-california-site	x					x					

Table A-2. Category 2 Sites with Links to the LM Public Website and Data Locations (continued)
(Typically involves routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[a]	Other Environmental Monitoring (biological, soil, etc.)	Site Inspection Report	CERCLA Five-Year Review Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	Environmental Monitoring Report[b]	EPCRA Report[a]	GEMS[c]
Plowshare/Vela Uniform Program											
Bronco, CO, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites					x						
Pre-Gondola and Trencher, MT, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites											
Utah, UT, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites											

Notes:

[a] LM conducts inventories at certain sites to ensure compliance with EPCRA. Refer to Section 5.1 for details.

[b] Environmental monitoring reports may include the following (some of which provide trending of data such as contaminant time-concentration plots):

- Verification monitoring reports
- Groundwater monitoring reports
- Hydrologic and natural gas sampling and analysis reports
- Postclosure inspection and monitoring reports

[c] Geospatial Environmental Mapping System (GEMS) https://gems.lm.doe.gov: This is a custom, web-based application to gather validated information for sites transferred to LM. Stakeholders, regulators, and project personnel can use GEMS to design interactive tabular reports, geospatial displays, and contaminant time-concentration plots from which trending can be evaluated. Available data may include:

- Historical air monitoring locations
- Analytical chemistry data
- Groundwater depths and elevations
- Well logs and well construction data
- Georeferenced boundaries
- Site physical features
- Sampling locations
- Site photographs

[d] The Bayo Canyon Aggregate Area RCRA site is counted with the Bayo Canyon FUSRAP site. For site count purposes, the FUSRAP programmatic framework is designated as the primary regulatory driver.

[e] The FUSRAP sites currently do not require LTS&M activities other than periodically assessing site conditions, managing site records, responding to stakeholder inquiries, and maintaining information on site fact sheets and websites. Site boundaries are provided on GEMS website https://gems.lm.doe.gov.

[f] This site follows the CERCLA process but is not on the National Priorities List. For the site, the equivalent to a CERCLA Five-Year Review is the Long-Term Periodic Review Report. A site-specific long-term monitoring report will be completed by LM to document future groundwater sampling events.

Table A-3. Category 3 Sites

(Typically involves operation and maintenance of remedial action system, routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported						
	Inspection	Groundwater and/or Surface Water Monitoring	Discharge Monitoring	Other Environmental Monitoring (biological, soil, etc.)	Chemical Inventory[a]	Site Inspection Report	CERCLA Five-Year Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	EPCRA Report[a]	NPDES Report	Environmental Monitoring Report[b]	GEMS[c]
CERCLA/RCRA Sites												
Fernald Preserve, OH, Site https://www.energy.gov/lm/fernald-preserve-ohio-site	x	x	x	x	x	x	x			x	x	x
Monticello, UT, Processing Site https://www.energy.gov/lm/monticello-utah-disposal-and-processing-sites	x	x				x	x				x	x
Monticello, UT, Disposal Site https://www.energy.gov/lm/monticello-utah-disposal-and-processing-sites	x	x				x	x				x	x
Mound, OH, Site https://www.energy.gov/lm/mound-ohio-site	x	x	x		x	x	x			x	x	x
Pinellas County, FL, Site https://www.energy.gov/lm/pinellas-county-florida-site		x			x						x	x
Rocky Flats Site, CO https://www.energy.gov/lm/rocky-flats-site-colorado	x	x		x	x	x	x		x		x	x
Weldon Spring Site, MO https://www.energy.gov/lm/weldon-spring-missouri-site	x	x			x	x	x				x	x

Table A-3. Category 3 Sites (continued)

(Typically involves operation and maintenance of remedial action system, routine inspection and maintenance, records-related activities, and stakeholder support)

Site Name	Type of Data Collected					Where Data Are Reported						
	Inspection	Groundwater and/or Surface Water Monitoring	Discharge Monitoring	Other Environmental Monitoring (biological, soil, etc.)	Chemical Inventory[a]	Site Inspection Report	CERCLA Five-Year Report	Annual Site Inspection and Monitoring Report for UMTRCA Title I or Title II Sites	EPCRA Report[a]	NPDES Report	Environmental Monitoring Report[b]	GEMS[c]
UMTRCA Sites												
Grand Junction, CO, Processing Site https://www.energy.gov/lm/grand-junction-colorado-disposal-and-processing-sites	x	x				x					x	x
Grand Junction, CO, Disposal Site https://www.energy.gov/lm/grand-junction-colorado-disposal-and-processing-sites	x	x						x			x	x
Shiprock, NM, Disposal Site https://www.energy.gov/lm/shiprock-new-mexico-disposal-site	x	x						x			x	x
Tuba City, AZ, Disposal Site https://www.energy.gov/lm/tuba-city-arizona-disposal-site	x	x			x			x			x	x

Notes:

[a] LM conducts chemical inventories at certain sites to ensure compliance with EPCRA. Refer to Section 5.1 for details.

[b] Types of environmental monitoring reports include:

- Verification monitoring reports
- Groundwater monitoring reports
- Hydrologic and natural gas sampling and analysis reports
- Federal Facility Agreement quarterly reports
- Site environmental reports (including CERCLA site annual reports)

[c] Geospatial Environmental Mapping System (GEMS) https://gems.lm.doe.gov: This is a custom, web-based application to gather validated information for sites transferred to LM. Stakeholders, regulators, and project personnel can use GEMS to design interactive tabular reports, geospatial displays, and time-concentration plots from which trending can be evaluated. Available data may include:

- Analytical groundwater and surface water data
- Groundwater depths and elevations
- Well logs and well construction data
- Georeferenced boundaries
- Site physical features
- Water quality sampling locations

Table A-4. Calendar Year 2022 Groundwater Monitoring Program and COC Exceedance Summary

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2022 Y/N	COCs[c]	Active Wells	POC Wells[d]
CERCLA/RCRA Sites							
Fernald Preserve, OH, Site	Y	Y	Semiannually	Y	Alpha-chlordane, antimony, aroclor-1254, arsenic, barium, beryllium, benzene, bis(2-chloroisopropyl) ether, bis(2-ethylhexyl) phthalate, boron, bromodichloromethane, bromoform, bromomethane, cadmium, carbazole, carbon disulfide, chloroethane, chloroform, chromium (VI), cobalt, copper, fluoride, lead, manganese, mercury, methylene chloride, molybdenum, neptunium-237, nickel, nitrate + nitrite, octachlorodibenzo-*p*-dioxin, radium-226, radium-228, selenium, silver, strontium-90, technetium-99, thorium-228, thorium-230, thorium-232, trichloroethene, total uranium, vanadium, vinyl chloride, zinc, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 4-methylphenol, 4-nitrophenol, and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin	93	0
Laboratory for Energy-Related Health Research, CA, Site	Y	Y	Quarterly	Y	Aluminum, americium-241, benzene, carbon-14, cesium-137, chlordane, chloroform, chromium, 1,1-dichloroethane, dieldrin, formaldehyde, gross beta, iron, manganese, mercury, molybdenum, nickel, nitrates, radium-226, selenium, silver, strontium-90, uranium-238, zinc	9	0
Monticello, UT, Disposal and Processing Sites	Y	Y	Semiannually	Y	Arsenic, gross alpha activity, gross beta, isotopic uranium, manganese, molybdenum, nitrate, selenium, uranium, vanadium	77	0
Mound, OH, Site		Y	Quarterly	Y	Tetrachloroethene, trichloroethene, vinyl chloride, *cis*-1,2-dichloroethene, *trans*-1,2-dichloroethene	51	0
Pinellas County, FL, Site		Y	Semiannually	Y	Trichloroethene, vinyl chloride, 1,1-dichloroethene, 1,4-dioxane, *cis*-1,2-dichloroethene, *trans*-1,2-dichloroethene	63	0
Rocky Flats, CO, Site	Y	Y	Quarterly	Y	Volatile organic compounds, semivolatile organic compounds, metals, plutonium, americium, uranium, nitrate (for a detailed list of COCs, see the site webpage) and 28 PFAS chemicals, including PFOA, PFAS, and other PFAS listed in Colorado Water Quality Control Commission Policy	88	0

Table A-4. Calendar Year 2022 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2022 Y/N	COCs[c]	Active Wells	POC Wells[d]
Weldon Spring, MO, Site	Y	Y	Quarterly	Y	Nitrate, nitrobenzene, trichloroethene, uranium, 1,3-dinitrobenzene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2,4,6-trinitrotoluene	106	0
Nevada Offsites							
Central Nevada Test Area, NV	Y		3 years#	N	Carbon-14, iodine-129, tritium	12	12
Gasbuggy, NM, Site	Y		5 years	N	Tritium	3	0
Gnome-Coach, NM, Site	Y		Annually	Y	Cesium-137, strontium-90, tritium	3	0
Rio Blanco, CO, Site	Y		Annually	Y	Tritium	4	0
Rulison, CO, Site	Y		Annually	Y	Tritium	3	0
Salmon, MS, Site	Y	Y	Biennially	Y	*cis*-1,2 -dichloroethene-, trichloroethene, tritium, vinyl chloride	35	0
Shoal, NV, Site	Y		3 years#	N	Carbon-14, iodine-129, tritium,	13	13
UMTRCA Sites							
Ambrosia Lake, NM, Disposal Site		Y	3 years	Y	Molybdenum, nitrate + nitrite as nitrogen, selenium, sulfate, uranium	3	0
Bluewater, NM, Disposal Site		Y	Semiannually	Y	Molybdenum, selenium, uranium	20	4
Burrell, PA, Disposal Site		Y	5 years	N	Calcium, chloride, iron, lead, magnesium, manganese, molybdenum, nitrate + nitrite as nitrogen, potassium, selenium, sodium, sulfate, total dissolved solids, uranium	8	0
Canonsburg, PA, Disposal Site		Y	5 years	N	Uranium	5	3
Durango, CO, Disposal Site		Y	Annually	Y	Molybdenum, selenium, uranium	7	3
Durango, CO, Processing Site[e]		Y	Annually	Y	**Cadmium, manganese,** molybdenum, selenium, **sulfate, uranium**	13	8
Falls City, TX, Disposal Site		Y	Annually	Y	Uranium	12	0
Grand Junction, CO, Disposal Site		Y	Annually	Y	Molybdenum, nitrate as nitrogen, polychlorinated biphenyls, selenium, sulfate, total dissolved solids, uranium, vanadium	3	0
Grand Junction, CO, Processing Site		Y	5 years	N	Ammonia (as NH_4), molybdenum, uranium	4	0
Green River, UT, Disposal Site[f]		Y	Annually	Y	**Nitrate, sulfate, uranium**	19	4

Table A-4. Calendar Year 2022 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2022 Y/N	COCs[c]	Active Wells	POC Wells[d]
Gunnison, CO, Disposal Site		Y	5 years	N	Calcium, chloride, iron, magnesium, manganese, potassium, sodium, sulfate, total dissolved solids, uranium	8	6
Gunnison, CO, Processing Site[e]		Y	Annually	Y	**Manganese, uranium**	33	26
Lakeview, OR, Disposal Site		Y	5 years	N	Arsenic, cadmium, uranium	9	8
Lakeview, OR, Processing Site		Y	Biennially	Y	Manganese, sulfate	5	0
L-Bar, NM, Disposal Site		Y	3 years	Y	Chloride, nitrate + nitrite as nitrogen, selenium, sulfate, total dissolved solids, uranium	12	4
Monument Valley, AZ, Processing Site		Y	Annually	Y	Nitrate, sulfate, uranium	63	0
Naturita, CO, Processing Site[e]		Y	Annually	Y	Arsenic, **uranium**, **vanadium**	8	8
Rifle New, CO, Processing Site[e]		Y	Semiannually	Y	**Arsenic, molybdenum, nitrate as nitrogen, selenium, uranium, vanadium**	25	8
Rifle Old, CO, Processing Site		Y	Semiannually	Y	Selenium, uranium, vanadium	8	0
Riverton, WY, Processing Site[e]		Y	Annually	Y	Manganese**, molybdenum,** sulfate**, uranium**	39	29
Sherwood, WA, Disposal Site		Y	Annually	Y	Chloride, sulfate, total dissolved solids	3	0
Shiprock, NM, Disposal Site		Y	Semiannually	Y	Ammonium, manganese, nitrate, selenium, strontium, sulfate, uranium	181	0
Shirley Basin South, WY, Disposal Site[g]	Y	Y	Annually	Y	Cadmium, chloride, **chromium**, lead, nickel, nitrate, radium-226, **radium-228, selenium, sulfate,** thorium-230, **total dissolved solids,** uranium	14	4
Slick Rock East, CO, Processing Site[e]	Y	Y	Annually	Y	Barium-133, manganese, molybdenum, radium-224, radium-226, radium-228, **selenium**, **uranium**	9	5
Slick Rock West, CO, Processing Site[e]	Y	Y	Annually	Y	BTEX (**benzene**, ethylbenzene, toluene and xylenes), manganese, **molybdenum, nitrate,** radium-224, radium-226, radium-228, **selenium, uranium**	9	7
Tuba City, AZ, Disposal Site[h]		Y	Semiannually	Y	Molybdenum, **nitrate, selenium, uranium**	137	7

Table A-4. Calendar Year 2022 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2022 Y/N	COCs[c]	Active Wells	POC Wells[d]
FUSRAP Sites							
Colonie, NY, Site		Y	Biennially	N	*Cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride	7	7
D&D Sites							
Grand Junction, CO, Site[i]		Y	Annually	Y	**Manganese**, molybdenum, selenium, **sulfate**, **uranium**	7	7
Hallam, NE, Decommissioned Reactor Site	Y	Y	5 years	N	Gamma-emitting nuclides, gross alpha, gross beta, nickel-63, tritium, uranium	17	0
Site A / Plot M, IL, Decommissioned Reactor Site	Y		Quarterly	Y	Strontium-90, tritium	19	0
Nuclear Waste Policy Act Section 151 Site							
Parkersburg, WV, Disposal Site	Y	Y	10 years	N	Antimony, barium, beryllium, cadmium, calcium, chloride, chromium, gross alpha, gross beta, lead, magnesium, mercury, nickel, nitrate + nitrite, potassium, radium-226, radium-228, selenium, sodium, sulfate, thallium, thiocyanate, uranium, zirconium	2	0

Notes:

[a] Rad monitoring refers to groundwater sampling for radiological analytes (including uranium isotopes).

[b] Nonrad monitoring refers to groundwater sampling for nonradiological analytes (including elemental uranium).

[c] COCs exceeding applicable standards at POC wells during the reporting year are in **bold** type.

[d] For the purposes of this report, a POC well is an active monitoring well at which regulatory standards apply and/or which an exceedance will trigger a regulatory action.

Reports and information documenting COC exceedances:
COCs may be exceeded at POC wells without a resultant violation; violations are conditional to the regulatory framework for each site. See the site-specific documents listed below for more information on the exceedances (available at https://www.energy.gov/lm/sites/lm-sites) including contaminant time-concentration plots from which trending can be evaluated. See Table A-5 for data on COC exceedances at UMTRCA processing sites and D&D sites.

[e] See Table A-5 for exceedances at UMTRCA processing sites and D&D sites.

[f] Green River site: https://www.energy.gov/lm/green-river-utah-disposal-site or Geospatial Environmental Mapping System (doe.gov)

[g] Shirley Basin South site: https://www.energy.gov/lm/shirley-basin-south-wyoming-disposal-site or Geospatial Environmental Mapping System (doe.gov).

[h] Tuba City site: https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Tuba_City or Geospatial Environmental Mapping System (doe.gov)

[i] Grand Junction site: *2023 Annual Inspection and Monitoring Report for the Grand Junction, Colorado, Site*. (June 2022)

[k] Mound, Ohio, Site: Active well count includes 45 groundwater wells and 6 seeps.

[l] Burrell, Pennsylvania, Disposal Site: Active well count includes 8 groundwater wells and 2 seeps.

Abbreviations:

N = no
nonrad = nonradiological
rad = radiological
Y = yes

Table A-5. Data for COC Exceedances at UMTRCA Processing Sites and D&D Sites

Site Name	COC	Result (mg/L)	Limit (mg/L)	Analytical Data
Durango, CO, Processing Site	Uranium	1.02	0.044	Durango Processing Site GEMS (doe.gov)
	Manganese	5.34	1.7	
	Sulfate	7870	1500	
	Cadmium	0.0427	0.01	
Grand Junction, CO, Site	Manganese	3.1	0.72	Grand Junction Site GEMS (doe.gov)
	Sulfate	1600	1150	
	Uranium	0.32	0.03	
Gunnison, CO, Processing Site	Manganese	3.5	1.6	Gunnison Processing Site GEMS (doe.gov)
	Uranium	0.64	0.044	
Naturita, CO, Processing Site	Uranium	0.316	0.044	Naturita Processing Site GEMS (doe.gov)
	Vanadium	1.20	0.33	
Rifle New, CO, Processing Site	Arsenic	0.215	0.05	Rifle Processing Site (New) GEMS (doe.gov)
	Molybdenum	1.88	0.1	
	Nitrate + Nitrite as Nitrogen	17.7	10	
	Selenium	0.994	0.01	
	Uranium	0.0787	0.044	
	Vanadium	21.8	0.086	
Riverton, WY, Processing Site	Molybdenum	0.876	0.1	Riverton Processing Site GEMS (doe.gov)
	Uranium	1.43	0.044	
Slick Rock East, CO, Processing Site	Selenium	0.0309	0.01	Slick Rock East Processing Site GEMS (doe.gov)
	Uranium	1.21	0.044	
Slick Rock West, CO, Processing Site	Benzene	0.241	0.005	Slick Rock West Processing Site GEMS (doe.gov)
	Molybdenum	1.25	0.1	
	Nitrate + Nitrite as Nitrogen	53.3	10	
	Uranium	0.0649	0.044	
	Selenium	1.40	0.18	

Notes:

[a] Result represents maximum concentration detected.

[b] Regulatory limits are defined in the following site-specific documents and may be a combination of risk-based limits, maximum concentration limits, alternate concentration limits, or other:

- Durango site: *Ground Water Compliance Action Plan for the Durango, Colorado, UMTRCA Project Site* (February 2008).
- Grand Junction site: *Long-Term Surveillance and Maintenance Plan for the Grand Junction, Colorado, Site* (April 2022).
- Gunnison site: *Final Groundwater Compliance Action Plan for the Gunnison, Colorado, Processing Site* (April 2010).
- Rifle Processing (New) Site: The site-specific reporting document is not yet available. When complete, it will be accessible at: https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Rifle_Processing_New.
- Riverton site: *Long-Term Management Plan for the Riverton, Wyoming, Processing Site* (August 2019).
- Slick Rock processing sites: The site-specific reporting document is not yet available. When complete, it will be accessible at: https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Slick_Rock_Processing.

Abbreviation:

mg/L = milligrams per liter