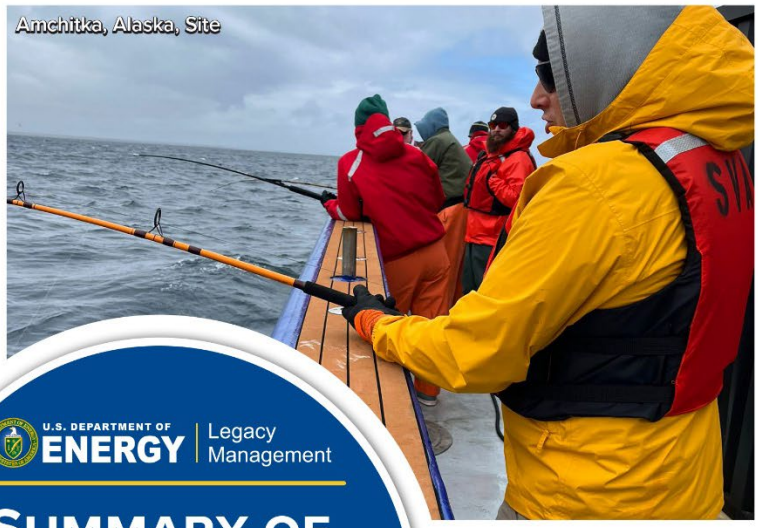
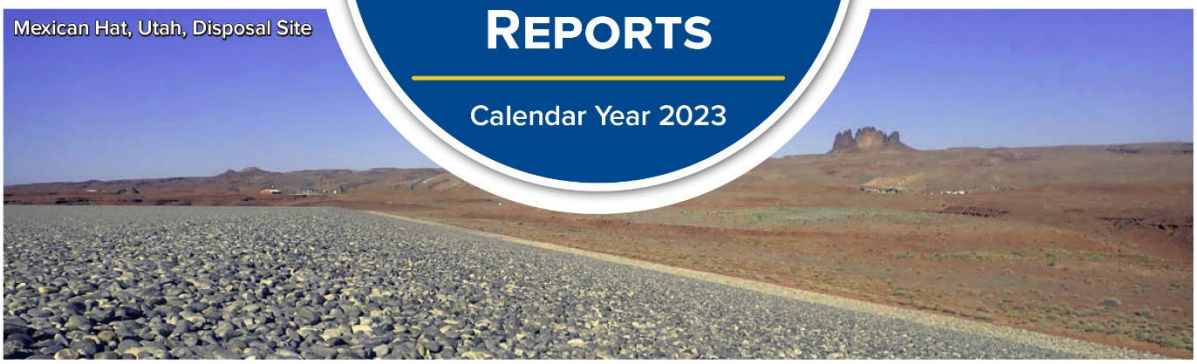


U.S. DEPARTMENT OF ENERGY | Legacy Management

SUMMARY OF ANNUAL SITE ENVIRONMENTAL REPORTS

Calendar Year 2023



This document has been designed for online viewing.

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:

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

Email: public.affairs@lm.doe.gov
Phone: (970) 248-6070

Contents

Figures

Tables

Appendix

Abbreviations

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
AWSS	alternate water supply system
BLM	U.S. Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CDPHE	Colorado Department of Public Health and Environment
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
FDEP	Florida Department of Environmental Protection
FFCA	Federal Facility Compliance Act

FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
FYR	Five-Year Review
GCAP	Groundwater Compliance Action Plan
HFC	hydrofluorocarbon
HSWA	Hazardous and Solid Waste Amendments
IPM	integrated pest management
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
MES	Mentorship for Environmental Scholars
µg/L	micrograms per liter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
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
PFAS	per- and polyfluoroalkyl substances

PFHxS	perfluorohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POC	point of compliance
ppt	parts per trillion
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	Stormwater 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 2023 Department of Energy Annual Site Environmental Reports* (DOE 2024k) 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) 2023. 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.

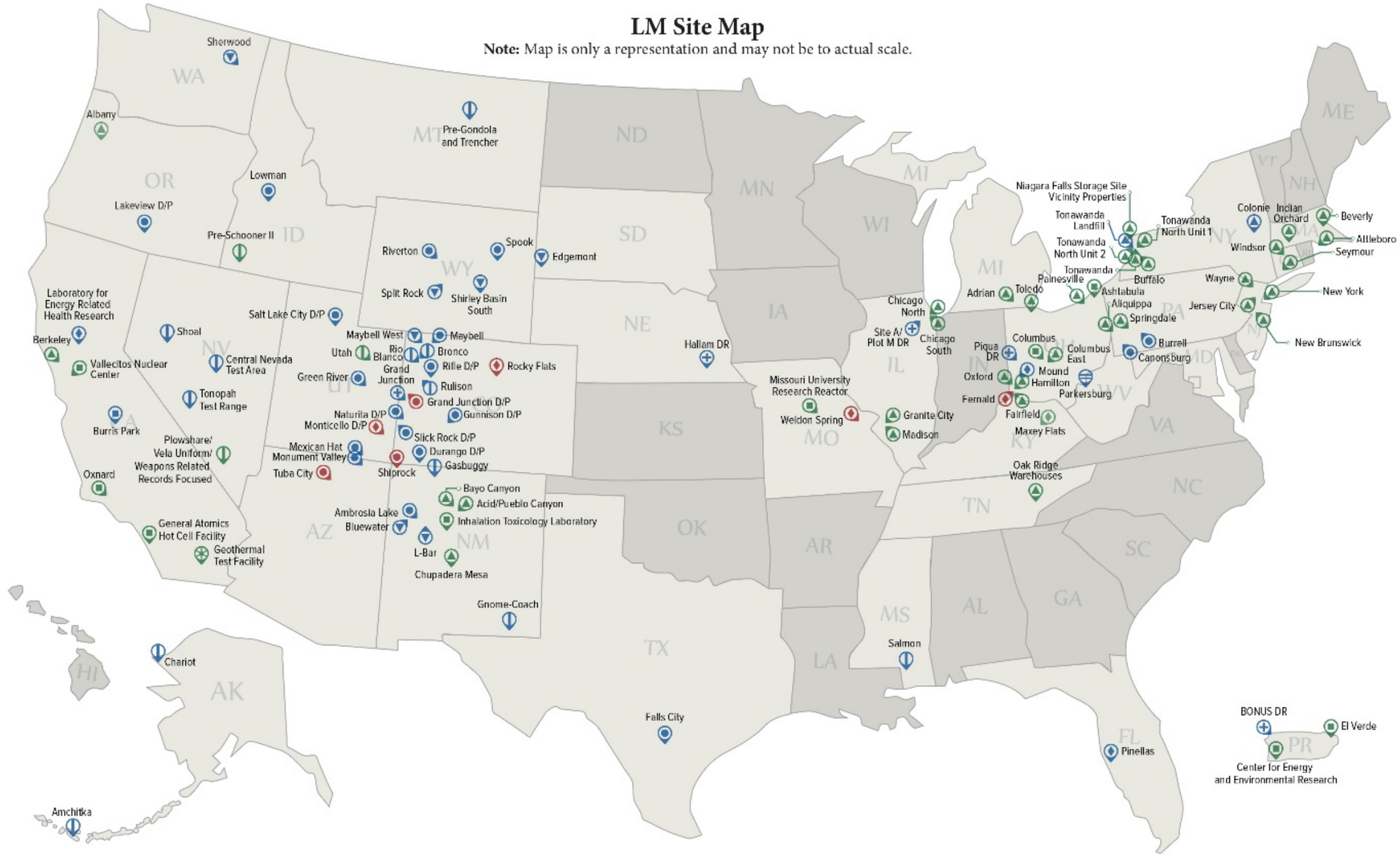
2.0 Introduction

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 2023, LM managed the long-term care of 102 sites. Site counts are updated annually in the LM *Site Management Guide* (DOE 2024s); site counts and site categories in this ASER were aligned with the November 2023 guide and updated information is used when available. The most recent guide is available at https://www.energy.gov/lm/downloads/site-management-guide. Figure 1 shows the map of LM sites by regulatory or programmatic framework. In CY 2023 one site transitioned to LM for long-term stewardship, the Split Rock, Wyoming, Disposal Site, an Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II site. This site will require routine inspection, environmental monitoring, and maintenance along with records-related activities and stakeholder support.

LM Site Map

Note: Map is only a representation and may not be to actual scale.



Sites in LM Requiring LTS&M (as of May 31, 2024)

CERCLA/ RCRA · D&D · FUSRAP · MED/AEC Legacy Site · NWPA · Plowshare/Vela Uniform/ Weapons Related · State Water Quality Standards · UMTRCA Title I · UMTRCA Title II

Site Category

Category 1 activities typically include records-related activities and stakeholder support.

Category 2 activities typically include routine inspections (site visits are conducted to verify the integrity of engineered or institutional barriers) and monitoring/maintenance, records-related activities, and stakeholder support.

Category 3 activities typically include operation and maintenance of active remedial action systems, routine inspections (site visits are conducted to verify the integrity of engineered or institutional barriers) and monitoring/maintenance, records-related activities, and stakeholder support.

D/P = Disposal/Processing **DR = Decommissioned Reactor** 05/07/24

Figure 1. Map of LM Sites as of May 2024

As active remediation of additional 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 in Table 1 and on the Legacy Site Programmatic Framework page of the LM public website. Figure 2 shows the percentage of LM sites by regulatory or programmatic framework.

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.

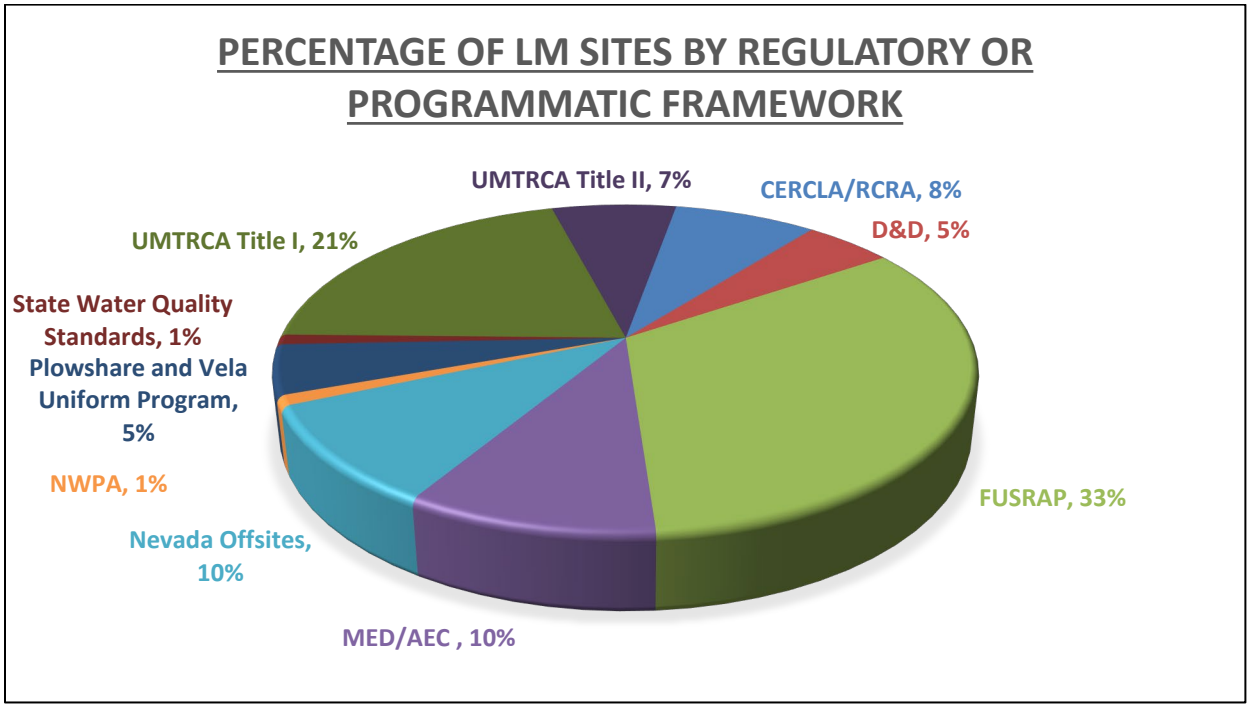
2.2 Decontamination and Decommissioning (D&D) Sites

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.

Table 1. LM Site Count by Regulatory or Programmatic Framework

Regulatory or Programmatic Framework	Site Count Through December 2023
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
UMTRCA Title I	21
UMTRCA Title II	7[a]
Total	**102**

Note:
[a] Includes the Split Rock disposal site which transitioned to LM in November 2023.



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

Figure 2. 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 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.

Note

In March 2024, LM began renaming the Nevada Offsites Program to Plowshare/Vela Uniform/Weapons Related Program. The LM website, LM Site Management Guides, LM figures and maps, as well as future documents will reflect this change and may not align with this document.

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 remediation requirements for uranium ore-processing sites 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 ore-processing sites with active uranium processing licenses on or after January 1, 1978. These sites were commercially owned and regulated under NRC license. Once the site owner completes NRC-approved reclamation, DOE accepts title to the site for long-term custody and care. LM managed seven 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):** The Atomic Energy Act and other legislative actions authorized the AEC to withdraw lands from the public domain and then lease them to private industry for mineral exploration—specifically, the mining of uranium and vanadium ore. More than 26,000 acres of land in southwestern Colorado, northern New Mexico, and southeastern Utah was withdrawn from the public domain during the late 1940s and early 1950s. The lands in New Mexico and Utah were returned to the public domain in 1994 and 1999, respectively. LM manages the ULP and administers 31 uranium mining lease tracts within the Uravan Mineral Belt in southwestern Colorado, in Mesa, Montrose, and San Miguel Counties. 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/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 backfilling 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 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 nine 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
  - 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 nine 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 2023 were determined using the November 2023 LM Site Management Guide*. Any LM* Site Management Guide *issued after November 2023 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 50 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 eight 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 2023 in addition to work completed at the categorized sites:

- Radiometric calibration facility activities:
  - Completed facility maintenance, annual inspections, and records-related activities
- ULP activities:
  - Performed formal annual inspections of the 10 permitted mining operations on eight lease tracts.
  - Inspected reclaimed mine-related locations and fenced multiple abandoned mine features on various lease tracts to mitigate physical safety hazards. Thirteen hazardous abandoned mine features were mitigated and reclaimed.
  - Prepared and submitted the ULP annual and biennial briefing letters in support of the 2014 ULP *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 Office, the Colorado State Historic Preservation Office, and the Pueblo of Zuni Regarding the Uranium Leasing Program Within Mesa, Montrose, and San Miguel Counties, Colorado* (DOE 2014b).

- Prepared the *DOE Uranium Leasing Program Annual Status and Activities Report for Calendar Year 2023* (DOE 2024e).
- Prepared the annual summary report of mitigation activities completed by ULP lessees in support of the 2014 *Uranium Leasing Program Mitigation Action Plan for the Final Uranium Leasing Program Programmatic Environmental Impact Statement* DOE/EIS-0472 (DOE 2014c). The document recorded that no activity requiring mitigation measures had occurred during 2023.
- Reviewed and approved lessee proposed activities for ULP Lease Tracts C-JD-6, C-JD-7, C-JD-9, and C-SR-11. The activities are associated with the lessee's reclamation responsibilities for active mining permits.
- Completed annual monitoring for the Dolores River Restoration Partnership on ULP Lease Tract C-SR-13.

- DRUM Program activities:
  - Completed field V&V of 164 mines on public lands in Arizona, California, Colorado, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming. Also completed field V&V of 45 mines on the Navajo Nation in Arizona and New Mexico.
  - Prepared summary reports for each mine or group of mines to be transmitted to the appropriate agency, including the first V&V reports for mines on the Navajo Nation.
  - Partnered with other agencies to complete mine safeguarding activities, including closing mine openings by installing devices such as gates or backfilling the opening and, when necessary, 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 environmental sampling and mud pit cover inspections at the Amchitka, Alaska, Site
  - Installed institutional control markers at the Chariot, Alaska, Site
  - Conducted historical research to obtain additional information about the sites


Note

Completed AS&T 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)

As required by previous DOE orders and DOE Order 436.1A, *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)* (DOE 2023k), 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* (DOE 2022c)
- *Environmental Management System/Energy Management System Description* (DOE 2024h)

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:

- LM Site Sustainability Plans: 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 EO 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*; DOE Order 436.1A; and the Sustainability Performance Office Fiscal Year Site Sustainability Plan Guidance.
- Significant Environmental Aspects: 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 (Public Law 110-140 [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 ninth 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.
- Energy Star Award for the LMOC at Westminster, Colorado.
- Federal Facility Excellence in site reuse award for the Middlesex South, New Jersey Site.
- The LM DRUM Program team won a Secretary of Energy Achievement Award in January 2023 for its outstanding achievements in locating and assessing more than 1500 mines.
- U.S. Environmental Protection Agency (EPA) Phoenix Award for Las Colonias Park in Colorado.
- Secretary of Energy Achievement Award for the Beneficial Reuse team.
- One LM and one LMS employee earned DOE's Sustainability Award for Lifetime Achievement.

5.0 Summary of Environmental Compliance

The following sections summarize compliance with applicable regulations and the related 2023 reporting. Because LM manages sites under different regulatory frameworks, postclosure environmental requirements vary based on activities being conducted. Figure 3 shows a timeline of environmental requirements included in this section that apply to LM sites. This is not an all-inclusive list of regulations that pertain to LM work but represents the sections of this chapter. Changes and updates made to Executive Orders, 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*.

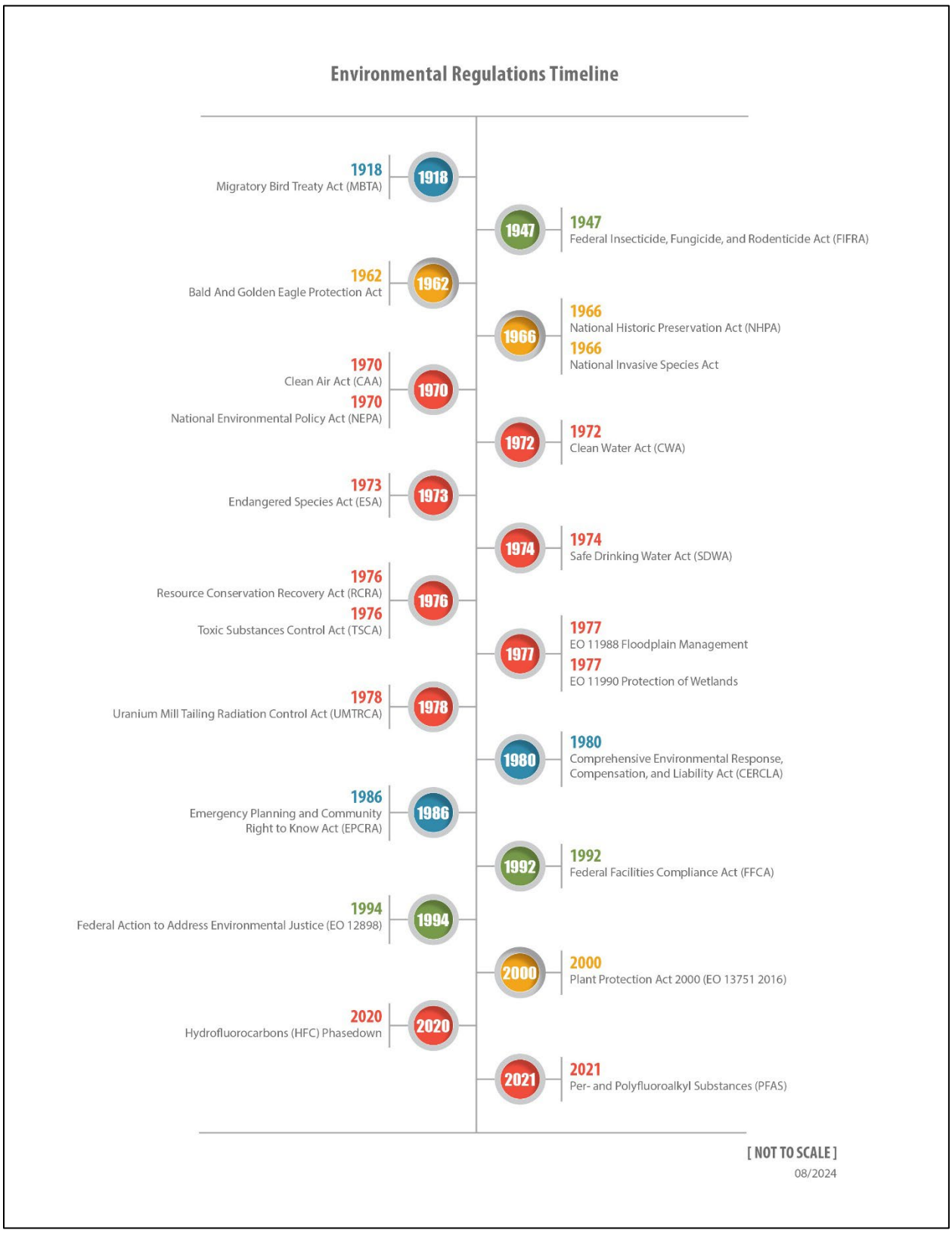


Figure 3. Environmental Regulations Timeline

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 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 (FYR) 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 2023 for the following:
  - Colonie, New York, Site (FUSRAP site)

Note

The Colonie, New York, Site is a non-National Priority List site, the required FYR 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 applicable to LM sites that generate hazardous or universal waste.

The following activities were performed in compliance with RCRA:

- In November 2023, deactivated the EPA identification number as a small quantity generator of hazardous waste for the Piqua, Ohio, Decommissioned Reactor Site for waste associated with the Piqua Site Demolition Project, following completion of demolition activities. Approximately 800 pounds of lead solder waste generated during CY 2022 was temporarily accumulated onsite and shipped to an offsite permitted RCRA treatment, storage, and disposal facility (TSDF) landfill in January 2023.
- Managed used oil drained from a Polar Crane Trolley and from demolition equipment associated with Piqua site demolition activities for offsite disposition in accordance with Ohio used oil regulations in July–August 2023.
- Recycled 212,460 pounds of scrap metal in CY 2023 in accordance with the RCRA scrap metal exclusion [40 CFR 261.1(c)(9)] associated with Piqua Site demolition activities.
- Transported hazardous waste from the LMFSC to an approved local, county-run hazardous waste collection 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 at the Pinellas County site on February 15, 2023. The site was in compliance and there were no findings.
- Transported unneeded chemicals, some of which qualified as hazardous waste, from a small, closed laboratory at the Tuba City, Arizona, Disposal Site to an approved hazardous waste collection facility for very small quantity generators operated by the City of Flagstaff, Arizona, for businesses located in Coconino County, Arizona.
- During CY 2023, RCRA Section 3016 biennial reporting was initiated by evaluating recently transitioned LM sites for reporting applicability and preparing draft Section 3016 reports and transmittal letters for 16 LM sites determined to be subject to RCRA 3016 reporting. The RCRA 3016 reports were submitted to EPA and the applicable state agencies in January 2024.

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* (DOE 2024i) and *Environmental Instructions Manual* (DOE 2024g), 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:

- Submitted notification to EPA of completion of PCB waste activity in November 2023 following completion of demolition activities associated with the Piqua Site Demolition Project, and received confirmation from EPA on November 16, 2023, that the facility has been removed from the PCB waste handlers database.
- Generated 203 pounds of PCB waste items (ballasts and capacitors) from the Piqua Site Demolition Project in CY 2022 that were incinerated at an EPA-approved TSCA PCB incineration facility on April 17, 2023.

- Generated 3956 tons of PCB bulk product waste associated with building demolition at the Piqua site in CY 2023 that were transported to a Subtitle D landfill (Waste Management's Stony Hollow Landfill) in accordance with TSCA regulations.
- In accordance with 40 CFR 761.180(a), completed the PCB Annual Record by the July 1, 2023, due date for PCB ballasts and PCB capacitors associated with demolition activities that were stored at the Piqua site in CY 2022.
- Generated 54 tons of nonfriable asbestos-containing material waste associated with building demolition at the Piqua site in CY 2023. That waste was transported to a Subtitle D landfill (Waste Management's Stony Hollow Landfill) in accordance with Ohio Environmental Protection Agency (Ohio EPA) regulations.
- TSCA regulated waste was not generated or disposed of from any other LM sites in 2023.

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 2023
- Fernald Preserve: 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 2023 under the CAA:

- Submitted annual fee, to maintain the required air permit, to the West Virginia Department of Environmental Protection Division of Air Quality 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 USC 7675) 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. LM removed four units from service.

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 2023, 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 associated with project-related earth-disturbing activity, as described in Section 5.3.4.

- At the Fernald Preserve, an NPDES permit (issued by Ohio EPA) regulates wastewater discharges. Sampling of nonradiological pollutants is conducted and results reported monthly in compliance with the current NPDES permit which took effect on June 1, 2022, and expires in 2027.
- At the Mound site, an NPDES permit covered discharge of treated groundwater until the CERCLA authorization demonstrating compliance with the CWA was terminated on March 1, 2024. No discharge has occurred since the pump-and-treat was shut off in 2014. During CY 2023, monthly electronic discharge reports were 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. Projects at LM sites during CY 2023 that require coverage under CWA Section 404 or USACE Dry Land Approved Jurisdictional Determinations are as follows:

- The USACE Subsurface Investigation Project at the L-Bar, New Mexico, Disposal Site operated under Section 404 Nationwide Permit 6, "Survey Activities"
- The USACE Road Repair Project at the L-Bar, New Mexico, Disposal Site: On March 15, 2023, USACE provided a written determination using the *Dry Land Approved Jurisdictional Determination* form to document that no Waters of the United States are within CWA jurisdiction

5.3.3 CWA Oil Pollution Prevention

Spill Prevention, Control, and Countermeasure (SPCC) Plans maintained in accordance with 40 CFR 112, "Oil Pollution Prevention," to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines.

No SPCC plans were required at LM sites in CY 2023.

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 and development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) 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. Demolition activities commenced in CY 2022 and continued through August 2023. Site redevelopment was completed in late CY 2023.
- At the Fernald Preserve, weekly and post rainfall inspections continued through CY 2023 in compliance with the Ohio Construction Permit issued in CY 2022 for the construction of the onsite workspace. Once construction activities were completed or reseeded areas reached emergence inspections were seized.

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 2023:

- 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 and construction of a pavilion and outdoor education area. The project commenced with the demolition of the former Interpretive Center in November 2022 and ended with the completion of the pavilion and outdoor education area and successful revegetation of disturbed areas in August 2023. In accordance with the general permit, a SWPPP was prepared and implemented and stormwater inspections were conducted weekly and after every storm event. The county permit was terminated on July 21, 2023, and the state permit was terminated on August 16, 2023.
- Although the footprint of the Piqua site disturbance remained slightly less than 1 acre, as a BMP, a SWPPP was developed and in place from June 2022 through October 2023 for the Piqua Site Demolition Project. Stormwater inspections were conducted weekly and stormwater controls were maintained throughout the duration of the project.
- At the L-Bar disposal site, USACE Road Repair Project, a Small Construction Low Erosivity Waiver (LEW) Certification was obtained in November 2023 in lieu of obtaining coverage under NPDES EPA Construction General Permit. Road repair construction activities began in November 2023 and extended into CY 2024.
- A LEW was obtained for a project at the Rifle disposal site in August 2023. The project occurred throughout the fall of CY 2023 and involved burying the disposal cell leachate discharge pipelines that lead to the evaporation pond.

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 applicable or relevant and appropriate requirement (ARAR) for LM CERCLA 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. No groundwater or surface water from LM sites is used to supply drinking water either onsite or offsite.

- At the Tuba City site, a groundwater well located northeast (upgradient) of the site provides uncontaminated water for use in sinks, toilets, a shower, and outside spigots. Bottled water is provided for drinking water. However, because the Tuba City site has less than 15 service connections and is unoccupied most of the year and therefore does not regularly serve an average of at least 25 individuals daily at least 60 days out of the year, it is not considered a public water system, and is not subject to SDWA requirements.
- At the Riverton, Wyoming, Processing Site, an alternate water supply system (AWSS) was installed by Indian Health Services in 1998 as an institutional control to provide local residents with an alternative to using potentially contaminated groundwater from shallow wells in the former mill site area. DOE funded the system and provided partial funding for a 1-million-gallon storage tank to supply water for the area. The AWSS is an addition to an existing system operated by the Northern Arapaho Water and Sewer Department. The 1-million-gallon tank connects to approximately 11 miles of water line filled from three wells located approximately 5 miles away from the processing site. Two of the wells are approximately 650 feet deep and one well is greater than 1000 feet deep; all wells withdraw water from the Wind River Formation.

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

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.

PFAS

PFAS are a group of more than 15,0000 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. Figure 4 shows common industrial uses of PFAS that may have occurred at LM sites.

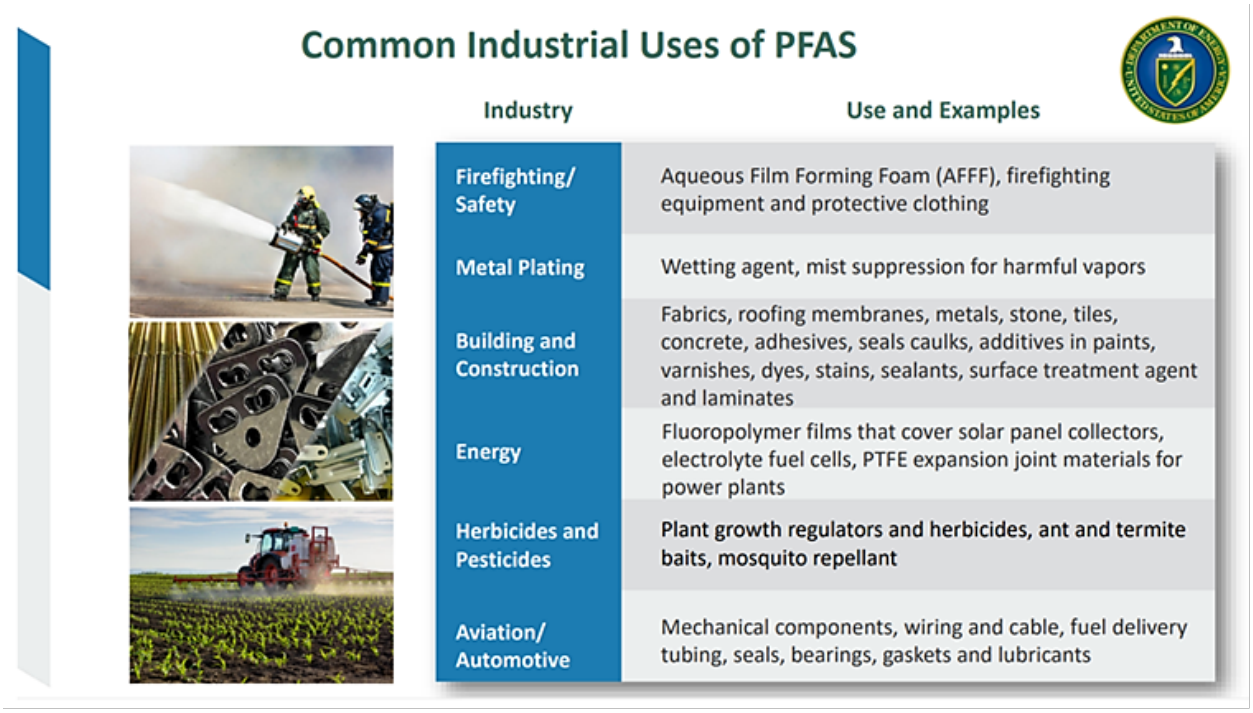


Figure 4. Common Industrial Uses of PFAS

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 2023 included:

- EPA issued proposed National Primary Drinking Water Standard for six PFAS in March 2023.
- A Final TSCA rule was issued in October 2023 to require reporting for manufacturers and importers of PFAS and PFAS-containing articles in any year since 2011 to report information to EPA on uses, production, disposal, exposures, and hazards.
- In October 2023, a Final Toxic Release Inventory reporting rule was issued eliminating the de minimis concentration exemption for PFAS chemicals used in small concentrations.
- EPA issued the *EPA's PFAS Strategic Roadmap: Second Annual Progress Report* in December 2023.

DOE actions related to PFAS can be found in a timeline in Figure 5.

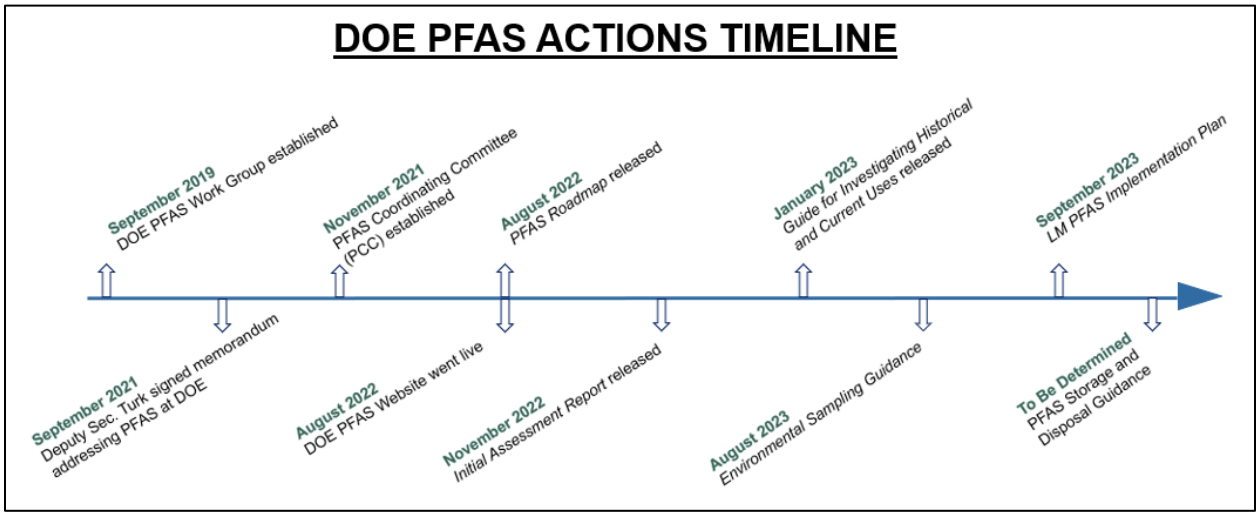


Figure 5. DOE PFAS Action Timeline

DOE developments in 2023 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* (DOE 2021a) included:

- DOE continues to maintain a PFAS: Per- and Polyfluoroalkyl Substances webpage (DOE 2024o) and meet required actions in accordance with the *PFAS Strategic Roadmap* (DOE 2022d). 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.
- In January 2023, DOE published the *Initial Assessment of Per- and polyfluoroalkyl Substances at Department of Energy Sites*, also called the PFAS Initial Assessment Report (DOE 2022b), which 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.
- In February 2023, DOE published the *Guide for Investigating Historical and Current Uses of Per- and Polyfluoroalkyl Substances at Department of Energy Sites* (DOE 2023c), designed to help DOE better understand its past and present uses of PFAS, identify areas of potential releases into the environment, and develop information to characterize and assess PFAS risks.
- In August 2023, DOE issued its *PFAS Environmental Sampling Guidance* (DOE 2023e) to support the goal outlined in the *PFAS Strategic Roadmap* (DOE 2022d) to understand the presence of PFAS in drinking water and the environment" at DOE sites.
- In October 2023, DOE initiated the new PFAS Annual Site Update Survey. This survey meets the required actions specified in Pillar 1 (Actions 1.7 and 1.8) of the DOE *PFAS Strategic Road Map*. Site submissions were due by the end of January 2024. Annual update surveys were submitted for seven LM CERCLA/RCRA sites in January 2024.

The *U.S. Department of Energy Office of Legacy Management PFAS Implementation Plan* (DOE 2023j) was issued as an internal document in September 2023 that details how LM will

implement the DOE PFAS roadmap's goals, objectives, and specific actions. One of the first steps LM plans to complete involves utilizing the DOE PFAS questionnaire for the remaining non-RCRA/CERCLA LM sites that have not yet completed PFAS Surveys to help in determining potential current and historic PFAS usage. Surveys will be completed by the end of CY 2024 and LM will evaluate survey responses and determine next steps.

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: This is the first (and only, as of ASER publication) LM site to begin monitoring for PFAS. In 2018, the Colorado Department of Public Health and Environment (CDPHE) formally requested that LM conduct sampling to look for the presence of PFOA and PFOS in groundwater and surface water on the basis that CDPHE had adopted PFOA and PFOS into the Colorado Hazardous Waste Act. LM searched records and interviewed former employees and found that historically, the Rocky Flats Plant housed a fire department and metallurgical facilities when it was operational, and these are potential sources of PFAS. The plant also had metal plating and other metallurgical research, development, and processing activities, including plutonium-machining and -forming processes.

  LM, CDPHE, and EPA agreed to focus PFAS sampling efforts at three monitoring wells, former landfills, the influent of a groundwater treatment system, and surface water points of compliance. A Sampling and Analysis Plan (SAP) was developed, and sampling commenced in 2019 using a modified version of EPA Method 537.1 to analyze PFOA and PFOS (EPA 2020). Every sample location during the 2019 sampling program reported detections of PFOA, PFOS, or both.

  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 2023.

  Beginning in the second quarter of CY 2023, the collection of split samples commenced to allow a statistical comparison of results obtained through two different analytical methods, modified EPA Method 537.1 (EPA 2020) and EPA Method 1633 (EPA 2024), and the number of sampling locations was reduced to six. The highest PFAS concentrations have been detected in samples from a monitoring well near 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, when analyzed using the modified EPA Method 537.1. When analyzed using EPA Method 1633 (beginning second quarter CY 2023), PFOA and PFOS results have been as high as 190 ppt and 530 ppt, respectively. Other PFAS have been detected at concentrations as high as 260 ppt for perfluorohexanesulfonic acid (PFHxS) and 280 ppt for perfluorobutanoic acid (PFBA) when analyzed using modified EPA Method 537.1, and 190 ppt PFHxS when analyzed using EPA Method 1633. For a complete description of PFAS analytical monitoring completed at the Rocky Flats site refer to the:

  — *Annual PFAS Monitoring Report Rocky Flats Site, Colorado, Calendar Year 2023* (DOE 2024a).

  — Appendix C of the *Initial Assessment of Per- and Polyfluoroalkyl Substances at Department of Energy Sites* (DOE 2022b).

  Additionally, at the Rocky Flats Site, a limited screening of the potential risk of PFAS to human and ecological receptors at the site was completed as part of the 2022 CERCLA

FYR. Because the risk to human and ecological receptors from PFAS at the site has not been fully evaluated, a protectiveness deferred determination was made and 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. To fulfill these recommendations, a protectiveness determination and a FYR report addendum will be completed and submitted to EPA by June 30, 2026.

- Fernald Preserve: The presence of PFAS was addressed in both the August 2016 CERCLA *Fourth Five-Year Review Report for the Fernald Preserve* (DOE 2016b) and the *Fifth Five-Year Review Report for the Fernald Preserve* (DOE 2021b) 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* (DOE 2022a), was submitted as an FYR deliverable. The report concluded that of the 58 general industry PFAS uses evaluated, five potential uses in historical processes were identified at the Fernald Materials Production Center. No PFAS chemicals manufacturing or large-scale uses of PFAS-containing liquid chemicals were identified in the evaluation. DOE submitted responses to the three minor EPA comments on July 27, 2023. The responses to the minor comments did not result in any additional commitments on PFAS. DOE is awaiting approval on the comment responses. Refer to the Fernald Preserve, Ohio, Site webpage 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 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* (DOE 2016a), 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 webpage 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. Additional discussions were held in 2021 and 2022 with FDEP that focused on a historical fire training area and fire training tank at the site, which had been designated No Further Action areas under RCRA. LM provided FDEP with all available information, which indicated 99.5% of the site structures were protected by water systems and not AFFF, and water-quality data for volatile organic contaminants in the two areas were below standards. A draft PFAS summary report was submitted to LM in February 2023. Refer to the *Draft Summary Report for Uses of PFAS Initial Assessment Report at the Pinellas County, Florida Site* (DOE 2023a).

- 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. The site did not have an onsite fire department or fire training facility. In September 2019, EPA suggested PFAS sampling be added to the groundwater monitoring program based on the March 2019 Central Valley Regional Water Quality Control Board PFAS sampling order for active landfills. PFAS sampling was deemed to be premature as LEHR has an inactive landfill, which is not subject to the water board's order. In the June 2021 *Second Five-Year Review Report, Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis* (DOE 2021e), LM committed to continue to monitor EPA and State of California policy changes on PFAS. LEHR indicated in their DOE PFAS survey response that there were Cold War-era liquid discharges, a landfill, and a wastewater treatment plant located onsite. LM is not expected to participate in PFAS-related activities at LEHR because the site is on land owned by the University of California, Davis. Refer to Appendix C of the PFAS Initial Assessment Report for the LEHR PFAS assessment summary.
- Weldon Spring, Missouri, Site: This site has received no inquiries on PFAS from regulators. Based on DOE PFAS survey responses, there were Cold War-era liquid waste discharges, a fire department, and a historical landfill onsite. The CERCLA FYR report was finalized in September 2021. Emerging contaminants, including PFAS, were not addressed in the report and the regulators did not comment or request that they be addressed.
- Monticello, Utah, Disposal and Processing Sites: Based on DOE PFAS survey responses, there were Cold War-era liquid waste discharges onsite. There is an onsite repository because of a CERCLA cleanup action that remediated a former uranium processing site and continues to remediate uranium-contaminated groundwater. Potential PFAS use onsite has not been investigated. The site has not been contacted by regulators or stakeholders regarding PFAS.

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 *RCRA Facility Investigation—Remedial*

Investigation/Corrective Measures Study—Feasibility Study for the Rocky Flats Environmental Technology Site (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: 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 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 in monitoring wells within the DOE area of the LEHR site, but concentrations of 2.4 micrograms per liter (µg/L) 1,4-dioxane in monitoring well UCD1-13, located east and downgradient of the DOE managed Dog Pens Area. The Dog Pens Area lays over a University of California, Davis landfill which is believed to be the source for the 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* (DOE 2022f) 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 2023 *Pinellas County, Florida, Site Environmental Restoration Project Environmental Monitoring Annual Progress Report for the Building 100 Area at the Young – Rainey STAR Center* (DOE 2023f), 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 2023 sampling event ranged between nondetect and 180 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* (DOE 2022f) 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 Executive Order (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
- A floodplain assessment was conducted in accordance with EO 11988 and the implementing regulations in 10 CFR 1022 for the proposed water treatment unit and associated infrastructure project at the Shiprock, New Mexico, Disposal Site

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 disturbed 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.

The Council on Environmental Quality did not request updates to the Conservation Action Plan during the reporting period. LM continued to work on conservation reuse projects across LM that will be completed in 2024.

5.4.2 Nature-Based Solutions

In April 2022, EO 14072, *Strengthening the Nation's Forests, Communities, and Local Economies*, was issued. The EO calls on federal agencies to deploy nature-based solutions to tackle climate change and enhance resilience. Nature-based solutions can be defined as actions to protect, sustainably manage, or restore natural or modified ecosystems to address societal challenges, simultaneously providing benefits for people and the environment. LM activities that were completed during the reporting period that supported nature-based solutions are reported throughout this document, specifically in Section 4.0 and Section 6.0.

5.4.3 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 Categorical Exclusion Determinations: Legacy Management The following is a summary of NEPA documents either completed or in progress during the reporting period:

- Forty CXEs were completed and approved
- LM was a cooperating agency in the *Gunnison Sage-Grouse Management Amendment, Environmental Impact Statement* (BLM 2024) as stated in the memorandum of understanding between the U.S. Bureau of Land Management (BLM) and LM. An EIS record of decision in July 2024. Details are found on the BLM National NEPA Register webpage.
- The following Environmental Assessment (EA) was completed and a Finding of No Significant Impact (FONSI) signed on October 12, 2023:
  - The *Environmental Assessment for the Evaporation Pond at the Shiprock, New Mexico, Disposal Site* (DOE 2023b)
- 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—the EA was in progress with the U.S. Department of the Interior during the reporting period
  - Split Rock, Wyoming, Disposal Site—the U.S. Department of the Interior and BLM signed the FONSI on March 30, 2023

5.4.4 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 Toxics Release Inventory (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, Section 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 2023, 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

5.4.5 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. See Section 5.4.6 for more information on herbicides.

5.4.6 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. A Biological Opinion is the response from USFWS and is required prior to starting the project. 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 2023:

- **Amchitka, Alaska, Site:** Access to the island, which is part of the Alaska Maritime National Wildlife Refuge and hosts an Aleutian Islands Wilderness area, required a Special Use Permit from USFWS. Travel between marine and on-island sampling locations required longer or alternate routes to protect endangered Stellar sea lions and their rookery on the island's southeast end.
- **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 consultations with Navajo Nation Department of Fish and Wildlife and USFWS for the proposed water treatment unit project and the proposed evaporation pond decommissioning project.
- **Mexican Hat:** Completed consultation with the Navajo Nation for routine maintenance activities.

5.4.7 Invasive Species Management

In accordance with the Plant Protection Act of 2000 (7 USC 104), LM cooperates with federal, state, and local agencies, and private individuals to control, eradicate, or prevent the spread of noxious weeds. The *Procedure for Handling Herbicides at Western Legacy Management Sites* (DOE 2023g) outlines the process followed to apply herbicides to invasive species at western LM sites. The *Procedure for Applying Herbicides at the Fernald Preserve, Ohio, Site* (DOE 2021d) outlines the processes used by LMS staff for herbicide treatment of invasive species at the Fernald Preserve. A commercial herbicide subcontractor is also used to support invasive species treatment at the Fernald Preserve. 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. FIFRA mandates that federal agencies use integrated pest management (IPM) in carrying out pest management activities (7 USC 136r). IPM relies on a combination of weed control practices and not solely on herbicides. In 2023, LM used herbicides along with mechanical methods (e.g., prescribed fire) to control weeds at its sites. LM also began to evaluate the use of host-specific biological control agents for long-term natural control and harvested U.S. Department of Agriculture-approved organisms for potential future release as appropriate.

In 2023, LM treated 41 different species of noxious weeds on 567.14 acres at 29 sites (including various ULP lease tracts). From 2022 to 2023, there was:

- Decreased acreage of noxious weeds sprayed at 16 sites.
- Increased acreage sprayed at 5 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.

During June 2023, vegetation monitoring was performed at the mud pit sites at the Amchitka site. Ecologists recorded observations of invasive species for USFWS, which manages the Alaska Maritime National Wildlife Refuge and Wilderness Area and the island. Two invasive species—common dandelion and white clover—were observed at the mud pit sites, the latter in very small amounts. These species are widespread outside of the mud pit sites, and control at the mud pit sites is impractical. Several other invasive species were observed elsewhere on the island.

5.4.8 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. Some of the specific BMPs used in CY 2023 include: Large-scale mowing of grassland areas at the Fernald Preserve was conducted in early May and mid-August to avoid nesting grassland bird season.
- During general surveillance and maintenance activities at LM sites field workers routinely looked for and avoided bird nests, eggs, or young.
- The Fernald Preserve obtained an annual 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 Compliance Procedure for Activities at the Rocky Flats Site, Colorado* (DOE 2024m).
- 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* (EIS-0472) (DOE 2014a) and Appendix C, "Specific Requirements and Stipulations" in the *Uranium Mining Leases*.

5.4.9 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. LM uses the Information for Planning and Consultation webpage (USFWS 2024) to evaluate 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.

5.4.10 National Historic Preservation Act (NHPA)

NHPA established a comprehensive national policy concerning historic and archaeological resource protection. Section 106 of NHPA requires 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 2023. LM consulted with:
  - Arizona SHPO
    - In May, regarding routine maintenance actions at Tuba City.
  - Wyoming SHPO
    - In June regarding installation of a new main gate at Gas Hills North Disposal Site.
    - In August regarding fence repair at the Shirley Basin South Disposal Site.
  - Colorado SHPO
    - In August, regarding erosion control work at the Slick Rock Disposal/Processing Site.
    - In June, regarding the proposed installation of an emergency backup electrical generator at the LMFSC.
  - New Mexico SHPO and historically-affiliated THPOs/tribes
    - In January, regarding road repair at the L-Bar site.
    - In January, regarding road repair at the Bluewater, New Mexico, Site.
    - In March, regarding archaeological subsurface investigation at the Bluewater site.
    - In May, regarding subsurface investigation at the L-Bar site.

    - In May, regarding road repair at the Bluewater site.
    - In June, regarding subsurface investigation work at the Bluewater site.
    - In October, regarding road repair at the Bluewater site.
    - In November, regarding roads and culverts at the Shiprock site.
  - Navajo Nation THPO
    - In March, regarding towing of a sensor sled at the Shiprock site.
    - In March, regarding evaporation pond removal at the Shiprock site.
    - In May, regarding road repair at Bluewater site.
    - In October, regarding installation of a water treatment unit at the Shiprock site.
  - Utah SHPO
    - In August regarding routine maintenance and new System Operation and Analysis at Remote Sites (SOARS) station at the Mexican Hat Disposal Site.
- Under the ULP, the reclamation projects performed by LM and the ULP lessees (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 2014b)
- In accordance with the *Memorandum of Agreement Between the U.S. Department of Energy Office of Legacy Management and the Ohio State Historic Preservation Office Regarding the Demolition of the Decommissioned Reactor Site Located at 101 Bridge Street, Piqua, Miami County, Ohio* (DOE 2021c) LM completed the following actions during the reporting period:
  - Completed and delivered a diorama exhibit of the Piqua site to the local public library
  - Supplied the exhibit with salvage site architecture for display
  - Designed and constructed an interpretive sign to be placed near the site
  - Collaborated with the city of Piqua to apply for an Ohio historical marker

More details on the Piqua Site Demolition Project can be found on the fact sheet at https://www.energy.gov/sites/default/files/2024-02/PiquaDemolitionFactSheet.pdf.

Archaeological Surveys:

- One archaeological survey of approximately 237 acres was completed at the Bluewater site in May by a subcontracted archaeological firm. The work was done to support the USACE subsurface investigation project which occurred in August–October 2023.

Section 110 Activities:

- LM did not initiate or complete any Section 110 work during 2023.

5.4.11 Environmental and Energy Justice Community Outreach

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, 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. Similarly EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, fulfills the nation's promises of justice, liberty, and equality, every person must have clean air to breathe; clean water to drink; safe and healthy foods to eat; and an environment that is healthy, sustainable, climate-resilient, and free from harmful pollution and chemical exposure.

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.

Some of the engagement related to environmental justice in 2023 included:

- On February 8, LM, DOE's Office of Arctic Energy, and members of the Environmental Justice Interagency Council held community engagement workshops in Dena'ina Center, Anchorage, Alaska. The objective of workshops was to support efforts to develop an EJ Collaborative Program Partnership in Alaska.
- On March 7–9, members from the Environmental Justice program took part in the 2023 *National Environmental Justice Conference and Training Program* in Washington, D.C.
- On July 12–14, the DOE Environmental Justice program cosponsored Teaching Radiation, Energy, and Technology workshops for teachers and community leaders from Barnwell, South Carolina. Participants learned about the Savannah River site's history and missions and viewed "Radiation 101," "Environmental Monitoring: Wildlife Surveillance Program," and "Emergency Preparedness" presentations. The workshops included representatives from DOE, the Savannah River site, EPA, the South Carolina Department of Health and Environmental Control, and the Georgia Department of Natural Resources.
- The Mentorship for Environmental Scholars (MES) Program introduced nearly 400 students to pre-college university and U.S. Department of Energy programs. One intern from the 2022 MES Program accepted a summer employment offer in 2023 from the DOE Office of Environmental Management's primary cleanup contractor in Oak Ridge, Tennessee. To date, three post-MES Program interns have found jobs with environmental work contractors. These placements help the MES Program accomplish its goal by introducing underrepresented students from minority-serving institutions to DOE and its mission.
- On September 22, LM awarded environmental justice grants to five minority-serving institutions to support and carry out environmental justice activities benefiting disadvantaged communities near LM sites. All five minority-serving institutions—Central

Wyoming College in Wyoming, San Juan College and Navajo Technical University in New Mexico, Diné College in Arizona, and Fort Lewis College in Colorado—are less than 200 miles from multiple LM sites.

- Each minority-serving institution was awarded $1.2 million to execute environmental justice activities in FY 2023. The grants established new environmental justice partnerships with the schools, increased foundational environmental justice program activities, and enabled LM to reach a larger number of communities affected by legacy activities.
- In FY 2023, LM conducted LTS&M activities at 15 sites that are located on or adjacent to tribal communities. In general, LTS&M includes operating remediation systems, executing institutional controls, archiving and records management, and stakeholder engagement. Executing these LTS&M activities at sites located on or adjacent to tribal communities helps to ensure that these communities are meaningfully involved in site management decisions, and they do not disproportionately bear environmental burdens.
- In FY 2023, LM's DRUM Program continued conducting V&V activities on tribal lands. LM completed V&V of 45 mines on Navajo Nation land. Data collected will be utilized to prioritize any safeguarding of hazardous mine features.
- One of the cornerstones of LM's stakeholder engagement includes community outreach. A portion of LM sites are located on or adjacent to tribal communities and nations. As a result, LM partners with more than 25 tribal communities and nations. These partnerships led to regular engagements between federal and contractor staff and tribal leaders to exchange information regarding long-term management solutions including aerial drone surveys; environmental testing; abandoned mine lands issues; stakeholder relations; seeking indigenous knowledge; and science, technology, engineering, and math (STEM) promotion. In FY 2023, these engagements have led to frequent communication such as emails, phone calls, meetings, and collaborations.

To learn more about DOE environmental justice goals and objectives, see the *U.S. Department of Energy Joint Annual Environmental Justice Implementation Progress Report and Second Environmental Justice Five-Year Implementation Plan Fiscal Year 2022* (DOE 2023i).

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 from discharge pipe failure at evaporation pond	11/9/2023–11/15/2023	Approximately 1025 gallons	No	LMS staff shut down the system as soon as the spill was identified, and the pipes were repaired before the system was turned back on.
Rifle, Colorado, Disposal Site	Pipeline connection from MW03 to MW02 well pumps	10/19/2023–10/20/2023	Approximately 400 gallons	No	LMS staff shut down the system to stop the leak. Repairs were conducted. The spill contaminants did not reach surface water or groundwater and most likely reinfiltrated back into the cell.
Monticello, Utah, Disposal and Processing Sites	Uranium-contaminated groundwater leaked from buried pipeline near vault CS-MNT-10 (determined to be non-radiological by Radiological Control personnel)	Estimated 4/30/2023–8/7/2023	Unknown. Worst case scenario estimated 1,868,546 gallons but could be substantially less.	No	The Groundwater Remedy Optimization System was shut down, repairs were made to the buried pipeline and vault CS-MNT-10. Samples of soil impacted by the spill were collected.
Rocky Flats Site, Colorado	Diesel spill while fueling equipment	12/06/2023	Less than 1 pint	No	Wetted soil and rock was collected and placed in a plastic bucket. The bucket was sent to the landfill. The soil and rock was replaced with clean gravel from the site laydown yard.

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 Facility Registry Service 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[a]	Facility Address	Facility Registry Service ID	Program Area	Status/Comments
Amchitka Island	Amchitka Island ADAK, AK 99546	110064823464	RCRA	Listings are RCRA Generator ID numbers assigned to US Army, DOI FWS US Navy, and USAF
U.S. DOE Bronco, CO Site	45 minutes from Meeker, CO 81641, Rio Blanco County Lat 40.049722 Long –108.366666	110070868928	NPDES	Terminated NPDES Permit
U.S. DOE Fernald Preserve, OH, Site	7400 Willey Road Hamilton, OH 45013	110000617850	RCRA/CERCLA/ TRI	Active RCRA VSQG; TRI last reported 1996
U.S. DOE Laboratory for Energy-Related Health Research, CA, Site	University of California-Davis South Campus Old Davis Road Center for Health and the Environment Davis, CA 95616 Lat 38.51875 Long –121.75125	110008278489	RCRA/CERCLA	Active RCRA SQG CAD982469702 (Under University of California Davis); On Final NPL
L-Bar, New Mexico Disposal Site Road Repair Project	Cibola County Road 1 and Moquino Llano Road Seboyeta, NM 87014	110071501629	NPDES	Non-Major General Permit Covered Facility, Permit Not Needed (NMR1005XM and NMR1005XS)—NPDES Low Erosivity Waivers related to Stormwater Construction and NPDES Permit
U.S. DOE Legacy Management Business Center	99 Research Park Way Morgantown, WV, 26505	110071133982	RCRA	Active RCRA VSQG WVR000551598
U.S. DOE Legacy Management Field Support Center/Grand Junction, CO, Site	2797 B ¾ Road Grand Junction, CO 81503	110000610580	CAA/RCRA	Synthetic Minor Emissions Permanently Closed; RCRA VSQG CO6890090065 Active
U.S. DOE Maxey Flats, KY, Site	2597 Maxey Flats Road Hillsboro, KY 41049	110008362805 110045024442 110063615333 110009287654	RCRA/CWA/ CERCLA	NPDES Terminated Permit; On Final NPL
U.S. DOE Middlesex South, NJ, Site	239 Mountain Avenue Middlesex, NJ 08846 Lat 40.569639, Long –74.491907	110004189280	RCRA/CERCLA	On Final NPL
U.S. DOE Monticello, UT, Processing/Disposal Site	1665 South Main Street Monticello, UT 84535 Lat: 37.869913 Long: –109.342868	110008540383 110061040369 110020079715 110002153231	CERCLA/UST	On the Final NPL
U.S. DOE Mound, OH Site	1 Mound Road Miamisburg, OH 45342	110000850632	RCRA/CAA/CWA/ TRI	TRI last reported in 2000; CAA Minor Source ID OH00000857091196 (permanently closed); NPDES Permit OHD000001 (terminated in March 2024); Inactive RCRA SQG; Active Legacy TSDF

Table 3. LM Facilities Monitored in EPA ECHO Database (continued)

ECHO Facility Name[a]	Facility Address	Facility Registry Service ID	Program Area	Status/Comments
U.S. DOE Pinellas County, FL, Site	7887 Bryan Dairy Road Suite 260 Largo, FL 33777	110000875465	RCRA/CAA	TRI last reported in 1994; Synthetic Minor Emissions Air Permit Permanently Closed; RCRA ID FL6890090008 Active
Rifle, Colorado, Disposal Site	Rifle, CO 81650 Latitude: 39.614; Longitude –107,801	1100714444299	NPDES	Non Major Permit Not Needed (COR10F09X) Low Erosivity Waiver from Stormwater Construction Permit
U.S. DOE Rocky Flats, CO, Site	HWY 93 Between Golden and Boulder Golden, CO 80402	110071101320 110041365545	CERCLA/CAA/ CWA/TRI/RCRA	On Final NPL; Terminated NPDES Permit; TRI last reported in 2004; Legacy TSDF
U.S. DOE Weldon Spring Site	7295 Highway 94 South St. Charles, MO 63304	110017989569	CERCLA/CWA/TRI	Active NPDES Permits MO0107701; MORA20661; TRI last reported in 1999; Note: Permit MORA20661 was a stormwater construction permit that was terminated on 8/16/2023

Note:
[a] Information presented in this table is shown exactly as it appears in the EPA ECHO Database.

Abbreviations:
DOI = U.S. Department of the Interior
lat = latitude
long = longitude
NPL = National Priorities List
UST = underground storage tank

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:

- The *Natural Resources Management Plan* (DOE 2024n) was updated and approved.
- Conducted a second follow-up pollinator study at the Bluewater site to document the density of monarch butterflies, a federal candidate species, and other pollinators. Preliminary work to install a watering device for the resident elk herd was also completed.
- Planted approximately 170 trees and shrubs at the Fernald Preserve to increase woody plant diversity, enhance successional development of restored areas, and decrease forest fragmentation.
- Conducted monitoring and rangeland health assessments at the Split Rock, Spook, and Bear Creek, Wyoming, Disposal Sites to evaluate impacts from grazing livestock.
- 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.
- Updated a baseline ecological characterization study for the Split Rock disposal site. During the survey, an ESA-listed threatened species, Ute lady's tresses, was discovered onsite.
- Continued tracking the acreage and types of pollinator-friendly BMPs implemented at LM sites each year. There was an approximately 30% increase in acreage in 2023 when the Split Rock disposal site transitioned to LM. Acreage in the site's interior that is excluded from livestock grazing will be managed for pollinator habitat.
- Conducted a wetland delineation for the San Juan River Floodplain below the Shiprock disposal site.
- LM renews the following permits annually as needed:
  - Scientific Collection Permit for wild animals at the Fernald Preserve issued by ODNR
  - Special-Purpose Salvage Permit for the Fernald Preserve issued by USFWS
- LM collected native plant specimens on Amchitka Island to assist research being conducted in the Aleutian Islands by Western Washington University as part of the North Pacific Stepping Stones Project.
- At the Fernald Preserve, the U.S. Forest Service under an interagency agreement, conducted a prescribed burn of the entire On-Site Disposal Facility cap in February 2023. This was the first time the entire cap, approximately 75 acres, was burned at one time.

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 groundwater protection programs within the LM program are complex and unique to each site and vary depending on regulatory framework and by state or location of the site. The monitoring requirements, number of wells, frequency of sampling, and

analytes of interest are site-specific. For example, groundwater samples may be collected quarterly; semiannually; annually; or every 2, 3, 5, or 10 years. To meet the intent of DOE 231.1B and annual ASER guidance Attachment IV: Alternate ASER Reporting for Closure Sites, a summary of LM's groundwater protection program was developed with specific definitions for this report.

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.


Note

Individual sites may utilize the term POC for other reasons and therefore will have a different definition. The definition above is specific to this report.

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 font)
- COC exceedances of regulatory standards were reported for 13 sites with POC monitoring wells sampled during the reporting period.


Note

Exceedances of COCs might not result in violations because violations depend on the regulatory framework for each site.

Appendix A, Table A-5, of this ASER documents exceedances at UMTRCA processing sites and D&D sites that have a site-specific groundwater monitoring program.

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 (e.g., Annual Monitoring Report, Site Annual Report, Site Environmental Report). 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 Monitoring

In 2023, LM performed quarterly sampling for PFAS at the Rocky Flats site. Additionally in 2023, LM performed annual sampling for 1,4-dioxane at the LEHR and Pinellas County sites. For a summary of PFAS sampling conducted at the Rocky Flats site in 2023, 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 2023 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* (DOE 2024j), the *Radiation Protection Program Plan* (DOE 2024q), and the *Radiological Control Manual* (DOE 2023h). 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 2.9, 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://www.energy.gov/sites/default/files/2024-08/2023_Title_1_AnnualComplianceReport.pdf) 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 2023 to allow personnel to be involved in the ALARA process, including identification of potential environmental and public impacts.
- No site-specific ALARA reviews were required or completed.

8.1 Unplanned Radiological Releases

There were no unplanned radiological releases in 2023.

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* (DOE 2023h). As such, surface contamination limits identified in "Table 2 *Summary of Surface Contamination Values in dpm/100 cm*^{2}" (derived from 10 CFR 835 Appendix D) and volumetric radioactivity guidelines identified in "Table 7 *Screening Levels for Volumetric Clearance of Personal Property*" (meeting the guidance of DOE Order 458.1, obtained from certain portions of American National Standards Institute [ANSI]/Health Physics Society [HPS] N13.12-2013) 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. LM updated the *Radiological Control Manual* to include additional guidance for releasing real and personal property in accordance with DOE Standard DOE-STD-1241-2023, *Implementing Release and Clearance of Property Requirements*.

No DOE-owned real property was released from LM sites, offices, or facilities in 2023, other than radioactive waste shipments identified in Section 5.1.5. 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, haul/work trucks and small equipment) was released for reuse as a result of:

- Evaporation pond sediment sampling and investigation activities at the Shiprock disposal site in February.
- Decontamination system upgrade work at the Grand Junction, Colorado, Disposal/Processing Site in December.

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 (NFPA):

- NFPA 1143, *Standard for Wildland Fire Management*, published in 2018
- NFPA 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. The Emergency Management Watch Office provides a daily hazard summary, which includes fire reports, and distributes to LMS site leads, LM site managers, and other interested internal parties. The summary reports any wildfire that occurred within 20 miles of an LM site (excluding DRUM Program 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.

Wildland fire management activities in FY 2023 include the following:

- At the Fernald Preserve, the U.S. Forest Service conducted a prescribed burn of the entire On-Site Disposal Facility cap in February 2023. This was the first time the entire cap, approximately 75 acres, was burned at one time.
- At the Tuba City site, dead shrubs were removed to reduce wildfire potential.

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 *LM Quality Policy* (DOE 2024l); the *Quality Assurance Program Plan* (DOE 2022e); and the LMS *Quality Assurance Manual* (DOE 2024p).

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*, which is implemented through the *LM Oversight* procedure (DOE 2023d). LM's oversight processes ensures 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 are generally 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.


Note

Surveillances are assessments that represent observing a field/site, facility, or equipment/property-related activity being performed in real-time.

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), SAPs, or in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (DOE 2024r), 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* (DOE 2024b) and the *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 1* (DOE 2024c) for program work on public lands and *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 2: Navajo Nation* (DOE 2024d) for work on Navajo Nation land. 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* (DOE 2024f). 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 QA 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 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 2023.

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
RJ Lee Group, Inc.	710 North 20th Avenue Pasco WA 99301
Tritium Laboratory	4600 Rickenbacker CSWY Miami, FL 33149
U.S. Geological Survey	12201 Sunrise Valley DR Mail Stop 431 Reston, VA 20192
TSDF	**Location**
Veolia ES Technical Solutions, L.L.C.	4301 Infirmary Road West Carrollton, OH 45449
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*.

10 CFR 1022. "Compliance with Floodplain and Wetland Environmental Review Requirements," *Code of Federal Regulations*.

40 CFR 112. "Oil Pollution Prevention," *Code of Federal Regulations.*

40 CFR 261.1(c)(9). "Identification and Listing of Hazardous Waste," *Code of Federal Regulations.*

40 CFR 761.180(a). "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations.*

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

7 USC 136r. "Research and Monitoring," *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.*

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

BLM (U.S. Bureau of Land Management), 2024. *Gunnison Sage-Grouse Management Amendment, Environmental Impact Statement*, https://eplanning.blm.gov/eplanning-ui/project/2019031/510, accessed September 19, 2024.

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), 2014a. *Final Uranium Leasing Program Programmatic Environmental Impact Statement*, EIS-0472, Office of Legacy Management, March.

DOE (U.S. Department of Energy), 2014b. *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 (U.S. Department of Energy), 2014c. *Uranium Leasing Program Mitigation Action Plan for the Final Uranium Leasing Program Programmatic Environmental Impact Statement DOE/EIS-0472*, LMS/ULP/Y00368, Office of Legacy Management, November.

DOE (U.S. Department of Energy) 2016a. *A Summary of the Per- or Polyfluorinated Alkyl Substances Records Search for Indications of Use at the Mound, Ohio, Site*, LMS/MND/S15235, Office of Legacy Management, December.

DOE (U.S. Department of Energy), 2016b. *Fourth Five-Year Review Report for the Fernald Preserve*, LMS/FER/S13683, Final, Office of Legacy Management, August.

DOE (U.S. Department of Energy), 2021a. *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), 2021b. *Fifth Five-Year Review Report for the Fernald Preserve*, LMS/FER/S33442, Final, Office of Legacy Management, September.

DOE (U.S. Department of Energy), 2021c. *Memorandum of Agreement Between the U.S. Department of Energy Office of Legacy Management and the Ohio State Historic Preservation Office Regarding the Demolition of the Decommissioned Reactor Site Located at 101 Bridge Street, Piqua, Miami County, Ohio*, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2021d. *Procedure for Applying Herbicides at the Fernald Preserve, Ohio, Site*, LMS/FER/S08834-3.0, Office of Legacy Management, July.

DOE (U.S. Department of Energy), 2021e. *Second Five-Year Review Report, Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis*, LMS/LEH/S30753, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2022a. *Evaluation Report for Uses of Per- and Polyfluoroalkyl Substances in Historical Processes at the Feed Materials Production Facility, Fernald, Ohio*, LMS/FER/41372, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2022b. *Initial Assessment of Per- and Polyfluoroalkyl Substances at Department of Energy Sites*, October.

DOE (U.S. Department of Energy), 2022c. *LM Environmental and Energy Policy*, LM-Procedure-1-24-1.0-0.0, Office of Legacy Management, April.

DOE (U.S. Department of Energy), 2022d. *PFAS Strategic Roadmap: Commitments to Action 2022–2025*, https://www.energy.gov/sites/default/files/2022-08/DOE%20PFAS%20Roadmap%20August%202022.pdf, accessed July 25, 2024.

DOE (U.S. Department of Energy), 2022e. *Quality Assurance Program Plan*, LM-Plan-1-24-1.0-1.0, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2022f. *Summary of the 1,4-Dioxane and Perchlorate Records Search for Indications of Use at the Mound, Ohio, Site*, LMS/MND/S38331, Office of Legacy Management, March.

DOE (U.S. Department of Energy) 2023a. *Draft Summary Report for Uses of PFAS Initial Assessment Report at the Pinellas County, Florida Site*, LMS/PIN/43719, Office of Legacy Management, February.

DOE (U.S. Department of Energy) 2023b. *Environmental Assessment for the Evaporation Pond at the Shiprock, New Mexico, Disposal Site*, EA-2195, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2023c. *Guide for Investigating Historical and Current Uses of Per- and Polyfluoroalkyl Substances at Department of Energy Sites*, https://www.energy.gov/sites/default/files/2023-02/Final%20PFAS%20Investigation%20Guide%20Final%20%28002%29_0.pdf, accessed July 25, 2024.

DOE (U.S. Department of Energy), 2023d. *LM Oversight*, LM-Procedure-2-20-5.0-3.0, Office of Legacy Management, March.

DOE (U.S. Department of Energy), 2023e. *PFAS Environmental Sampling Guidance*, https://www.energy.gov/sites/default/files/2023-08/PFAS%20Environmental%20Sample%20Guidance%207-31-23.pdf, accessed July 25, 2024.

DOE (U.S. Department of Energy), 2023f. *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/44555, Office of Legacy Management, July.

DOE (U.S. Department of Energy), 2023g. *Procedure for Handling Herbicides at Western Legacy Management Sites*, LMS/PRO/S12853-1.4, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2023h. *Radiological Control Manual*, LMS/POL/S04322-7.0, Office of Legacy Management, August.

DOE (U.S. Department of Energy), 2023i. *U.S. Department of Energy Joint Annual Environmental Justice Implementation Progress Report and Second Environmental Justice Five-Year Implementation Plan Fiscal Year 2022*, DOE/LM-1498, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2023j. *U.S. Department of Energy Office of Legacy Management PFAS Implementation Plan,* LM Plan-3-24-3.0, LMS/POL/45072, Office of Legacy Management, September.

DOE (U.S. Department of Energy), 2023k. *Worker Safety and Health Program (10 CFR 851)*, LMS/POL/S14697-4.0, Office of Legacy Management, December.

DOE (U.S. Department of Energy), 2024a. *Annual PFAS Monitoring Report Rocky Flats Site, Colorado, Calendar Year 2023*, Office of Legacy Management, April.

DOE (U.S. Department of Energy), 2024b. *Defense-Related Uranium Mines Quality Assurance Program Plan*, LMS/DRM/S15867-4.0, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2024c. *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 1*, LMS/DRM/S13690-3.8, Office of Legacy Management, May.

DOE (U.S. Department of Energy), 2024d. *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 2: Navajo Nation*, LMS/DRM/41156-0.4, Office of Legacy Management, May.

DOE (U.S. Department of Energy), 2024e. *DOE Uranium Leasing Program Annual Status and Activities Report for Calendar Year 2023*, LMS/ULP/46995, Office of Legacy Management, April.

DOE (U.S. Department of Energy), 2024f. *Environmental Data Validation Procedure*, LMS/PRO/S15870-2.0, Office of Legacy Management, August.

DOE (U.S. Department of Energy), 2024g. *Environmental Instructions Manual*, LMS/POL/S04338-8.1, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2024h. *Environmental Management System/Energy Management System Description*, LM-Procedure-3-20-12.0-1.1, LMS/POL/S04346-6.1, Office of Legacy Management, March.

DOE (U.S. Department of Energy), 2024i. *Environmental Protection Manual*, LMS/POL/S04329-7.1, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2024j. *Environmental Radiation Protection Program Plan*, LMS/POL/S13339-3.0, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2024k. *Guidance for Preparation of the 2023 Department of Energy Annual Site Environmental Reports*, Office of Environment, Health, Safety and Security, March.

DOE (U.S. Department of Energy), 2024l. *LM Quality Policy*, LM-Policy-1-24-4.0-0.0, Office of Legacy Management, July.

DOE (U.S. Department of Energy), 2024m. *Migratory Bird Treaty Act Compliance Procedure for Activities at the Rocky Flats Site, Colorado*, LMS/RFS/S04511-2.0, Office of Legacy Management, April.

DOE (U.S. Department of Energy), 2024n. *Natural Resources Management Plan*, LM-Plan-3-20-15.0-0.1, Office of Legacy Management, January.

DOE (U.S. Department of Energy), 2024o. "PFS: Per- and Polyfluoroalkyl Substances," https://www.energy.gov/pfas/pfas-and-polyfluoroalkyl-substances, accessed September 12, 2024.

DOE (U.S. Department of Energy), 2024p. *Quality Assurance Manual*, LMS/POL/S04320-19.0, Office of Legacy Management, August.

DOE (U.S. Department of Energy), 2024q. *Radiation Protection Program Plan*, LMS/POL/S04373-10.0, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2024r. *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*, LMS/PRO/S04351-16.7, Office of Legacy Management, September.

DOE (U.S. Department of Energy), 2024s. *Site Management Guide*, LM-Guide-3-20.0-1.0-20.12, Office of Legacy Management, May.

DOE Order 226.1B Chg 1 (AdminChg), *Implementation of Department of Energy Oversight Policy*, U.S. Department of Energy, May 3, 2022.

DOE Order 231.1B Admin Chg 1, *Environment, Safety and Health Reporting*, U.S. Department of Energy, November 28, 2012.

DOE Order 414.1D LtdChg 2, *Quality Assurance*, U.S. Department of Energy, September 15, 2020.

DOE Order 420.1C LtdChg 3, *Facility Safety*, U.S. Department of Energy, December 12, 2012.

DOE Order 435.1 Chg 2, *Radioactive Waste Management*, U.S. Department of Energy, January 11, 2021.

DOE Order 436.1A, *Departmental Sustainability*, U.S. Department of Energy, April 25, 2023.

DOE Order 458.1 LtdChg 4, *Radiation Protection of the Public and the Environment*, U.S. Department of Energy, September 15, 2020.

DOE Policy 450.4A MinChg 1, *Integrated Safety Management Policy*, U.S. Department of Energy, January 18, 2018.

DOE Standard DOE-STD-1241-2023. *Implementing Release and Clearance of Property Requirements*, U.S. Department of Energy, March 1, 2023.

EPA (U.S. Environmental Protection Agency), 2020. *Method 537.1: Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)*, EPA/600/R-20/006, March.

EPA (U.S. Environmental Protection Agency), 2023. *EPA's PFAS Strategic Roadmap: Second Annual Progress Report*, https://www.epa.gov/system/files/documents/2023-12/epas-pfas-strategic-roadmap-dec-2023508v2.pdf, accessed September 26, 2024.

EPA (U.S. Environmental Protection Agency), 2024. *Method 1633: Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS*, EPA 821-R-24-001, January.

EO (Executive Order) 11988. *Floodplain Management*, May 24, 1977.

EO (Executive Order) 11990. *Protection of Wetlands*, May 24, 1977.

EO (Executive Order) 12898. *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, February 11, 1994.

EO (Executive Order) 13186. *Responsibilities of Federal Agencies to Protect Migratory Birds*, January 10, 2001.

EO (Executive Order) 13751. *Safeguarding the Nation from the Impacts of Invasive Species*, December 5, 2016.

EO (Executive Order) 14008. *Tackling the Climate Crisis at Home and Abroad*, January 27, 2021.

EO (Executive Order) 14057. *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, December 8, 2021.

EO (Executive Order) 14072. *Strengthening the Nation's Forests, Communities, and Local Economies,* April 27, 2022.

EO (Executive Order) 14096. *Revitalizing Our Nation's Commitment to Environmental Justice for All,* April, 26, 2023.

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.

NFPA 299. *Standard for Protection of Life and Property from Wildfire*, National Fire Protection Association, 1997.

NFPA 1143. *Standard for Wildland Fire Management*, National Fire Protection Association, 2018.

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

PL 116-260. "Consolidated Appropriations Act, 2021," Public Law.

State of Colorado, 2007. “Rocky Flats Legacy Management Agreement,” *United States Environmental Protection Agency and the State of Colorado vs. United States Department of Energy Rocky Flats Site*, State of Colorado Docket# 96-07-19-01, February.

USFWS (U.S. Fish and Wildlife Service), 2024. “Information for Planning and Consultation”, https://www.fws.gov/service/information-planning-and-consultation, accessed September 12, 2024.

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[a]

(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)

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[b] 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

Notes:

[a] The table is aligned with the November 2023 *Site Management Guide* (site categories may have changed or been updated in subsequent versions).

[b] 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[a]

(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[b]	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[c]	EPCRA Report[b]	GEMS[d]
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		
Pinellas County, FL, Site https://www.energy.gov/lm/pinellas-county-florida-site		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			x		

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

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[b]	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[c]	EPCRA Report[b]	GEMS[d]
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

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

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[b]	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[c]	EPCRA Report[b]	GEMS[d]
UMTRCA Sites (continued)											
Lakeview, OR, Disposal Site https://www.energy.gov/lm/lakeview-oregon-disposalprocessing-sites	x	x			x			x			x
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

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

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[b]	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[c]	EPCRA Report[b]	GEMS[d]
UMTRCA Sites (continued)											
Salt Lake City, UT, Processing Site https://www.energy.gov/lm/salt-lake-city-utah-disposal-and-processing-sites											x
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
Split Rock, WY, Disposal Site	x	x			x			x	x		x
Spook, WY, Disposal Site https://www.energy.gov/lm/spook-wyoming-disposal-site	x				x			x			x
FUSRAP Sites											
Bayo Canyon, NM, Site[e] https://www.energy.gov/lm/bayo-canyon-new-mexico-aggregate-area-and-fusrap-sites											
Colonie, NY, Site[e] https://www.energy.gov/lm/colonie-new-york-site		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											

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

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[b]	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[c]	EPCRA Report[b]	GEMS[d]
FUSRAP Sites (continued)											
Tonawanda, NY, Site https://www.energy.gov/lm/tonawanda-new-york-site											
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					
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)

Site Name	Type of Data Collected					Where Data Are Reported					
	Inspection	Groundwater and/or Surface Water Monitoring	Production Water or Gas Monitoring	Chemical Inventory[b]	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[c]	EPCRA Report[b]	GEMS[d]
Plowshare/Vela Uniform Program											
Bronco, CO, Site https://www.energy.gov/lm/plowsharevela-uniform-program-sites					x						
Pre-Gondola and Trencher, MT, Site[e] https://www.energy.gov/lm/plowsharevela-uniform-program-sites											

Notes:

[a] The table is aligned with the November 2023 *Site Management Guide* (site categories may have changed or been updated in subsequent versions).

[b] LM conducts inventories at certain sites to ensure compliance with EPCRA. Refer to Section 5.4.3 for details.

[c] 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

[d] Geospatial Environmental Mapping System (GEMS) https://gems.lm.doe.gov: This is a custom, web-based application to gather validated information for LM-managed sites. 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.

[e] 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
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)

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 5.4.3 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 LM-managed sites. 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 2023 Groundwater Monitoring Program and COC Exceedance Summary

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2023 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	91	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	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	48[k]	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	61	0
Rocky Flats, CO, Site	Y	Y	Quarterly[f]	Y	Volatile organic compounds, semivolatile organic compounds, metals, plutonium, americium, uranium, nitrate (for a detailed list of COCs, see the site webpage); special targeted monitoring of PFAS chemicals including PFOA, PFAS and other PFAS listed in Colorado Water Quality Control Commission Policy	88	0

Table A-4. Calendar Year 2023 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2023 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	82	0
Nevada Offsites							
Central Nevada Test Area, NV	Y		3 years	Y	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	N	Molybdenum, nitrate + nitrite as nitrogen, selenium, sulfate, uranium	3	0
Bluewater, NM, Disposal Site		Y	Semiannually	Y	Molybdenum, selenium, uranium	19	4
Burrell, PA, Disposal Site		Y	5 years	Y	Calcium, chloride, iron, lead, magnesium, manganese, molybdenum, nitrate + nitrite as nitrogen, potassium, selenium, sodium, sulfate, total dissolved solids, uranium	8[l]	0
Canonsburg, PA, Disposal Site		Y	5 years[g]	Y	**Uranium**	5	3
Durango, CO, Disposal Site		Y	Annually	Y	Molybdenum, selenium, uranium	7	3
Durango, CO, Processing Site		Y	Annually[e]	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		Y	Annually[g]	Y	**Nitrate, sulfate, uranium**	19	4
Gunnison, CO, Disposal Site		Y	5 years	N	Calcium, chloride, iron, magnesium, manganese, potassium, sodium, sulfate, total dissolved solids, uranium	8	6

Table A-4. Calendar Year 2023 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2023 Y/N	COCs[c]	Active Wells	POC Wells[d]
Gunnison, CO, Processing Site		Y	Annually[g]	Y	**Manganese, uranium**	29	26
Lakeview, OR, Disposal Site		Y	5 years	N	Arsenic, cadmium, uranium	9	8
Lakeview, OR, Processing Site		Y	Biennially	N	Manganese, sulfate	5	0
L-Bar, NM, Disposal Site		Y	3 years[h]	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	61	0
Naturita, CO, Processing Site		Y	Annually[e]	Y	Arsenic, **uranium, vanadium**	8	8
Rifle New, CO, Processing Site		Y	Semiannually[e]	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		Y	Annually[e]	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	149	0
Shirley Basin South, WY, Disposal Site	Y	Y	Annually[i]	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	Y	Y	Annually[e]	Y	BTEX (benzene, ethylbenzene, toluene and xylenes), manganese, molybdenum, nitrate, radium-226, radium-228, **selenium, uranium**	9	5
Slick Rock West, CO, Processing Site	Y	Y	Annually[e]	Y	BTEX (**benzene**, ethylbenzene, toluene and xylenes), **manganese**, **molybdenum, nitrate,** radium-226, radium-228, **selenium, uranium**	9	7
Tuba City, AZ, Disposal Site		Y	Semiannually[j]	Y	Molybdenum, **nitrate, selenium, uranium**	8	8
FUSRAP Sites							
Colonie, NY, Site		Y	Biennially	Y	*cis*-1,2-Dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride	7	7

Table A-4. Calendar Year 2023 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	Sampled in 2023 Y/N	COCs[c]	Active Wells	POC Wells[d]
D&D Sites							
Grand Junction, CO, Site		Y	Annually[e]	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		Annually and Biennially	Y	Strontium-90, tritium	19	0
Nuclear Waste Policy Act Section 151 Site							
Parkersburg, WV, Disposal Site	Y	Y	10 years	Y	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.

[e] See Table A-5 for exceedances at UMTRCA processing sites and D&D sites.
[f] Sampling frequency of quarterly applies to 10 wells at Rocky Flats the remaining wells have varying sampling frequencies. Details on sampling frequency can be found in the Rocky Flats Legacy Management Agreement (State of Colorado 2007).
[g] 2023 Annual Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites (energy.gov).
[h] L-Bar site sampling in 2023 was outside of routine 3-year sampling events as a response to exceedances in routine 2022 sampling data.
[i] 2023 Annual Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title II Disposal Sites (energy.gov).
[j] Tuba City site: https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Tuba_City or Geospatial Environmental Mapping System (doe.gov).
[k] Mound site: Active well count includes 48 groundwater wells and 6 seeps.
[l] Burrell disposal site: Active well count includes eight groundwater wells and two 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 (link to site specific document with action limits and maximum concentration limits, etc.)	COC	Result (mg/L)[a]	Limit (mg/L)[b]	Notes
Durango, CO, Processing Site	Uranium	1.13	0.044	NA
	Manganese	6.09	1.7	NA
	Sulfate	3610	1500	NA
	Selenium	0.0802	0.05	NA
Grand Junction, CO, Site	Manganese	4.41	0.72	NA
	Sulfate	1620	1150	NA
	Uranium	0.26	0.03	NA
Gunnison, CO, Processing Site	Manganese	2.76	1.6	NA
	Uranium	0.342	0.044	NA
Naturita, CO, Processing Site	Uranium	1.9	0.044	Result is greater than the MCL, but not the ACL
	Vanadium	1.19	0.33	Result is greater than the MCL, but not the ACL
Rifle New, CO, Processing Site	Molybdenum	1.9	0.1	Result is greater than the MCL, but not the ACL
	Arsenic	0.147	0.05	Result is greater than the MCL, but not the ACL
	Uranium	0.1	0.044	Result is greater than the MCL, but not the ACL
	Vanadium	26.2	0.086	Result is greater than the MCL, but not the ACL
	Selenium	1.25	0.01	Result is greater than the MCL, but not the ACL
	Nitrate + Nitrite as Nitrogen	19.5	10	Result is greater than the MCL, but not the ACL
Riverton, WY, Processing Site	Molybdenum	1.08	0.1	NA
	Uranium	1.59	0.044	NA
Slick Rock East, CO, Processing Site	Uranium	2.45	0.044	NA
	Selenium	0.131	0.01	NA
Slick Rock West, CO, Processing Site	Selenium	5.02	0.18	NA
	Manganese	4.43	3.5	NA
	Molybdenum	1.95	0.1	NA
	Uranium	0.156	0.044	NA
	Nitrate + Nitrite as Nitrogen	148	10	NA
	Benzene	560	5	NA

Notes:
[a] Result represents maximum concentration detected.
[b] Regulatory limits are defined in site-specific documents and may be a combination of risk-based limits, MCLs, ACLs, or other.

Abbreviations:
ACL = alternate concentration limit
MCL = maximum concentration limit
mg/L = milligrams per liter
NA = not applicable