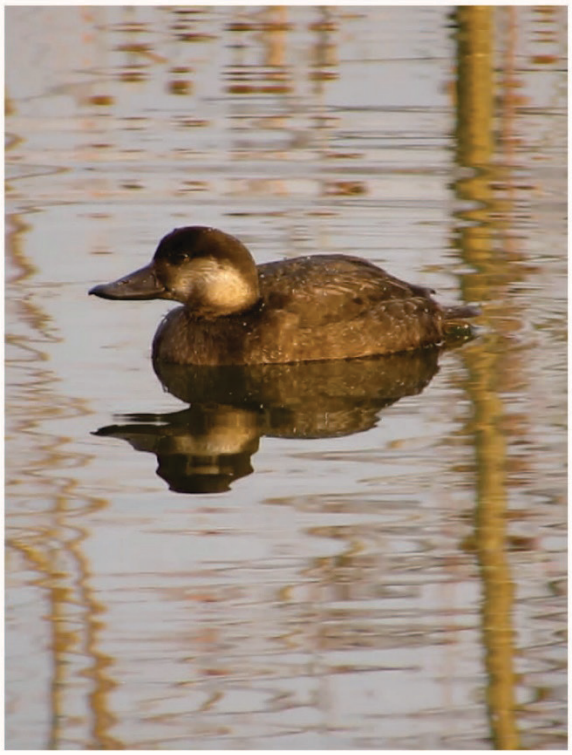

U.S. DEPARTMENT OF ENERGY | Legacy Management

Summary of Annual Site Environmental Reports Calendar Year 2021

LMS/S14598

Cover photo captions:

Top left: Elk (*Cervus canadensis*). A herd of elk walk across an open field at the Rocky Flats Site, Colorado. The 5200-acre Rocky Flats National Wildlife Refuge managed by U.S. Fish and Wildlife was part of the Rocky Flats site, a former weapons-production site that is now managed by the U.S. Department of Energy Office of Legacy Management (LM). In 2021, LM received a National Federal Facility Excellence in Site Reuse Award for the Rocky Flats National Wildlife Refuge by the U.S. Environmental Protection Agency, highlighting the significant accomplishments of restoring and reusing this formerly contaminated federal land.

Middle left: Black Scoter duck (*Melanitta nigra*). A duck swims across a pond at the Fernald Preserve, Ohio, Site. The site, once home to the Fernald Feed Materials Production Center, is now a popular destination for bird-watching and features more than 900 acres of wetland, forest, and grassland habitats.

Bottom left: Wild burro (*Equus asinus*). A wild burro grazes at the Mexican Hat, Utah, Disposal Site.

Bottom right: A team of contractors drill at the Monument Valley, Arizona, Processing Site. LM uses wells like this to collect and test groundwater samples and confirm that the site's ongoing remediation strategies continue to protect human health and the environment.

Public and Stakeholder Feedback

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

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Contents

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
BA/BE	Biological Assessment/Biological Evaluation
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
COVID-19	coronavirus disease 2019
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
GCAP	Groundwater Compliance Action Plan
GEMS	Geospatial Environmental Mapping System
HAL	health advisory level
HFC	hydrofluorocarbon
HSWA	Hazardous and Solid Waste Amendments
ISO	International Organization for Standardization
LEHR	Laboratory for Energy-Related Health Research
LM	Office of Legacy Management
LMBC	Legacy Management Business Center
LMFSC	Legacy Management Field Support Center
LMOC	Legacy Management Operations Center
LMS	Legacy Management Support
LTS&M	long-term surveillance and maintenance
MBTA	Migratory Bird Treaty Act
MED	Manhattan Engineer District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLN	National Laboratory Network
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
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
PA	Performance Assurance
PCC	PFAS Coordinating Committee
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid

PFOS	perfluorooctane sulfonate
POC	point of compliance
ppt	parts per trillion
P&T	pump-and-treat
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RPP	Radiation Protection Program
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SLERA	screening-level ecological risk assessment
SPCC	Spill Prevention, Control, and Countermeasure
SWMU	solid-waste management unit
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
UC Davis	University of California–Davis
ULP	Uranium Leasing Program
UMTRCA	Uranium Mill Tailings Radiation Control Act
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
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 April 2022 *Guidance for the Preparation of the 2021 Department of Energy Annual Site Environmental Reports* 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) 2021. 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 ASER Reporting and the Ongoing Coronavirus Disease 2019 (COVID-19) Pandemic

During the reporting period, many LM operations continued to be temporarily and intermittently disrupted due to the COVID-19 pandemic and resulting safety guidelines enacted by the U.S. Centers for Disease Control and Prevention, DOE, and state and local health departments. LM instituted maximum telework policies in March 2020 that continued through the end of CY 2021. Essential personnel were identified for minimum facility operations and field operations to eliminate disruptions to the mission. LM continued to adapt to ever-changing requirements and instituted new safety procedures when necessary to ensure that field staff could continue to fulfill LM's mission, stay healthy and safe, and observe federal, tribal, state and local COVID-19 guidelines. The impacts to fulfilling requirements varied by site depending on the applicable guidelines. LM worked with federal and state regulators when necessary to modify or adjust monitoring and maintenance requirements that were planned to occur in 2021. Specific disruptions are discussed within this report by topic area.

1.2 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 2021, LM managed the long-term care of 101 sites. The regulatory or programmatic framework and the number of sites managed under each framework during the reporting period are described below and on the DOE website at Legacy Site Programmatic Framework | Department of Energy. Site counts are updated annually in the LM *Site Management Guide* (LM-Guide-3-20.0-1.0); this ASER was aligned with the October 2021 guide but site counts are through December 2021. The most recent guide is available at https://www.energy.gov/lm/downloads/site-management-guide. Table 1 provides a summary of the site counts. As active remediation of additional DOE sites is completed, the sites will be transferred to LM for long-term care. Additional information on transferring sites is provided in the LM *Site Management Guide.*

Table 1. LM Site Count by Regulatory or Programmatic Framework

Regulatory or Programmatic Framework	Site Count Through December 2021
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	10
Nuclear Waste Policy Act (NWPA)	1
Plowshare and Vela Uniform Program	5
State Water Quality Standards	1
Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I	21
UMTRCA Title II	6
Total	**101**

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

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

2.2 Decontamination and Decommissioning (D&D) Sites

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

2.3 Formerly Utilized Sites Remedial Action Program (FUSRAP) Sites

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

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

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

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

2.5 Nevada Offsites

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

2.6 Nuclear Waste Policy Act (NWPA) Section 151 Site

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

2.7 Plowshare and Vela Uniform Program

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

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

More than 150 Plowshare and Vela Uniform Program proposed project sites were previously identified by the DOE Office of Environmental Management. Most of these proposed projects never occurred; only 30 sites had activities with the potential for remaining liabilities. These 30 sites were grouped by purpose: Non-Nuclear Explosive Tests, Non-Nuclear Civil Works Projects, Canceled Nuclear Tests (some activities occurred but planned nuclear tests were canceled), and other (geothermal energy experiment). LM evaluated these sites for potential environmental liabilities and safety hazards before accepting them for long-term management. Following the completion of maintenance activities, LM's management of the sites will consist of preserving records and responding to public inquiries. LM managed five sites during the reporting period. Four are individual sites, and one consisted of records-only management of 166 Plowshare and Vela Uniform project sites.

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

2.8 State Water Quality Standards Site

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

2.9 Uranium Mill Tailings Radiation Control Act (UMTRCA) Sites

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

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

2.10 Additional LM Programs and Facilities

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

- **Radiometric Calibration Facilities:** LM maintains five facilities used to calibrate instruments for measurements of uranium, thorium, and potassium. LM grants access to these facilities to non-LM users.
  - The primary calibration facilities are at the:
    - Grand Junction Regional Airport in Grand Junction, Colorado.
    - Grand Junction, Colorado, Decontamination and Decommissioning Site.
  - Secondary facilities are in:
    - Grants, New Mexico.
    - George West, Texas.
    - Casper, Wyoming.
  - Additional information is available at https://www.energy.gov/lm/services/calibration-facilities.
- **Uranium Leasing Program (ULP):** LM manages the ULP and administers 31 uranium mining lease tracts within the Uravan Mineral Belt in southwestern Colorado. Administrative duties include ongoing monitoring and oversight of leaseholders' activities and annual inspections to identify and correct safety hazards and environmental compliance issues.
  - Additional information is available at https://www.energy.gov/lm/services/property-management/uranium-leasing-program.

- **Defense-Related Uranium Mines (DRUM) Program:** LM established this program in 2016 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 4000 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 filling or blocking hazardous mine openings by installing minor devices such as gates and removing structures and materials of no historical value to protect public safety, human health, and the environment.

  — Additional information is available at https://www.energy.gov/lm/defense-related-uranium-mines-program.

- **Applied Studies and Technology (AS&T) Program:** An overriding LM goal is to "incorporate advances in science and technology to improve our capabilities" in advancing protection of human health and the environment. AS&T is a core component of LM's efforts to fulfill this goal by incorporating improvements in scientific understanding and technology applications with management strategies to decrease long-term costs. AS&T conducts studies to fulfill these objectives and to continually improve the quality of LTS&M and the cost effectiveness, sustainability, and protectiveness of environmental remedies at LM sites. These studies include working with other federal agencies, the environmental community, universities, national laboratories, and the international scientific community so that LM can stay informed about emerging engineering and scientific advancements that support ongoing LM studies and promote data sharing, discourse, and scientific achievements.

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

- **LM National Laboratory Network (NLN) Program**: This program collaborates with DOE's national laboratories and LM's strategic partner (the Legacy Management Support [LMS] contractor) to accelerate LM's ability to assess and deploy technology and expertise to sustainably manage the use of legacy land and assets. This collaboration assists LM to reduce budget expenditures and improve stakeholder confidence utilizing the expertise of DOE's national laboratories. LM signed a Memorandum of Understanding formally establishing Savannah River National Laboratory as the lead national laboratory providing technical support to LM's management of remediated sites around the United States.

- **LM Business Center (LMBC) at Morgantown, West Virginia:** This facility is certified by the National Archives and Records Administration as an official repository for the storage of federal records. The facility is environmentally controlled and capable of storing approximately 150,000 cubic feet of physical records, including a cold storage vault for microfilm, negatives, photographs, and other media.

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

- **LM Occupied Facilities:** LM executes its mission and programmatic activities from 10 occupied facilities in the following locations:
  - Fernald Preserve, Ohio
  - LM Field Support Center (LMFSC) at Grand Junction, Colorado
  - Monticello, Utah
  - LMBC at Morgantown, West Virginia
  - Pinellas County, Florida
  - Tuba City, Arizona
  - Washington, D.C.
  - Weldon Spring, Missouri
  - LM Operations Center (LMOC) at Westminster, Colorado
  - Window Rock, Arizona


Note

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

3.0 Summary of General Environmental Reporting

3.1 Oversight

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

3.2 Summary of Site-Specific Activities

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

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

Note

Site counts for CY 2021 were determined using the October 2021 Site Management Guide. Any Site Management Guide issued after December 2021 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:

1. Category 1 sites
    - Category 1 sites are listed in Table A-1 of Appendix A of this ASER and include 43 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.
2. Category 2 sites
    - Category 2 sites are listed in Table A-2 of Appendix A of this ASER and include 49 LM sites.
    - LM activities may include:
        - Conducting required inspections (typically annually) and maintenance.
        - Sampling for environmental monitoring data, as required.
        - Addressing potential environmental liabilities and safety hazards.
        - Managing site records and providing support on stakeholder inquiries and requests for information. Historical site information and monitoring results are accessible online for stakeholders.
        - Implementing and managing administrative controls (e.g., access agreements or land use control through federal ownership) and institutional controls.
        - Preparing inspection, monitoring, and compliance reports, as required.
3. Category 3 sites
    - Category 3 sites are listed in Table A-3 of Appendix A of this ASER and include nine LM sites.
    - In addition to the activities listed above for Category 2 sites, LM activities at Category 3 sites can include:
        - Operating and maintaining active remedial action systems (e.g., pump and treatment systems for contaminated groundwater).
        - Inspection and verification of integrity of engineered or institutional barriers.

The following LM facility and program activities were performed in 2021 in addition to work completed at the categorized sites:

1. Radiometric calibration facility activities:
    - Completed facility maintenance, annual inspections, and records-related activities.

2. ULP activities:
    - Completed reclamation of the Burro Mines Complex on lease tract C-SR-13 in San Miguel County, Colorado.
        - — Completed the National Environmental Policy Act (NEPA) Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Reclamation of the Burro Mines Complex in San Miguel County, Colorado.
        - — Developed and implemented a Stormwater Management Plan in support of the Reclamation of the Burro Mines Complex.
        - — Obtained a general permit to discharge stormwater associated with construction activities (Colorado Discharge Permit COR400000, Certification Number COR412704) in support of the Reclamation of the Burro Mines Complex in San Miguel County, Colorado.
    - Prepared and submitted the ULP annual, biennial, and triennial briefing letters in support of the 2014 ULP Programmatic Agreement.
    - Prepared the annual status and activities report summarizing LM activities for the ULP during the calendar year.
    - Prepared a significant revision of the *Uranium Leasing Program Mineral Leasing Procedures Manual* (LMS/PRO/S04344), to incorporate new procedures for ensuring environmental compliance by lessees.
3. DRUM Program activities:
    - Completed reconciliation, inventory, and field V&V of 507 BLM and U.S Forest Service mines in Colorado and Utah.
    - Prepared summary reports for each mine or group of mines to be transmitted to the appropriate agency.
    - Partnered with other agencies to complete mine safeguarding activities that include filling or blocking hazardous mine openings (e.g., adits), installing minor devices such as gates, and removing structures and materials of no historical value to protect public safety, human health, and the environment.
4. Plowshare and Vela Uniform Program activities:
    - Conducted historical research to obtain additional information about the sites.
    - Conducted stormwater inspections and vegetation monitoring at abandoned well CCH3 of the Bronco, Colorado, Site in accordance with state permit and BLM requirements.
    - Abandoned AEC well CCH2 at the Bronco site in accordance with BLM requirements. Stormwater permitting was not required at this location due to the small size of disturbance. However, the site was reseeded with native species after work was complete.
    - In 2021, no field activities were conducted at the Pre-Gondola and Trencher, Montana, Site; Pre-Schooner II, Idaho, Site; or the Utah, Utah, Site.

5. AS&T Program activities:
    - Optimized current LM operations and advanced technological applications.
    - Supported collaboration between LM and the NLN.
        - Collaboration with the NLN for the Rifle, Colorado, Disposal Site began in December 2021.
        - Collaboration with the NLN for the Weldon Spring, Missouri, Site began in September 2021.
        - AS&T collaborated with Lawrence Berkeley National Laboratory on climate change/climate resiliency.
    - Prepared an internal annual report documenting application of AS&T project outcomes to improve LTS&M and reduce costs.

4.0 Summary of Environmental Management System (EMS) and Sustainability

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

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

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

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

4.1 Performance Measures

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

- *FY 2022 LM Site Sustainability Plan* (LMS/S07225): LM reports past performance and future plans for meeting sustainability goals in the Site Sustainability Plan. This plan helps DOE meet its sustainability requirements outlined in DOE Order 436.1 and the *Fiscal Year 2022 Site Sustainability Plan Guidance* (August 2021, U.S. Department of Energy Sustainability Performance Division).
- Annual Energy Data Report: This annual report contains information on electronics stewardship, energy and water usage, waste diversion data, renewable energy generation, greenhouse gas emissions, high-performance sustainable buildings, and sustainability projects. Information is entered into the DOE Sustainability Dashboard.
- LM Facility EMS Annual Report: This report identifies the scope of LM's EMS and the status of sustainability goal performance and conformance with the EMS standard.
- *2019–2023 Significant Environmental Aspects* (LMS/S24255): This document describes the four categories of significant environmental aspects from LM operations, including land use, resource consumption, waste management, and releases to the environment. Environmental aspects are the attributes of project and program activities, products, and services that interact with the environment that may create a significant impact if not controlled.

Other reporting mechanisms for the EMS include:

- Energy Independence and Security Act (EISA) Section 432 Report: Section 432 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.
- 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:

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

- LM received a High-Performance Sustainable Building Award by the DOE Sustainable Performance Division for FY 2021 for the newly constructed Weldon Spring Site Interpretive Center.
- LM received the first DOE GreenSpace Award for FY 2021. LM was awarded the silver level GreenSpace Award in the Auditorium/Conference Space category in recognition of meeting an 80% threshold of environmentally preferable product purchases for the new Interpretive Center at the Weldon Spring site. LM topped the threshold by about 10%.
- LM received two National Federal Facility Excellence in Site Reuse Awards by the U.S. Environmental Protection Agency (EPA). The awards highlight the significant accomplishments of federal agencies, states, tribes, local partners, and developers in restoring and reusing contaminated land at federal facilities.
  - Rocky Flats Site, Colorado, won in the Superfund National Priorities List (NPL) category. In 2001, Congress passed the Rocky Flats National Wildlife Refuge Act of 2001, creating the 5200-acre federally-protected Refuge that is managed by the U.S. Fish and Wildlife Service (USFWS). The Refuge now restores and preserves native ecosystems, while providing habitat for migratory and resident wildlife, and recreational opportunities for surrounding communities.
  - Las Colonias Park won in the non-NPL category. The Grand Junction, Colorado, Processing Site, located along the Colorado River, is a former uranium processing facility that was transformed into Las Colonias Park. It is a multi-use park that is part of Grand Junction's city park network and includes a 15-acre business zone, 5000-seat amphitheater, riverfront park, boat ramp, trails, and an arboretum. The park features walking and biking trails along the river and has become a catalyst for redevelopment in the surrounding area.

5.0 Summary of Environmental Compliance

The following sections summarize compliance with applicable regulations and the related 2021 reporting. Because LM manages sites under different regulatory frameworks, postclosure environmental requirements vary based on activities being conducted. Changes and updates made to Executive Orders (EOs), DOE orders, state, local, and tribal regulations are reviewed and tracked for LM sites and identified for evaluation in the *LMS Environmental Compliance Regulatory Review Quarterly Report*.

5.1 Environmental Remediation and Waste Management Compliance

5.1.1 CERCLA

CERCLA was enacted by Congress in 1980 to enforce cleanup and reporting requirements that apply to abandoned or uncontrolled hazardous waste sites. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). Typically, the lead agency at a federal facility (e.g., DOE) initiates a response action under CERCLA if there is a release or a substantial threat of a release of a hazardous substance into the environment. Remedial actions have been completed at LM CERCLA sites regulated by the EPA or state agencies, or both, with the expectation of long-term monitoring and active groundwater remediation at several sites. The status of the activities at each site is available on site-specific links provided in Appendix A of

this report. A Five-Year Review report (see Table A-2 and Table A-3 of this report) is required for a CERCLA site with remaining residual contamination to evaluate whether the remedy at the site remains protective of human health and the environment.

- CERCLA Five-Year Reviews were completed in CY 2021 for the following:
  - Laboratory for Energy-Related Health Research (LEHR), California, Site
  - Fernald Preserve, Ohio, Site
  - Mound, Ohio, Site
  - Weldon Spring, Missouri, Site
- CERCLA Five-Year Reviews were initiated in CY 2021 for the following sites:
  - Rocky Flats, Site, Colorado
  - Monticello, Utah, Disposal and Processing Sites

5.1.2 RCRA

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

The following activities were performed in compliance with RCRA:

- Each site generating hazardous waste maintained a very small-quantity generator status.
- Hazardous waste from the LMFSC at Grand Junction, Colorado, was taken to an approved local, county-run hazardous waste collection facility for disposal.
- Hazardous waste from the LMOC at Westminster, Colorado, was taken to an approved local, county-run hazardous waste collection facility for disposal.
- Each site generating universal waste managed the waste at approved recycling or disposal facilities.
- An active RCRA HSWA corrective action permit issued by the State of Florida is maintained 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.
- Obtained EPA identification number for the LMBC at Morgantown, West Virginia.

5.1.3 Federal Facility Compliance Act (FFCA)

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

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

5.1.4 Toxic Substances Control Act (TSCA)

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

- LM did not generate or dispose of any TSCA regulated waste in 2021.

5.1.5 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.

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

5.1.6 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 1, *Radioactive Waste Management.* The following are site-specific activities related to radioactive waste management:

- Grand Junction 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* 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.
  - Radioactive materials were received for disposal from the following LM UMTRCA Title I sites: Durango, Colorado; Rifle, Colorado; Shiprock, New Mexico; Monticello, Utah; and vicinity properties in Grand Junction, Colorado.

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 2021 under the CAA:

- Submitted an annual operating fee for 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, outlined the requirements to phasedown HFC consumption and production to 15% by 2035. EPA began implementation of the requirements in October 2021. LM has reviewed the current uses and inventory of HFCs at LM sites. Uses include commercial refrigerators, freezers, and drinking fountain coolers. As these items are replaced, LM will seek items with alternative coolant sources.

5.3 Water Quality and Protection Compliance Status

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

The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating water quality standards for surface waters.

Under the CWA, EPA's NPDES permit program controls discharges. In 2021, multiple LM sites maintained NPDES permits. These NPDES permits include discharge permits and stormwater permits as described below.

- At the Fernald Preserve, stormwater runoff sampling of nonradiological pollutants is conducted, and effluent discharges are treated in compliance with an NPDES permit administered by the state. An additive application to use new material in well rehabilitation process, which discharges to the wastewater treatment system, was submitted and approved in fall 2021.
- At the Mound site, an NPDES permit covers discharge of treated groundwater under a CERCLA authorization demonstrating compliance with the CWA. Operation of the pump-and-treat (P&T) Record of Decision remedy for Operable Unit 1 was shut off on September 15, 2014, with regulatory approval, to allow for an undisturbed evaluation of treatment zones during the enhanced attenuation field demonstration involving the injection of edible vegetable oil into the groundwater. No discharge has occurred since the P&T was shut off.
- 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.

- A Section 404 nationwide permit was applied to the construction of a haul road in support of reclamation at the Burro Mines Complex, in San Miguel County, Colorado.

5.3.3 CWA Oil Pollution Prevention

Spill Prevention, Control, and Countermeasure (SPCC) Plans maintained in accordance with 40 CFR 112 were not required at LM sites in CY 2021.

5.3.4 CWA Stormwater Management and EISA Section 438

A stormwater management program was established by the CWA to reduce runoff and improve water quality. An NPDES permit for stormwater discharges associated with construction activity is required for projects disturbing 1 acre or more. Under Section 438 of the EISA, federal agencies are required to reduce stormwater runoff from federal facility development and redevelopment projects with a footprint exceeding 5000 square feet to maintain or restore predevelopment hydrology. A federal facility is any building constructed, renovated, leased, or

purchased by the federal government. Federal agencies can comply using a variety of stormwater management practices often referred to as "green infrastructure" or "low impact development" practices, including, for example, reducing impervious surfaces and using vegetative practices, porous pavements, cisterns, and green roofs.

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

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 2021:

- At the Rocky Flats site, LM managed stormwater in accordance with the site *Erosion Control Plan for Rocky Flats Property Central Operable Unit* (DOE-LM/1497-2007, LMS/RFS/S03416) during construction projects, thus meeting the substantive requirements for stormwater permitting. EPA and the Colorado Department of Public Health and Environment (CDPHE) approved this approach. Soil disturbances are controlled by institutional controls managed through the *Rocky Flats Legacy Management Agreement*.
- At the Burro Mines Complex, ULP Site, LM managed stormwater discharges in accordance with a general permit to discharge stormwater associated with construction activities (Colorado Discharge Permit COR400000) in support of the Reclamation of the Burro Mines Complex in San Miguel County, Colorado.
- At the Fernald Preserve, LM managed sitewide and construction-related stormwater in accordance with the *Fernald Preserve, Fernald, Ohio, Storm Water Pollution Prevention Plan* (LMS/FER/S03161) and the current Fernald Preserve NPDES permit.
- At the Plowshare/Vela Uniform Program Bronco site, coverage under the Colorado Discharge Permit COR400000 was obtained for construction activities associated with a well abandonment project. Construction was completed in 2020, and monitoring continued through 2021. The permit will remain active until final stabilization is achieved.

5.3.5 Safe Drinking Water Act (SDWA)

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

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

- Most occupied LM sites and facilities have service connections to municipal drinking water systems, provided by the local utility company, which are operated and maintained in accordance with the SDWA.
    - At the Tuba City, Arizona, Disposal Site, an onsite groundwater well provides water for use in sinks, toilets, a shower, and outside spigots, and bottled water is provided for drinking water. However, because the Tuba City disposal site has less than 15 service

connections and is unoccupied more than 300 days per year, it is not considered a public water system, and it is not subject to SDWA standards.

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

Emerging contaminants, including PFAS, 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 are a group of more than 9000 man-made 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 and have been designated by EPA as emerging contaminants of concern (COCs) at federal facilities. Additional emerging COCs that may be present at LM sites include 1,4-dioxane and vapor intrusion chemicals.

The regulatory environment varies from state to state and continues to change as regulators gather evidence linking PFAS exposure with adverse human health effects. The EPA and states have begun to promulgate regulations that establish analytical measuring and monitoring procedures for these chemicals, identify treatment processes for removal in surface and groundwaters, and establish standards to protect human health and the environment. In April 2021, EPA identified PFAS as a top priority and established a new EPA Council on PFAS to develop a multi-year PFAS strategy and continue close interagency coordination. In October 2021, EPA issued the PFAS Strategic Roadmap, which sets timelines by which EPA plans to take specific actions. Additionally, Section 7321 of the National Defense Authorization Act for FY 2020 (NDAA) added 172 PFAS to the list of chemicals covered by the Toxics Release Inventory (TRI) under Section 313 of EPCRA and provided a framework for additional PFAS to be added to TRI on an annual basis.

In September 2021, Deputy Secretary David Turk issued a policy memorandum, *Addressing Per- and Polyfluoroalkyl Substances at the Department of Energy*, to address PFAS management for DOE operations. The Deputy Secretary's memorandum also established the PFAS Coordinating Committee (PCC), composed of senior-level representatives from all DOE program offices with PFAS equities, including LM. The PCC works with DOE program offices to appropriately characterize historic PFAS use and releases at the site level. The PCC began development of a PFAS Strategic Roadmap and PFAS Initial Assessment Report in late 2021. The intent of the PFAS Strategic Roadmap is to describe 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. The purpose of the PFAS Initial Assessment Report is to capture current knowledge of historical and on-going uses of PFAS at DOE sites, presence of PFAS in the environment and drinking water, and stakeholder/regulatory engagement. A PFAS survey tool was developed for completion by DOE sites in order to capture this information.

- PFAS surveys were completed at 53 DOE sites, including seven LM CERCLA/RCRA sites where probable PFAS use could have historically occurred based on currently available information.

EPA and states have consulted with federal facilities regarding unique issues and challenges related to these contaminants, including at CERCLA sites where cleanup actions are complete.

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 emerging contaminants:

- Rocky Flats site: The Rocky Flats Plant housed a fire department and metallurgical facilities when it was operational, and these are potential sources of the PFAS detected at the site. The plant also had metal plating and other metallurgical research, development, and processing activities, including plutonium machining and forming processes. PFAS have been detected in Rocky Flats groundwater, surface water, and landfill leachate. A Sampling and Analysis Plan (SAP) for PFOA and PFOS was submitted to CDPHE in January 2019, revised to address comments, and issued in April 2019. The SAP used a modified version of EPA method 537 to analyze PFOA and PFOS. Work related to this sampling effort included sampling at three monitoring wells, two surface water locations, influent to one groundwater and one groundwater/landfill leachate treatment system, and one landfill seep during the second and fourth quarters of CY 2019. Locations were selected with input from CDPHE to evaluate PFAS in or from the former fire department training area, both former landfills, a facility that was involved in metallurgical work, both former oil burn pits, and a groundwater treatment system. Sampling results indicated concentrations above the current EPA health advisory level (HAL) of 70 parts per trillion (ppt) combined PFOA and PFOS in a groundwater monitoring well at the fire department/oil burn pit (70–130 ppt for PFOA and 240–310 ppt for PFOS) and in landfill leachate influent to the associated treatment system (59–69 ppt for PFOA and 20–23 ppt for PFOS). At the two surface water points of compliance (POCs), sampling results indicated concentrations up to 13 ppt PFOA and 19 ppt PFOS.
- In late August 2021, DOE began quarterly sampling for PFAS in accordance with a new SAP that was provided to CDPHE in January 2021 and prepared in consultation with DOE, CDPHE, and EPA. This SAP increased the number of sample locations from 8 to 12 and the target analytes from 2 to 28 PFAS, including PFOA and PFOS and other PFAS listed in Colorado Water Quality Control Commission Policy 20-1: *Policy for Interpreting the Narrative Water Quality Standards for Per- and Polyfluoroalkyl Substances (PFAS).* While the SAP lists 28 PFAS to be analyzed, one of these compounds was not analyzed. The omitted PFAS is ammonium perfluoro-2-methyl-3-oxahexanoate (HPFO-DA, GenX; CAS #62037-80-3), a PFAS salt that the laboratory does not analyze.
- The duration of the sampling program will extend for at least 8 quarters. Third and fourth quarter CY 2021 sampling results, in accordance with the 2021 SAP, show concentrations of PFOA and PFOS continue to be highest in the area near the former fire training area (PFOA up to 73 ppt, PFOS up to 270 ppt), and leachate routed through the Present Landfill Treatment System remains next highest (PFOA up to 55 ppt, PFOS up to 21 ppt).
- Fernald Preserve: A records search following the 2016 CERCLA Five-Year Review 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. LM is currently pursuing additional research on potential historical PFAS use related to other industrial processes such as pipe coatings.

In the August 2016 CERCLA *Fourth Five-Year Review Report for the Fernald Preserve* (LMS/FER/S13683), DOE was required to address the presence of the emerging contaminant PFAS through two deliverables. To fulfill these deliverable requirements, DOE submitted the *Draft Perfluorinated Compound Groundwater Screening Sampling and Analysis Plan* (LMS/FER/S15292) to EPA in December 2016, and, in March 2018, DOE submitted the *Draft Polyfluorinated Alkyl Substances (PFAS) Investigation Plan for the Fernald Preserve* (LMS/FER/S18662). Interim recommendations were established for PFOA and PFOS by EPA in December 2019. PFAS were also addressed in the *Fifth Five-Year Review Report for the Fernald Preserve* (LMS/FER/S33442) issued in September 2021, which included a deliverable to submit an evaluation report on use of PFAS in historical operations by September 9, 2022. Staff at the Fernald Preserve have not completed PFAS sampling. If additional research identified a credible PFAS source that could represent a threat to human health or the environment, a sampling plan would be developed in coordination with site regulators.

- Mound site: LM conducted vapor intrusion assessment activities in accordance with the recommendation in the September 2016 CERCLA *Fourth Five-Year Review for the Mound, Ohio, Site, Miamisburg, Ohio* (LMS/MND/S14085). In 2019, both EPA and Ohio Environmental Protection Agency (Ohio EPA) approved the Phase I vapor intrusion assessment report that provided results of the preliminary screening and source assessment. Areas were identified that required soil gas sampling as part of a Phase II SAP and a Quality Assurance Project Plan (QAPP), which were submitted for regulatory review in 2019 and reissued for final review in 2020. Ohio EPA and EPA comments were received in October and December 2020, respectively. The SAP and QAPP were revised in 2021 and sampling activities are expected to begin in fall 2022.

  During the 2021 CERCLA *Fifth Five-Year Review for the Mound, Ohio, Site, Miamisburg, Ohio* (LMS/MND/S31971), EPA presented a list of 13 proposed emergent contaminants. Three of those were recommended for further review: perchlorate; 1,4-dioxane; and PFAS. Evaluation of the use of these substances or materials containing these substances in historical operations such as metals plating and plastics production processes was completed and submitted to the EPA and Ohio EPA in March 2022. The records search revealed that the Mound site historically used very small quantities of PFAS as mass spectroscopy standards, which were completely consumed during analysis. Research revealed that all historical fire suppression systems onsite did not contain AFFF. As of the end of CY 2021, the Mound FFA Core Team was evaluating the potential for PFAS usage in other industrial processes that occurred during operations, such as metals plating and plastics production processes, to provide guidance on next steps that LM should consider based on the results of these evaluations.

- Pinellas County site: The Florida Department of Environmental Protection (FDEP) requested LM to conduct a records search in 2019. This records search, which resulted in querying approximately 50 PFAS search terms, indicated no documented use of PFAS 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 (SWMU). On June 29, 2021, a summary of analytical results for COCs (trichloroethene; cis-1,2-dichloroethene; trans-1,2-dichloroethene; total 1,2-dichloroethene; 1,1-dichloroethene; and vinyl chloride) from two monitoring wells

formerly located in the SWMU area was provided to FDEP via email. As of the end of CY 2021, FDEP had neither responded to the email nor required that PFAS be addressed.

- LEHR site: A PFAS records search performed by LM indicated no records of current or historical firefighting foams or PFAS usage. Because the likelihood of PFAS releases at the DOE Areas appears low and state and federal policies on PFAS response actions are being developed, LM committed in the 2021 *Second Five-Year Review Report, Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis* (LMS/LEH/S30753), to continue to monitor EPA and State of California policy changes on PFAS, but LM does not plan to sample for PFAS.
- Weldon Spring site: Vapor intrusion constituents were reviewed and presented in 2016 during the CERCLA Five Year Review. It was determined there was no potential for concern. Emerging contaminants were not addressed in the *Weldon Spring Site Sixth Five-Year Review* (LMS/WEL/S31922) report and the regulators did not comment or request that they be addressed.

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

- LM considers working alternatives to avoid floodplains when possible and complies with this EO and other applicable federal, state, tribal, and local requirements. None of the work conducted at LM sites in 2021 required a floodplain assessment or impacted any floodplains.

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.

- Fernald Preserve staff continued long-term monitoring of mitigation wetlands with amphibian surveys and hydrologic monitoring using shallow piezometers.
- Rocky Flats site staff continued wetland mitigation monitoring to document the reestablishment of mitigation wetlands.

5.4 Compliance Status of Other Environmental Statutes and EOs

5.4.1 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-4-20-5.0). Recent categorically excluded actions are accessible for public review at https://www.energy.gov/nepa/categorical-exclusion-determinations-legacy-management. The following is a summary of NEPA documents either completed or in progress during the reporting period:

- 23 CXEs were completed and approved
- An EA and a FONSI was prepared by Argonne National Laboratory on behalf of LM for the Reclamation of the Burro Mines Complex in San Miguel County, Colorado
- The following EAs were in progress:
  - LM finalized *Environmental Assessment for Proposed Demolition of the Buildings at the Piqua, Ohio, Decommissioned Reactor Site* (DOE/EA-2107). A FONSI was signed December 21, 2021
  - LM continued work on an *Environmental Assessment of Groundwater Compliance at the Shiprock Uranium Mill Tailings Site* (DOE/EA-2108) for proposed evaporation pond removal actions at the Shiprock, New Mexico, Disposal Site
- Additionally, as the applicant for proposed land withdrawals, LM participated in preparing EAs for and in coordination with the BLM for the following sites:
  - Durita, Colorado, Disposal Site—in progress
  - Split Rock, Wyoming, Disposal Site—in progress

5.4.2 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, hazardous substances, hazardous chemicals, or toxic chemicals, or all of these, in quantities that exceed specific thresholds to report these inventories and planned or accidental environmental releases to federal, state, and local emergency planning authorities. Site-specific hazardous chemical inventory (EPCRA Tier II) and TRI reports are required to be submitted to federal, state, and local emergency planning authorities if specific reporting thresholds are exceeded.

- LM utilizes the Safety Data Sheets online system for tracking chemicals and Safety Data Sheets at LM sites and facilities.
- An internal EPCRA webpage on the LM Portal is used to maintain chemical inventory reports as well as the required documentation (reporting threshold calculations, documentation of exemptions, and so on) for evaluating the applicability of EPCRA Section 304, 311/312 and Section 313 reporting. EPCRA Tier II reports are used to provide state and local officials and the public with specific information on potential hazards associated with hazardous chemicals and extremely hazardous substances (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 2021, 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

5.4.3 Endangered Species Act (ESA)

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

Threatened or endangered species investigations or consultations occurred at the following LM sites in 2021:

- Rifle disposal site: A survey of the DeBeque phacelia (*Phacelia submutica*) plant and habitat was conducted. No DeBeque phacelia or its habitat were found at or near any of the locations where proposed activities were to occur.
- Bronco site: A sensitive plant survey was performed for an additional AEC well (CCH2) abandoned in 2021. No sensitive plants were found that could be affected by the work. Consultation is not necessary.
- Fernald Preserve: Although USFWS removed running buffalo clover (*Trifolium stoloniferum*) from the federal list of threatened and endangered species (effective September 2021) due to its recovery across the United States, LM will continue to monitor the habitat for the presence of clover as it has not been removed from state or local lists.
- Fernald Preserve: In October 2021, the Cincinnati Zoo formally requested the termination of the Memorandum of Agreement to release American burying beetles (*Nicrophorus americanus*) at the Fernald Preserve to reallocate beetles to other release sites in the state. Zoo personnel completed 1 week of monitoring in spring 2021 in support of terminating the agreement. This monitoring was similar to the prerelease monitoring that had occurred in previous years. American burying beetle recovery efforts have been ongoing in Ohio since 1998. The American burying beetle was downlisted from endangered to threatened in November 2020.
- Grand Junction disposal site: Radioactive materials were placed in the open disposal cell in 2021, and preplacement water use estimates exceeded the quantity evaluated under a USFWS Biological Opinion for sites in the Upper Colorado River Basin. USFWS determined that additional formal consultation would be needed to perform the work as designed. The work was rescheduled from summer to fall, conservation measures were put in place, and water use was closely monitored to successfully keep water use below the amount evaluated in the Biological Opinion. These measures prevented the need to reconsult

and avoided adverse impacts to endangered Colorado River fish and their designated critical habitat within the watershed.

- Gunnison, Colorado, Disposal Site: Routine activities, including the 2021 annual inspection and site maintenance activities, were scheduled after July 15 to protect threatened Gunnison sage-grouse (*Centrocercus minimus)* during their breeding and nesting seasons.
- Piqua decommissioned reactor site: LM's planned demolition work was evaluated for impacts to species listed under the ESA. The evaluation included impacts to threatened or endangered bats. Based on information provided by USACE and USFWS, LM determined that the project will not affect threatened or endangered species because impacts to large trees are scheduled to occur when the bats are not present. Consultation was not necessary.
- Rocky Flats site: Consultations and notifications associated with project activities were completed in accordance with the site's Programmatic Biological Assessment and associated Biological Opinion.
- Shiprock disposal site: LM prepared a Biological Assessment/Biological Evaluation (BA/BE) to initiate formal consultation with USFWS and the Navajo Nation for several listed species including the Mesa Verde cactus (*Sclerocactus mesae-verdae*). The BA/BE determined that the cactus may be affected but is not likely to be adversely affected by the proposed work and that other species are not likely to be affected. LM plans to remove a groundwater treatment system and utility pipelines in and near Many Devils Wash, which is near the site.
- DRUM Program: Time restrictions were placed on field visits based on nesting seasons of protected birds, 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.
- ULP: Wildlife restrictions for the Burro Mines Reclamation project included avoiding work during the wintering and lambing season for a local heard of desert bighorn sheep (*Ovis canadensis nelsoni*). Work began after the season ended and work concluded well before the next season began.

5.4.4 America the Beautiful

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

- During the reporting period LM submitted a Conservation Action Plan to the Council on Environmental Quality. The plan included eight ongoing conservation activities across LM sites.

5.4.5 Invasive Species Management

In accordance with the Plant Protection Act of 2000, LM cooperates with federal, state, and local agencies, as well as farmers associations and private individuals to control, eradicate, or prevent the spread of noxious weeds. The *Procedure for Handling Herbicides at Western Legacy Management Sites* (LMS/PRO/S12853) outlines the process followed to implement treatment of invasive species at western LM sites. LM also complies with EO 13751, *Safeguarding the Nation*

from the Impacts of Invasive Species, enacted December 5, 2016, which calls on federal agencies to prevent the introduction, establishment, and spread of invasive species and to eradicate and control populations of established invasive species.

In 2021, LM treated 41 different species of noxious weeds on 789.53 acres at 29 sites (including various ULP lease tracts). From 2020 to 2021, there was:

- Decreased acreage of noxious weeds sprayed at five sites.
- Increased acreage sprayed at 17 sites.
- No change in acreage sprayed at seven sites.

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

5.4.6 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.

- DRUM Program field activities were scheduled during specific windows to avoid significant impacts to migratory birds.
- Multiple LM site-specific environmental review documents and statements of work provided guidance about best management practices (BMPs) to protect migratory birds. Environmental reviews identified specific windows that would avoid impacts to nesting migratory birds and provisions to implement mitigation measures for activities that cannot be scheduled outside those windows.
  - Bird surveys were conducted at the Shiprock disposal site to ensure that nesting birds would not be disturbed by LM's exploratory drilling work.
  - At the Fernald Preserve, large-scale mowing of grassland areas are scheduled to avoid nesting bird season.
  - At the Piqua decommissioned reactor site, two separate bird surveys were conducted prior to activities related to the demolition of the buildings at the site.
  - For general surveillance and maintenance activities at LM sites, fieldworkers routinely look for and avoid bird nests, eggs, or young.
- LM reports migratory bird conservation measures to DOE Headquarters' Migratory Bird Working Group on a periodic basis. No data call was issued for CY 2021.
- The Fernald Preserve maintains a Nest Destruction Permit issued by the Ohio Department of Natural Resources (ODNR). This permit is for removing Canada goose (*Branta canadensis*) nests and eggs if they are determined to be a nuisance.

- Project activities at the Rocky Flats site followed the site document guidance and BMPs addressed in the *Migratory Bird Treaty Act Issues, Natural Resource Management Activities, and Maintenance and Project Activities at the Rocky Flats Site, Colorado* (LMS/RFS/S04511).

5.4.7 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act 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.

- 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.
- 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 (in accordance with the USFWS Information for Planning and Consultation website).
- Bald and golden eagle nesting surveys were conducted at the Rifle disposal site to ensure that proposed activities would not disturb the birds. No nests were found within 0.5 mile of the project area.

5.4.8 National Historic Preservation Act (NHPA)

NHPA established a comprehensive national policy concerning historic and archaeological resource protection. Section 106 of NHPA compels federal agencies to consider the effect of its projects on historic and archaeological resources, even if projects are not located on its lands. Section 110 of NHPA states federal agencies must identify and manage historic properties under their jurisdiction or control.

Section 106 Consultations:

- LM initiated the Section 106 consultation process three times in 2021. LM completed two of the consultations in 2021.
  - A Memorandum of Agreement between LM and the Ohio State Historic Preservation Office was completed in December 2021 under a Section 106 consultation for the demolition of the buildings at the Piqua decommissioned reactor site.
  - LM consulted with the Illinois Historic Preservation Division regarding the potential of listing Site A/Plot M, Illinois, Decommissioned Reactor Site on the National Register. LM provided the state with a historic property survey as a courtesy. The state historic preservation division advised that the site likely will not meet historic integrity criteria.
- Some projects required consultation with both a State Historic Preservation Officer and a Tribal Historic Preservation Officer or tribal representatives. Consultation supporting a proposed Programmatic Agreement between LM and the Navajo Nation Heritage and Historic Preservation Office continued into December 2021.

Archeological Surveys:

- One archaeological survey of approximately 100 acres was completed at the Shirley Basin South, Wyoming, Disposal Site. The work was done to support soil sampling.

Section 110 Activities:

- LM did not initiate or complete any Section 110 work during 2021.

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

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

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

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

5.5 Unplanned Nonradiological Releases

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

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

Table 2. Summary of Unplanned Nonradiological Releases

Site or Facility	Release	Date of Release	Volume	Reporting Required?	Immediate or Corrective Actions
Monticello, Utah, Disposal and Processing Sites	Contaminated groundwater from pinhole in transfer line pump	12/27/2021	Less than 100 mL	Yes	LMS operation lead used Wypall towels to wipe up the water. The system was shut off and a reducing coupler was replaced with a like-for-like component that the site already had on the shelf.
Fernald Preserve, Ohio, Site	Nonpotable water leak in valve house	12/16/2021	NA	No	LMS operations staff discovered leak of water into the valve house. It was determined that this was perched groundwater, not water from the leachate collection system. Water was pumped from the leachate collection system tank into the converted advanced wastewater treatment backwash basin. A permanent fix will occur at a later date when weather conditions permit.
Fernald Preserve, Ohio, Site, Delta Building	Oil leak from GSA vehicle	8/10/2021	2 quarts	No	LMS staff noticed a leak under a GSA vehicle while it was parked at the Delta Building. The vehicle was repaired immediately. Leak had occurred on loose gravel, the gravel was scraped up and replaced with soil front on site. The soil was placed within the fenced area around Converted Advanced Wastewater Treatment facility and skid-rowed until dry.
Fernald Preserve, Ohio, Site	Hydraulic fluid leak on Kubota tractor	7/26/2021	10 gallons	No	LMS field staff placed absorbent pads under the tractor as quickly as possible. The soil where the hydraulic fluid had leaked was placed within the fenced area around Converted Advanced Wastewater Treatment facility and skid-rowed until dry. New clean soil was put in place where contaminated soil was removed.
LM Business Center at Morgantown, West Virginia	Oil leak from emergency generator within containment area	3/22/2021	2 ounces	No	LMS facility staff placed absorbent pads where the leak was occurring. They inspected the generator further and found a loose oil drain plug, the plug was tightened, and the leak stopped. A bucket was placed under a vent hose inside the enclosure that was also leaking, no further leaks have occurred since.
Weldon Spring, Missouri, Site	Nonpotable water, leaking or broken pipe in lift station	3/12/2021	NA, release was contained inside lift station	No	LMS operations staff put lift station in operation mode and discovered a leak in the pipes about 7 feet down. Leak was occurring at a connection in aging pipes. A subcontractor was contacted to complete the repair.

Abbreviations: GSA = U.S. General Services Administration, mL = milliliters, NA = not applicable

5.6 Summary of Environmental Notices

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

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

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

Table 3. LM Facilities Monitored in EPA ECHO Database

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

6.0 Additional Natural Resources Management

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

- Ecologists conducted a pollinator study at the Bluewater, New Mexico, Disposal Site. The study determined the density of monarch butterflies, a federal candidate species. Monarchs were found in stands of horsetail milkweed that have developed at the site, primarily on the disposal cell cover. The study also described other pollinator species and established a baseline for future pollinator studies at this and other LM sites.
- A regenerative grazing and carbon sequestration study was initiated at the Shirley Basin South, Wyoming, Disposal 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.
- LM's Ecosystem Management Team tracks the acreage and types of pollinator-friendly BMPs implemented at LM sites each year between May 1 and April 30. There was a slight increase in acreage in 2021 from growth of a milkweed patch at the L-Bar, New Mexico, Site, which is prime habitat for monarch butterflies.
- LM coordinated with BLM to include pollinator-friendly species in the seed mix for reclamation work conducted on ULP lease tracts.

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

7.0 Summary of Groundwater Protection Program

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

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

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

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


Note

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

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

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

7.1 COVID-19 Related Modifications to Sampling and Monitoring Activities

LM made the following modifications to sampling and monitoring activities because of COVID-19 related travel and field work restrictions:

- At the Pinellas County site, FDEP concurred that the indoor monitoring wells would not be sampled in September 2021 because of COVID-19 access restrictions in Building 100.
- At the Bluewater site, the 2021 fall semiannual sampling was conducted in two separate trips in November and December because of COVID-19-related illness. Both semiannual events were successfully completed.
- At the Tuba City disposal site, travel restrictions remained in place through 2021. The February 2021 sampling event was canceled because of the restrictions. The June 2021 sampling event and site inspection proceeded with assistance from tribal organizations familiar with the Tuba City disposal site. LMS staff provided online training on the inspection process in advance.
- At the Shiprock disposal site, the 2021 spring semiannual sampling event was cancelled due to COVID-19-related travel restrictions. NRC was notified of the cancellation, and no additional action was required.

7.2 PFAS and Emerging Contaminants

In 2021, LM performed sampling for PFAS at the Rocky Flats site. For additional PFAS sampling conducted at the Rocky Flats site in 2021, see Section 5.3.6.

No other sampling for PFAS or other emerging contaminants occurred in 2021 at LM sites.

8.0 Summary of Environmental Radiation Protection Program

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

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

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

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

- Requirements for inspections, monitoring, and maintenance activities are specified in site-specific Long-Term Surveillance Plans, LTS&M Plans, and GCAPs, all of which are reviewed and agreed to by NRC (see Tables A-2 and A-3).
- Two LM-wide inspection and monitoring reports, one for Title I sites (https://energy.gov/lm/downloads/title-i-disposal-sites-annual-report-0) and one for Title II sites (https://www.energy.gov/lm/articles/annual-site-inspection-and-monitoring-report-umtrca-title-ii-disposal-sites), are compiled and submitted annually to NRC. These reports present the results of LTS&M activities at each of the UMTRCA sites as part of the general license requirements.

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

- LM implements the *Environmental Radiation Protection Program Plan* to ensure that work involving radiological hazards complies with the requirements of DOE Order 458.1 Chg 4. The implemented processes and measures are tailored to LM activities and reflect a graded approach commensurate with the hazard or risk to the public and the environment.
- LM and the LMS contractor held two routine semiannual ALARA meetings in 2021 to allow personnel to be involved in the ALARA process, including identification of potential environmental and public impacts.
- No site-specific ALARA reviews were completed.

8.1 Unplanned Radiological Releases

There were no unplanned radiological releases in 2021.

8.2 Clearance of Property

This section summarizes the real and personal property clearance activities for LM, including application of authorized limits, type of material or property, and expected end-use scenario (e.g., disposal, recycle, reuse). This information is provided in accordance with

DOE Order 458.1 LtdChg 4, which requires a summary of the clearance of property to be reported in the ASER.

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

No DOE-owned real property was released from LM sites, offices, or facilities in 2021, other than radioactive waste shipments identified in Section 5.1. The personal property identified below was radiologically surveyed and released from various LM radiologically controlled areas:

- DOE-owned personal property (e.g., project work trucks and light equipment) was released for reuse
- Contractor and subcontract-owned personal property (e.g., heavy equipment, light equipment and haul/work trucks) was released for reuse as a result of:
  - Shiprock disposal site's pond liner investigation work that was performed in June.
  - Weldon Spring site parking lot repair and replacement work that was performed in July.
  - Grand Junction disposal site uranium mill tailing material delivery work that was performed in September.
  - Burro Mines Complex Reclamation project work that was performed in October.

9.0 Summary of Fire Protection Management and Planning

In late 2021 LM began drafting an integrated site-wide fire management plan to be consistent with the *Federal Wildland Fire Management Policy*, published in 2000. Wildland fire management plans are in place for the LM sites listed in this section. These plans describe the current site-specific fire environment and fire prevention and mitigation strategies to meet the fire protection objectives of DOE Order 420.1C LtdChg 3, *Facility Safety*. This includes compliance with the following standards of the National Fire Protection Association: Standard 1143, *Standard for Wildland Fire Management*, published in 2018, and Standard 299, *Standard for Protection of Life and Property from Wildfire*, published in 1997. Wildland fire management strategies implemented include use of fire protection equipment, vegetation management, site access controls, job safety analyses or procedures, and prescribed burns.

LM sites with wildland fire management plans include:

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

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

LM Emergency Management and site management staff are developing 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. No prescribed burns occurred at LM sites in 2021.

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 standard 9001:2015, *Quality Management Systems–Requirements*, as the chosen international standard. Implementing documents include the *LM Quality Assurance Policy* (LM-Policy 414.1B); the *Quality Assurance Program Plan* (LM-Plan-1-10.0-1.0); and the LMS *Quality Assurance Manual* (LMS/POL/S04320).

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

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

The annual assessment schedule includes:

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

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

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

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

LM uses contracted analytical laboratories and treatment, storage, and disposal facilities (TSDFs) when required and ensures these providers participate in the DOE Consolidated Audit Program or the Mixed Analyte Performance Evaluation Program. Table 4 lists all contracted analytical laboratories and TSDFs used in 2021.

Table 4. Contracted Analytical Laboratories and TSDFs

Laboratory	Location
GEL Laboratories LLC	2040 Savage Road Charleston, SC 29407
Eurofins TestAmerica	4995 Yarrow Street Arvada, CO 80002 13715 Rider Trail North Earth City, MO 63045 880 Riverside Parkway West Sacramento, CA 95605
Sanford Cohen & Associates	1608 Spring Hill Rd Suite 400 Vienna, VA 22182
ALS Global+ (Formerly Paragon Analytics)	225 Commerce Drive Fort Collins, CO 80524
ARS International LLC	2609 North River Road Port Allen, LA 70767
U.S. Geological Survey	12201 Sunrise Valley DR Mail Stop 431 Reston, VA 20192
TSDF	**Location**
EnergySolutions, Clive Disposal Facility	Interstate 80 Exit 49 Grantsville, UT 84029

Appendix A

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

Table A-1. Category 1 Sites

(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 (continued)

(Typically involves records-related activities and stakeholder support)

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

Note:

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

Table A-2. Category 2 Sites

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

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

Table A-2. Category 2 Sites (continued)

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

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

Table A-2. Category 2 Sites (continued)

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

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

Table A-2. Category 2 Sites (continued)

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

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

Table A-2. Category 2 Sites (continued)

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

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

Table A-2. Category 2 Sites (continued)

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

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

Notes:

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

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

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

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

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

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

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

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

Table A-3. Category 3 Sites

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

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

Table A-3. Category 3 Sites (continued)

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

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

Notes:

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

[b] Types of environmental monitoring reports include:

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

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

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

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
CERCLA/RCRA Sites							
Fernald Preserve, OH, Site	X	X	Semiannually*	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	131	0	N/A
Laboratory for Energy-Related Health Research, CA, Site	X	X	Quarterly*	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	N/A
Monticello, UT, Disposal and Processing Sites	X	X	Semiannually*	Arsenic, gross alpha activity, gross beta, isotopic uranium, manganese, molybdenum, nitrate, selenium, uranium, vanadium	160	0	N/A

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
Mound, OH, Site[k]		X	Quarterly*	Tetrachloroethene, trichloroethene, vinyl chloride, *cis*-1,2-dichloroethene, *trans*-1,2-dichloroethene	51	0	N/A
Pinellas County, FL, Site		X	Semiannually*	Trichloroethene, vinyl chloride, 1,1-dichloroethene, 1,4-dioxane, *cis*-1,2-dichloroethene, *trans*-1,2-dichloroethene	63	0	N/A
Rocky Flats Site, CO	X	X	Quarterly*	Volatile organic compounds, semivolatile organic compounds, metals, plutonium, americium, uranium, nitrate (for a detailed list of COCs, see the site webpage) 28 PFAS chemicals, including PFOA, PFAS and other PFAS listed in Colorado Water Quality Control Commission Policy	88	0	N/A
Weldon Spring Site, MO	X	X	Quarterly*	Nitrate, nitrobenzene, trichloroethene, uranium, 1,3-dinitrobenzene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2,4,6-trinitrotoluene	106	0	N/A

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
Nevada Offsites							
Central Nevada Test Area, NV	X		3 years*#	Carbon-14, iodine-129, tritium	12	12	No
Gasbuggy, NM, Site	X		5 years	Tritium	3	0	N/A
Gnome-Coach, NM, Site	X		Annually*	Cesium-137, strontium-90, tritium	3	0	N/A
Rio Blanco, CO, Site	X		Annually*	Tritium	4	0	N/A
Rulison, CO, Site	X		Annually*	Tritium	3	0	N/A
Salmon, MS, Site	X	X	2 years*	*cis*-1,2 -dichloroethene-, trichloroethene, tritium, vinyl chloride	35	0	N/A
Shoal, NV, Site	X		3 years*	Carbon-14, iodine-129, tritium,	13	13	No
UMTRCA Sites							
Ambrosia Lake, NM, Disposal Site		X	3 years	Molybdenum, nitrate + nitrite as nitrogen, selenium, sulfate, uranium	3	0	N/A
Bluewater, NM, Disposal Site		X	Semiannually*#	Molybdenum, selenium, uranium	20	4	No
Burrell, PA, Disposal Site[l]		X	5 years	Calcium, chloride, iron, lead, magnesium, manganese, molybdenum, nitrate + nitrite as nitrogen, potassium, selenium, sodium, sulfate, total dissolved solids, uranium	10	0	N/A
Canonsburg, PA, Disposal Site		X	5 years	Uranium	5	3	N/S
Durango, CO, Disposal Site		X	Annually*	Molybdenum, selenium, uranium	7	3	No
Durango, CO, Processing Site		X	Annually*	**Cadmium, manganese**, molybdenum, selenium, **sulfate, uranium**	13	8	Yes[f]
Falls City, TX, Disposal Site		X	Annually*	Uranium	12	0	N/A

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
Grand Junction, CO, Disposal Site		X	Annually*	Molybdenum, nitrate as nitrogen, polychlorinated biphenyls, selenium, sulfate, total dissolved solids, uranium, vanadium	3	0	N/A
Grand Junction, CO, Processing Site		X	5 years*	Ammonia (as NH_4), molybdenum, uranium	4	0	N/A
Green River, UT, Disposal Site		X	Annually*	**Nitrate, sulfate, uranium**	22	6	Yes[h]
Gunnison, CO, Disposal Site		X	5 years*	Calcium, chloride, iron, magnesium, manganese, potassium, sodium, sulfate, total dissolved solids, uranium	8	8	No
Gunnison, CO, Processing Site		X	Annually*	**Manganese, uranium**	33	26	Yes[g]
Lakeview, OR, Disposal Site		X	5 years	Arsenic, cadmium, uranium	9	8	N/S
Lakeview, OR, Processing Site		X	Biennially	Manganese, sulfate	5	0	N/A
L-Bar, NM, Disposal Site		X	3 years	Chloride, nitrate + nitrite as nitrogen, selenium, sulfate, total dissolved solids, uranium	12	4	N/S
Monument Valley, AZ, Processing Site		X	Annually	Nitrate, sulfate, uranium	73	0	N/A
Naturita, CO, Processing Site		X	Annually*	Arsenic, **uranium, vanadium**	8	8	Yes
Rifle, CO Processing (New) Site		X	Semiannually*	**Arsenic, molybdenum, nitrate as nitrogen, selenium**, **uranium, vanadium**	17	8	Yes[f]
Rifle, CO Processing (Old) Site		X	Semiannually*	Selenium, uranium, vanadium	8	0	N/A
Riverton, WY, Processing Site		X	Annually*	**Manganese, molybdenum, sulfate, uranium**	38	28	Yes[f]
Sherwood, WA, Disposal Site		X	Annually*	Chloride, sulfate, total dissolved solids	3	0	N/A

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
Shiprock, NM, Disposal Site		X	Semiannually	Ammonium, manganese, nitrate, selenium, strontium, sulfate, uranium	133	0	N/A
Shirley Basin South, WY, Disposal Site	X	X	Annually*	Cadmium, chloride, chromium, lead, nickel, nitrate, radium-226, **radium-228**, **selenium**, **sulfate**, thorium-230, **total dissolved solids**, uranium	14	4	Yes[i]
Slick Rock, CO, Processing Site	X	X	Annually*	BTEX (benzene, ethylbenzene, toluene and xylenes), manganese, **molybdenum**, **nitrate**, radium-226, radium-228, **selenium, uranium**	18	12	Yes[f]
Tuba City, AZ, Disposal Site		X	Semiannually*#	Molybdenum, **nitrate**, **selenium**, **uranium**	129	7	Yes
FUSRAP Sites							
Colonie, NY, Site		X	Biennially*	*Cis*-1,2-dichloroethene, tetrachloroethene, **trichloroethene**, vinyl chloride	7	7	Yes[j]
D&D Sites							
Grand Junction, CO, Site		X	Annually*	Manganese, molybdenum, selenium, sulfate, **uranium**	7	7	Yes[f]
Hallam, NE, Decommissioned Reactor Site	X	X	5 years	Gamma-emitting nuclides, gross alpha, gross beta, nickel-63, tritium, uranium	17	0	N/A
Site A/Plot M, IL, Decommissioned Reactor Site	X		Quarterly*	Strontium-90, tritium	19	0	N/A

Table A-4. Calendar Year 2021 Groundwater Monitoring Program and COC Exceedance Summary (continued)

Site Name	Radiological Monitoring[a]	Nonrad Monitoring[b]	Sampling Frequency	COCs[c]	Active Wells	POC Wells[d]	Exceedance During Reporting Period at POC Wells
Nuclear Waste Policy Act Section 151 Site							
Parkersburg, WV, Disposal Site	X	X	10 years	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	N/A

Notes:

* Sites with sampling frequency marked with * were sampled during the reporting period.

[#] Normal sampling routine was affected by COVID-19 travel restrictions.

[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.

[e] Exceedance during reporting period:
No: the site was sampled but had no exceedances of COCs
Yes: there was an exceedance of one or more COCs
Not Sampled (N/S): the site was not required to be sampled during the reporting period
Not Applicable (N/A): there are no regulatory actions if an exceedance occurs or there are no defined POC wells

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

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

[g] Gunnison Processing Site: *2021 Verification Monitoring Report for the Gunnison, Colorado, Processing Site* (September 2021).

[h] Green River site: *2021 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (June 2021).

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

[j] Colonie site: Long Term Monitoring Report for the Colonie, New York Site- Natural Attenuation Remedy, July 2021 Sampling Event.

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

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

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

Site Name	COC	Result[a] (mg/L)	Limit[b] (mg/L)	Analytical Data
Durango, CO, Processing Site	Cadmium	0.039	0.01	Durango Processing Site GEMS (doe.gov)
	Manganese	4.4	1.7	
	Molybdenum	No exceedances	0.1	
	Selenium	No exceedances	0.05	
	Sulfate	7700	1500	
	Uranium	2.9	0.044	
Grand Junction, CO, Site (D&D Site)	Uranium	0.37	0.03	Grand Junction Site GEMS (doe.gov)
Rifle, CO, Processing (New) Site	Arsenic	0.284	0.05	Rifle Processing Site (New) GEMS (doe.gov)
	Molybdenum	2.67	0.1	
	Nitrate as nitrogen	21.8	10.0	
	Selenium	0.89	0.01	
	Uranium	0.113	0.044	
	Vanadium	26.8	0.086	
Riverton, WY, Processing Site	Manganese	2.1	0.05	Riverton Processing Site GEMS (doe.gov)
	Molybdenum	0.77	0.1	
	Sulfate	5000	250	
	Uranium	1.4	0.044	
Slick Rock, CO, Processing Sites	Manganese	No exceedances	3.5	Slick Rock West Processing Site GEMS (doe.gov) and Slick Rock East Processing Site GEMS (doe.gov)
	Molybdenum	1.4	0.1	
	Nitrate	85	44	
	Selenium	1.4	0.01	
	Uranium	1.8	0.044	

Notes:

[a] Result represents maximum concentration detected.

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

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

Abbreviation:

mg/L = milligram per liter