LM-Plan-3-23-1.0-0.3
LMS/POL/S15809-2.0 4

Defense-Related Uranium Mines Program Management Plan

July 2024

U.S. DEPARTMENT OF ENERGY | Legacy Management

This document has been designed for online viewing.

Contents

Abbreviations iv
Forms Referenced in This Manual vi
Glossary vii
Executive Summary xii
1.0 Purpose 1
2.0 Introduction 1
2.1 Background 1
2.2 Overview 3
3.0 Program Authority 6
4.0 Goals and Objectives 6
5.0 Program Administration 7
5.1 Contract Management 7
5.1.1 Procurement and Integrated Work Control Process (IWCP) 7
5.1.2 Contract Work Breakdown Structure (CWBS) 7
5.1.3 Performance Milestones 8
5.1.4 Budget and Cost Baseline 8
5.1.5 Life-Cycle Baseline (LCB) 8
5.1.6 Baseline Change Proposals 8
5.2 Schedule 9
5.2.1 Contract Schedule 9
5.2.2 Program Schedule 9
5.3 Records Management 11
6.0 Program Scope 11
6.1 Program Implementation 11
6.2 DRUM Program Plans 12
6.2.1 Campaign-Specific V&V Work Plans 12
6.2.2 Quality Assurance Program Plan 12
6.2.3 Safety Plan 12
6.2.4 Field Operations Plans 12
6.2.5 Data Management Plan 13
6.2.6 Safeguarding Management Plan 13
6.3 Program Management 13
7.0 DRUM Program Approach 13
7.1 V&V Process 14
7.1.1 Mine Reconciliation 14
7.1.2 V&V Fieldwork 14
7.1.2.1 Soil Sampling 15
7.1.2.2 Water Sampling 15
7.1.2.3 Gamma Radiation Surveys 15
7.1.3 Risk Screening 15
7.2 Campaign 1: V&V Evaluation of Mines on Public Land 16
7.3 Campaign 2: V&V Evaluation of Mines on Tribal Land 16
7.4 Campaign 3: V&V Evaluation of Mines on Private Property 17
7.5 Safeguarding of Physical Hazards at Mines 17
7.6 Data Management 18
7.7 Risk Roll-Ups and Hazard Summary Reports 18

8.0 Program Organization 18
8.1 Office of Legacy Management 19
8.2 LMS Contractor 19
8.3 Roles and Responsibilities 19
8.4 DRUM Program Team 21
8.4.1 LMS Staffing 22
8.4.2 LM and LMS Subcontractor Staffing 22
8.5 Interagency Roles, Responsibilities, and Agreements 22
8.5.1 State and Tribal Agencies 22
8.5.2 U.S. Bureau of Land Management 24
8.5.3 U.S. Forest Service 24
8.5.4 National Park Service 25
8.5.5 Other Agencies 25
8.5.6 Abandoned Uranium Mines Working Group 25
9.0 Reporting 26
9.1 Program and Project Status 26
9.2 Reconciled Historical Mine Data 26
9.3 V&V Reports 26
9.3.1 Campaign 1: Reports for V&V Work on Public Land 26
9.3.2 Campaign 2: Reports for V&V Work on Tribal Land 27
9.3.3 Campaign 3: Reports for V&V Work on Private Property 27
9.4 Semiannual and Annual Program Reports 27
10.0 Environmental Management System (EMS) 27
10.1 Environmental Compliance 28
10.1.1 NEPA Compliance 28
10.1.2 Cultural Resources 28
10.1.3 Other Environmental Requirements 29
10.2 Environmental Sustainability 29
11.0 Quality Assurance 29
11.1 Quality Assurance Program Plan 29
11.2 Quality Assurance Requirements 30
11.2.1 Data Management 30
11.2.2 Lessons Learned 30
11.3 Assessments 30
11.3.1 Management Assessments 31
11.3.2 Surveillances 31
12.0 Safety and Health 31
12.1 Personnel Protection 31
12.2 Radiological Protection 32
13.0 Program Risk Management 32
13.1 Statement of Risk 33
14.0 Program Communications 33
14.1 Internal LM Communication 33
14.2 Partner Agencies and Private Landowner Communication 33
14.3 LM and LMS Communication 34
14.4 Internal LMS Communication 34
14.4.1 Weekly Team Meetings 34
14.4.2 Pre-Job Briefings 34

15.0 Public Relations....35
15.1 Freedom of Information Act (FOIA)....35
15.2 Stakeholder Inquiries....36
15.3 Education and Outreach....36
16.0 Program Completion....36
16.1 Program Closeout....36
16.2 Long-Term Responsibilities....37
17.0 References....37

Figures

Figure 1. Timeline of Uranium Ore Production....2
Figure 2. DRUM Program Flow Diagram....5
Figure 3. Program Schedule....10
Figure 4. LMS DRUM Program Organizational Chart....20
Figure 5. Collaboration Between LM, the LMS Contractor, and Partner Agencies....23

Tables

Table 1. Summary of DRUM Program Reconciliation as of May 14, 2024....3
Table 2. Mines Identified for V&V Field Visits by Campaign as of May 14, 2024....4
Table 3. Mines on Public Land as of May 14, 2024....16
Table 4. Mines on Tribal Lands as of May 14, 2024....17
Table 5. Mines on Private Property as of May 14, 2024....17
Table 6. DRUM Program Key Positions....21
Table 7. Program Risk Screening....33

Abbreviations

AEC	U.S. Atomic Energy Commission
AML	abandoned mine lands
AUM	abandoned uranium mine
AUMWG	Abandoned Uranium Mines Working Group
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWBS	Contract Work Breakdown Structure
DOE	U.S. Department of Energy
DRUM	Defense-Related Uranium Mines
EC	Environmental Compliance
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FOIA	Freedom of Information Act
FOP	Field Operations Plan
IWCP	Integrated Work Control Process
LCB	life-cycle baseline
LM	Office of Legacy Management
LMBC	LM Business Center
LMFSC	LM Field Support Center
LMOC	LM Operations Center
LMS	Legacy Management Support
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
PgMP	Program Management Plan
PL	Public Law
QA	quality assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Program Plan

QC	quality control
QMS	Quality Management System
RSA	risk scoring assessment
URP	Uranium Related Programs
USC	*United States Code*
USFS	U.S. Forest Service
V&V	verification and validation
WBS	work breakdown structure

Forms Referenced in This Manual

LMS forms are accessible on the **Document Management** homepage > **LMS Forms**.

DRUM Verification and Validation Work Plan Process (QA/QC)	LMS 4501 DRUM
Supplemental Emergency Response Information (SERI)	LMS 1415

Glossary

adit. A mine opening greater than 10 feet (ft) deep driven horizontally for the purpose of providing access to a mineral deposit.

attractive nuisance. A potentially hazardous object or feature that arouses curiosity to the point of enticing an individual into a potentially hazardous situation for the purpose of investigating the object or feature; features may include buildings and structures, adits or shafts, equipment, nearby springs or bodies of water shown on maps, or other attractions that could encourage an individual to spend time on a mine property.

closed. The egress condition of a single mine feature such as an adit or shaft with a barrier which prevents human access to the mine.

decline. A sloping, three-sided (two sides and a floor) excavation trending from ground surface elevation to a subgrade mine entrance.

disturbed area. The portion of the ground surface that is impacted by mechanical mining-related activities. The area includes mine entries, rim cuts, open pits, waste rock piles, topsoil, and overburden stockpiles. Roads providing access to mines and natural features such as ephemeral drainages are excluded from the disturbed area. Features associated with a mine, but which are separated from the disturbed area by undisturbed lands will be mapped as disparate, isolated portions of the disturbed area for purposes of completing the risk scoring assessment. Examples of such features may include vents, buildings, and waste rock piles.

drainage. A large-scale natural erosional feature present at a mine that existed before the mining disturbance (e.g., wash, ephemeral or perennial creek, canyon floor).

duplicate mine resolution. The resolution of duplicate mines is complete when two or more mines are reconciled into a single name and location. Irrelevant names and incorrect locations are removed from the Defense-Related Uranium Mines (DRUM) Program database. Merged duplicate records are documented using a certificate generated by the database titled the *Defense-Related Uranium Mines Program Verification and Validation Certificate of Completion: Merged Duplicates*.

ecological unit. A plant community that is distinct in terms of dominant species and successional stage from proximate communities within the mine disturbed area and surrounding undisturbed areas.

endangered species. Any species that is in danger of extinction throughout all or a significant portion of its range and that is protected by federal, state, or tribal statute.

engineered closure. A mine safety closure designed by a state or federal abandoned mine land program or equivalent. The closure may have been installed by an abandoned mine land program, a mining company, or other entities.

environmental sampling. A verification and validation (V&V) activity designed for the collection of soil, sediment, water, gamma radiation, or other environmental and ecological data at a mine.

environmental sampling completed. Environmental sampling at a mine is complete when the U.S. Department of Energy DRUM Program database is updated with field data collected by the Legacy Management Support contractor or obtained from an approved third party. V&V completion is documented when the database includes the date that field sampling occurred.

erosional feature. Small-scale erosion resulting in sediment transport of mined waste or disturbed soil from wind, water, or slope failure (e.g., rill, gully, unstable slope, soil piping, or sheet wash).

Field Operations Plan (FOP). A plan written to ensure that field teams are ready to perform their work as described in the appropriate campaign-specific V&V Work Plan before initiating field activities. FOPs are used to coordinate fieldwork and document that the necessary sampling and inventory preparations have been completed before deploying to the field. The FOP describes any deviation from the V&V Work Plan to the extent that such are anticipated before initiating environmental sampling work, lists the mines to be evaluated, describes the division of work tasks, identifies the inventory and environmental sampling responsibilities, and lists partner agency contacts and emergency response contact information.

habitat. A specific set of physical and biotic factors to which an individual, a species, or an ecological community is adapted.

hazard. A threat to physical safety of humans, the environment, or animals posed by conditions at a mine; something that can cause harm.

human use. Observable evidence of past and present human activity: Current activity might include mine inhabitation, recent campfire rings showing evidence of burning, or vehicle tracks, and past activity might include weathered foot or vehicle tracks, vegetative growth invading use areas, or relics such as weathered, discarded cans or trash. It is used in the context of the risk scoring assessment to partially describe degrees of mine occupancy.

inventory. A V&V activity designed primarily for the collection of observational data, such as the location of specific points or features at a mine. These geographic points may include the perimeter of the disturbed area, the crest and toe of a waste rock pile, or the location of a mine entry.

mine entry. A point at which people, wildlife, or materials can enter or leave an underground mine. Mine entries include adits and shafts but are not the same as ventilation raises meant for the intake or exhaust of mine air.

mine site location. A point at or immediately adjacent to a defense-related uranium mine from which most, if not all, mine features are visible.

mine size. Determined by the U.S. Atomic Energy Commission-documented quantity (tons) of uranium ore produced (DOE 1997). Mine sizes by production are as follows:

small mine = 0–100 tons of ore

small/medium mine = 100–1000 tons of ore

medium mine = 1000–10,000 tons of ore

medium/large mine = 10,000–100,000 tons of ore

large mine = 100,000–500,000 tons of ore

very large mine >500,000 tons of ore

needs maintenance. Status of a mine feature indicating that engineered abatement of physical hazards has been breached or otherwise damaged, and the engineering controls require maintenance to remain protective.

not addressed. Status indicating that no work has been conducted to reclaim or remediate the mine.

notifiable feature. A mining-related hazard that could pose a significant and immediate threat to a visitor who encounters such. Notifiable features may include subsidence areas, shafts, explosives, chemicals, or severely compromised structures.

open. The egress condition of a single mine feature such as an adit or shaft either without a barrier to human access or where underground mine workings may be observed from outside the mine without a safety closure being present.

operations not evident (ONE). Status of a reconciled mine location where no evidence of mining operations is apparent during completion of V&V activities.

physical feature. An excavation created for the purpose of exploring for, extracting, or developing an orebody and consequent openings in the ground surface which result from such activities. Examples of physical features include trenches, prospects, pits, shafts, adits, vents, and subsidences.

portal. A surface entrance to an adit.

potential wetland. An area with a vegetation type that is ecologically distinct from surrounding vegetation types because of surface water or shallow subsurface water. Potential wetlands are generally lusher and contain at least one wetland plant species (a plant classified as an obligate or facultative wetland species in the Arid West Region on the U.S. Army Corps of Engineers National Wetland Plant List).

prospect. A mine opening or excavation related to mining activities with a depth between 4 and 10 ft.

reclaimed. Mine description indicating that, in actions not performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), waste rock or other portions of the mine, such as roads or ponds, have been recontoured or graded to a stable

condition. The primary purpose of these actions is to minimize the potential for future erosion and make items blend with the original site topography. This may include covering the site with enough topsoil to enhance revegetation. Unless otherwise noted in a FOP, complete V&V activities as described herein are conducted at reclaimed mines.

reconciliation. The process of evaluating mine location data, U.S. Atomic Energy Commission production records, and other pertinent information for the purpose of correlating a specific mine with a specific geographic location.

remediated. Mine description indicating that, in CERCLA actions, response actions have been taken or Action Memoranda signed to mitigate the release or potential release of a CERCLA hazardous substance. The primary purpose of these actions is to mitigate potential risks to human health and the environment. Such actions include, but are not limited to, consolidation areas or repositories.

rim cut. A mining technique in which uranium ore is removed by relatively shallow underground extraction methods. Mining follows the trend of the ore-bearing formation parallel with the outcrop and generally occurs at or near the top of a cliff or slope.

risk. Potential exposure to health or environmental hazards posed by conditions at a mine.

safeguard. An engineered barricade constructed for the purpose of preventing site visitors from approaching or accessing a mine or mine feature. Some state and federal abandoned mine lands agencies refer to safeguards as "mine safety closures."

sediment shed. Earthen material transported from a disturbed area by aeolian or fluvial processes and subsequently deposited outside of the disturbed area of a mine.

shaft. A vertical excavation that provides access to an orebody, sometimes equipped with a hoist at the top that lowered and raised a conveyance for workers and materials at a mine.

shallow excavation. A horizontal or vertical excavation less than 4 ft deep which is associated with mining or exploration activities.

special-status species. Species listed as threatened or endangered or proposed for listing under the Endangered Species Act and species designated for special protection by states, tribes, and other agencies including the U.S. Bureau of Land Management and U.S. Forest Service.

structure. A building or building remnant originally constructed for the purpose of facilitating mining operations. Examples include former offices, ore bins and loadouts, stand-alone powder magazines, workshops, and equipment storage facilities.

subsidence. Downward deflection of the earth's surface as a result of a roof (back) failure in an underlying mine. The result of subsidence may be a shallow trench, a vertical hole, or a broad downward deflection on the ground surface. The subsidence feature might or might not be open to the underground mine workings.

threatened species. Any plant or animal species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and also protected by federal, state, or tribal statute.

trench. An excavation created for the purpose of exploring a potential ore-bearing formation. They are generally longer than wide and sometimes open at both ends.

utility task vehicle (UTV). Vehicle type that also includes off-highway vehicles and all-terrain vehicles that may engage in cross-country travel along roads not suitable for four-wheel-drive vehicles.

verification and validation (V&V). The DRUM Program process of verifying historic records and validating current mine conditions. Collectively, V&V is the process of reconciling mine data, inventorying mine features, performing environmental sampling, and documenting results in a database and report that provides a risk scoring assessment to land management agencies.

waste rock. Materials associated with an orebody of interest which, due to their subeconomic value, are disposed of onsite. Waste rock may contain constituents of interest and may exhibit elevated gamma radiation and thus is a focus of the DRUM Program.

waste rock crest. The area of topographic transition of a waste rock pile from a relatively flat surface to a downward trending slope. Generally, the crest is at or near the top of the waste rock pile and is accessible for environmental sampling.

waste rock toe. The area of topographic transition of a waste rock pile from a downward trending slope to a relatively flat surface below the crest. Generally, the toe of a waste rock pile is at or near the base of the pile.

Executive Summary

The *Defense-Related Uranium Mines Program Management Plan* (PgMP) provides the structure and basis for the U.S. Department of Energy Office of Legacy Management (LM) and its Legacy Management Support (LMS) contractor to manage the verification and validation (V&V) and risk evaluation of defense-related uranium mines (mines). The PgMP describes how LM, the LMS contractor, and partner agencies will work as a cohesive team to execute the Defense-Related Uranium Mines (DRUM) Program. The PgMP is a living document and will be revised as needed.

The purpose of conducting V&V activities is to evaluate and document the scope of the risks these mines pose. V&V activities fall into three primary stages: (1) reconciliation of mine location and production data; (2) field inventory and environmental sampling to screen for potential risks to public safety, human health, and the environment; and (3) reporting, which includes data management and risk evaluation.

The PgMP addresses V&V activities for the DRUM Program's three campaigns: public land (Campaign 1), tribal land (Campaign 2), and private property (Campaign 3). Whereas reconciliation efforts and field activities are similar across all three campaigns, the reporting stage differs because risks are evaluated differently. For each campaign, risk evaluation and reporting are based upon a unique set of exposure scenarios with established benchmarks. In all three campaigns, V&V reports are written for each mine. For Campaign 1, V&V reports are summarized in risk roll-up reports and shared with the land management agencies for use in safeguarding physical hazards associated with the mines. For Campaigns 2 and 3, V&V reports are summarized in hazard summary reports and shared with tribal agencies and private landowners, respectively. The hazard summary reports are used in safeguarding mine-related physical hazards.

The DRUM PgMP aligns with Goal 1 of the LM *2020–2025 Strategic Plan*,[1] "to protect human health and the environment." To achieve this goal, LM is partnering with state and federal agencies, tribal governments, and private landowners to implement the DRUM Program. In order to define these partnerships, LM entered into agreements with the various agencies to accomplish the work of the DRUM Program. These agreements require planning documents to specify how the work will be completed and to assign responsibility and authority to carry out those functions.

The DRUM Program schedule is to complete Campaign 1 V&V fieldwork by December 31, 2024; complete Campaign 2 V&V fieldwork by September 30, 2027; and complete Campaign 3 V&V fieldwork by September 30, 2028. Partner land management agencies began comprehensive safeguarding activities for Campaign 1 in October 2020, and will continue until the end of the program.[2]

[1] DOE (U.S. Department of Energy), 2020. *2020–2025 Strategic Plan*, DOE/LM-1488, Office of Legacy Management, January.

[2] *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan*, LMS/DRM/S33217, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

1.0 Purpose

The 2024–2030 *Defense-Related Uranium Mines Program Management Plan* (PgMP) presents the U.S. Department of Energy (DOE) Office of Legacy Management's (LM's) and Legacy Management Support (LMS) contractor's implementation strategy for the Defense-Related Uranium Mines (DRUM) verification and validation (V&V) program. This plan addresses V&V activities for the following three campaigns: public land (Campaign 1), tribal land (Campaign 2), and private property (Campaign 3). The PgMP is the primary guiding document of the DRUM Program, describing how LM, the LMS contractor, and partner agencies will work as a cohesive team to execute the program. The PgMP is a living document and will be revised as necessary.

2.0 Introduction

The DRUM Program PgMP supports LM's mission of protecting human health and the environment by addressing the environmental legacy of defense-related uranium mines (mines). This includes reconciling historical records to determine which locations need to be visited and which records are duplicates; conducting V&V activities to evaluate and document the scope of the risks and hazards these mines pose; developing risk screening scenarios for each campaign; conducting risk evaluations; compiling mine-specific V&V reports; and preparing risk roll-up and hazard summary reports.

The concepts outlined in the Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK Guide)* (PMI 2021) and *The Standard for Program Management* (PMI 2024) were considered in developing this plan. These guides focus on key concepts for successful program and project management with the most critical elements being thorough project planning and understanding organizational influences and project constraints. Other key elements are clearly defining the project scope and mitigating project risks. This updated PgMP reflects these key elements, including an initial evaluation of V&V activities on private property. The safeguarding of physical safety hazards based on DRUM Program evaluation is described in the *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* (LMS/DRM/S33217).

2.1 Background

The U.S. Atomic Energy Commission (AEC) was created in 1946 by the Atomic Energy Act (Title 42 *United States Code* Section 2011 [42 USC 2011 et seq.]). The mines that are the focus of the DRUM Program have a production history that is generally limited to 1947 to 1970 when uranium ore was sold to AEC for defense-related purposes. Following a brief transition period ending in the late 1960s, uranium ore production continued solely for commercial nuclear power purposes; therefore, a few of these mines remained in operation after 1970 (Figure 1).

The National Defense Authorization Act for Fiscal Year 2013 (Public Law 112–239 [PL 112–239]) mandated that DOE prepare a Report to Congress on abandoned uranium mines (AUMs). The act also requires consultation with other relevant federal agencies, affected states and tribes, and the interested public.

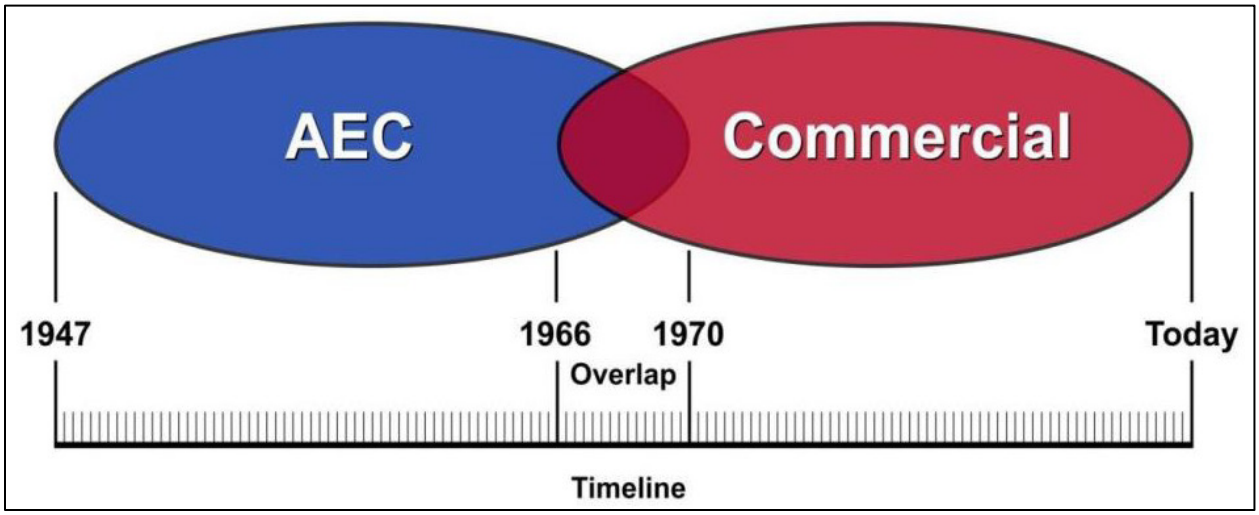


Figure 1. Timeline of Uranium Ore Production

In August 2014, LM submitted a report titled *Defense-Related Uranium Mines Report to Congress* (DOE 2014) (Report to Congress) that addressed the following:

- The location of mines on federal, state, tribal, and private lands and the status of efforts to remediate or reclaim these mines
- The extent to which these mines pose or may pose a significant radiation hazard or other public health and safety threat
- The extent to which these mines cause, or have caused, water contamination or other environmental degradation
- A priority ranking for the reclamation and remediation of these mines
- The potential cost and feasibility of reclamation and remediation in accordance with federal law

LM defines a mine as a feature or complex that is generally associated with a patented or unpatented mining claim (established under the General Mining Law of 1872, as amended) or a lease of federal, state, or tribal land (DOE 2014). Information available from AEC records and various federal and state agency databases, tribal abandoned mine lands (AML) programs, maps, and other documents identified 4225 mines across the United States. The DRUM reconciliation team's subsequent evaluation of historic records reduced the number of mines requiring V&V visits to 3073 as of May 14, 2024. Included in this total are 117 mixed-ownership sites that require two field visits to complete V&V activities for the entire mine. Thus, the total number DRUM field V&V visits to complete is 3190 (Table 1). In some cases, V&V inventory activities show that mine-related features unexpectedly lie outside the boundaries of a given property. This new information may result in mines being considered mixed-ownership rather than within a single campaign, resulting in changes to the total number of mines and V&V field visits in the affected campaigns.

Table 1. Summary of DRUM Program Reconciliation as of May 14, 2024

Total mine records[a]	4225
Duplicate records removed	(1126)
New mine records[b]	380
Deleted mine records	(7)
Total reconciled mine records	3472
Mines with no V&V visit required[c]	(399)
Mines requiring V&V visits[d]	3073
Mixed-ownership mines requiring two field visits[d,e]	117
Field V&V visits to complete[e]	3190

Notes:
[a] Number of mine records identified in the 2014 Report to Congress.
[b] Includes 40 EPA "orphan" mines added to the list of DRUM mines.
[c] Includes sites regulated under CERCLA, sites with active mining permits, unconventional sites, unlocatable mine records, and sites where access is denied.
[d] Includes one unconventional mixed-ownership site (Edna Mill Site [LM ID 6167]) visited by request.
[e] Includes 116 mixed-ownership sites (generally public and private) that require more than one field visit to complete V&V activities.

Abbreviations: CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; EPA = U.S. Environmental Protection Agency

After the Report to Congress, LM helped found the Abandoned Uranium Mines Working Group (AUMWG), which is composed of federal agencies including DOE, the U.S. Environmental Protection Agency (EPA), the U.S. Bureau of Land Management (BLM), the U.S. Department of the Interior, the U.S. Forest Service (USFS), the U.S. Department of Agriculture, the National Park Service (NPS), and the U.S. Bureau of Indian Affairs (BIA). Through the AUMWG collaboration, it was determined that many unknowns (e.g., actual number, status, location, ownership) still exist for mines on public land, tribal land, and private property. As a result, DOE entered into agreements with the various land management agencies to facilitate its capability to conduct V&V evaluations of the mines in the DRUM Program.

This collaborative effort with partner agencies led LM to develop a unique V&V Work Plan for each of the three DRUM campaigns. The V&V Work Plans describe the activities and data collection procedures required to assess potential risks to the public and the environment while adding to the body of knowledge of the mines visited.

2.2 Overview

The DRUM Program's first goal is to complete V&V fieldwork on mines on public land (Campaign 1) by December 31, 2024. Partner land management agencies began comprehensive safeguarding activities for Campaign 1 in October 2020 and will continue until the end of the program (LMS/DRM/S33217). The DRUM Program's second goal is to complete V&V fieldwork on mines on tribal land (Campaign 2) by September 30, 2027. Campaign 2 V&V fieldwork was initiated in August 2022. The DRUM Program's third goal is to complete V&V fieldwork on mines on private property (Campaign 3) by September 30, 2028. Campaign 3 V&V fieldwork began in March 2024. The distribution of V&V field visits by campaign is provided in Table 2.

Table 2. Mines Identified for V&V Field Visits by Campaign as of May 14, 2024

Campaign	Land Ownership Type	Total V&V Field Visits
Campaign 1	Public land	2330[a,b]
Campaign 2	Tribal land	210
Campaign 3	Private property	650[a,b]
Total V&V Field Visits		**3190**

Notes:
[a] Includes 116 public and private mixed-ownership sites.
[b] Includes one unconventional mixed-ownership site (Edna Mill Site [LM ID 6167]) visited by request.

Campaigns 1–3 involve the following activities: (1) reconciliation of mine location and production data; (2) field inventory and environmental sampling to screen for potential risks to public safety, human health, and the environment; and (3) reporting, which includes data management, risk evaluation, and report submission. Mine reconciliation involves the review of AEC records alongside available sources of information, such as maps, reports, and data from partner agencies, to determine land ownership and locations. V&V fieldwork (inventory and environmental sampling) confirms mine locations, collects mine feature information, evaluates potential physical and ecological safety hazards, samples for radionuclides and metals, and assesses risks posed by the mines. Data management involves managing a database that allows team members to access, analyze, revise, update, and add to the inventory and environmental sampling data, which will be shared with partner agencies. In all three campaigns, a V&V report is written and submitted for each mine within 120 business days of the V&V completion date. For Campaign 1, V&V reports are summarized in risk roll-up reports and shared with the land management agencies for use in safeguarding physical hazards associated with the mines. For Campaigns 2 and 3, V&V reports are summarized in hazard summary reports and shared with tribal agencies and private landowners, respectively. The hazard summary reports are used in safeguarding mine-related physical hazards.

To date, the program's focus has been on developing and implementing its approach to evaluating and reporting on the mines in Campaigns 1 and 2 and implementing Campaign 3. The primary challenge for Campaign 3 will be to adjust the Campaign 1 and 2 approaches to the requirements and conditions of conducting V&V work on private property. Figure 2 shows how the program and these projects will be managed through this PgMP.

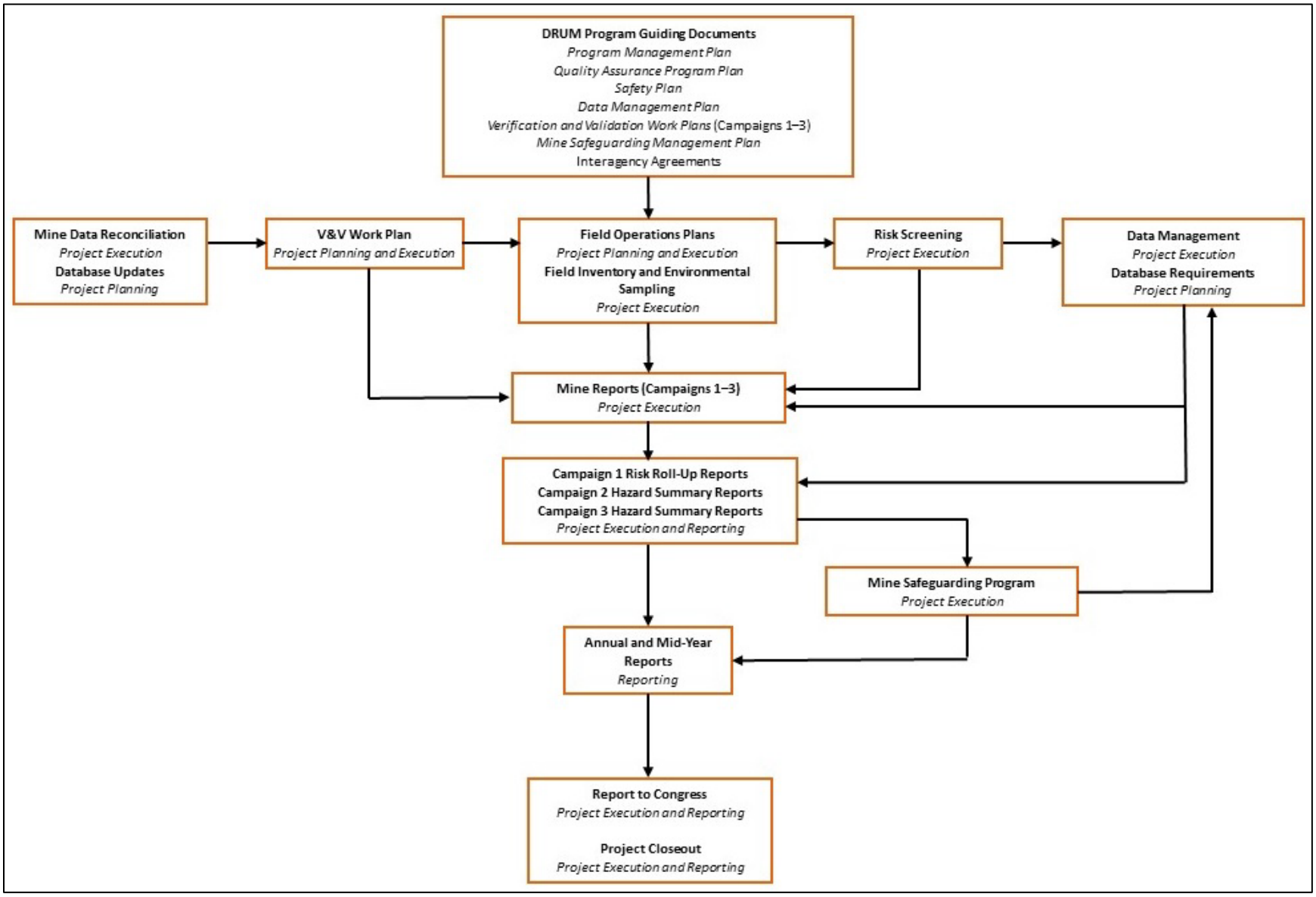


Figure 2. DRUM Program Flow Diagram

3.0 Program Authority

LM is authorized to conduct the DRUM Program by the following:

- National Defense Authorization Act for Fiscal Year 2013 (PL 112–239). DOE has the authority to undertake a review of AUMs that provided uranium ore for defense-related activities of the United States.
- Atomic Energy Act of 1954, as amended (42 USC 2011 et seq.). DOE is authorized to protect public health and safety through its activities.
- Department of Energy Organization Act (PL 95–91). DOE is established in the public interest and will promote the general welfare by assuring coordinated and effective administration of federal energy policy and programs.
- DOE is authorized to enter into agreements with other federal agencies to complete its functions. Certain other agencies (BLM and USFS) have authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 960 et seq.).

4.0 Goals and Objectives

The DRUM Program aligns with Goal 1 of the LM *2020–2025 Strategic Plan* (DOE 2020a) (Strategic Plan), "to protect human health and the environment." The DRUM Program's mission directly supports this goal by completing a multiphased approach to screening abandoned defense-related uranium mines, evaluating potential mine-related risks and hazards, and developing plans to safeguard the public from those risks and hazards.

To this end, the DRUM Program currently employs, or will employ, numerous strategies to fulfill its mission and meet Strategic Plan challenges, including the following:

- Work with other federal agencies and state and tribal governments to exchange mine information and leverage resources to address land management concerns
- Close data gaps and improve data quality and content in DOE's inventory of AUMs by completing location and production record reconciliation
- Collect site-specific data at each mine, including inventory and environmental sampling, to identify safety hazards or the potential release of contaminants
- Conduct site-specific screening-level evaluations, relative scoring, and ranking of mine risks and hazards
- Document the results of site-specific evaluations of potential risks and hazards
- Improve the data quality and content of the DRUM Program database and agency databases
- Provide land management agencies, including federal, tribal, and state governments, and private landowners with reports documenting and prioritizing the risks and hazards of each site visited and identifying specific features for safeguarding

5.0 Program Administration

5.1 Contract Management

Effective contract management ensures that LM and LMS managers, staff, and subcontractors know what DRUM Program activities and services are to be performed under the LMS contract. The process of contract work definition generally begins with LM direction and subsequent negotiations to the LMS contractor's preparation of detailed work packages. During negotiations with LM and work package preparation, the LMS contractor employs the following contract management instruments and prioritizes tasks to ensure that worker safety and environmental protection will not be compromised.

5.1.1 Procurement and Integrated Work Control Process (IWCP)

The *Procurement Manual* (LMS/POL/S04334) provides direction for the procurement of equipment, services, and subcontracts and ensures the most economic and efficient methods will be used to conduct DRUM Program work in accordance with the federal and prime LMS contract requirements, programmatic schedules, best commercial practices, and established safety and health requirements.

The *Integrated Work Control Process Manual* (LMS/POL/S11763) provides direction for initiating, authorizing, performing, and conducting work within the LMS Project Controls and Program Integration scope in the LMS contract. The IWCP defines the roles and responsibilities of the LMS DRUM Program staff and subcontractors, as applicable. The LMS organization may use subcontractors to provide services such as remotely piloted aircraft operation for data collection. Part of the subcontracting process is to identify hazards that the subcontractor may be exposed to while performing work and to communicate those hazards.

5.1.2 Contract Work Breakdown Structure (CWBS)

All LMS contract costs are categorized by CWBS, cost element, and organizational structure. For task assignment costing and performance measurement, all costs must be captured by the CWBS element.

CWBS accounting can be defined as the ability to account for all costs with the work breakdown structure (WBS) network. The network collects costs at the lowest level of the network (the work package) and rolls them into successively higher levels of the WBS network. Integrated work packages roll up to a control account managed by a control account manager. The CWBS is the official internal breakdown for the purposes of tracking approved DRUM Program work scope as well as budget and cost collection.

At the work package level, the definition of work must include sequence, schedule, task breakdown, labor, or any other details that specify how and when work will be performed. These details are used to determine the DRUM Program's standards and requirements for the work scope to analyze hazards, develop controls, and determine what skills and training are required. The LMS contractor also uses these details to ensure that the right resources are allocated to address safety, environmental, and operational considerations.

5.1.3 Performance Milestones

Contract performance milestones are events identified in the schedule baseline that mark the due dates for the accomplishment of specified efforts (work scope) or objectives. A milestone may mark the start, an interim step, or the end of one or more activities. There are four types of milestones used: performance evaluation and measurement plan, contract, baseline, and internal. Each has a set change control level and is used for tracking and reporting purposes.

LM establishes performance milestones for the DRUM Program to measure LMS performance on priority DRUM Program tasks and deliverables.

5.1.4 Budget and Cost Baseline

LMS work performance begins after LM has approved the contract task plan and contract funding has been received. Formal task order controls for funds management, accounting, work authorization, performance analysis, and reporting ensure completion of the technical work scope in a cost-efficient and timely manner. The contract budget baseline is associated with the baseline milestones, and performance is tracked using earned value management tools.

The *Project Management Control Systems Manual* (LMS/POL/S04330) and the *Finance and Accounting Manual* (LMS/POL/S04342) establish the requirements and responsibilities for management of LMS financial reporting. The LMS organization maintains an information system to identify, assemble, analyze, classify, record, and report its transactions, events, and conditions. Management is responsible for appropriately communicating to give employees an understanding of their roles and responsibilities regarding financial reporting objectives and controls.

5.1.5 Life-Cycle Baseline (LCB)

Contract LCB planning is the starting point for contract budget planning and is used throughout the planning cycle. LCB planning supports the LM organization and several of its orders and procedures by providing context for the budget and contract work prioritization and execution.

The near-term 5-year LCB lays out a strategy for how the LMS organization will support LM in implementing the DRUM Program. The 5-year LCB will include all scope elements described in this plan.

5.1.6 Baseline Change Proposals

The LMS change control procedure is a formal, documented process in which changes are proposed to a task order budget or performance measurement baseline. The LMS Uranium Related Programs (URP) manager would initiate a baseline change proposal when a potential scope, schedule, budget, or other performance measurement baseline change has been identified and obtain technical direction from LM for the requested baseline change. By following the directions in the *Project Management Control Systems Manual*, the URP manager will ensure that an accurate and complete baseline change proposal form has been prepared.

5.2 Schedule

5.2.1 Contract Schedule

Contract schedules will be developed that are consistent with the CWBS, integrated with the cost baseline, and representative of all site and activity work scope. An approved schedule baseline that clearly depicts critical path activities and milestones will be established as part of the annual budgeting process.

5.2.2 Program Schedule

The program schedule is a collaborative effort by LM and the LMS contractor to plan key tasks, determine start and end dates, and identify interdependencies with other schedule tasks. Critical milestones and deliverables are also identified. The program schedule is updated regularly and shared with partner agencies for communications and coordination. Figure 3 presents the DRUM Program schedule.

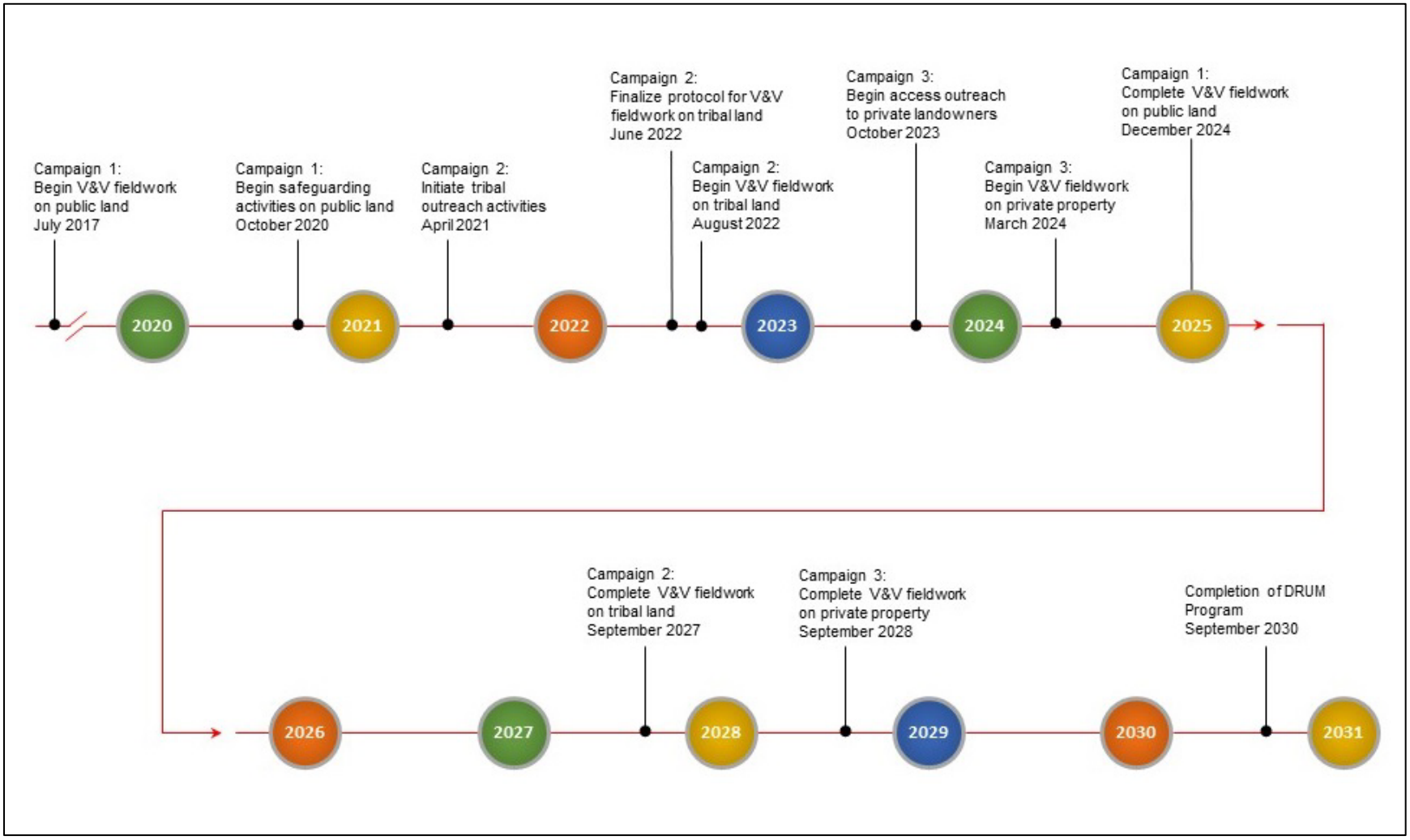


Figure 3. Program Schedule

5.3 Records Management

The *Records and Information Management* (LM-Policy-1-11-1.0) policy establishes the requirements and responsibilities for the management of LM and LMS records. Records created or received during performance of the DRUM Program are maintained at the LM Field Support Center (LMFSC) at Grand Junction, Colorado, and at the LM Business Center (LMBC) at Morgantown, West Virginia. A DRUM Program LM file plan provides structure for developing and implementing continuous, systematic, and cost-effective controls over each phase of the records life cycle: creation or receipt, maintenance and use, and disposition.

A project-specific file plan identifies the records to be generated, file locations, and retention schedule for DRUM Program records. The file plan is augmented by the *Records and Information Management* LM policy, which establishes the requirements for preparing, preserving, and storing records. Project personnel work with the Records Management lead to ensure that project records are correctly identified and maintained in accordance with the applicable file plan. Modifications to the file plans shall be submitted to the Records Management lead and are subject to review and approval by the URP manager.

All records generated during the DRUM Program, including analytical reports, field data sheets, field calibration records, trip reports, chain-of-custody forms, and data validation documentation are stored electronically in a task-specific folder in a protected network location.

6.0 Program Scope

The primary goal for Campaign 1, mines on public land, is to complete V&V fieldwork by December 31, 2024. Additional goals may be developed, and the scope may be further refined.

For Campaign 2, mines on tribal land, V&V fieldwork began in August 2022 and is scheduled to be completed by September 30, 2027.

For Campaign 3, mines on private property, V&V fieldwork began in March 2024 and is scheduled to be completed by September 30, 2028. However, in 2017–2019 and before the official beginning of Campaign 3, V&V activities were conducted at four mines on private property at the request of the landowner and adjacent land management agency. These mines are now categorized as Campaign 3.

6.1 Program Implementation

DRUM Program implementation requires program documents to specify how LMS functions are to be completed and to identify who has the responsibility and authority to complete those functions. Depending on the complexity of the document, it may specify the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work. The documents indicate how responsibilities flow from management to workers and down to subcontractors or suppliers, as applicable.

The LMS Project Controls and Program Integration group includes the DRUM Program. Project management personnel are responsible for setting priorities, project management and planning, reporting, client interface, regulatory interface, and work authorization.

6.2 DRUM Program Plans

The activities performed as part of the DRUM Program are covered under multiple plans that provide specific guidance and direction in the performance of a task or project activity. These plans include campaign-specific V&V Work Plans (DOE 2024a; DOE 2024b; DOE 2024c), the *Defense-Related Uranium Mines Quality Assurance Program Plan* (LMS/DRM/S15867) (QAPP), the *Defense-Related Uranium Mines Safety Plan* (LMS/DRM/S15804), the Field Operations Plans (FOPs), the *Defense-Related Uranium Mines Data Management Plan* (LMS/DRM/S19467) (Data Management Plan), and the *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan*. A brief summary of each plan is provided below.

6.2.1 Campaign-Specific V&V Work Plans

The campaign-specific V&V Work Plans provide data objectives, direction, and methodologies regarding how LM and partner agencies will collect, store, and report information gathered during V&V activities. This includes digital mine-related feature inventories, radiological survey data, soil and water sample data, photo documentation of mine-related features, in-field and office-based data quality assurance (QA) procedures, and reporting. The V&V Work Plans are updated annually to account for lessons learned from the previous field season.

6.2.2 Quality Assurance Program Plan

The QAPP ensures that environmental data collected during V&V activities at a mine will be of sufficient quantitative and qualitative value for use in determining whether data quality objectives are being met. The QA data provided to partner agencies will supplement existing documentation of the mine conditions.

6.2.3 Safety Plan

The *Defense-Related Uranium Mines Safety Plan* provides for the requirements of the LMS Worker Safety and Health Program and the Integrated Safety Management System, which are the high-level programs that encompass DRUM Program worker safety and health and set forth the parameters for how the LMS contractor integrates safety into program activities.

6.2.4 Field Operations Plans

The FOPs provide the details of activities to be performed on land administered by partnering agencies within discreet operational areas. Each FOP provides contact information for the relevant personnel at LM, the LMS contractor, and partner agencies; the mines where V&V activities will be performed; information pertinent to mine access; and special circumstances and restrictions that need to be addressed before, during, or after V&V activities. Each FOP directs field personnel to a *Supplemental Emergency Response Information (SERI)* form (LMS 1415) that provides detailed emergency contact information for local law enforcement agencies and

locations of and directions to nearby medical facilities relevant to where V&V activities are being performed.

6.2.5 Data Management Plan

The Data Management Plan describes the tasks, processes, and procedures for managing DRUM data. This plan identifies responsibilities, outlines data sources and locations, and provides insight regarding quality control (QC) checks, capabilities, and database queries.

6.2.6 Safeguarding Management Plan

The *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* was issued in 2021 to support LM and land management agencies' efforts to safeguard mine-related physical hazards identified during DRUM Program V&V activities.

6.3 Program Management

Program management includes the functional support of Safety and Health, QA, Environmental Compliance (EC), Public Affairs, and budgeting and scheduling. Program management includes the development and revision of program-related documents to support the DRUM Program. Program management also implements the PgMP and requirements of the prime LMS contract.

7.0 DRUM Program Approach

LM is partnering with state, federal, and tribal land agencies and private property owners to implement a coordinated, multiyear DRUM Program. The purpose of the program is to conduct V&V activities and risk screening for mines on public land (Campaign 1), tribal land (Campaign 2), and private property (Campaign 3). The total number of V&V field visits to complete is 3190 as of May 14, 2024. The distribution of V&V field visits by campaign is provided in Table 2. The methodologies for accomplishing these tasks are outlined in Sections 7.1, 7.2, 7.3, and 7.4 and in V&V Work Plans specific to each campaign (DOE 2024a; DOE 2024b; DOE 2024c).

In addition to the project approach described thus far, the following activities are needed to successfully implement the DRUM Program:

- Developing, updating, and finalizing memoranda of understanding (MOUs) and Cooperative Agreements with other federal agencies and state and tribal AML offices
- Identifying, exchanging, and discussing land management agency objectives, expectations, and data requirements
- Developing DRUM Program documents that support joint AML efforts with federal, tribal, and state agencies
- Developing discreet operational areas to conduct mine inventory and environmental sampling activities
- Refining and managing the DRUM Program database to accommodate new data collection, analysis, and reporting

- Sharing information and data with partner agencies
- Conducting public outreach activities for the DRUM Program
- Participating in the AUMWG

7.1 V&V Process

The purpose of the V&V process is to associate a specific mine location with specific mine production records, then to perform a screening-level field evaluation of each mine to verify the mine location and collect data pertinent to mining-related features (e.g., location information, physical and ecological hazards, gamma radiation, and waste rock chemistry). The data are used to evaluate risks and hazards associated with each mine visited.

Details of the screening level approach are included in the campaign-specific V&V Work Plans, which are updated annually to incorporate new scenarios encountered by the V&V field teams. The major V&V activities are briefly described in the following sections.

7.1.1 Mine Reconciliation

AEC production records are used to identify defense-related uranium mines. These data are supplemented with information from federal and state agency databases, tribal AML programs, input from private companies and public entities, maps, and other documents.

The reconciliation process includes verifying the existing mine location information, merging of duplicate mine production records, and establishing the locations of new mines. The mine location reconciliation process is most efficient when mines in a geographic area or mining district are considered together. Once available information for a particular mine is gathered and evaluated, the mine is assigned a specific geographic location and associated production record, and the DRUM Program database is modified to reflect this information. Detailed information regarding the reconciliation process is included in the campaign-specific V&V Work Plans.

7.1.2 V&V Fieldwork

The purpose of V&V fieldwork is to complete a screening-level assessment of mine conditions at the time of a site visit. This evaluation comprises two components: inventory and environmental sampling. The purpose of the mine inventory is to document the location and condition of mining-related features, particularly those that pose health and safety hazards. The purpose of environmental sampling is to document conditions pertaining to potential human health and environmental risks and hazards resulting from gamma radiation or chemical constituents. Environmental sampling activities include gamma radiation surveys and soil and water sampling. Risk screening is conducted to help the appropriate land management agency prioritize potential future site activities, including construction of safeguards. These activities are performed by LMS personnel with input and review by LM and partner agencies. Environmental sampling activities also include data analysis, and the results are incorporated into the risk screening. Detailed information regarding inventory and environmental sampling work is included in the campaign-specific V&V Work Plans.

7.1.2.1 Soil Sampling

Soil samples are collected from most waste rock piles and from a designated background location for a mine or a group of mines. Soil samples may be collected from ephemeral drainages if the gamma radiation survey and visual evidence indicate that elevated radiological material has migrated from the mine into nearby drainages or onto the surrounding landscape. Detailed information regarding soil sampling is included in the campaign-specific V&V Work Plans.

7.1.2.2 Water Sampling

Water sampling is performed at mines where surface water is either associated with the mine (e.g., water exiting an adit) or may be impacted by mining. Surface water sampling provides a "snapshot in time" analysis of water chemistry. Detailed information regarding water sampling is included in the campaign-specific V&V Work Plans.

7.1.2.3 Gamma Radiation Surveys

Gamma radiation surveys are performed at each mine to establish general exposure rates and to identify areas with elevated gamma radiation levels that could pose potential risks to the public. The gamma radiation survey identifies the spatial variability of radionuclides in soil (primarily uranium ores) due to natural mineralization in the area and the distribution of waste rock materials. Using GPS location data, survey results depict the extent and magnitude of gamma radiation levels at the mine minus background levels. Detailed information regarding gamma radiation surveys is included in the campaign-specific V&V Work Plans.

7.1.3 Risk Screening

The DRUM Program risk screening process is designed to systematically evaluate risks using consistent standards while also providing some flexibility given the variability of individual mine sites. The risk screening for each mine involves evaluating physical safety hazards as well as potential radiological and chemical hazards to human health and the environment. The rating for each risk category relies on a "multiple lines of evidence" approach based on field observations, field data, laboratory data, or established radiological and chemical constituent of interest screening levels.

This approach focuses on the physical safety hazards and potential exposures to gamma radiation or chemical constituents, then uses modifying factors such as mine accessibility to evaluate the probability that the hazards or risks may occur. The risk screening information for the individual mines is incorporated into risk roll-up or hazard summary reports completed according to FOP (or other geographic area). The risk roll-up or hazard summary reports are provided to land management agencies, tribal agencies, or private landowners to facilitate future decisions regarding potential further action at the mines. Detailed information regarding the risk screening process is included in the campaign-specific V&V Work Plans.

Whereas physical safety hazards are evaluated according to the same criteria across all three campaigns, potential radiological and chemical risks are evaluated differently in Campaign 1 compared to Campaigns 2 and 3 due to different exposure scenarios. For Campaign 1 mines, exposure is based on a recreational-use scenario, which is defined as 2 weeks of exposure per year

by a recreationist (camper) for 26 years (24 years as an adult and 2 years as a child). However, for Campaign 2 and 3 mines, exposure is based on the EPA's regional screening levels for a residential scenario, which assumes an exposure duration of 350 days per year for 26 years (20 years as an adult and 6 years as a child).

7.2 Campaign 1: V&V Evaluation of Mines on Public Land

Campaign 1, V&V evaluation of mines on public land, is an ongoing process that began in 2017. Campaign 1 V&V fieldwork is scheduled to be completed by December 31, 2024. Table 3 shows the status of Campaign 1 by land management agency as of May 14, 2024.

Table 3. Mines on Public Land as of May 14, 2024

Land Management Agency	Mines to be Visited	Mines Completed	Mines Remaining
BLM	1568	1554	14
U.S. Bureau of Reclamation	2	2	0
U.S. Department of Defense	1	1	0
Local	3	0	3
Mixed (both public)	216	213	3
Mixed public and private (public portion only)[a]	117	110	7
NPS	35	35	0
State	84	74	10
U.S. Fish and Wildlife Service	2	2	0
USFS	302	286	16
Total	**2330**	**2277**	**53**

Note:
[a] Includes one unconventional mixed-ownership site (Edna Mill Site [LM ID 6167]) visited by request.

7.3 Campaign 2: V&V Evaluation of Mines on Tribal Land

Mines on tribal land are unique compared to mines on public land. Although the methodology for screening for physical hazards is the same across Campaigns 1–3, the methodology for screening for potential radiological and chemical hazards is different for Campaign 2. For Campaign 1 mines, exposure to these potential environmental risks is based on the BLM recreational use scenario, whereas for Campaign 2 mines, exposure is based on the EPA residential scenario as described above in Section 7.1.3.

Campaign 2 V&V fieldwork began in August 2022 and is scheduled to be completed by September 30, 2027. Table 4 shows the status of Campaign 2 by tribe as of May 14, 2024.

Table 4. Mines on Tribal Lands as of May 14, 2024

Tribe	Mines to be Visited	Mines Completed	Mines Remaining
Navajo Nation	200	65	135
Pueblo of Laguna	3	3	0
Spokane Tribe of Indians	2	2	0
Hualapai Tribe	1	0	1
Pueblo of Zuni	1	0	1
Tohono O'odham Nation	1	0	1
Ute Indian Tribe of the Uintah and Ouray Reservation	1	0	1
Zia Pueblo	1	0	1
Total	**210**	**70**	**140**

7.4 Campaign 3: V&V Evaluation of Mines on Private Property

Campaign 3 of the DRUM Program refers to the implementation of V&V field activities and follow-up reporting at mines on privately owned property. The essential programmatic functions, assumptions, and activities implemented in Campaign 1 will be used at DRUM mines on private property. However, evaluation of potential radiological and chemical hazards will be based on the EPA residential scenario used in Campaign 2. To access DRUM mines on private property and carry out V&V activities, LM will need to complete access agreements with the landowners. It is anticipated that some landowners will provide access to LM while others will not. As a result, only a portion of the population of affected mines will ultimately be accessed and evaluated. The specific methodologies and potential outcomes of this targeted effort will be developed in consultation with state agencies.

Planning for Campaign 3 began in 2023. V&V fieldwork began in March 2024 and is scheduled to be completed by September 30, 2028. Table 5 shows the status of Campaign 3 by landowner as of May 14, 2024.

Table 5. Mines on Private Property as of May 14, 2024

Landowner	Mines to be Visited	Mines Completed	Mines Remaining
Private	533	11	522
Mixed public and private (private portion only)[a]	117	16	101
Total	**650**	**27**	**623**

Note:
[a] Includes one unconventional mixed-ownership site (Edna Mill Site [LM ID 6167]) visited by request.

7.5 Safeguarding of Physical Hazards at Mines

The screening-level V&V evaluations indicate that many mining-related physical features (e.g., adits, shafts, subsidences, and dangerous highwalls) may pose risks to the public. To mitigate these risks while preserving the historic significance and ecological resources of the

affected mines, LM initiated the DRUM safeguarding program to be conducted in collaboration with federal land management agencies and state and tribal AML programs. The *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* describes how the program is being implemented.

7.6 Data Management

The collection and management of high-quality data are critical to the success of the DRUM Program. To ensure consistency and accuracy of DRUM V&V data, LM implemented the Data Management Plan to describe data collection standards, general data organization, and data access protocols. The objectives of this plan are to (1) describe the life cycle of collected data from the source to their presentation in final reports or eventual export to partner agencies, (2) define data quality requirements and quality reviews for each mine site and feature type, (3) define metadata requirements for each mine site and feature, (4) describe data management processes and quality reviews, and (5) define the systems in which data will be stored.

The DRUM Program collects several different types of data, including reconciliation information (location, land ownership, mine production), spatial data (point, line, and polygon data), photographic data, analytical data (chemical and radiological), and ecological data. Details of data types, specific database storage locations, and data management are provided in the Data Management Plan.

7.7 Risk Roll-Ups and Hazard Summary Reports

In addition to mine-specific V&V reports, risk roll-up reports or hazard summary reports are prepared for groups of mines in each campaign. For Campaign 1, risk roll-up reports are prepared for groups of approximately 10–30 mines typically grouped by FOP, locality, state, or other criteria suggested by the land management agency. The objective of the risk roll-up reports is to categorize each mine based on physical hazards, long-term health risks (chemical and radiological), and modifying factors (accessibility and site use). These risk roll-up categories summarize which mines pose no hazards and may therefore be eliminated from future evaluation, which mines pose immanent threats to human health and the environment, and which mines fall somewhere in between. The risk evaluation process is described in detail in the *Defense-Related Uranium Mines Risk Screening Process* (DOE 2020b). Ultimately, the risk roll-up reports provide a structured framework for suggesting future actions to partner land management agencies (e.g., BLM).

For Campaign 2 and 3 mines, hazard summary reports are prepared based on physical hazards only. Unlike Campaign 1, long-term health risks (chemical and radiological) are not evaluated for Campaign 2 and 3 mines; however, analytical data from environmental sampling are provided in individual V&V mine reports.

8.0 Program Organization

The program organization structure defines the organizational elements necessary to plan and implement work. The LM Uranium Mine Team supervisor is responsible and accountable for program and project management, contractor oversight and performance evaluation, interagency

coordination, and overall success of the DRUM Program. The LMS URP manager is responsible and accountable for successful execution of the LMS contractor's program scope of work according to regulatory and contractual requirements. Figure 4 depicts the LMS program organizational structure and the collaboration between LM, the LMS contractor, and partner agencies.

In addition to the LM and LMS program organizations, partner agencies such as BLM, USFS, tribes, and state AML programs provide support to the DRUM Program. Examples of how partner agencies contribute to the program include providing LM and LMS personnel access to mines on land they manage and providing information regarding reclamation and remediation of specific mines.

8.1 Office of Legacy Management

The LM organization is managed from DOE Headquarters at Washington, D.C.; the LMFSC at Grand Junction, Colorado; the LM Operations Center (LMOC) at Westminster, Colorado; and the LMBC at Morgantown, Virginia. The DRUM Program operates out of the LMOC at Westminster and is managed by the LM Uranium Mine Team lead. The LM Uranium Mine Team consists of federal employees and support contractors who directly support the DRUM Program.

8.2 LMS Contractor

The LMS organization supports LM through project execution and ongoing LM program support functions as required by contract. The DRUM Program is part of the URP task order. The LMS lead for the DRUM Program is the URP manager, who in turn is supported by direct staff and mission support organizations. Field activities operate from the LMFSC at Grand Junction. The LMS DRUM Program organization chart is shown in Figure 4.

8.3 Roles and Responsibilities

LM consults with partner agencies to develop scope and projects for the LMS contractor. LM and partner agencies offer input on program and project documents, mine reconciliation efforts, location and scope of field projects, and schedules. LM provides direction to the LMS URP manager regarding what activities need to be conducted, and the LMS URP manager provides direction to LMS staff to execute the work. The roles and responsibilities of the partner agencies are identified in Section 8.5.

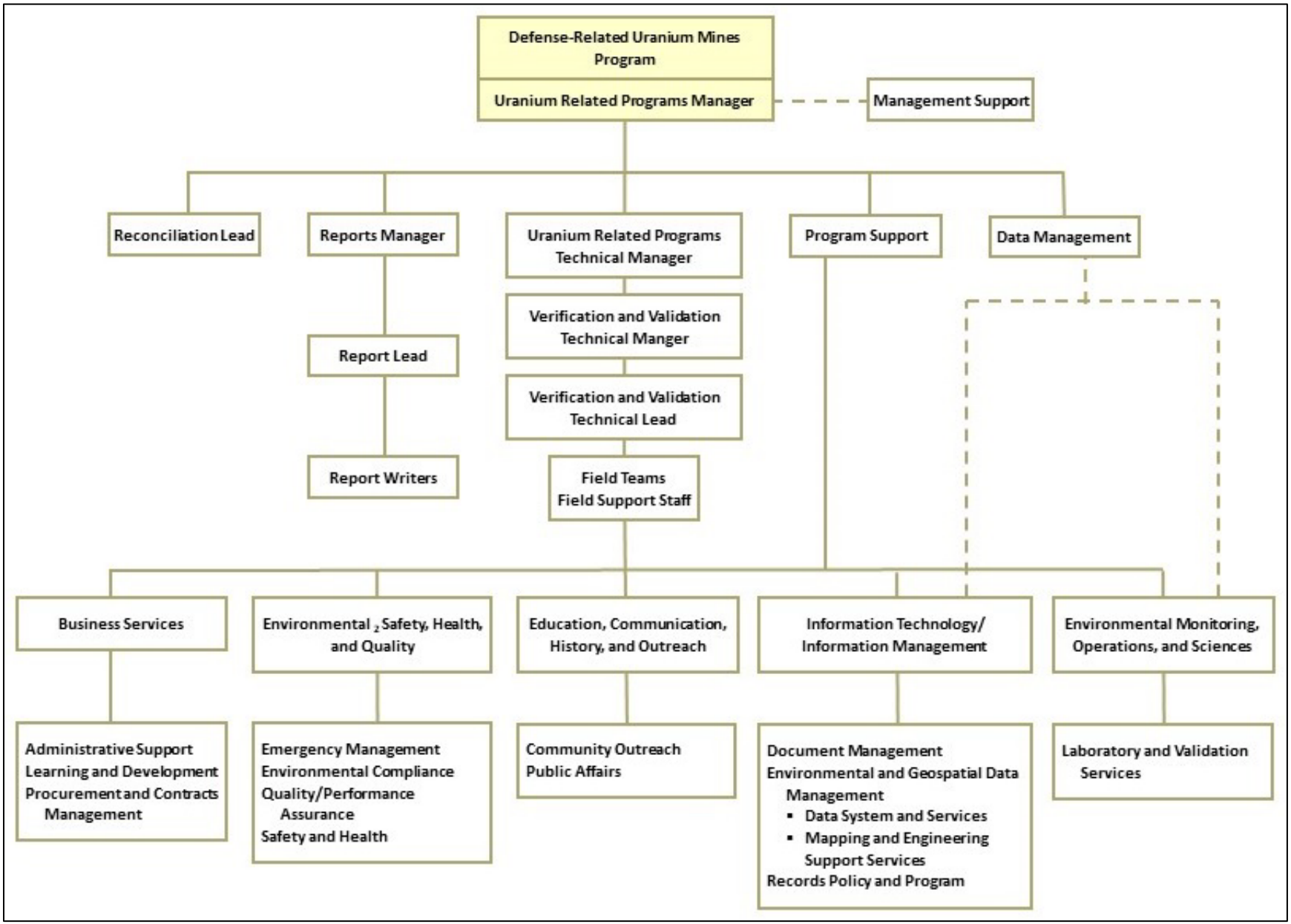


Figure 4. LMS DRUM Program Organizational Chart

8.4 DRUM Program Team

The DRUM Program team is composed of LM and LMS personnel who manage, oversee, perform, and report on all work activities. Table 6 provides a list of LM and LMS personnel roles and responsibilities for the DRUM Program team.

Table 6. DRUM Program Key Positions

Roles	Responsibilities
LM Positions (federal)	
Uranium Mine Team Supervisor	Program management, contract task management
Project managers	Development of agreements and management of project activities in assigned state, tribal, and agency areas
Technical manager	Scientific support and guidance
Data manager	Management of the DRUM Program database upgrades and oversight of data management activities
LMS Positions (contractor)	
URP manager	Program and project management
URP technical manager	Programmatic coordination and support
Reconciliation lead	Reconciliation of mine locations, project-related references, and field team support
Radiological control manager	Implementation of 10 CFR 835[a] and LMS *Radiological Control Manual*[b]
Safety and Health specialist	Project safety and health requirements and oversight
V&V technical manager	Daily project direction, project updates, and scheduling
DRUM technical manager	Oversight of data collection methods, instrumentation, and data quality
QA specialist	QA program and project oversight
EC specialist	EC program and project support
Asset Management	Mine access agreements
Public Affairs specialist	Public Affairs program and project support
Records Policy and Program specialist	Records Policy and Program and project support
Project controls analyst	Budget and schedule program support
Data manager	Maintenance of the DRUM Program database, database support, and creation of tables and figures for miscellaneous activities and reports
Reports manager	Management of report writers and reports process
Reports lead	Managing reports process and safeguarding
Report writer	Development of program and project reports
Field team lead	V&V team member directing all field activities
Radiological specialist	V&V team member providing radiological surveys
Field team ecological specialist	V&V team member providing ecological and environmental support
Field team geologist	V&V team member providing soil sampling and overall support

Notes:
[a] Title 10 *Code of Federal Regulations* Section 835 (10 CFR 835).
[b] *Radiological Control Manual* (LMS/POL/S04322).

8.4.1 LMS Staffing

The LMS organization employs a diverse team of professionals who directly support the DRUM Program out of the LMFSC at Grand Junction. V&V work is done by five field teams, each composed of a team lead, a geologist, an ecologist, and a radiological specialist. V&V reports are developed and compiled by report writers and a report coordinator with support from the Document Management group for formatting and technical editing. Other support includes Risk Management, Data Management, QA, Public Affairs, Asset Management, Environmental Compliance, and Records Policy and Program. These activities are supported by two administrative staff members who help track, organize, and facilitate all DRUM Program activities.

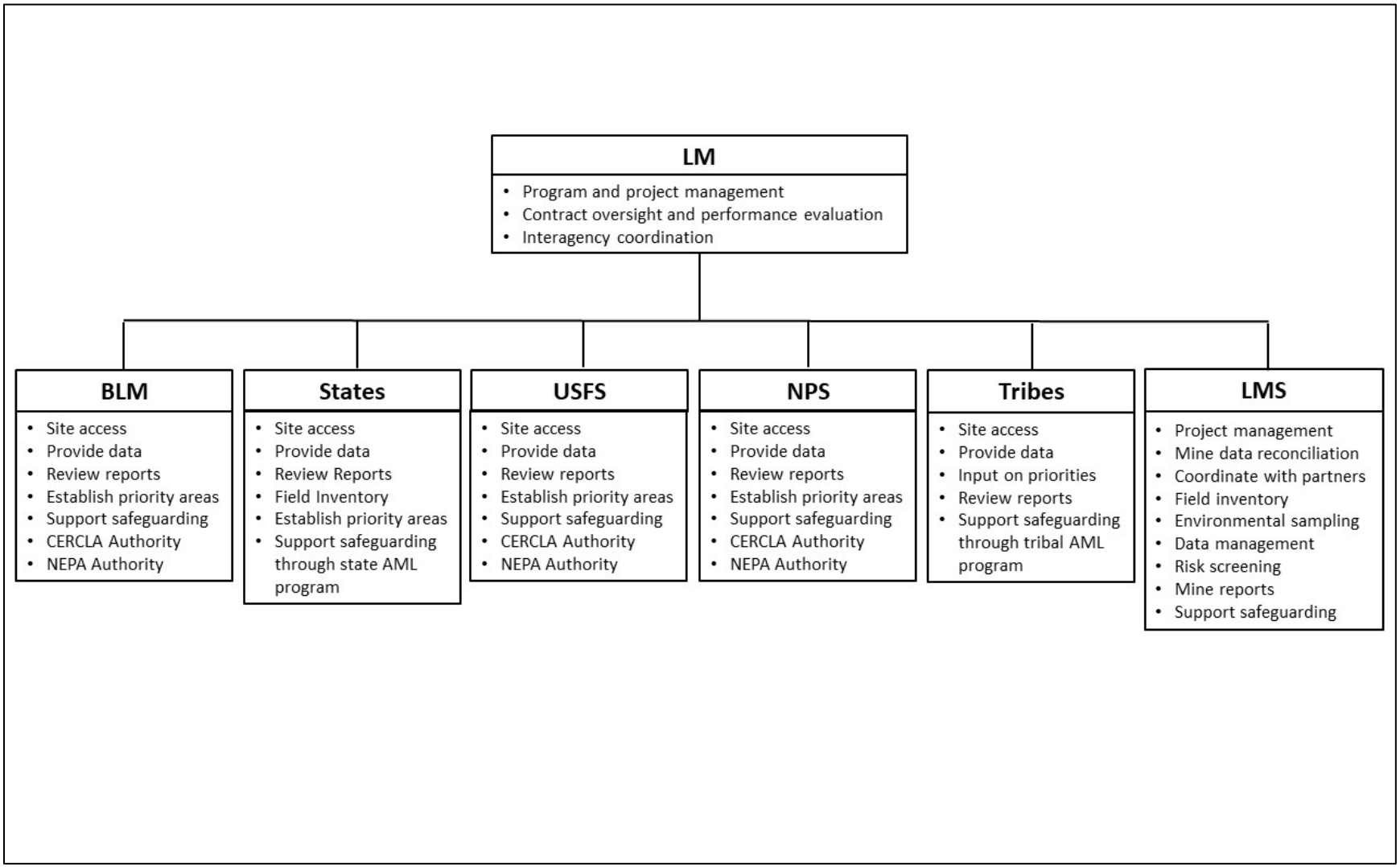
8.4.2 LM and LMS Subcontractor Staffing

Aside from the LMS organization, other contractors support the DRUM Program. For example, SHB Inc. provides radiological expertise in areas such as risk-based screening thresholds and instrumentation, and TI Verbatim Consulting, Inc. performs QC checks of the V&V reports produced by LMS personnel.

8.5 Interagency Roles, Responsibilities, and Agreements

8.5.1 State and Tribal Agencies

The LMS contractor works or will work with state and tribal AML programs to perform field inventory activities (Figure 5). Some state AML programs have the authority to conduct activities on private property, which will facilitate inventory work at mines identified as having private or mixed ownership. Tribal AML programs have direct knowledge of past reclamation efforts at mines on tribal land. This knowledge will facilitate V&V work. Engaging the states and tribes early in the process allows for coordinated field activities that maximize time and resources.



Abbreviation: NEPA = National Environmental Policy Act

Figure 5. Collaboration Between LM, the LMS Contractor, and Partner Agencies

8.5.2 U.S. Bureau of Land Management

BLM state offices are the primary contact for V&V efforts on BLM-managed public land. BLM state and field offices work with LM and the LMS contractor on mine reconciliation and coordinating access for LMS personnel to conduct V&V activities. BLM authorities that support the DRUM Program include the following:

- Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.)
  - BLM has broad authority to manage public land and to protect public health and welfare from risks associated with abandoned mines on public land. BLM is authorized to enter into agreements with other federal agencies to carry out its responsibilities to manage public land.
- Surface Resources Act of 1955 (30 USC 611 et seq.)
  - BLM has broad authority to address an abandoned mine opening on an active mining claim staked after 1955 provided the proposed closure work does not endanger or materially interfere with actual, established prospecting, mining or processing operations, or reasonably incidental uses. BLM is authorized to take the necessary steps to protect public safety and prevent further unnecessary and undue degradation caused by abandoned mines.
- CERCLA, as amended[1]
  - BLM is authorized to undertake response actions to investigate the release or threat of release of hazardous substances on or from sites under its jurisdiction, custody, or control.

For mines on BLM-administered land, BLM has the governing National Environmental Policy Act (NEPA) (42 USC 4321 et seq.) responsibility and authority to determine the need for NEPA evaluation.

8.5.3 U.S. Forest Service

The relevant USFS regional office is the primary contact for V&V efforts in national forests. USFS regional and district offices work with LM and the LMS contractor on mine reconciliation and coordinating access for LMS personnel to conduct V&V activities. USFS authorities that support the DRUM Program include the following:

- Federal Land Policy and Management Act of 1976
  - USFS has broad authority to manage the public forest system and to protect public health and welfare from risks associated with abandoned mines on public land. USFS is authorized to enter into agreements with other federal agencies to carry out its responsibilities to manage forest system lands.
- National Forest Management Act of 1976 (PL 94–588)
  - USFS has broad authority to restore land disturbed by historic mining activities and to protect public safety from the risks associated with abandoned mines on public land.

[1] The DRUM Program is limited to field inventory and environmental sampling at mines. These activities are not subject to CERCLA requirements. However, CERCLA may be invoked if the release or threat of release of a hazardous substance exists at a mine.

- CERCLA and authorities as delegated by Executive Order (EO) 12580, *Superfund Implementation*[1]
  - As a CERCLA lead agency, USFS is authorized to undertake response actions to investigate the release or threat of release of hazardous substances on or from sites on USFS-managed land according to EO 12580.

For mines on USFS-administered land, USFS has the governing NEPA responsibility and authority to determine the need for NEPA evaluation as necessary.

8.5.4 National Park Service

The NPS Intermountain Region AML coordinator will be the primary contact for V&V efforts on NPS public land (national park units). The NPS Natural Resource Stewardship and Science Directorate Geologic Resources Division and individual park units work with LM and LMS personnel on mine reconciliation and coordinating access for LMS personnel to conduct V&V activities. NPS authorities that support the DRUM Program include the following:

- National Park Service Organic Act (54 USC 100101 et seq.)
  - NPS has broad authority to manage public land and to protect public health and welfare from risks associated with abandoned mines on national park units. NPS is authorized to enter into agreements with other federal agencies to carry out its responsibilities to manage public land.
- CERCLA[1]
  - NPS is authorized to undertake response actions to investigate the release or threat of release of hazardous substances on or from sites under its jurisdiction, custody, or control.

For mines on NPS-administered land, NPS has the governing NEPA responsibility and authority to determine the need for NEPA evaluation.

8.5.5 Other Agencies

The LMS contractor will work with other federal agencies, such as BIA, EPA, and state or tribal agencies, to facilitate V&V activities. These and other federal, state, and tribal agencies may have information pertaining to access routes, land ownership, and past reclamation or remediation activities. Utilizing the expertise and knowledge of other agencies facilitates an efficient one-government approach to DRUM project management.

8.5.6 Abandoned Uranium Mines Working Group

LM leads the federal AUMWG. Federal agencies represented include DOE, EPA, BLM, the U.S. Department of the Interior, USFS, the U.S. Department of Agriculture, BIA, and NPS. The AUMWG agencies use a coordinated approach to share expertise, exchange technical and administrative information, and leverage resources to address problems posed by AUMs. The DRUM Program sites are a subset of AUMs. The AUMWG updated the *Abandoned Uranium Mines Working Group Addressing Health and Safety Risks of Abandoned Uranium Mines*

[1] The DRUM Program is limited to field inventory and environmental sampling at mines. These activities are not subject to CERCLA requirements. However, CERCLA may be invoked if the release or threat of release of a hazardous substance exists at a mine.

Multiagency Strategic Plan in 2022 (AUMWG 2022). This strategy is accompanied by an action plan that identifies what the agencies will accomplish each fiscal year. The action plan calls for the physical inventory, assessment, reclamation, and remediation of AUMs posing the greatest risks to human health, safety, and the environment. The DRUM Program helps LM achieve the goals established in the action plan.

9.0 Reporting

Reporting is an important function of the DRUM Program because it tracks progress in meeting program milestones and achievements. Mine-specific V&V reports provide LM and partner agencies with information to make decisions regarding safeguarding hazardous physical features and evaluating potential environmental risks at mine sites. LM requires status updates on the progress of DRUM Program activities, early notification of imminent hazards discovered at any mine, reconciled historical mine data, V&V activities, and annual program reports.

9.1 Program and Project Status

DRUM Program progress will be reported within LM and the LMS contractor to partner agencies. Periodic meetings and teleconference calls with LM, the LMS contractor, and partner agencies will be used to communicate the details and status of DRUM Program activities. LMS personnel will provide LM with information regarding V&V projects and mine-specific reports on a regular basis, and LM will update partner agencies as needed. Weekly teleconference calls between LM and LMS personnel will also provide updates on programmatic issues, discuss field activities and scheduling, and plan future work.

9.2 Reconciled Historical Mine Data

Reconciled mine data will be reported by LMS personnel to LM, showing the progression of reconciliation efforts. Upon completion of reconciliation activities in specific areas, LMS staff will prepare a list with reconciled mine data. The list will be used by LM and LMS personnel for V&V project planning and will be provided to partner agencies.

9.3 V&V Reports

V&V reports will be written and submitted for each mine within 120 business days of the V&V completion date.

9.3.1 Campaign 1: Reports for V&V Work on Public Land

Campaign 1 V&V reports include a general description of the DRUM Program, a summary of mine reconciliation information, methodology of equipment used for V&V work, a compilation of mine features and site photographs collected during V&V activities, and environmental sample results. Also included in each V&V report is a risk scoring assessment (RSA) of physical feature hazards and potential human health risks associated with long-term exposures (gamma radiation, chemical constituents, and radium-226). The potential human health risks for mines on public land are compared to benchmarks associated with a recreational use scenario (exposure duration of 14 days per year for 26 years). The RSA and other V&V report content provides

partner land management agencies sufficient flexibility to establish priorities and develop decisions relative to the mines based on their needs, requirements, and budget. The V&V reports also provide the data used in the risk roll-up reports.

9.3.2 Campaign 2: Reports for V&V Work on Tribal Land

Campaign 2 V&V reports follow a similar format to those of Campaign 1. Both campaigns use the same RSA approach in assessing observable physical hazards at each mine. However, in Campaign 2, in addition to the recreational use scenario, multiple residential use scenarios are used to evaluate long-term exposures (gamma radiation, chemical constituents, and radium-226), which are captured in soil sample results tables and bar charts in the V&V report. This approach provides sufficient flexibility to allow tribal and U.S. governmental agencies to establish priorities based on their needs, requirements, and budgets. The V&V reports also provide the data used in the hazard summary reports.

9.3.3 Campaign 3: Reports for V&V Work on Private Property

V&V reports for Campaign 3 will follow the same format as those of Campaign 2. For all three campaigns, the same RSA approach is used to assess observable physical hazards at each mine. As with Campaign 2, the recreational use scenario and multiple residential use scenarios are used to evaluate long-term exposures (gamma radiation, chemical constituents, and radium-226) captured in soil sample results tables and bar charts in the V&V reports. This approach provides sufficient flexibility to allow landowners and U.S. governmental agencies to establish priorities based on their needs, requirements, and budgets. The V&V reports also provide the data used in the hazard summary reports.

9.4 Semiannual and Annual Program Reports

The semiannual and annual program reports provide LM with a detailed summary of DRUM Program activities and achievements for the appropriate calendar year. The annual report will discuss the administrative, reconciliation, field inventory, and V&V activities which were performed during the reporting period. The semiannual report will be an interim progress update.

10.0 Environmental Management System (EMS)

The EMS, which is jointly run by LM and the LMS contractor, is integral to LM's mission to achieve excellence in environmental stewardship. The EMS is a systematic process for reducing environmental impacts that result from LM work activities and services and for helping achieve the intended outcomes for compliance obligations, environmental performance, and environmental objectives. The EMS has two areas of focus: environmental compliance and environmental sustainability. The environmental compliance component implements federal, state, tribal, and local regulatory requirements, agreements, and permitted activities. The environmental sustainability component promotes and integrates sustainability initiatives into all phases of work. The joint LM/LMS EMS applies to all personnel performing work related to the LM mission.

The EMS implementation strategy is documented in the following manuals:

- The *Environmental Management System/Energy Management System Description* (LM-Procedure-3-20-12.0, LMS/POL/S04346) describes the mechanisms for implementing the EMS
- The *Environmental Protection Manual* (LMS/POL/S04329) provides an overview of environmental compliance requirements that are applicable to LM and LMS work activities
- The *Environmental Instructions Manual* (LMS/POL/S04338) provides instructions to implement environmental compliance, including procedures for reviewing environmental requirements, transportation and packaging, waste management, recycling electronic equipment, chemical inventory, spill response, reporting, and project and activity evaluations
- The *EMS Sustainability Teams Manual* (LM-Manual-3-20.3-1.0, LMS/POL/S11374) describes the EMS sustainability teams, EMS support teams, and project teams

EMS authorities for the DRUM Program are described below. The LMS contractor manages the work it performs in a manner that protects natural and cultural resources in accordance with federal, state, local, and tribal laws; regulations; DOE policy; and DOE orders and EOs.

10.1 Environmental Compliance

10.1.1 NEPA Compliance

NEPA requires an environmental review for any action that occurs on federal land, any federally funded action, or any federal decision that would result in impacts to the environment. The federal agency taking the action or making the decision must conduct and document the NEPA review. DRUM Program work is conducted with partner agencies with roles and responsibilities described through MOUs. Information from partner agencies' NEPA documents may be used, as appropriate, in DOE's NEPA evaluations for the DRUM Program. At times, DOE may not be the federal agency taking the action. In this case, the lead agency responsible for the action would complete the NEPA review and documentation. DOE is responsible for completing NEPA reviews for actions on state lands, tribal lands, and private property. DOE's NEPA responsibilities are summarized in DOE Policy 451.1, *National Environmental Policy Act Compliance Program*, and DOE's NEPA implementation procedures are described in Title 10 *Code of Federal Regulations* Section 1021 (10 CFR 1021), "National Environmental Policy Act Implementing Procedures."

10.1.2 Cultural Resources

The most comprehensive policy concerning the protection of cultural resources is the National Historic Preservation Act (NHPA) (16 USC 470 et seq.). LM's *Cultural Resources Management Plan* (LM-Plan-3-3-1.0, LMS/PRO/S07371) cites foundational cultural resource laws and regulations, outlines a consistent approach for managing cultural resources, and includes considerations related to Indigenous peoples. Section 106 of the NHPA provides protocols for any DRUM action that has potential to affect historic properties, culturally significant artifacts, or other cultural resources. These potential impacts are identified during the NEPA review for the proposed action. During the project planning process, partner agencies, tribes, or both are

consulted regarding whether the proposed actions could impact historic properties or culturally significant artifacts.

10.1.3 Other Environmental Requirements

Natural resources potentially affected by DRUM activities include vegetation, wildlife, and Waters of the United States, including wetlands. Laws protecting these resources include the Endangered Species Act (16 USC 1531 et seq.), Migratory Bird Treaty Act (16 USC 703–712), Bald and Golden Eagle Protection Act (16 USC 668), and Section 404 of the Clean Water Act (33 USC 1251 et seq). Other potential environmental requirements related to DRUM activities include waste management, spills, and hazardous material transportation. The NEPA review would identify environmental requirements and the associated mitigation measures that must be followed during DRUM actions. Environmental concerns specific to the partnering agencies, tribes, or both would be considered during the planning and consultation phase of work.

The V&V Work Plans and the *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* provide more information on compliance with applicable laws.

10.2 Environmental Sustainability

The environmental sustainability area of the EMS promotes and integrates initiatives such as energy and natural resource conservation, waste minimization, and the use of sustainable products and services in all phases of work. U.S. General Services Administration vehicle management is integrated with the vehicle and fuel use requirements. Utility task vehicle fuel use is also subject to reporting requirements for the EMS Vehicle and Fuel Use Team. To support other goals of EMS sustainability teams, DRUM personnel practice water conservation, waste minimization, pollution prevention, and recycling whenever possible during work.

11.0 Quality Assurance

The *Quality Assurance Manual* (LMS/POL/S04320) (QAM) describes a Quality Management System (QMS) that incorporates the requirements of International Organization for Standardization (ISO) 9001:2015; DOE Order 414.1D Chg 1 (Admin Chg), *Quality Assurance*; and other customer-requirement documents. The QMS describes a “Plan-Do-Check-Act” cycle that promotes continuous improvement in all work activities. Any work performed by or for the LMS contractor must comply with the QMS requirements. Elements of the QMS apply to all activities and all LMS contractor work. The achievement of quality is the responsibility of those who manage and, most importantly, those who perform the work. Employees are expected to perform their jobs in accordance with procedures and other requirements.

11.1 Quality Assurance Program Plan

The DRUM QAPP is intended for use by partner agencies and LMS personnel performing various tasks, such as evaluating historical information, collecting new data, and preparing reports for the DRUM Program.

The ultimate success of the DRUM Program depends on the quality of the environmental data collected and used in decision-making. Key components of successful data collection may depend on the adequacy of the QAPP and its effective implementation. All parties involved in the DRUM Program (e.g., data users, data producers, decision-makers) are involved in the planning process to ensure that their needs are adequately defined and addressed.

11.2 Quality Assurance Requirements

The data collection design process includes the establishment of performance objectives, the design of field sampling methods and procedures, sample handling and custody, analytical test methods, data validation and verification methods, techniques for assessing limitations on data use, data management, and data reporting to satisfy the performance objectives. QA/QC checks will be performed by appropriate DRUM personnel at each step of the V&V process to verify that all necessary information has been properly collected and recorded for each mine evaluated. The QA/QC checks are documented using the *DRUM Verification and Validation Work Plan Process (QA/QC)* (LMS 4501 DRUM) (Process Form), or electronic equivalent, to provide accountability and assurance that data quality checks have been completed as described in the V&V Work Plans.

11.2.1 Data Management

All DRUM data will be subjected to a variety of QA/QC processes, including visual representations, automated tools, and manual processes that check for completeness, accuracy, and internal consistency. Additionally, chemical data that will be used to characterize environmental conditions must be validated and qualified according to the *Environmental Data Validation Procedure* (LMS/PRO/S15870). Data will be validated, and qualifiers will be added or a reanalysis requested if the data do not meet the specific QA/QC checks. Prescriptive rules and statistical analyses are used to determine the qualification method. Only data deemed acceptable by the data validation processes will be accepted for use.

Upon completion of QA/QC checks, the Process Form, or electronic equivalent (Section 11.2), will be used to document the completion of each of the QA/QC process on a mine-by-mine basis.

11.2.2 Lessons Learned

The lessons learned (operational experience) system disseminates lessons learned from past activities for the improvement of work processes, equipment operation, quality, safety, and cost-effectiveness. The DRUM Program will document lessons learned from ongoing V&V efforts and incorporate lessons learned from other programs.

11.3 Assessments

Assessments, which are evaluations of the conduct of DRUM work tasks, should be conducted at a frequency commensurate with the risk and importance of the activity or as dictated by a requirement. They must also be conducted using criteria describing acceptable work performance and should promote continuous improvement. Assessments identify issues, opportunities for improvement, noteworthy practices, lessons learned, or problems that hinder the organization

from achieving its objectives. Assessments will be planned, scheduled, conducted, and tracked according to the requirements outlined in the QAM.

DRUM management will work with the QA representatives to plan yearly assessments based on the criteria listed above. The scope of the assessments should highlight the highest risks of nonconformance in the program and what areas may have opportunities for improvement. The assessment plan will generally be a combination of management assessments and surveillances. The DRUM Program may also be subject to independent assessments, external assessments, or supplier evaluations (as described in the QAM).

11.3.1 Management Assessments

Management assessments are performed by management or its delegates and involve management teams evaluating company systems or issues, management at any level evaluating operations under its responsibility, compliance groups evaluating activities or projects, and personnel or independent assessors (as assigned by management) evaluating an activity. The program manager is responsible for developing an annual schedule for performing management assessments within the organization and submitting those assessments to the QA manager for inclusion in the integrated assessment schedule.

11.3.2 Surveillances

Surveillances are smaller scale assessments in which real-time activities are monitored and observed to verify that an item or activity conforms to procedures, practices, or other specified requirements. Surveillances are process- and activity-oriented. Surveillances need not be on the assessment schedule before being conducted or reported. Surveillances are subject to a graded approach planning process as described for other types of assessments.

12.0 Safety and Health

Protection of the safety and health of workers and the public is the prime consideration during all LMS contractor activities. In addition to the application of laws, regulations, orders, and standards to LMS activities, plans and procedures have been developed and implemented for the safety and health of workers, the public, and the environment. These plans and procedures include the *Worker Safety and Health Program (10 CFR 851)* (LMS/POL/S14697), the *Integrated Safety Management System Description for LMS in Support of DOE Legacy Management Sites* (LMS/POL/S14463), the *Environmental Management System/Environmental Management System Description*, and the *LMS Safety and Health Program* (LMS/POL/S20043). All employees shall adhere to the requirements of these plans and procedures. In addition, the *Defense-Related Uranium Mines Safety Plan* will be followed during the performance of V&V activities.

12.1 Personnel Protection

Employees shall follow good safety, industrial hygiene, and radiation protection practices and procedures to ensure that personal exposure to radiation, chemicals, toxic materials, and other

personnel hazards is kept as low as reasonably achievable. Operations personnel shall do the following:

- Adhere to posted personal protection requirements and observe proper practices and precautions
- Correctly use appropriate monitoring instruments and take appropriate action in response to monitoring or system status indicators
- Be aware of personal exposure, such as radiological or chemical exposures, and take appropriate action to minimize exposures
- Be knowledgeable of the requirements listed in work control documents, such as workflow documents and job safety analyses
- Promptly report protection deficiencies and hazards to their immediate supervisors, Safety and Health personnel, or the site operations lead; in addition, operators should take appropriate immediate action to reduce or correct hazards
- Inform the site operations lead before performing activities that could significantly change facility or site conditions
- Wear required personal protective equipment as designated in the job safety analyses

12.2 Radiological Protection

It is the policy of the LMS contractor to conduct radiological operations in a manner that ensures the safety and health of all its employees, subcontractors, and the general public. In achieving this objective, the LMS organization ensures that radiation exposures to its workers and the public and releases of radioactivity to the environment are maintained below regulatory limits and that efforts are taken to further reduce exposures and releases to levels as low as reasonably achievable. The LMS contractor is fully committed to implementing a radiological control program of the highest quality that consistently reflects this policy.

V&V work performed at mines will also follow the requirements of the *Radiation Protection Program Plan* (LMS/POL/S04373) and the *Radiological Control Manual* (LMS/POL/S04322). Specific requirements, limitations, goals, and actions associated with radiation protection for this project are defined in the *Defense-Related Uranium Mines Safety Plan*. Fieldworkers will wear dosimeters to evaluate their radiological exposure. If dosimeters are not available, handheld gamma radiation instruments will be used instead.

13.0 Program Risk Management

The *Integrated Risk Management Plan* (LMS/POL/S27671) defines the risk-management strategy to ensure that the LMS contractor incorporates appropriate, efficient, and cost-effective measures to mitigate the impact of risks to programs and projects. This strategy includes assessing the probability of a major event negatively impacting the program and the uncertainty associated with the assumptions and costs of performing the planned activities. An analysis of the potential for risk not covered in budget estimates and schedules provides the program manager an opportunity to develop mitigating measures to reduce the probability or severity of a risk to the program goals.

13.1 Statement of Risk

The DRUM Program is currently authorized to perform V&V work to collect additional field data at mines on public and tribal land and private property. Campaign-specific risks are mitigated primarily through the implementation of approved V&V Work Plans. The biggest uncertainty for achieving the LCB goals is likely to be the availability of requested outyear funding. The DRUM Program's potential risks and mitigation measures are summarized in Table 7.

Table 7. Program Risk Screening

Potential Risk	Mitigation Measures
Funding	Staffing, scope, or schedule reduction (or more than one of these)
Partner agency roles and responsibility	MOUs, V&V Work Plans
Stakeholders	Communication plans
Staff turnover	Mentoring program, auxiliary staffing
Litigation	Regulatory authority, data quality
Approved access to mines	Early and documented communication with landowners

Safeguarding activities introduce additional risk, especially with regard to funding, partner agency contracting capabilities, and environmental review responsibilities. These risks are defined and mitigation measures discussed in the *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan*. As the DRUM Program conducts V&V activities across all three campaigns, the probability will increase that one or more of the issues identified as potential risks will occur. However, the overall DRUM Program risk is to be considered moderate.

14.0 Program Communications

This program requires effective and comprehensive communication to be successfully completed. The organizations involved in the program include LM, the LMS contractor, partner agencies, tribal organizations, and private landowners. This section describes how effective communications will occur within and among these organizations.

14.1 Internal LM Communication

LM will have weekly team meetings in which programmatic issues are addressed, current activities are reviewed, and planning for future work is discussed. A shared network drive provides a repository for DRUM Program reports and other technical information pertinent to the program.

14.2 Partner Agencies and Private Landowner Communication

LM will communicate with its partner federal, state, and tribal agencies (collectively referred to as "partner agencies") and private landowners through a mix of meetings, conferences, briefings, telephone calls, emails, and the LM public website. LM will work with partner agencies and

private landowners to determine the scope of work to be performed, including the discrete FOPs where V&V activities will be performed, any specific actions required that are not part of the V&V Work Plans, specific reporting requirements, and any other requirements that are necessary. At a minimum, LM will provide regular status updates to brief relevant partner agencies and private landowners regarding locations where current and anticipated V&V activities are being performed and which V&V reports are complete. The LMS contractor will communicate and work directly with the partner agencies' representatives and private landowners in the field.

14.3 LM and LMS Communication

LM and LMS team meetings will be held via teleconference or in person on a triweekly basis or more often if needed. Continual interaction between LM and LMS team members to work on specific work products, exchange ideas, and discuss issues is key to the program's success. Weekly status tracking will be used to determine which mines are in progress and which are complete. Formal communication tools, such as monthly financial reporting, as required by the prime LMS contract, will be utilized.

14.4 Internal LMS Communication

Sustained integration of safety and environmental management requires teamwork and mutual understanding between workers and management. Teamwork and understanding can be promoted only through effective communication that flows both up and down through the organization. The LMS organization is committed to ensuring effective communication. Managers participate in weekly field team meetings; each worker can communicate directly with the LMS program manager and other managers if concerns cannot be resolved at the line management level. All workers have access to the LMS contractor section of the LM Portal, which is used to communicate organizational goals, achievements, or concerns and current versions of environment, safety, and health policies and procedures. Workers are asked to participate in safety and health planning, including the development of hazard controls. Worker feedback is actively solicited. The Employee Concerns Program is an additional mechanism for communication within the organization.

Communication between field team leads and the V&V lead will be held as often as necessary to ensure that V&V activities are proceeding as directed, identify issues that may arise during fieldwork, and ensure that direction is provided on the performance of field activities, as needed.

14.4.1 Weekly Team Meetings

Routine staff meetings are conducted by all levels of LMS contractor management. Meetings between the program manager and senior staff are held regularly. Information is provided to staff members during routine group meetings. Pertinent safety information that comes from staff meetings at any level is communicated to field personnel during the next pre-job briefing.

14.4.2 Pre-Job Briefings

A pre-job briefing is an interactive discussion between the line manager and work participants regarding the work scope, hazards, mitigations, and responsibilities associated with an activity.

Initial pre-job briefings are conducted for large or complex projects to ensure that all personnel performing, overseeing, or supporting work activities understand the project requirements. Initial pre-job briefings cover additional information that is not required during routine daily pre-job safety meetings. Pre-job safety meetings cover both daily pre-job briefs and routine LMS activities (e.g., field data collection or site reconnaissance).

15.0 Public Relations

The LMS Public Affairs program includes national, intergovernmental, and local stakeholder involvement; public affairs and outreach; and community involvement required for the acquisition, maintenance, dissemination, and delivery of program and project knowledge and information. The *Public Affairs Manual* (LMS/POL/S11690) describes the responsibilities of, requirements of, and procedures followed by the Public Affairs program.

The policy of LM and the LMS contractor is that public involvement must be a routine component of program operations and planning activities. The purpose of this policy is to bring a full range of diverse stakeholder viewpoints and values into the decision-making process early, enabling LM to make better decisions and build mutual understanding and trust among LM, the LMS contractor, and the public.

Because the DRUM Program involves working on land managed by other federal, state, and tribal agencies, most public affairs activities (public meetings, release of statements to the press, etc.) will be coordinated with those agencies.

15.1 Freedom of Information Act (FOIA)

The DOE Office of Information Resource Management is responsible for administering policies, programs, and procedures to ensure the agency's compliance with FOIA (5 USC 552). This is often described as the law that keeps citizens knowledgeable about their government and provides any person with the statutory right to obtain access to government information in executive branch agency records.

All FOIA requests received by the program are directed to the FOIA coordinator and follow protocols established by LM. The investigatory records, specifically mine locations and features, captured by the DRUM Program using GPS could reasonably be expected to endanger the life or physical safety of any individual if disclosed. These mines are considered attractive nuisances because they have openings, structures, equipment, and objects that are both dangerous and irresistibly inviting or intriguing to the public. The condition of these AUMs has the potential to cause serious bodily harm to the public, specifically recreators and tourists.

These AUMs are also of historical significance to the United States. As an outgrowth of the investigations undertaken by the DRUM Program, states such as Colorado are expressing their desire to establish historic mining districts that capture the rich history of mining for uranium ore for defense and commercial nuclear energy purposes. These historic mining districts will tell the tale of a state rich in precious minerals and provide a controlled means of touring the mines. To do so, the mines must be safeguarded to ensure public safety, and the mining structures,

equipment, and property must be preserved from theft and destruction. For these reasons, the mine locations and features should not be disclosed.

Additionally, mineral resources and deposits are commercially valuable, rare, and composed of mineral objects, and they often contain cultural resources or are cultural resources in themselves. Abandoned mine sites likewise contain mineral resources and cultural resources and often serve as habitat for threatened and endangered species. Disclosure of specific mine location information may lead to unauthorized extraction, vandalism, and theft and may have adverse consequences for human safety, cultural resource protection, and wildlife protection.

All FOIA requests received by the program are directed to the FOIA coordinator and follow protocols established by LM.

15.2 Stakeholder Inquiries

Public inquiries will be sent to the LM Uranium Mine Team lead (or delegated individual) to coordinate a response. The LM Uranium Mine Team lead will engage the LM Education, Communication, History, and Outreach Team as necessary. Some inquiries must be coordinated with the DOE Office of Congressional and Intergovernmental Affairs according to procedures described in *Processing Records Requests* (LM-Procedure-3-11-5.0).

15.3 Education and Outreach

The DRUM Program plans to explore opportunities to educate the public about the history of defense-related uranium mining across the nation. Uranium mining played a significant role in the nation's history during the World War II and Cold War eras. There are a number of communities that exist today because of the boom of the uranium mining industry. The goal is to ensure this history is not lost.

The DRUM Program will develop an education and outreach program that may include the designation of historical uranium mining areas on the Colorado Plateau and other geographic locations. These areas may be marked by interpretive signage, maps, and educational brochures. Further education and outreach programs could include additions to LM's oral history project and science, technology, engineering, and mathematics programming for K-12 and collegiate students.

16.0 Program Completion

The DRUM Program is focused on completing V&V fieldwork on mines on public land (Campaign 1) by December 31, 2024, completing V&V fieldwork on tribal land (Campaign 2) by September 30, 2027, and completing V&V fieldwork on private property (Campaign 3) by September 30, 2028. The program will be completed after these activities are concluded, which is scheduled for 2030.

16.1 Program Closeout

As described in the IWCP document, a program completion report may be required by the URP manager when the DRUM Program ends.

Periodic reporting to Congress will be made as the DRUM Program matures and individual campaigns are completed. Congressional overview reports pertaining to program accomplishments and findings will likely be compiled following the conclusion of each Campaign (V&V activities on public land, tribal land, and private property) and upon completion of the program.

16.2 Long-Term Responsibilities

Records will be retained in the LMBC until the established retention period has expired or transfer to another facility is required to comply with approved disposition. If transfer is required, Records Management personnel will perform the necessary tasks, as applicable, including acknowledgment of receipt.

17.0 References

10 CFR 835. U.S. Department of Energy, "Occupational Radiation Protection," *Code of Federal Regulations*.

10 CFR 1021. U.S. Department of Energy, "National Environmental Policy Act Implementing Procedures," *Code of Federal Regulations*.

5 USC 552. "Freedom of Information Act," *United States Code*.

16 USC 470 et seq. "National Historic Preservation Act," *United States Code*.

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

16 USC 703–712. "Migratory Bird Treaty Act," *United States Code*.

16 USC 1531 et seq. "Endangered Species Act," *United States Code.*

30 USC 611 et seq. "Surface Resources Act," *United States Code*.

33 USC 1251 et seq. "Clean Water Act," *United States Code*.

42 USC 2011 et seq. "Atomic Energy Act," *United States Code*.

42 USC 4321 et seq. "National Environmental Policy Act," *United States Code*.

42 USC 9601 et seq. "Comprehensive Environmental Response, Compensation, and Liability Act," *United States Code*.

43 USC 1701 et seq. "Federal Land Policy and Management Act," *United States Code*.

54 USC 100101 et seq. "National Park Service Organic Act," *United States Code*.

AUMWG (Abandoned Uranium Mines Working Group), 2022. *Abandoned Uranium Mines Working Group Addressing Health and Safety Risks of Abandoned Uranium Mines Multiagency Strategic Plan*, December 3.

DOE (U.S. Department of Energy), 2014. *Defense-Related Uranium Mines Report to Congress*, U.S. Department of Energy, August.

DOE (U.S. Department of Energy), 2020a. *2020–2025 Strategic Plan*, DOE/LM-1488, Office of Legacy Management, January.

DOE (U.S. Department of Energy), 2020b. *Defense-Related Uranium Mines Risk Screening Process*, LMS/DRM/S29603, Office of Legacy Management, May.

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

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

DOE (U.S. Department of Energy), 2024c. *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 3*, LMS/DRM/45113, Office of Legacy Management, April.

DOE Order 414.1D Chg 1 (Admin Chg), *Quality Assurance*, U.S. Department of Energy, archived April 25, 2011.

DOE Policy 451.1, *National Environmental Policy Act Compliance Program*, U.S. Department of Energy, December 21, 2017.

EO (Executive Order) 12580. *Superfund Implementation*, January 23, 1987.

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

LMS contract implementing documents, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Cultural Resources Management Plan, LM-Plan-3-3-1.0, LMS/PRO/S07371

Defense-Related Uranium Mines Data Management Plan, LMS/DRM/S19467

Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan, LMS/DRM/S33217

Defense-Related Uranium Mines Quality Assurance Program Plan, LMS/DRM/S15867

Defense-Related Uranium Mines Safety Plan, LMS/DRM/S15804

EMS Sustainability Teams Manual, LM-Manual-3-20.3-1.0, LMS/POL/S11374

Environmental Data Validation Procedure, LMS/PRO/S15870

Environmental Instructions Manual, LMS/POL/S04338

Environmental Management System/Energy Management System Description, LM-Procedure-3-20-12.0, LMS/POL/S04346

Environmental Protection Manual, LMS/POL/S04329

Finance and Accounting Manual, LMS/POL/S04342

Integrated Risk Management Plan, LMS/POL/S27671

Integrated Safety Management System Description for LMS in Support of DOE Legacy Management Sites, LMS/POL/S14463

Integrated Work Control Process Manual, LMS/POL/S11763

LMS Safety and Health Program, LMS/POL/S20043

Procurement Manual, LMS/POL/S04334

Project Management Control Systems Manual, LMS/POL/S04330

Public Affairs Manual, LMS/POL/S11690

Quality Assurance Manual, LMS/POL/S04320

Radiation Protection Program Plan, LMS/POL/S04373

Radiological Control Manual, LMS/POL/S04322

Worker Safety and Health Program (10 CFR 851), LMS/POL/S14697

PL 94–588. "National Forest Management Act of 1976," Public Law.

PL 95–91. "Department of Energy Organization Act," Public Law.

PL 112–239. "National Defense Authorization Act for Fiscal Year 2013," Public Law.

PMI (Project Management Institute), 2021. *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, seventh edition.

PMI (Project Management Institute), 2024. *The Standard for Program Management*, fifth edition.

Processing Records Requests, LM-Procedure-3-11-5.0, continually updated, prepared by the U.S. Department of Energy Office of Legacy Management.

Records and Information Management, LM-Policy-1-11-1.0, continually updated, prepared by the U.S. Department of Energy Office of Legacy Management.