

LM Plan: 3-23-1.0-0.0
LMS/DRM/S15809-1.0
Issue Date: 03/17/2020
Effective Date: 04/17/2020

Defense-Related Uranium Mines Program Management Plan

2020–2030



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Executive Summary

The Defense-Related Uranium Mines (DRUM) 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), risk evaluation, safeguarding, and LM monitoring and maintenance of defense-related uranium mines (mines). This PgMP describes how LM, LMS, and partner agencies will work as a cohesive team to execute the DRUM Program. The PgMP is a living document and will be revised as needed.

V&V activities are conducted to fully understand the scope of the risks posed by these mines by determining their location, reclamation or remediation status, and potential impacts on public safety, human health, and the environment. V&V efforts include reconciliation of the mine location and production data; field inventory; environmental sampling (gamma radiation surveys, soil sampling, and in some cases water sampling); risk screening; data management; and reporting. 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 risk evaluation involves compiling the risk-screening information gathered during V&V work into risk roll-up reports to recommend what actions may be needed to reduce the risks associated with these mines. The PgMP also provides a strategic outline for implementing safeguarding activities for physical safety hazards that have been identified during V&V activities and summarized in risk roll-up reports. Finally, as a follow-up to all these activities, LM will be implementing monitoring and maintenance of mines that undergo safeguard construction, which is also outlined in this plan.

The DRUM PgMP aligns with Goal 1 of the LM *2020–2025 Strategic Plan*.¹ Goal 1’s charge is “to protect human health and the environment.” To achieve this goal, LM is partnering with state and federal agencies to implement the DRUM Program. As part of this approach, LM entered into agreements with the various federal and state agencies to accomplish the work.

Implementing the DRUM Program requires planning documents to specify how the work will be completed and identify who has the responsibility and authority to carry out those functions. The overall schedule for the program is to complete V&V work on public land by end of fiscal year (FY) 2022, begin V&V work on tribal land in FY 2023, and conduct V&V work on private property starting in FY 2024. Comprehensive safeguarding activities are slated to begin in FY 2021, and monitoring and maintenance activities are scheduled to start in FY 2024. To date, the major focus has been on developing the program’s approach in order to better understand and evaluate the mines on public land. The challenge going forward will be to adjust these approaches to the requirements and conditions found on tribal land and private property. The other major challenge will be to develop a safeguarding program that protects the public from the hazards identified at the mines.

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

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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
FY	fiscal year
IWCP	Integrated Work Control Process
LCB	life-cycle baseline
LM	Office of Legacy Management
LMS	Legacy Management Support
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NPS	National Park Service
PgMP	Program Management Plan
PL	Public Law
PMBOK	Project Management Body of Knowledge
QA/QC	quality assurance/quality control
QAM	Quality Assurance Management
QAPP	Quality Assurance Program Plan
QMS	Quality Management System
SMCRA	Surface Mining Control and Reclamation Act
TAM	task assignment manager
USC	United States Code
USFS	U.S. Forest Service
V&V	verification and validation
WBS	work breakdown structure

Forms or Worksheets Referenced in This Manual

Forms or worksheets are accessible at the Document Management SharePoint page
> **Libraries** > **LMS Forms and Worksheets**

DRUM Verification and Validation Work Plan Process (QA/QC)

LMS 5401 DRUM

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1.0 Purpose

This 2020–2030 Defense-Related Uranium Mines (DRUM) Program Management Plan (PgMP) presents the U.S. Department of Energy (DOE) Office of Legacy Management (LM) and Legacy Management Support (LMS) contractor’s implementation strategy for the 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). In addition, it also addresses safeguarding physical safety hazards and monitoring and maintenance activities. This PgMP is the primary guiding document of the program. It describes how LM, the LMS contractor, and partner agencies will work as a cohesive team to execute the DRUM Program. This 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 and data to determine what locations need to be visited and which records are duplicates, conducting V&V activities to fully understand the scope of the problem posed by these mines, conducting a screening-level risk evaluation, developing mine-specific reports, developing risk roll-up reports for groups of mines, and safeguarding physical safety hazards.

The concepts outlined in the *Project Management Body of Knowledge (PMBOK Guide)* (PMI 2017a) and the Project Management Institute’s *Standard for Program Management* (PMI 2017b) were considered in developing this plan. These guides focus on the key concepts for successful program and project management with the most critical elements being thorough project planning and understanding the organization influences and project constraints. Other key elements are clearly defining the project scope and mitigating the project risks. This updated PgMP reflects all these key elements and includes an initial evaluation of the forthcoming phases of the program, including the upcoming campaigns on tribal land and private property, the safeguarding of physical safety hazards, and monitoring and maintenance.

2.1 Background

The U.S. Atomic Energy Commission (AEC) was created in 1946 by the Atomic Energy Act. The mines that are the focus of the DRUM Program have a production history that is generally limited to the period of 1947 to 1970 (Figure 1), which is when uranium ore was sold to AEC for defense-related purposes. Following a brief transition period, after 1970, uranium ore production was conducted solely for commercial nuclear power purposes. A few of the mines kept producing after 1970.

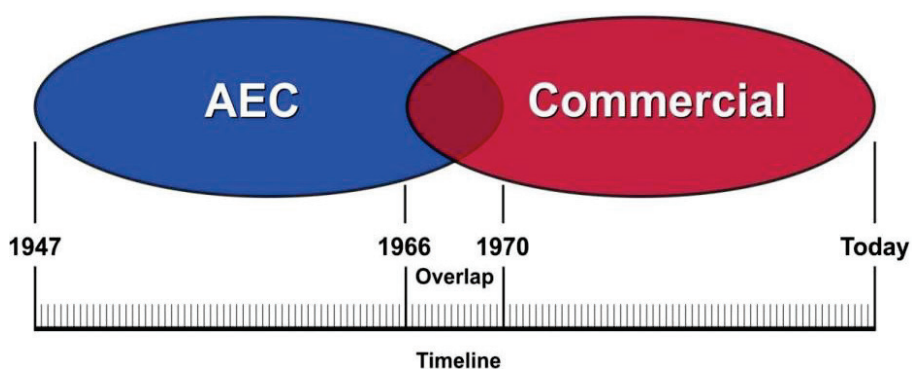


Figure 1. Timeline of Uranium Ore Production

The National Defense Authorization Act for Fiscal Year 2013 mandated that DOE prepare a report to Congress on abandoned uranium mines. The act also requires consultation with other relevant federal agencies, affected states and tribes, and the interested public.

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

- The location of mines on federal, state, tribal, and private land, and the status of efforts to remediate or reclaim these mines.
- The extent to which mines pose a significant radiation hazard or other public health and safety threat and cause, or have caused, water contamination or other environmental degradation.
- A priority ranking for the reclamation and remediation of 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 determined that approximately 4225 mines exist across the United States. It was further determined that an estimated 2500 of these mines are located on land mostly managed by the U.S. Bureau of Land Management (BLM) and the U.S. Forest Service (USFS).

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), BLM, the U.S. Department of the Interior, USFS, the U.S. Department of Agriculture, and the U.S. Bureau of Indian Affairs (BIA). Through the AUMWG collaboration, DOE, BLM, and USFS determined that many unknowns (e.g., status, location, ownership) still exist for the approximately 2500 mines on public land. As a result, DOE entered into agreements with the various federal and state agencies. The purpose of these agreements is to facilitate DOE's capability to conduct V&V evaluations of the mines located on public land.

This collaborative effort with partner agencies led LM to develop the *Defense-Related Uranium Mines Verification and Validation Work Plan* (DOE 2020) (V&V Work Plan) that describes the numerous activities and types of data to be collected that focus on assessing the risk to the public and environment, while adding to the body of knowledge for the mines visited.

2.2 Overview

The report to Congress provides the framework for the DRUM Program. The program's first goal is to verify and validate approximately 2500 mines located on public land by September 30, 2022, which is referred to as Campaign 1. Campaigns 2 and 3 are focused on conducting V&V activities on tribal land and private property, respectively. In addition, DOE will also be involved with safeguarding physical safety hazards that have been identified during V&V operations and conducting subsequent monitoring and maintenance of safeguarded mines. The three campaigns involve the following major activities: (1) mine data reconciliation; (2) field inventory and environmental sampling; (3) risk screening; (4) data management; and (5) reporting. Mine data reconciliation involves the review of AEC records alongside available information such as maps and reports and data from partner agencies to determine land ownership and locations. Field inventory and environmental sampling confirms the location of the mines, collects mine feature information, evaluates potential physical safety hazards, samples for radionuclides and metals, and assesses risks posed by the mines. Risk screening is a systematic approach to evaluate the risks associated with the mines. Data management involves managing a database that allows team members to easily access and analyze the data, revise existing data or add new data to the database, share data with partner agencies, and maintain the integrity of data and upkeep of the database. Figure 2 shows how the program and these projects will be managed through this PgMP.

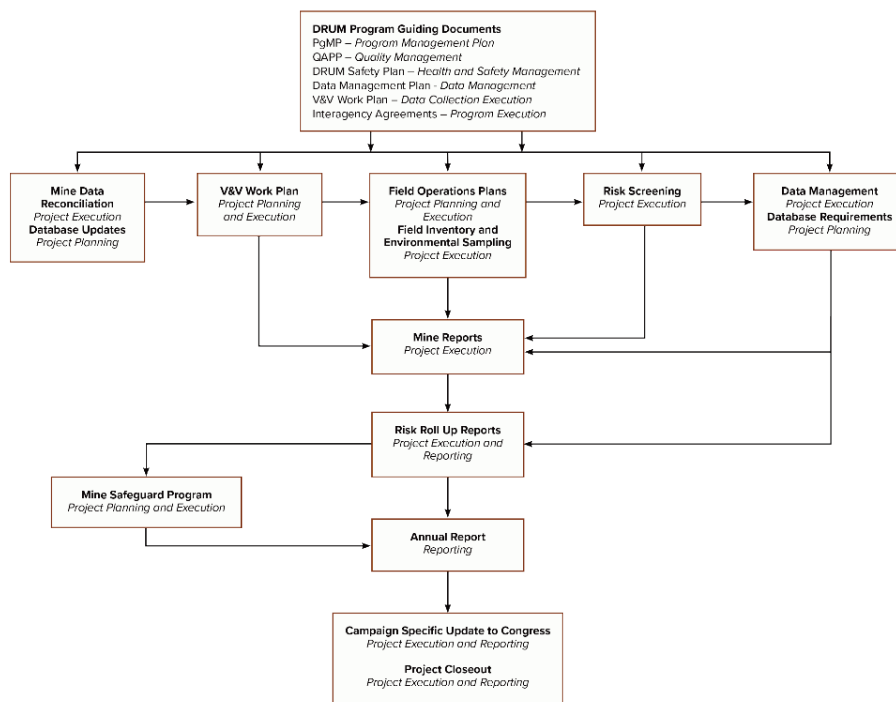


Figure 2. DRUM Program Flow Diagram

3.0 Program Authority

DOE has direct authority to evaluate the mines and implied authority to conduct safeguarding activities.

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 abandoned uranium mines that provided uranium ore for defense-related activities of the United States.
- Atomic Energy Act of 1954, as amended, in Title 42 *United States Code* Section 2011 (42 USC 2011 et seq.). DOE is authorized to protect public health and safety during its activities.
- Department of Energy Organization Act of 1977 (PL 95-91, Stat. 565).
- DOE is authorized to enter into agreements with other federal agencies to carry out its functions. Certain of these other agencies (BLM and USFS) have authority under the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601 et seq.) (CERCLA).

4.0 Goals and Objectives

This section identifies the LM goals and objectives of the DRUM Program.

4.1 Program Goals

The DRUM Program aligns with Goal 1 of the Legacy Management *2020–2025 Strategic Plan* (DOE 2020) (Strategic Plan). Goal 1 of the Strategic Plan is “to protect human health and the environment.” The DRUM Program mission directly aligns with this goal by completing a multi-phased approach to screening abandoned defense-related uranium mines for the purposes of evaluating risks and hazards presented by these mines and developing plans to safeguard the public from those risks and hazards. This overarching goal is also the major benefit of implementing this program.

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

- Closing data gaps and improving data quality and content in DOE’s inventory of abandoned uranium mines by completing location and production record reconciliation.
- Conducting site-specific screening level evaluations, including inventory and environmental sampling at mines.
- Documenting the results of the site-specific evaluations including an evaluation of potential risks and hazards.
- Providing land management agencies with reports that document the risks and hazards of each site visited, and which propose potential safeguarding actions.

- Addressing the environmental legacy and human health and safety risks posed by DRUM sites in conjunction with land management agencies and state and tribal governments.
- Exchanging mine information with other federal agencies and state governments to help address land management concerns.
- Safeguarding communities and the public from the inherent physical hazards presented by abandoned uranium mines.
- Providing monitoring and maintenance of safeguarded mines.

4.2 Program Objectives

In support of Goal 1, the objectives of the DRUM Program are to:

1. Share existing information and collect site-specific data at each mine to identify safety hazards or potential release of contaminants.
2. Perform high-level or relative risk scoring and ranking of these mine hazards.
3. Improve the data quality and content of the DRUM Program database and agency databases.
4. Exchange information with federal, tribal, and state governments.
5. Work together to leverage resources to address mines with priority hazards.

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. Contract work definition is generally a process that progresses from 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 prioritizes tasks to ensure that worker safety and environmental protection will not be compromised.

5.1.1 Procurement and Contracts Management

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 procure services for DRUM Program work in accordance with the federal and prime contract requirements, programmatic schedules, best commercial practices, and established safety and health requirements.

The *Integrated Work Control Process* (LMS/POL/S11763) (IWCP) document provides for initiating, authorizing, performing, and conducting work within the LMS Projects and Programs 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 unmanned aerial vehicle operation for data collection. Part of the subcontracting process is to identify and communicate the hazards that the subcontractor may be

exposed to while performing work and to identify and communicate the hazards that the subcontractor tasks may cause.

5.1.2 Work Breakdown Structure

All LMS contract costs are categorized by Contract Work Breakdown Structure (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 the 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 marking the due date for the accomplishment of a specified effort (work scope) or objective. 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 after contract funding has been received. Formal task assignment 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

Contract life-cycle baseline (LCB) planning information helps support the LM organization and a number of its orders and procedures. LCB planning is the starting point for contract budget planning and is used throughout the planning cycle. LCB planning provides the context for the budget and for how contract work is prioritized and executed.

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, including the three campaigns, safeguarding activities, and monitoring and maintenance.

5.1.6 Baseline Change Proposals

The LMS change control procedure is a formal, documented process in which changes are proposed to a task assignment budget or performance measurement baseline, including scope, budget, and schedule. Changes are controlled to maintain the validity and integrity of the task assignment baseline. A baseline change proposal is an internal change to the performance measurement baseline that is initiated by the LMS task assignment manager (TAM) when a potential scope, schedule, or budget change has been identified. The TAM obtains technical direction from LM for the change being requested in the baseline. By following the directions in the *Project Management Control Systems Manual*, the TAM will ensure that an accurate and complete baseline change proposal form has been prepared.

5.2 Schedule

5.2.1 Contract Schedule

Contract schedules that are consistent with the WBS, integrated with the cost baseline, and represent all site and activity work scope will be developed. 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 and identify start and end dates as well as interdependencies with other schedule tasks. Critical milestones and deliverables are also identified. The Program Schedule is a management tool that is updated regularly and shared with partner agencies for communications and coordination. Figure 3 presents the overall DRUM Program schedule.

DRUM PROGRAM MANAGEMENT PLAN TIMELINE*

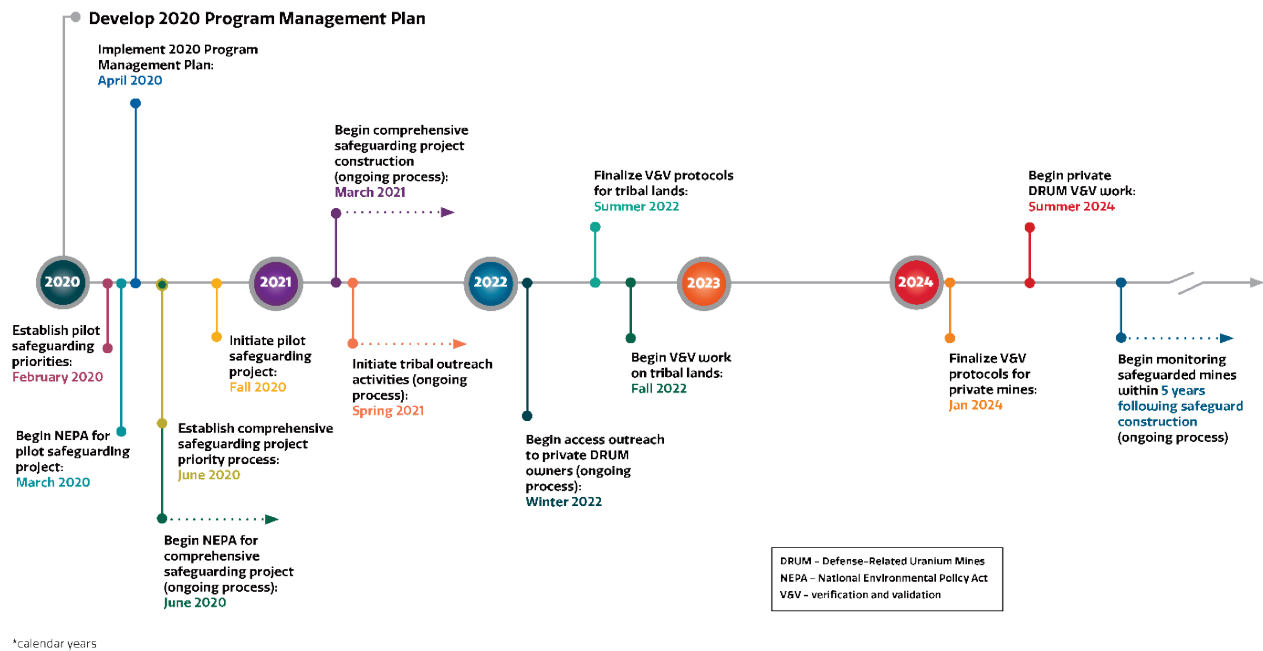


Figure 3. Program Schedule

5.3 Records Management

The *Records Management Manual* (LMS/POL/S04327) 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 offices in Grand Junction, Colorado, and LM Business Center in 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 Management Manual*, 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 TAM.

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 is to conduct V&V evaluations for an estimated 2500 mines on public land by September 30, 2022. V&V activities will start in fiscal year (FY) 2023 on tribal land (Campaign 2) and in FY 2024 on private property (Campaign 3). A pilot safeguarding project is slated to start in the fall of 2020, with more comprehensive safeguarding projects to begin in FY 2021, and monitoring and maintenance of completed safeguards is planned to begin in FY 2024. Additional goals and further refinement of the scope will be developed closer to the initiation of these activities.

6.1 Program Implementation

Implementing the DRUM Program requires program documents to specify how the LMS functions are to be carried out and identify who has the responsibility and authority to carry out 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 the worker and down to subcontractors or suppliers, as applicable.

The LMS Projects and Programs 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.

Project management personnel receive input from functional support groups. Implementing work is done in accordance with the LMS IWCP.

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 are the V&V Work Plan, *Defense-Related Uranium Mines Quality Assurance Program Plan* (LMS/DRM/S15867) (QAPP), *Defense-Related Uranium Mines Safety Plan* (LMS/DRM/S15804), Field Operations Plans (FOPs), and the *Defense-Related Uranium Mines Data Management Plan* (LMS/DRM/S19467) (Data Management Plan). A brief summary of each plan is provided.

6.2.1 V&V Work Plan

The V&V Work Plan provides data objectives, direction, and methodologies regarding how LM and partner agencies will collect, store, and report information gathered during V&V activities at the mines. This includes inventorying mine-related features using digital technology, radiological data collection, soil and water sampling if required, photo documentation of mine-related features, in-field and office-based data quality assurance procedures, and reporting. Work plans which are specific to the following two campaigns will be completed before field work is initiated.

6.2.2 Quality Assurance Program Plan

The QAPP provides 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 data provided to partner agencies will be used to supplement documentation of the existing 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 Plan

The FOP provides 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, LMS, and partner agencies; the mines where V&V activities will be performed; information pertinent to mine access; special circumstances and restrictions that need to be addressed before, during, or after V&V activities; and emergency contacts and locations of 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 on the quality control checks, capabilities, and queries that can be done in the database.

6.3 Program Management

Program management includes the functional support of Safety and Health, Quality Assurance, Environmental Compliance, 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 contract.

7.0 DRUM Program Approach

LM is partnering with state and federal agencies to implement a coordinated, multi-year DRUM Program. To date, the primary focus has been to conduct V&V activities and risk screening for mines located on public land (Campaign 1). Verification and validation of mines located on tribal land (Campaign 2) will be addressed beginning in FY 2023. The methodologies for accomplishing this task are outlined in Section 7.2 and Appendix A of this document.

Verification and validation of mines located on private property (Campaign 3) will be addressed beginning in FY 2024. The methodologies for accomplishing this additional task are outlined in Section 7.3 and Appendix B of this document. In addition to these three campaigns, LM will be

conducting safeguarding activities for physical safety hazards that have been identified during V&V activities. A summary of the safeguarding program is provided in Section 7.4 and Appendix C. Finally, as a follow-up to all these activities, LM will be implementing monitoring and maintenance of safeguarded mines. This will be done for a finite time period to determine whether conditions at individual mines have changed since the time of the mine safeguarding; Section 7.5 provides additional details about this activity.

In addition to this overall project approach, the following activities are also needed to successfully implement this program:

- Developing, updating, and finalizing memoranda of understanding (MOUs) and cooperative agreements with federal agencies as well as state and tribal AML offices, respectively
- Identifying, exchanging, and discussing agency objectives, expectations, and data collection needs
- 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
- Updating the risk screening and risk roll-up approaches based on input from partner agencies
- 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 Campaign 1: Verification and Validation of Mines on Public Land

Campaign 1, V &V evaluation of mines situated on public land, is an ongoing process that commenced in 2017. 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 for the purpose of verifying the mine location, collecting data pertinent to mining-related features such as location information, gamma radiation, and waste rock chemistry, among other variables. The data are used to evaluate the degree of risks and hazards associated with the mine visited. The number and significance of physical hazards will drive a decision-making process that is designed to safeguard hazards such as open mine entries and dangerous highwalls.

Details of the screening-level approach are included in the V&V Work Plan. This Work Plan is updated annually to incorporate new scenarios encountered by the V&V field teams. The major V&V activities are briefly described below.

7.1.1 Mine Data Reconciliation

AEC production records are used to identify defense-related mines. These data are supplemented with information from federal and state agency databases, tribal AML programs, private company and public input, 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 all of the 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. The V&V Work Plan contains detailed information regarding the reconciliation process.

7.1.2 Field Verification and Validation

The purpose of field verification and validation work is to complete a screening level assessment of mine conditions observed at the time of a site visit. This evaluation is comprised of 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 contribute to health and safety risks. The purpose of environmental sampling is to document conditions pertaining to potential human health and environmental risks and hazards the mines pose resulting from gamma radiation or chemical constituents. Environmental sampling activities include gamma radiation surveys, as well as 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; the results are incorporated into the risk screening and eventually into the risk roll-up reports. The V&V Work Plan contains detailed information regarding inventory work and environmental sampling.

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. The V&V Work Plan contains detailed information regarding soil sampling.

7.1.2.2 Water Sampling

Water sampling is performed at mines where surface water is associated with the mine (e.g., water exiting an adit). The surface water sample provides a snapshot-in-time analysis of water chemistry. The V&V Work Plan contains detailed information regarding water sampling.

7.1.3 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. The V&V Work Plan contains detailed information regarding gamma radiation surveys.

7.1.4 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 and is based on field observations, field data, laboratory data, or established radiological and chemical constituent of interest screening levels. The approach focuses on the primary hazards (physical safety concerns and potential exposures to gamma radiation or chemical constituents) and then uses modifying factors, such as mine accessibility, to evaluate the probability that the hazards or risks may actually occur. The risk screening information for these mines is then incorporated into risk roll-up reports which are completed according to FOP (or other geographic area) and are provided to the appropriate land management agencies to facilitate future decisions regarding potential further action at the mines. The V&V Work Plan contains detailed information regarding the risk screening process.

7.2 Campaign 2: Verification and Validation of Mines on Tribal Land

Campaign 2 of the DRUM Program refers to the implementation of field V&V activities and follow-up reporting on tribal land. Initial outreach to tribal entities will begin in FY 2021, while field V&V activities are scheduled to begin in FY 2023.

Mines on tribal land, primarily the Navajo Nation, are unique when compared to mines situated on public land. Therefore, a distinct effort to screen the environmental and physical characteristics of DRUM mines located on tribal land is required. The specific methodologies and potential outcomes of this targeted effort will be developed in consultation with affected tribal entities and the EPA. The management strategies for DRUM activities on tribal land are outlined in Appendix A.

7.3 Campaign 3: Verification and Validation of Mines on Private Property

Campaign 3 of the DRUM Program refers to the implementation of field V&V activities and follow-up reporting on privately owned property. It is anticipated that the essential programmatic functions, assumptions, and activities implemented in Campaign 1 will be used at DRUM mines situated on privately held properties. In order to access DRUM mines situated on private property, LM will need to complete access agreements with the landowners to carry out V&V activities. 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. Initial outreach to private property owners will begin in FY 2022, while field V&V activities are scheduled to begin in FY 2024. The specific methodologies and potential outcomes of this targeted effort will be developed in consultation with state agencies. The management strategies for DRUM activities on private property are outlined in Appendix B.

7.4 Safeguarding of Physical Hazards at Mines

The DRUM Program has completed a substantial number of V&V evaluations at mines located on public land in the western United States. Analysis of the information gleaned from these onsite evaluations indicates that approximately 40% of the mines contained physical hazards ranked either “medium” or “high.” These physical hazards, primarily attributed to unprotected open mine entries, subsidence features, or dangerous highwalls, are the focus of the safeguarding program. Some federal land management agencies may safeguard physical hazards ranked “low.” These circumstances will be addressed on a case-by-case basis.

In order to protect the health and safety of the public, who may come into contact with these features, DOE will proceed to safeguard hazardous mine features. An initial mine safeguarding effort will be undertaken in fall of 2020. This effort will target a limited subset of hazardous mines located on public land. Approximately 25 mine entries will be safeguarded during this effort. A comprehensive mine safeguarding project will be initiated in calendar year 2021. This program will build on the lessons learned, including the likely economies of scale, realized by completion of the 2020 safeguard project. Details of the mine safety closure program are included in Appendix C.

7.5 Monitoring and Maintenance of Mines

Monitoring and maintenance of mines is a natural progression of the DRUM V&V and reporting processes. LM is investing significant resources into developing screening level snapshot-in-time evaluations of DRUM mine sites across the country. V&V activities result in an accounting of mine features to be potentially safeguarded. In order to evaluate the integrity and effectiveness of constructed mine safeguards, a monitoring and maintenance program is required.

Additionally, land management agencies may implement longer-term environmental stewardship plans for mines. In this case, LM could help shape those plans by sharing the information obtained during V&V activities. Implementation of longer-term environmental stewardship monitoring is left to the discretion of individual land management agencies.

Monitoring and maintenance performed by LM will be focused on providing mine-specific information throughout a specified time interval following completion of safeguard construction. This interval will depend upon the date of mine safeguard construction. Monitoring and maintenance intervals will be sequenced in order that safeguarded mines will be monitored at least once within five years of completing safeguard construction. Monitoring will focus on evaluating the integrity and functionality of constructed safeguards and development of subsidence features and stability of remnant highwalls. The monitoring reoccurrence interval

may be adjusted if modifying factors such as site use and access indicate that a different schedule is warranted.

As part of its monitoring and maintenance commitment, DOE will safeguard new or previously unobserved hazardous mine features that pose a significant and immediate threat to a potential visitor. DOE will contact the appropriate land management agency and obtain necessary approvals prior to closing the hazardous feature. Monitoring and ongoing maintenance of the closure will be implemented as described above.

Monitoring will be completed by trained personnel who are familiar with the DRUM V&V process. Knowledge of the V&V process prior to initiating monitoring is critical to ensure continuity with the initial V&V observations. In this way, inadvertent observational bias with regard to the monitored site conditions will be tempered, and evaluations will be more objective and uniform.

Maintenance will be conducted if monitoring identifies and documents a significant lapse in the effectiveness of a given safeguard. Maintenance activities will be focused on addressing the causes and issues associated with the observed change in site conditions. Maintenance activities may include repairing breached, incompetent, or nonfunctional safeguards, or installing new safeguards in the event that new hazards (such as a subsidence feature) have recently developed at a mine where safety closures had been previously constructed.

Maintenance will be completed by trained personnel who will complete required tasks safely and efficiently with minimal collateral damage to the surrounding environment. Maintenance activities will be coordinated with the appropriate land management agency beforehand so that any compliance issues may be addressed in advance of planned work activities.

LM will complete the five-year monitoring and required maintenance. Following these activities, LM will surrender responsibilities for ongoing monitoring and maintenance to the appropriate land management agency. Land management agencies will then assume the responsibility for monitoring and any subsequent maintenance.

7.6 Data Management

The success of the DRUM Program depends on the proper management of large volumes of data. Data must be properly managed during their collection, use, and storage to ensure the integrity and viability of this program. The data will be stored in Microsoft SQL Server databases and managed through both off-the-shelf software products (QGIS, ArcGIS, and EQuIS) and custom applications. Field collected data will be managed according to the *Defense-Related Uranium Mines Data Management Plan*. Field data include information regarding individual mine features such as adits, shafts, and structures, and radiological survey data. Chemical data will be validated according to the *Environmental Data Validation Procedure* (LMS/PRO/S15870) and managed according to the *ESDM Environmental Data Management Team Work Procedures* (LMS/PRO/S13473). Chemical data are the results of laboratory analyses of field collected soil and water samples.

7.7 Risk Roll-Ups

The objective of the risk roll-ups is to provide a systematic approach to categorizing (bin or bucket) mines that is based on the screening-level risk evaluation. The results are used to support concurrence on final risk rankings and to provide the basis for possible future actions.

The overall approach is to screen the mines in successively more detailed stages or tiers and to focus on binning the mines that are at the far ends of the hazard continuum—those mines that pose no hazard are at the low end of the range, and those that are considered an immediate threat are at the high end of the range. With each tier of screening, mines from each end of the continuum are identified and eliminated from further evaluation. The decision criteria for identifying primary hazards (such as physical and chemical hazards) are used in the earlier tiers and modifying criteria (such as accessibility and site use) are used in successive tiers.

The outcome of this evaluation is to produce a risk roll-up report that documents the potential mine risks for a localized collection of mines for land management agencies (e.g., BLM). The mines evaluated can be grouped by FOP, locality, state, or other grouping suggested by the land management agency. The risk roll-up report also suggests potential actions that can be accomplished at individual mines and is intended to be used to reach agreement on the follow-up activities. After agreement is reached on the risk roll-up report recommendations, DOE or the land management agency prepare a concurrence letter to document the decisions.

8.0 Program Organization

The program organization structure defines the organizational elements to plan and implement work. The LM Uranium Mine Team Lead is responsible and accountable for program and project management, contractor oversight and performance evaluation, and interagency coordination as well as the overall success of the DRUM Program. The LMS TAM is responsible and accountable for successful execution of the 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, LMS, 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 provide information regarding reclamation and remediation of specific mines.

8.1 Office of Legacy Management

The LM organization is a DOE headquarters office that is managed from Washington, D.C., Grand Junction and Westminster, Colorado, and Morgantown, West Virginia. The DRUM Program operates out of the Westminster location and is managed by the LM Uranium Mine Team Lead. The LM Uranium Mine Team also consists of other federal employees and support contractors that directly support the DRUM Program.

8.2 Legacy Management Support Contractor

The LMS organization provides support to LM through project execution and ongoing LM program support functions, as required by contract. The DRUM Program is part of the Uranium Related Programs task order. The LMS lead for the DRUM Program is the TAM. The TAM is supported by direct staff and mission support organizations. Field activities are operated from Grand Junction. The LMS DRUM Program organization chart is shown in Figure 4.

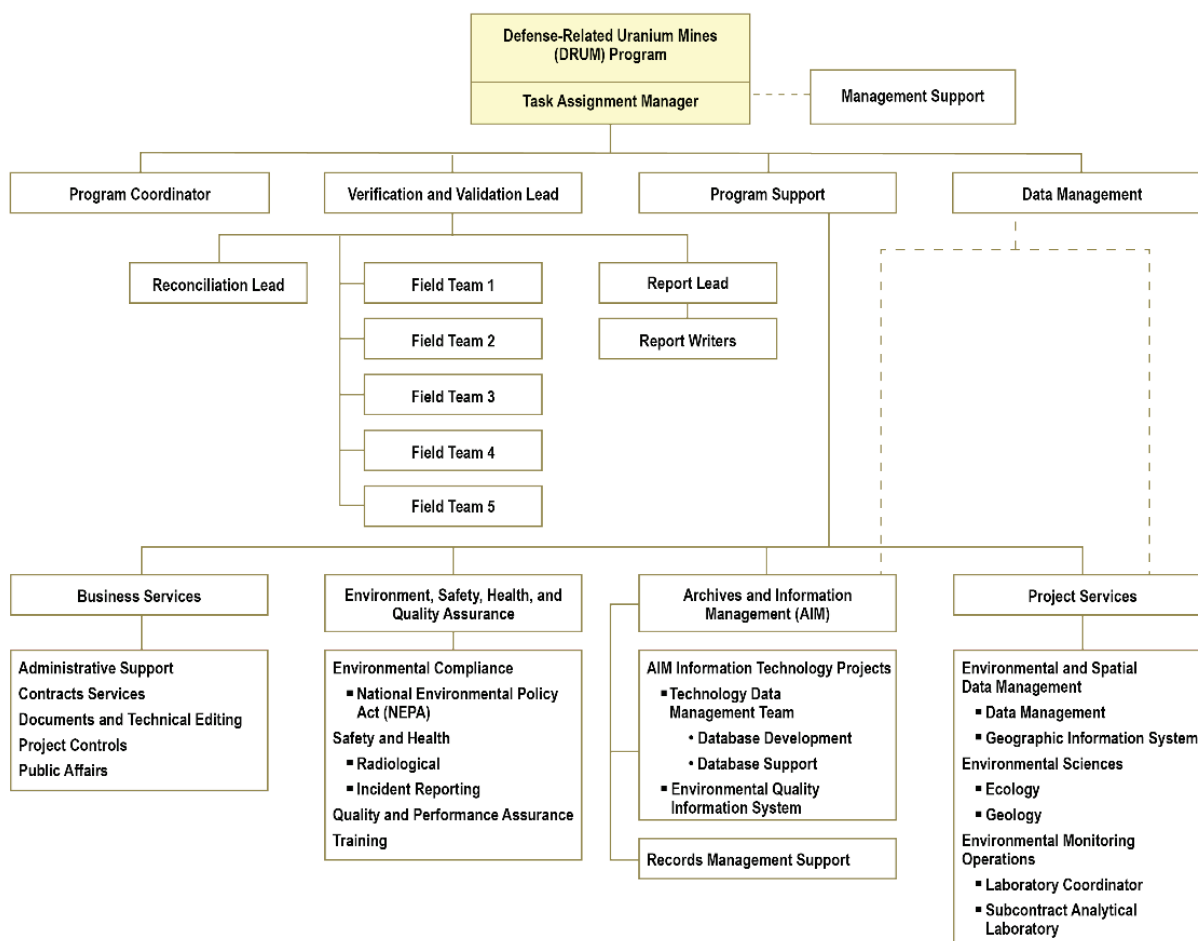


Figure 4. LMS DRUM Program Organizational Chart

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 TAM about what activities need to be conducted, and the LMS TAM provides direction to LMS staff to execute the work associated with the program. The roles and responsibilities of the partner agencies are identified in Section 8.5.

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 1 provides a list of LM and LMS personnel roles and responsibilities for the DRUM Program team.

Table 1. DRUM Program Key Positions

Roles	Responsibilities
LM Positions (federal)	
Uranium Mine Team lead	Program management, contract task management
Project managers	Development of agreements and management of project activities in assigned state, tribal, and agency areas
Technical manager	Provides scientific support and guidance
Data manager	Management of the DRUM Program database upgrades and oversight of data management activities
LMS Positions (contractor)	
Task assignment manager	Program and project management
Program coordinator	Programmatic coordination and support
Radiological control manager	Implements 10 CFR 835 ¹ and LMS <i>Radiological Control Manual</i> ²
Safety and Health specialist	Performs project safety and health requirements and oversight
Senior geologist	Provides reconciliation of mine locations, project-related references, and field team support
V&V lead	Provides daily project direction, project updates, and scheduling
Quality and performance assurance specialist	Provides Quality Assurance program and project oversight
Environmental Compliance specialist	Provides Environmental Compliance program and project support
Public Affairs specialist	Provides Public Affairs program and project support
Records Management specialist	Provides Records Management program and project support
Project controls analyst	Provides budget and schedule program support
Data manager	Maintains DRUM Program database; provides database support and tables and figures for miscellaneous activities and reports
Report writer	Prepares 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:

¹ Title 10 Code of Federal Regulations Section 835 (10 CFR 835).

² *Radiological Control Manual* (LMS/POL/S04322).

8.4.1 LMS Staffing

The LMS organization has a diverse team of professionals that directly support the DRUM Program out of the LM office in 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. The reports are

developed by five writers and a report lead with support from the Document Management group for formatting and technical editing. Other support includes risk assessment, Data Management, Quality and Performance Assurance, Public Affairs, and Records Management. All these activities are supported by two administrative staff members who help track, organize, and facilitate all work being done by the DRUM Program.

8.4.2 LM/LMS Subcontractor Staffing

Other contractors besides the LMS organization support the DRUM Program. SHB Inc. provides radiological expertise in areas such as risk-based screening thresholds and instrumentation. TI Verbatim Consulting performs quality control checks of the mine reports that are 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 in performing 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 situated on tribal land. This knowledge will facilitate V&V work. Engaging the states and tribes early on allows for coordinated field activities that maximize time and resources.

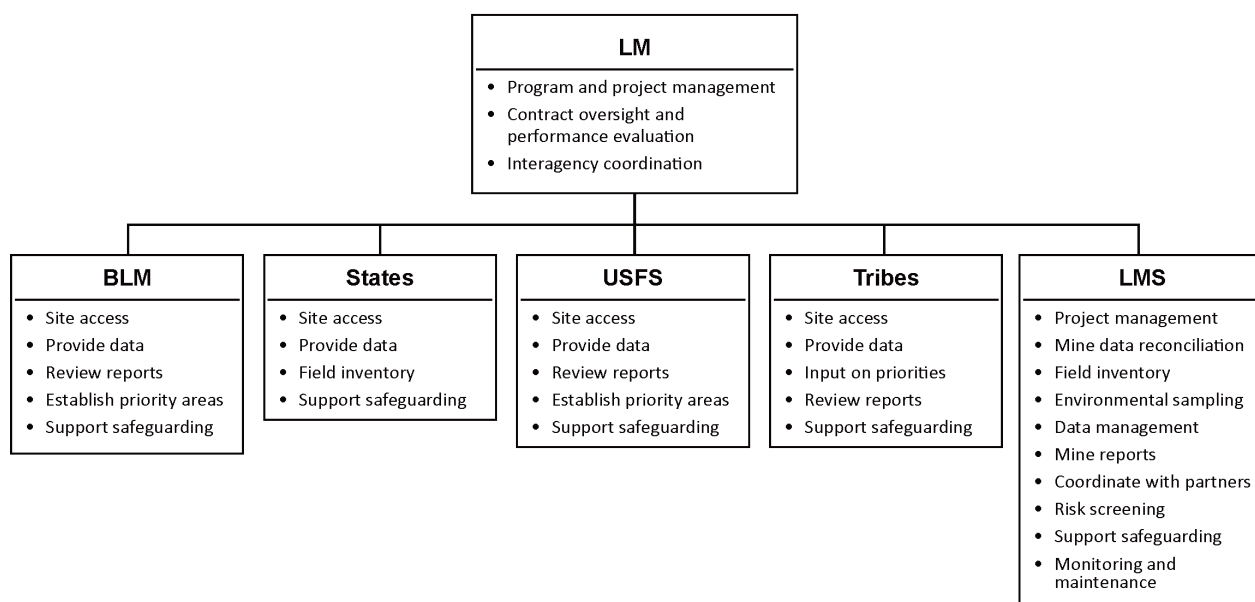


Figure 5. Collaboration Between LM/LMS and Partner Agencies

8.5.2 BLM

BLM state offices will be the primary contact for V&V efforts on BLM-managed public land. BLM state and field offices work with LM and LMS on mine data reconciliation and provide input on field activities. BLM also coordinates access for LMS personnel to perform environmental sampling. BLM authorities that support the DRUM Program include:

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

8.5.3 USFS

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 data reconciliation and provide input on field activities. USFS also helps facilitate environmental sampling efforts by coordinating site access for LMS. USFS authorities that support the DRUM Program include:

- 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 the risks associated with abandoned mines on these public lands. USFS is authorized to enter into agreements with other federal agencies to carry out its responsibilities to manage forest system lands.

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.

- National Forest Management Act of 1976 (PL 94-588).
 - USFS has broad authority to restore the land disturbed by historic mining activities and to protect public safety from the risks associated with abandoned mines on these public lands.
- 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 present on USFS-managed land according to EO 12580.

Because the mines are on USFS-administered land, USFS has the governing NEPA responsibility and authority for these mines and will determine the need for NEPA evaluation as necessary.

8.5.4 NPS

The National Park Service (NPS) Intermountain Regional 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, Geologic Resources Division as well as individual park units work with LM and LMS personnel on mine data reconciliation and provide input on field activities. NPS also coordinates access for LMS personnel to perform environmental sampling. NPS authorities that support the DRUM Program include:

- 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 these public lands.
- CERCLA.²
 - 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 NPS-administered land, NPS has the governing NEPA responsibility and authority for mines located on national park units and will determine the need for NEPA evaluation as necessary.

8.5.5 Other Agencies

The LMS contractor will also work with other federal agencies, such as BIA, EPA, and state or tribal agencies as needed to facilitate verification and validation activities. In some instances, these and potentially other federal, state, and tribal agencies may have information pertaining to access routes, land ownership, and past reclamation or remediation activities. Utilizing the

² 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.

expertise and knowledge of other agencies enhances the ability to conduct the DRUM Program following 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 abandoned uranium mines (AUMs). The DRUM Program sites are a subset of AUMs. The AUMWG updated their Strategic Plan in 2020. 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. Reporting tracks progress in meeting milestones and documents program achievements. LM and partner agencies will require status updates on the progress of DRUM Program activities, early notification of imminent hazards discovered at any mine, and data reconciliation, 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, LMS, and partner agencies will be used to effectively communicate details and status of DRUM Program activities. LMS personnel frequently provide LM with informational reporting regarding V&V projects and mine-specific reports, regularly. LM updates partner agencies with this information as needed. Weekly teleconference calls between LM and LMS personnel will also be utilized to provide updates on programmatic issues, discuss field activities and scheduling, and plan future work.

9.2 Mine Data Reconciliation Lists

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 is provided to partner agencies.

9.3 V&V Reports

V&V reports will be prepared for each mine at the completion of V&V work. These reports will be generated as work progresses throughout the year.

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

V&V reports for Campaign 1 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 laboratory analytical results. Reports should also document priority ranking of physical safety hazards and potential risks to human health, safety, and the environment. The V&V reports also provide the supporting data used in the risk roll-up reports. Reports will be provided to the appropriate partner land management agencies for their use in developing future decisions relative to the mines.

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

V&V reports for Campaign 2 may follow a similar format as Campaign 1. The notable difference between Campaign 2 and Campaign 1 reports is that the risk assumptions and benchmarks for physical safety hazards and potential risks to human health, safety, and the environment will likely be modified to align with conditions and cultural patterns on tribal land. These revised risk assumptions and benchmarks have not been determined; however, they will be developed collaboratively with our tribal partners, and the EPA.

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

V&V reports for Campaign 3 may follow a similar format as Campaign 1. The notable difference between Campaign 3 and Campaign 1 reports is that the risk assumptions and benchmarks for physical safety hazards and potential risks to human health, safety, and the environment will likely be modified to accommodate potential land uses. The risk assumptions have not been determined, but they will be developed before V&V work is initiated for this campaign.

9.4 Semi-Annual and Annual Program Reports

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

10.0 Environmental Management System

Environmental protection is conducted under the umbrella of the Environmental Management System (EMS) run jointly by LM and LMS. The EMS mandates compliance with applicable environmental regulations to ensure that air, water, land, and other natural and cultural resources are protected. EMS has two areas of focus: environmental compliance (EC) and environmental sustainability. The EC 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 EMS implementation strategy is documented primarily in the following manuals:

- The *Environmental Management System Description* (LMS/POL/S04346) describes the mechanisms for implementing the EMS.
- The *Environmental Protection Manual* (LMS/POL/S04329) provides an overview of EC requirements that are applicable to LM and LMS work activities.
- The *Environmental Instructions Manual* (LMS/POL/S40338) provides instructions to implement EC, including procedures for reviewing EC requirements, transportation and packaging, waste management, recycling electronic equipment, chemical inventory, spill response, reporting, and project and activity evaluations.
- The *Environmental Management Systems Teams Manual* (LMS/POL/S11374) describes the EMS sustainability teams, EMS support teams, and project teams.

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

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. The 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. DOE's NEPA expectations are summarized in DOE Policy 451.1, and DOE's NEPA implementing procedures are in Title 10 *Code of Federal Regulations* Section 1021 (10 CFR 1021).

10.1.2 Cultural Resources

The most comprehensive policy concerning the protection of cultural resources is the National Historic Preservation Act (16 USC 470). LM Plan 3-3-1.0-0.1, *Cultural Resource Management Plan*, provides information on cultural resource laws and regulations, outlines a consistent approach for how LM will manage cultural resources, and includes considerations related to Native American people.

10.1.3 Natural Resources and Surface Water

Natural resources potentially affected by DRUM activities are vegetation, wildlife, and waters of the U.S. including wetland. These resources are protected by laws that 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). The V&V Work Plan provides information on compliance with applicable natural resource-related laws.

10.1.4 Transportation

Small quantities of hazardous materials associated with water sampling may be transported during DRUM Program activities. The V&V Work Plan provides information on compliance with these regulations.

10.1.5 Waste Management and Spills

The environmental component of waste management and spills is described in the V&V Work Plan. The *Environmental Instructions Manual* provides specific instructions related to managing hazardous or radioactive waste and spills.

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 Vehicle and Fuel Use sustainability 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 ISO 9001:2015, DOE Order 414.1D, *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 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. Each person is expected to do his or her job in accordance with procedures and other requirements.

11.1 Quality Assurance Program Plan

The *Defense-Related Uranium Mines Quality Assurance Program Plan* 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. A key component of successful data collection may depend on the adequacy of the QAPP and its effective implementation. All parties involved in the DRUM Program (i.e., 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. Quality assurance/quality control (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 Worksheet) to provide accountability and assurance that data quality checks have been completed as contemplated in the V&V Work Plan.

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*. Data will be validated, and qualifiers 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 that are deemed acceptable by the data validation processes will be accepted for use.

Upon completion of QA/QC checks, the Process Worksheet (Section 11.2) will be used to document the completion of each of the QA/QA process on a mine-by-mine level.

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 Quality and Performance Assurance 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 their delegates, and include management teams evaluating company systems or issues, management at any level evaluating operations under their responsibility, compliance groups evaluating activities or projects, and personnel or independent assessors as assigned by management to evaluate an activity. The program manager is responsible to develop an annual schedule for performing management assessments within the organization and submit those assessments to the Quality and Performance Assurance 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 prior to being conducted or reported. Surveillances are subject to a graded approach planning process 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. Plans and procedures have been developed and implemented for the protection of the safety and health of workers, the public, and the environment. These plans and procedures include the *Worker Safety and Health Program (10 Code of Federal Regulations 851 Implementation)* (LMS/POL/S14697), *Integrated Safety Management System Description* (LMS/POL/S14463), and the *Environmental Management System Description* and implement the requirements of laws, regulations, orders, and standards applicable to LMS activities. All employees shall adhere to the requirements of the Worker Safety and Health Programs, the *LMS Safety and Health Program* (LMS/POL/S20043), and other applicable safety and health plans and procedures. 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. In particular, 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 supervisor, safety and health personnel, or the site operations lead; in addition, operators should take appropriate immediate action to reduce or correct the 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 the 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 thermoluminescent dosimeters to evaluate their radiological exposure. If dosimeters are not available, handheld gamma radiation instruments will be used instead.

13.0 Program Risk Management

LM guidance directs that a contingency be applied to all LM activities because of the uncertainties associated with long-term program management. This contingency 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 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 land. 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 2.

Table 2. Program Risk Screening

Potential Risk	Mitigation Measured
Funding	Staffing, scope, and/or schedule reduction
Partner agency role/responsibility	MOUs, operation plans
Stakeholders	Communication plans
Litigation	Regulatory authority, data quality

Safeguarding, monitoring and maintenance, and Campaigns 2 and 3 will introduce additional risks. These upcoming activities will increase the risks associated with stakeholder interactions, regulatory authority, funding, access issues, resolution of NEPA responsibilities, data quality, data management, and risk evaluations. Strategies to overcome and mitigate these risks will be identified in project-specific implementation plans. As the program grows, 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, LMS, partner agencies, tribal organizations, and private property owners. This section describes how effective communications will occur within and among these organizations.

14.1 Internal LM Communication

LM will have weekly team meetings where programmatic issues are addressed, current activities are reviewed, and planning for future work is discussed. A network share drive has been set up that provides a repository for DRUM Program reports and other technical information pertinent to the program.

14.2 Partner Federal, State, and Tribal Agencies, and Private Landowner Communication

LM will communicate with its partner federal, state, and tribal agencies (collectively referred to as partner agencies), and with private property owners through a mix of meetings, conferences, briefings, telephone calls, emails, and the LM website. LM will work with partner agencies, as well as private landowners, to determine the scope of work to be performed, including the discreet FOPs where V&V activities will be performed, any specific actions required that are not part of the V&V Work Plan, 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 as to where current and anticipated V&V activities are being performed and what V&V reports are completed. The LMS contractor will communicate and work directly with the partner agencies representatives, as well as private property owners, in the field.

14.3 LM/LMS Communication

LM/LMS team meetings via teleconference or face-to-face will be held on a bi-weekly 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 ones are complete. Formal communication tools, such as monthly financial reporting, as required by the prime contract, will be performed.

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 tailgate meetings; each worker has the ability to 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 Intranet, 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 field work, and to ensure 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. Once each week, a meeting between the program manager and senior staff is held. 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. Safety information requiring prompt attention is communicated immediately via email.

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) provides 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, LMS, and the public.

Because the DRUM Program involves working on other federal, state, and tribal agencies' managed land, 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

The DOE Office of Information Resources is responsible for administering policies, programs, and procedures to ensure the agency's compliance with the Freedom of Information Act (5 USC 552) (FOIA). 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 and particularly their features are considered an attractive nuisance. The mines have attractive openings, structures, equipment, and objects that are both dangerous and irresistibly inviting or intriguing to the public. The condition of these abandoned uranium mines has the potential to cause serious bodily harm to the public, specifically recreators and tourists.

These abandoned uranium mines 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 a historic mining district that captures the rich history of mining for uranium ore for defense and commercial nuclear energy purposes. This historic mining district 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 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 comprised 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, 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 Mine Team Lead will engage the LM Communication, Education, and Outreach Team as necessary. Some inquiries must be coordinated with the DOE Office of Congressional and Intergovernmental Affairs (LM Procedure 3-11-5.0-0.1).

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 our nation's history during World War II and the 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 currently focused on completing V&V work on approximately 2500 mines on federally managed public land by September 30, 2022. LM is also developing plans to begin V&V operations on tribal land (Campaign 2) and at private property (Campaign 3). Concurrently, LM is developing an initiative to safeguard physical hazards, such as open mine entries, subsidences, and dangerous highwalls. These subsequent campaigns and the mine safeguard initiative are described in Appendixes A, B, and C of this document. The program will be completed after all these activities are complete, which is scheduled for 2030.

16.1 Program Closeout

As described in the IWCP document, a Project Completion Report may be required by the TAM 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 of public land, tribal land, and private property) and upon completion of the program following safeguarding and monitoring activities.

16.2 Long-Term Responsibilities

Records will be retained in the LM Business Center 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.

Monitoring and maintenance of sites that were verified and validated or safeguarded will be the last DRUM activity and may continue past 2030. However, this will only continue for a set period (e.g., 5 years after safeguard construction was completed), and then these responsibilities will be turned over the appropriate land management agency.

17.0 References

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

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*.

16 USC 470. “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 of 1976,” *United States Code*.

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

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), 2020. *2020–2025 Strategic Plan*, DOE/LM-1488, Office of Legacy Management, January.

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

ISO (International Organization for Standardization) 9001, 2015. “Quality Management Systems–Requirements,” September.

LM Plan 3-3-1.0-0.1, *Cultural Resources Management Plan*, LM/S07371, Office of Legacy Management, November 2019.

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LMS Contract DE-LM0000421 implementing documents, continually updated, prepared by Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

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

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

Environmental Data Validation Procedure, LMS/PRO/S15870

Environmental Instructions Manual, LMS/POL/S40338

Environmental Management System Description, LMS/POL/S04346

Environmental Management Systems Teams Manual, LMS/POL/S11374

Environmental Protection Manual, LMS/POL/S04329

ESDM Environmental Data Management Team Work Procedures, LMS/PRO/S13473

Finance and Accounting Manual, LMS/POL/S04342

Integrated Safety Management System Description, LMS/POL/S14463

Integrated Work Control Process, LMS/POL/S11763

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
Records Management Manual, LMS/POL/S04327
LMS Safety and Health Program, LMS/POL/S20043
Worker Safety and Health Program (10 Code of Federal Regulations 851 Implementation), LMS/POL/S14697

PL 94-588, “National Forest Management Act of 1976,” Public Law.

PL 95-91, Stat. 565, “Department of Energy Organization Act,” Public Law.

PL 112-239, “National Defense Authorization Act for Fiscal Year 2013,” Public Law.

PMI (Project Management Institute) 2017a. *Project Management Body of Knowledge (PMBOK Guide)*.

PMI (Project Management Institute) 2017b. *The Standard for Program Management*.

18.0 Glossary

Added DRUM mine: Mines identified during the reconciliation process that have associated AEC production records corresponding to the DRUM-eligible timeframe that were not included in the original 4225-mine estimate. These are added to the total number of DRUM mines that will require V&V.

Duplicate DRUM mine: When two or more records are reconciled into a single mine and location. Irrelevant names and incorrect locations are removed from the database. A *Defense-Related Uranium Mines Program Verification and Validation Certificate of Completion: Merged Duplicates* (Merged Duplicate) form is completed for these records, and they are considered as V&V complete.

Field Operations Plan (FOP): Plans written to ensure that field teams are ready to perform their work as described in the V&V Work Plan prior to initiating field activities. FOPs are used to coordinate field work 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 known prior to 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.

Hazard: Threat to physical safety of humans, the environment, or animals posed by conditions at a mine; something that can cause harm.

Highwall: The excavated, generally vertical, face of exposed overburden.

Human use: Observable evidence of past or present human activity. This includes current activity, such as mine inhabitation, recent campfire rings showing evidence of burning, or vehicle tracks, or past activity, such as 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.

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.

Mixed-ownership sites: Mines where the disturbed area is situated on two or more parcels of property, and at least two of the parcels are owned or managed by separate entities.

Needs maintenance: Engineered abatement of physical hazards has been breached or otherwise damaged, and the engineering controls require maintenance to remain protective.

Non-DRUM: Records not associated with a mine location. This includes production records that cannot be linked to a specific mine or mines, small quantities of ore sold to private entities (outside sales), and sites that collected ore from multiple mine locations for storage or processing. These records were included in the original estimated count of 4225 mines identified in the report to Congress.

Operations not evident: Reconciled mine locations where no evidence of mining operations is apparent during completion of V&V activities.

Physical feature: Term used to describe an excavation created for the purpose of exploring for, extracting, or developing an ore body 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.

Public land: Land managed by a governmental agency for use by the public (excluding tribal land, and any land managed under the auspices of the U.S. Bureau of Indian Affairs). This includes land managed by the U.S. Bureau of Land Management, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the National Park Service, and the U.S. Bureau of Reclamation. For the purposes of tracking V&V complete in Campaign 1, this also includes mines located on state or municipal (e.g., county or town) land.

Reclaimed: In non-CERCLA actions, 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 an 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.

Remediation: In CERCLA actions, response actions taken, or an Action Memorandum 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. Unless otherwise noted in an FOP, only inventory operations will be conducted at remediated mines.

Risk: Potential exposure to health or environmental harm factors posed by conditions at a mine; the chance, “high,” “medium,” “low,” or “none,” that any hazard will actually cause harm.

Safeguard: An engineered barricade constructed at or immediately inside a mine entry (adit, shaft, subsidence) or adjacent to a hazardous highwall for the purpose of preventing site visitors from approaching the highwall or accessing the subsurface. Some state and federal abandoned mine lands agencies refer to safeguards as “mine safety closures.”

Structure: A building or building remnant originally constructed for long-term use 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.

Unknown DRUM mines: Records where the exact geographic location of a mine is not known or provided; therefore, land ownership of the mine location is unknown. These were included in the 4225 mine records identified in the report to Congress.

Verification and validation (V&V): The DRUM Program is verifying the old records and validating the current mine conditions. Verification consists of documenting mine records, including location and production data, and validation consists of field inventory and sampling to document 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 assessment scoring to federal land management agencies.

Verification and validation complete: Mines where V&V activities described in the V&V Work Plan have been completed. These are:

- **Duplicate mines resolved:** The resolution of duplicate mines is complete when two or more mines are reconciled into a single name and location. Resolved duplicate mines are considered as V&V complete when the irrelevant names and incorrect locations are removed from the database or flagged as a non-DRUM record and a Merged Duplicate form is issued. All records for which the Merged Duplicate form has been issued are considered as a V&V complete. This includes mine records where the land ownership is likely not on public land or when the land ownership is not known.

- **Sampling completed:** Inventory and environmental sampling activities completed, and the DRUM Program database is updated to reflect the date of field work and with the reconciliation status changed to “Field Confirmed.” Mines where evidence of operations are not evident are considered to be V&V complete. In addition, mines that are partially located on public land (mixed ownership) are considered to be V&V complete after the V&V on public land is complete; however, V&V work must be complete for all land management agencies before it is counted as complete (e.g., a mine location that includes portions managed the U.S. Forest Service and the U.S. Bureau of Land Management must both be complete). Mines inventoried by a third party, but not field confirmed by a DRUM team, are not considered to be V&V complete.

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

Appendix A

Campaign 2: Management Strategies for DRUM Activities on Tribal Land

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A1.0 Objectives

The primary objective of the DRUM Program Campaign 2 is to conduct a screening-level evaluation of legacy uranium mines located on tribal land by verifying the physical location and production records of each mine and validating site conditions. Validation of site conditions requires a field investigation of each mine for the purposes of inventorying mining-related features, identifying potential physical safety hazards, collecting radiological data, obtaining soil and water samples as needed, and determining the status of reclamation or remediation. The data gathered will be used to evaluate the potential risks associated with the physical hazards and chemical and radiological constituents at the mines. This information will be presented to tribal government as individual mine reports and summary risk roll-up reports. The collected information, reporting, and risk screening may be used by partner agencies to assess priorities and determine if any further future action is warranted to help prioritize any potential future actions. Details on the data collection processes will be included in a Campaign 2–specific V&V Work Plan. The V&V Work Plan will be tailored to meet screening level data collection and reporting requirements that are consistent with DRUM and tribal goals and objectives.

A2.0 Project Planning/Collaborative Partnering

Successful project planning and implementation is possible only with the collaborative participation of all potentially impacted organizations. An interdisciplinary team approach will be used with key stakeholders to solicit input on interagency coordination, outreach, task requirements, work plan creation, risk screening criteria, and useful data reporting mechanisms. The anticipated key stakeholders are the Navajo Nation Abandoned Mine Land (NNAML) Reclamation Department, the Navajo Nation Environmental Protection Agency, and the U.S. Environmental Protection Agency. Collaboration with these partners will start in FY 2021 to ensure that field implementation can begin as planned in FY 2023.

A3.0 Schedule

A3.1 Overall Schedule

Outreach to tribal nations is scheduled to begin in FY 2021. Outreach, an ongoing process, will help facilitate project planning and collaborative partnerships as described in Section A2.0. The goal of these outreach conversations is to enable the program to initiate field V&V work on tribal land in FY 2023. The objectives of establishing partnerships, creating access agreements, ensuring National Environmental Policy Act documentation is in place, creating opportunities for effective public outreach, and reaching final agreements with tribal nations will need to be completed before the summer of 2022 to maintain the project schedule.

A3.2 Overall Schedule

It is anticipated that field V&V work will be initiated in early FY 2023. An initial draft schedule will be created in FY 2021. The initial draft schedule will be sufficiently detailed so that affected tribal nations and partner organizations may begin their own planning processes. Specific

programmatic milestone dates, including a timeline pertaining to any necessary access agreements, will be included in the draft schedule to facilitate longer-term project planning.

Field V&V activities are anticipated to begin in early FY 2023 once reconciliation of mine location and production records is complete and a Field Operations Plan (FOP) is developed for a specific set of mines. These preliminary steps will be completed during FY 2022, so that all interested parties have the opportunity to be involved in the planning process and have input into the FOP development. Each FOP will provide guidelines for V&V crews completing the field evaluations of a defined subset of mines. FOPs will be created, in part, based on the relative locations and distances between mines. Each FOP will contain information necessary to effectively complete field evaluations of the mines included. This information may include Navajo Nation contacts, local resident information, directions to the individual mines, hospital and other emergency contact information, and any mine-specific sampling or other requirements.

A detailed field schedule will be outlined for Campaign 2 during the summer of 2022. This schedule will be sufficiently detailed so that all partners are aware of the general areas that the field teams will visit and approximately when the visits will occur. Due to the distances involved and relative degrees of difficulty of access, the schedule will provide a rough timeline of anticipated field activities. Partner agencies and local contacts, if any, will be notified prior to individual site visits.

A4.0 Scope

The general scope will be similar to Campaign 1, which focused on V&V work on public land. Production and location verification will be completed, screening level V&V data will be collected in the field, individual mine reports will be written, and risk roll-ups will be completed. However, due to anticipated differences in land use between tribal land and the previously screened public land, modifications to the scope of work to be completed will likely be necessary. Tribal and other partners will be engaged to help define the general parameters of the field screening level work. It is anticipated that, in general terms, inventory work will remain relatively consistent with current practice; however, sampling may be modified to accommodate differing site conditions and circumstances. Additionally, it is likely that exposure scenario assumptions will be revised to accommodate Campaign 2 land use circumstances. As a result, certain observational data points and certain sampling parameters may be modified so that appropriate levels of detail are captured during field mobilizations. To accommodate these anticipated changes, field V&V screening level methodologies will be designed and written into a Campaign 2–specific V&V Work Plan in order that relevant information is consistently collected and so that data quality objectives are met.

Input from tribal and other stakeholders will be critical so that outcomes are defined by all partners in advance of conceiving work plan requirements. Through early outreach and communication, the field V&V screening level methodologies may be designed and written into the V&V Work Plan in order that relevant information is consistently collected, and data quality objectives are met. Mine-specific reports and FOP-based risk roll-up reports are expected to be similar in format. However, adjustments to these reporting tools will be made in order to accommodate any modifications to the anticipated Campaign 2–specific exposure scenarios.

A5.0 Resources

For consistency in data collection, it is critical that all data are collected using well-established procedures which are documented by the Campaign 2-specific work plan. Further, data integrity is critical to the continued success of the program and to ensure that the proper end-product assessments are completed. Therefore, it is critical that the multi-step QA/QC process of evaluating data in the field, in the office, and as part of final reporting, is maintained.

The LMS contractor will use the five current DRUM field teams (20 people) to complete the V&V work. Field team allocation may be adjusted based on the workload and other LM priorities or suggested activities, including potential overlap with Campaigns 1 and 3 and mine safeguarding activities. Funding may be provided to NNAML to assist in gaining access to mines, supplement field teams, and act as liaisons to the Navajo Nation Council and Chapter Houses. Additional communication, education, and outreach staff will be used for coordination with the Navajo Nation and other Native American tribes.

The majority of Campaign 2 DRUM sites are situated on Navajo Nation land. However, several DRUM sites are located on the land of other tribal entities that LM has not worked with in the past. As a result, additional outreach to and coordination with these tribes will be required. These activities will occur simultaneously with outreach to the Navajo Nation in order that Campaign 2 objectives and timelines are maintained.

A6.0 Risk Scenarios

Campaign 1 exposure scenarios were developed assuming that site use would primarily be related to brief camping events occurring yearly over an extended period of time. Due to the land uses common on tribal land, the exposure assumptions and risk scenarios will need to be revisited and likely revised so that these align with local uses and potential exposures. It is likely that a modified residential risk scenario will be assumed for Campaign 2; however, there may be a need to propose alternatives within the residential risk scenario based on the probability that different residential use assumptions will occur.

A7.0 Outreach

The objective of the outreach program is to promote collaboration and protection of human health, safety, and the environment as a commonly shared goal. Maintaining good relations with tribes is paramount, so initial outreach will focus on fostering strong working relationships with Native American agencies and representatives. Cultural sensitivity training will be included in program training procedures. Stakeholder and community member meetings will be held to collaborate and strengthen relationships with tribal communities. Expanded use of outreach resources will be needed, and ways to use an outward-facing database to facilitate better stakeholder communications will be implemented before field activities begin.

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Appendix B

Campaign 3: Management Strategies for DRUM Activities on Private Property

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B1.0 Project Objectives

The primary objective of the DRUM Program Campaign 3 is to conduct a screening-level evaluation of legacy uranium mines located on private property by verifying the physical location and production records of each mine visited. Validation of site conditions requires a field investigation of each mine visited for the purposes of inventorying mining-related features, identifying potential physical safety hazards, collecting radiological data, obtaining soil and water samples as needed, and determining the status of reclamation or remediation. The data gathered will be used to evaluate the potential risks associated with the physical hazards and chemical and radiological constituents at the mines on private property. The combined information will be used help prioritize any potential future actions. Details on the data collection processes will be included in a private property-specific V&V Work Plan.

B2.0 Project Planning/Collaborative Partnering

It is proposed that an interdisciplinary team approach be used with key stakeholders. The anticipated key stakeholders will be private landowners, including companies and corporations as well as individuals, state agencies, and land management agencies at mines where ownership of a mine may involve private landowners and a federal land management agency. These agencies include BLM and USFS. Outreach to private entities, potentially in conjunction with state Abandoned Mine Land offices, will begin in FY 2022 to maintain the projected V&V schedule.

B3.0 Schedule

B3.1 Overall Schedule

Outreach to private landowners to provide educational opportunities and to obtain consent to enter and complete V&V activities are planned to begin in FY 2022. Coordinating private right of entry for Campaign 3 DRUM sites will be more time-intensive than similar processes for V&V activities on public land, resulting in increased scheduling uncertainty. Campaign 3 field V&V activities are scheduled to begin in FY 2024. The objectives of establishing access agreements, ensuring National Environmental Policy Act documentation is in place, and reaching final access agreements with the private entities all need to be accommodated and integrated into the project schedule. Due primarily to the uncertainty of the time frames required to obtain consent to access private property, a long interval between program kick-off (FY 2022) and initial field work (FY 2024) is required.

B3.2 Field Schedule

Campaign 3 field V&V activities are scheduled to begin in FY 2024. In order to effectively implement Campaign 3, a concerted effort to obtain consent to enter and sample private properties will be undertaken as described above. Ideally, consent to enter and sample will be obtained for many privately held mines located in a contiguous geographic area. A challenge to developing field schedules is the potential inability to achieve planned timelines during the

process of obtaining consent to enter and sample private property. As a result, there may be a need to develop FOP areas using different criteria from those used in Campaign 1. Flexibility in planning and scheduling will be necessary to efficiently complete this campaign. Once FOPs are developed, a detailed field schedule will be outlined for Campaign 3. Most of the mines are located in mining districts visited during Campaign 1. Therefore, many of the general logistical planning steps undertaken during Campaign 1 can be duplicated for this V&V effort.

B4.0 Scope

It is important to determine the end points for this effort early in the planning process, including the exposure scenario assumptions, so they match the field collection requirements before any field work begins. The general scope will be similar to that of Campaign 1 with production and location verification being completed, screening level V&V data collected in the field, and reports being written.

Due to the potential for varying land uses being encountered, modifications to the scope of work to be completed may be necessary. Landowners and other partners will be engaged to help define the general parameters of the field screening level work. It is anticipated that, in general terms, inventory work will remain relatively consistent with current practice; however, sampling may be modified to accommodate differing site conditions and circumstances. Additionally, it is likely that exposure scenario assumptions will be revised to match Campaign 3 land use assumptions. As a result, certain observational data points and sampling parameters may be modified so that appropriate levels of detail are captured during field mobilizations

Through early outreach and communication with landowners and land management agencies, the field V&V screening level methodologies may be designed and written into a Campaign 3–specific V&V Work Plan so that relevant information is consistently collected and data quality objectives are met. Mine-specific reports are expected to be similar in format to the Campaign 1 reports. However, adjustments to these reporting tools will be made if necessary to accommodate any needed adjustments for the anticipated Campaign 3–specific exposure scenarios.

Mixed-ownership sites (federal or state and private ownership) with safety hazards on private property that were identified in Campaign 1 could be expedited and potentially included in the safeguarding strategy (see Appendix C). Flexibility will be required to absorb potential delays due to the access agreements process and the need to work with private entities.

B5.0 Resources

For consistency in data collection, it will continue to be critical that all data are collected using well-established procedures and that they meet high-quality standards. The LMS contractor will use the five current DRUM field teams (20 people). This may be adjusted based on the workload and other DOE priorities or suggested activities. Additional real estate, communication, education, and outreach staff will be used for coordination with the private landowners.

B6.0 Risk Assumptions

The exposure assumptions and risk scenarios may be reevaluated. Some form of a residential risk scenario will likely need to be assumed; however, it may be necessary to propose different potential versions of this scenario based on the probability that they will occur.

B7.0 Outreach

Expanded use of outreach resources will be needed, and ways in which the outward-facing database may be used to facilitate better stakeholder communications will need to be evaluated. Communicating potential benefits of the program to private landowners will be critical to getting participation and site access.

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Appendix C

Strategy to Safeguard Physical Hazards Identified by the DRUM Program on Public Land

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C1.0 Introduction

LM has conducted V&V evaluations at Defense-Related Uranium Mines (DRUM) sites situated on public land since July 2017. These screening-level site evaluations indicate that many subsurface mining-related excavations and dangerous highwalls pose a risk to the public. To mitigate the inherent risk posed by these mining-related features, LM proposes to initiate a project to safeguard these hazards while preserving both the historic significance of the affected mines and ecological importance of the surrounding environments.

The DRUM Program can help safeguard communities and the general public from the inherent physical hazards presented by abandoned defense-related uranium mines. Construction of physical barriers at hazardous underground mine entries and elimination or safeguarding of dangerous highwalls will afford protection to the public from these remnants of historic uranium production. Safeguarding abandoned uranium mines can provide neighboring communities with new opportunities to grow and prosper through construction-related jobs and the potential to enhance historical tourism opportunities. Safeguarding a mine while protecting culturally significant mining-related features, for example, can restore a tribe's connection to an area or afford an opportunity for the public to safely appreciate unique mining-related structures.

Mine safety closures, referred to as safeguards, are engineered barricades constructed at or immediately inside a mine entry or subsidence, or adjacent to a dangerous highwall for the purpose of preventing human access to the subsurface or highwall. This appendix describes the LM strategy of constructing safeguards at hazardous DRUM mine entries and protecting the public from dangerous highwalls. The strategy is focused on an efficient and cost-effective method of ensuring public safety at DRUM mines, entailing partnerships with land management agencies and state and tribal Abandoned Mine Lands (AML) programs. However, before this program is initiated, a program implementation plan will be developed. The implementation plan will provide more detail and suggest approaches regarding successful program implementation.

Note that the LM mine safeguarding initiative, which involves affected land management agencies and state and tribal AML offices, is referred to as the safeguarding program. Individual mine safeguarding installation initiatives are referred to as safeguarding projects.

C1.1 Program Objectives

The objectives of the mine safeguarding program are threefold:

- Protect the public from the physical hazards at abandoned uranium mines
- Accomplish safeguarding in a manner which is consistent with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act
- Complete safeguarding whenever possible in conjunction with partner state and federal agencies in a manner that maximizes effectiveness and utilization of expertise in order to increase program efficiency

C1.2 Strategy

To maximize available human and fiscal resources, LM has formed partnerships with federal land management agencies and state and tribal AML offices to implement a one-government approach for the DRUM safeguarding initiative. Federal agencies, particularly USFS and BLM, manage public land which collectively hosts as many as 2500 DRUM sites. These land management agencies have frequently partnered with state and tribal AML offices to complete mine safeguard projects.

The land management agencies have expertise regarding development of NEPA compliance, travel management, human use, and cultural resources. State and tribal AML offices have accumulated expertise in the development and execution of mine safeguarding projects. The state and tribal offices have developed and implemented engineered safeguard designs, are familiar with contracting requirements, and have experience in safeguard construction management. Some state and tribal AML offices may have the capability to match LM safeguarding funds with grant money from the U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement. These funds are available to some state and tribal AML offices through Title IV of the Surface Mining Control and Reclamation Act (SMCRA). Additionally, LM through its Legacy Management Support (LMS) services contract, can provide safeguard design and project management capabilities, construction management experience, NEPA expertise, and contracting capabilities. Overall, it is in the best interest of the public to develop interagency partnerships that are flexible enough to accommodate changing circumstances and facilitate efficient and effective administration of a mine safeguarding program administered by LM.

The following tasks must be accomplished in advance of initiating the program in order to create the efficiencies desired by the impacted agencies. These actions include:

- Developing and expanding partnership relationships with impacted federal land management agencies and state and tribal AML offices. LM has developed and implemented cooperative agreements with USFS and BLM in some areas of the western United States that outline the mechanics of conducting V&V and safeguard construction activities. Some key points that partnership agreements should address include:
 - Creating opportunities for the transfer of funds.
 - Creating opportunities for matching of funds and in-kind services.
 - Addressing responsibilities for pre-construction compliance work.
 - Defining a mechanism to adopt an agency's NEPA Categorical Exclusion process for LM safeguarding projects.
- Prioritizing eligible mines by feature hazard ranking.
- Defining scope of work at hazardous structures.
- Developing logical project areas that foster cost and programmatic efficiency (e.g., project areas organized by FOP; watershed; BLM field office or USFS ranger district).
- Developing multiple project areas early in program life to be immediately implemented as future funding becomes available.

- Completing NEPA compliance activities well in advance of anticipated safeguard construction.
- Developing administrative mechanisms to utilize state and tribal AML office capacities to help facilitate safeguarding projects.

Collaborative partnerships are the most efficient and effective method of executing a mine safeguard project from initiation through final transfer of responsibilities. It is important that the involved agencies are provided the opportunity to engage in the process, relying upon their inherent strengths. Table C-1, “Partnership Matrix,” describes some of the capabilities provided by the various entities that may be involved in the mine safeguarding program.

Table C-1. Partnership Matrix

Agency	Expertise Provided	Primary Tasks	Other Contributions
LM	Program policy and direction; Funding; Cooperative agreement administration	Complete cooperative agreements; Provide portion of funding; Administer program	Programmatic direction, guidance, and oversight; Coordination of activities
LMS	Knowledge of mine conditions; Tabulation of mines; Accounting; Construction quality assurance; Monitoring	Provide lists of mines to be safeguarded by defined project area; Provide accounting services for safeguard project management; Complete quality assurance inspections during construction; Monitoring and reporting of affected DRUM sites	Utilize inventory knowledge and DRUM database to support project development; Provide objective evaluations of construction quality
Land management agencies	Funding; NEPA compliance capabilities; Local area knowledge	Provide portion of funding; Complete or review NEPA documentation; Provide guidance regarding local policies, conditions, and regional planning	Knowledgeable staff to complete NEPA; Focal point of land use planning and compliance
SMCRA state and tribal AML offices	Funding; Safeguard design expertise; Contracting capabilities; Construction supervision; Safeguard maintenance	Provide portion of funding; Complete bid design package and contract safeguarding projects; Manage safeguard construction; Complete project closeout reporting; Complete maintenance construction	Expertise and history of planning; Contracting and supervising safeguard construction, including maintenance of compromised safeguards

Creative collaborative partnerships may be utilized to create efficiencies for land management agencies as well as state and tribal AML offices. For example, it may be possible to accommodate other agency mine safeguard priorities by combining nearby non-DRUM uranium mine safeguards into a DRUM-specific safeguard project. Alternatively, SMCRA-funded state and tribal AML offices may include DRUM mine safeguards in a non-uranium mine safeguard project when an AML project is proposed near a relatively isolated DRUM site.

Collaborative partnerships can also be utilized to create efficiencies in the safeguard design and installation process by accepting and adopting existing safeguard construction specifications. The SMCRA-funded state and tribal AML offices construction specifications have been designed and approved by professional engineers and have been successfully used by the individual AML programs. These proven effective designs will eliminate the necessity of re-inventing mine safeguard specifications and provide confidence to LM that the safeguards will

function as designed. In addition, they will provide independent safeguard construction contractors with assurances that the designs being specified are within the scope of previous work, which adds a degree of certainty and economy to the construction bidding process.

Generally, interagency agreements implementing collaborative partnerships will address administrative tasks and responsibilities pertaining to program implementation such as the intent, administrative requirements, communication approach, potential funding options, NEPA and other compliance related responsibilities, general safety considerations, and safeguard closure practices. Flexibility will be maintained to tailor these items to SMCRA-funded state or tribal AML office capabilities or to meet the needs of specified administrative units within individual land management agencies.

C2.0 Program Approach

The goal of the mine safeguarding program is to protect the public from the physical hazards presented by abandoned mine entries and dangerous highwalls in a manner that maximizes collaboration with the affected land management agencies and is efficiently implemented.

C2.1 Program Initiation

C2.1.1 Funding and Cost Sharing

LM is in the process of seeking long-term funding via its annual congressional appropriation to complete the program objectives of safeguarding hazardous mine entries and dangerous highwalls. It is anticipated that the safeguard program will be sufficiently funded over the course of ten years in order that mine safeguards may be constructed, that subsequent safeguard performance may be evaluated, and that any required maintenance may be completed. In the interim, funding is available in order to initiate a pilot mine safeguard project in the fall of 2020.

LM intends to fund the mine safeguard program, including follow-up monitoring and maintenance activities. However, it has been the experience of the SMCRA-funded state and tribal AML offices that cost sharing agreements between a state or tribe and USFS or BLM are a cost-effective and efficient partnership. Another option for a fund sharing arrangement is that partner federal, state, or tribal agencies could provide in-kind services. These in-kind services could be utilized to facilitate any number of project-specific tasks, including developing NEPA documentation, creating safeguard contract specifications, providing construction contract management, providing construction management, conducting monitoring, or some combination of these tasks.

C2.1.2 Responsibilities

It is recognized that agency responsibilities and tasks may differ not only among land management agencies, LM, and state and tribal AML offices, but also that these may vary on a project-by-project basis. In order to provide some clarity concerning the capabilities of various agencies, a qualitative assessment of these capabilities is provided in Table C-2. Because land management agencies in Colorado, New Mexico, and Utah, which are the states where most

DRUM sites are located, have historically completed safeguards in conjunction with state and tribal AML offices, it is assumed for purposes of this analysis that this practice would continue.

Table C-3 is a summary of the strengths and potential pitfalls that may be encountered when using multiple agencies' expertise in completing a safeguard project. The table also identifies an idealized preferred approach for project management. Although it is the preferred approach, the model may not be applicable in some cases due to variances in the level of participation that some agencies may be able to offer on a case-by-case basis. Table C-3 highlights the need to use a multi-agency approach to safeguard project management by relying on the relative strengths of the participating agencies. Table C-3 also illustrates that the ability to appropriately staff specific functions is a potential chokepoint that will need to be overcome in any project management scenario involving state and tribal AML offices.

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Table C-2. Matrix of Tasks and Responsibilities

Matrix of Tasks and Responsibilities

This matrix represents safeguarding projects with shared responsibilities between federal and SMCRA funded state/tribal offices.

ACTIVITY	PARTICIPANTS	FUNDING ALTERNATIVES	PROS	CONS	NOTES	LEGEND	
Pre-Contracting Compliance Activities excluding NEPA	LM	100% LM	Current in-house expertise excepting underground biologic surveys. Ability to supply dedicated work force.	Potentially limited ability to complete district-wide compliance documents. Lack of job-specific experience.	NEPA evaluations, specifically cultural/historic evaluation and clearance, may require substantial personnel time commitments.	AML	Abandoned Mine Lands
	LMA*	Split with SMCRA states/tribes	Generally in-house expertise excepting underground biologic surveys. BLM has nationwide underground biologic survey contract. Potential ability to complete district wide compliance documents.	Safeguard projects must be integrated with Land Management Agencies priorities in order that program moves forward on schedule.		BLM	U.S. Bureau of Land Management
	SMCRA states and tribes**	100% SMCRA states/tribes	Ability to provide in-house services or contract for such services. Experienced at compiling documents specific to safeguard projects.	Requires LMA approval of compliance product. Limited staff and potential FTE ceilings could present dedicated personnel issues. Safeguard projects must be integrated with land management agency priorities in order that program moves forward on schedule.		DRUM	Defense-Related Uranium Mine
NEPA Responsibilities	LM	100% LM via LMS.	Targeted to specific safeguarding needs.	Needs closure experience and BLM and possible state-approved archaeologist. Perception of increased duration.	Combining duties between multiple entities may be useful, assuming avenues of communication and priorities are well established.	FTE	full-time employee
	LMA*	100% LMA, plus SHPO contractor.	Familiar with local resource issues; likely previous safeguard NEPA experience	Potentially subject to agency priorities and staffing levels; need to establish quality-control processes; ensure archaeologist is acceptable to SHPO.		GPS	global positioning system
	SMCRA states and tribes**	100% SMCRA states/tribes.**	Have NEPA experience relative to mine-safeguarding projects.	Potentially subject to state/tribal priorities and staffing levels; need to establish quality-control processes.	IFB	Invitation for Bids	
	Other third party contractor	On contract to LM.	Could focus exclusively on process to facilitate timely completion	Needs closure experience and BLM and possible state-approved archaeologist.	Potentially faster long-term process with dedicated resources.	LM	Office of Legacy Management
Safeguard Closure Funding	LM	100% LM	Minimizes administrative requirements.	Requires greater funding per safeguard by LM.	Funding may be from multiple sources on a per mine basis. Accounting during construction critical.	LMA	land management agency
	LMA*	Split with LMA	Multiple funding sources increases population of mines potentially closed annually.	Potential issues forecasting annual funding availability.		LMS	Legacy Management Support
	SMCRA states and tribes**	Split with SMCRA states/tribes.	Multiple funding sources increases population of mines potentially closed annually.	Potential issues with annual SMCRA funding availability.		NEPA	National Environmental Policy Act
Selection Of Closure Type At A Specific Mine	LM	100% LM, or in consultation with LMA and SMCRA states and tribes.	LM controls decision-making process — potential time savings.	Decisions potentially made outside context of land management planning.	Closure decision-making processes lend themselves to joint decision-making.	SHPO	State Historic Preservation Officer
	LMA*	Split with LM or in consultation with LM and SMCRA states and tribes.	Decisions should be more consistent with resources requirements.	LM may lose cost control.		SMCRA	Surface Mining Control and Reclamation Act
	SMCRA states and tribes**	100% SMCRA states/tribes or in consultation with LM and LMA.	Decisions based on AML closure experience.			USFS	U.S. Forest Service
Closure Construction Contract Management	LM	100% LM via LMS.	Relatively quick process via LMS.	Likely create new closure-specific contracting process and language.	Sharing of construction contract management between agencies not a viable option.		
	LMA*	100% LMA.	LMA controls contract language.	Relatively slow process through federal system.			
	SMCRA states and tribes**	100% SMCRA states/tribes.	Experienced with closure contract processing and management.	Subject to state/tribal purchasing systems. Likely not an AML-controllable process.			
Construction Management	LM	LM via LMS.	LM to maintain training and quality control.	Requires training of LMS staff; establishment of construction oversight processes.	Only two options appear viable: 1) LM via LMS or 2) SMCRA states/tribes either acting independently or on behalf of LMA.		
	LMA*	LMA via SMCRA states/tribes.	Experienced with closure construction management.	LM may lose control of scheduling; potentially subject to state/tribal priorities and staffing levels; need to establish quality-control processes.			
	SMCRA states and tribes**	100% SMCRA states and tribes.**	Experienced with closure construction management.				
Post-Safeguard Monitoring	LM	100% LM via LMS.	LM to maintain training and quality control; staff tasked to specific needs; experienced with safeguard suitability criteria, if previously tasked to complete safeguard construction management.	Requires training of LMS staff; establishment of monitoring processes.	LMA may utilize SMCRA states/tribes to accomplish monitoring. Consider direct link to party responsible for safeguard maintenance.		
	LMA*	100% via seasonal or temporary staff.	Staff tasked to specific needs.	LM may lose control of scheduling; potentially subject to staffing levels, seasonal nature of the work, and funding fluctuations; need to establish quality-control processes. Historically low-priority task.			
	SMCRA states and tribes**	100% via existing staff.	Experienced with monitoring duties; experienced with safeguard suitability criteria.				
Post-Safeguard Maintenance	LM	100% LM via LMS.	LM to maintain contracting, training, and quality control.	Establish maintenance-specific contract vehicle. Establish maintenance construction oversight processes.	Splitting maintenance duties among multiple entities is not cost-effective or efficient. Consider direct link to party responsible for safeguard monitoring. Pros and cons similar to safeguard construction contract management and safeguard construction management.		
	LMA*	LMA via SMCRA states/tribes.	Experienced with maintenance contract development and project management.	LM may lose control of scheduling; potentially subject to state/tribal priorities and staffing levels; need to establish quality-control processes.			
	SMCRA states and tribes**	100% via existing staff.					
						* LMA - Land management agency, typically USFS or BLM.	
						** States and tribes (Alaska, Colorado, Montana, Navajo Nation, New Mexico, North Dakota, Pennsylvania, Texas, Utah, and Wyoming) that receive AML funds via the Surface Mining Control and Reclamation Act.	

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Table C-3. Preferred Shared Responsibilities

Preferred Shared Responsibilities

This assumes that Land Management Agencies would work through associated SMCRA funded AML offices; LM works via LMS

Task	Responsible Agency	Tasks	Pro	Con	Notes
Pre-Contracting Compliance Activities	SMCRA funded state and tribe AML offices in conjunction with land management agencies.	Evaluate all compliance related issues, permits and requirements; obtain needed clearances and permits.	Generally in-house expertise excepting underground bat habitat surveys. BLM has nation-wide underground bat habitat survey contract. Potential ability to complete district wide compliance documents. Ability to provide in-house services, or contract for such services. Experienced at compiling documents specific to safeguard projects.	Safeguard projects must be agency priority in order that program moves forward on schedule. Requires Land Management Agency approval of compliance product. Limited staff and potential FTE ceilings could present dedicated personnel issues.	Build in time and personnel controls LM oversight during construction (construction specifications, costs, other administration, construction acceptance).
Contracting	SMCRA funded state and tribe AML offices.	Create project specifications in Invitation for Bid format; bid project; award contract; hold performance bond.	Process quicker than federal contracting. SMCRA AML offices have extensive construction contracting experience; no start-up issues.	State systems have finite capacity to process purchasing contracts; could lead to delays in contract issuance. LM has no influence over this purchasing process.	Build in time, accounting and personnel controls.
Construction Management	SMCRA funded state and tribe AML offices.	Manage safeguard construction contractual requirements; manage construction progress and assess for integrity, compliance with specifications and evaluate safety procedures. Accept safeguards for payment. Complete construction project closeout reporting.	SMCRA AML programs have extensive experience managing mine safeguard contracts and construction processes.	SMCRA AML offices generally have limited existing staff capabilities. Adding DRUM safeguarding projects may require hiring and training of staff. SMCRA AML offices generally have a less rigorous safety program than LM.	Build in time and personnel controls. LM oversight during construction (construction specifications, costs, other administration, construction acceptance).
Monitoring	LMS	Monitor safeguarded mines at a specified time frame following completion of construction. Note maintenance needs and specify remedies.	Some in-house monitoring expertise exists. Grand Junction based staff close to most project areas. Ability to add staff as needed to achieve project goals. Developed sense of LM safety culture.	Training required in order to appropriately survey constructed safeguards and identify required maintenance needs and subsequent remedies.	Monitoring is an observational exercise driven by GPS enabled field computers and trained staff capable of deploying to multiple locations simultaneously.
Maintenance	SMCRA-funded state/tribe AML offices.	For safeguards that are identified as compromised during monitoring. Develop construction specifications; complete bidding through purchasing system; manage construction activities; complete closeout reporting.	SMCRA AML offices have extensive experience developing construction specifications; managing mine safeguard contracts and construction processes.	SMCRA AML offices generally have limited existing staff capabilities; adding DRUM maintenance projects may require hiring and training of staff. SMCRA AML offices generally have a less rigorous safety program than LM.	Include time/ personnel controls and LM oversight during construction (e.g., construction specifications, costs, other administration, construction acceptance).

Abbreviation:

FTE = full-time equivalent

C2.1.3 Interagency Coordination

The safeguard program will be administered by LM in fulfillment of its commitment to safeguard the public from the physical hazards presented by DRUM Program–eligible mines. LM will maintain decision-making capabilities to the extent that specific programmatic decisions impact the DRUM mission. LM and partner agencies will utilize interagency agreements to delineate programmatic responsibilities in conducting the safeguarding program. Safeguard project–specific agreements may also be employed as needed in order to facilitate individual project needs or if substantial changes to the preferred approach to project management as illustrated in Table C-2 are necessary.

C2.2 Project Planning

Safeguarding project planning is an iterative process that includes engagement of partner agencies, delineation of project areas, identification of specific mine features to safeguard, completion of NEPA and other compliance and permitting, outreach, construction contracting management, and closeout. Figure C-1 illustrates the tasks to be undertaken when planning and executing a mine safeguard project.



Figure C-1. DRUM Physical Hazard Safeguarding Project Process

Engagement of partner agencies begins at the administrative level when the interagency agreements described in Section C2.1.3 are completed. Re-engagement of partner agencies, particularly at the local-office level, should be completed as specific mine safeguard projects are planned. Partner agencies and SMCRA-funded state and tribal offices, when involved in the mine safeguard project, should be contacted early in the project identification process to promote inclusive planning to efficiently and effectively complete project objectives.

Table C-4 describes various safeguard construction project tasks and outlines a relative timeline in which to accomplish specific items. Due to the inherent environmental and physical variables encountered at individual mines and because of the complexities of completing compliance and contracting processes, these timelines may need to be expanded. Long-term planning and early initiation of compliance and contracting processes may provide a more direct path to timely completion of safeguard projects.

Table C-4. Project Tasks

Task	Description	Relative Timeline
Project Development	Field evaluate each feature to be safeguarded	2 years prior to construction
Pre-Contracting Compliance Activities	Complete NEPA documentation process	1 year prior to construction
Contracting	Issue invitation to bid, process documents, hold bond, issue contract	1 year prior to construction
Construction Management	Monitor quality control checkpoints at each safeguard; construction closeout reporting	Complete in 1 construction season
Monitoring	Evaluate for integrity; note performance	Within 5 years of construction
Maintenance	Contract and complete necessary repairs	By fifth year following construction

Completion of the individual tasks may vary between projects depending upon the agencies involved, their expertise, availability of matching funds, and staffing levels.

C2.4 Logical Project Organization

Safeguarding projects will be organized in a logical manner that promotes efficiency in pre-contracting compliance activities, construction, and follow up monitoring and maintenance tasks. Experience indicates that mines to be safeguarded should be grouped in a manner which facilitates efficient access by a construction contractor, that is inclusive so that all hazards within the project area are addressed in a single mobilization, and which facilitates follow-up administration by the affected land management agency.

C2.4.1 Outreach

Public outreach and education are important components of a safeguarding project. Public education regarding the inherent hazards associated with abandoned mines, provision of mining-related historical interpretative information, and safeguard-specific outreach have been hallmarks

of national AML programs on both the state and federal levels. The DRUM safeguarding program is uniquely positioned to participate in these educational outreach efforts. Community outreach during safeguard project planning could include:

- Public scoping meetings.
- County commissioner meetings.
- Tribal council meetings.
- Public service announcements in local media.
- School presentations.
- Historic interpretive signs.
- Signage at the project area.

Because the DRUM Program is unique in its scope on both national and regional levels, it is important to present methodologies, findings, lessons learned, and paths forward strategies to more widespread audiences. Some methods to disseminate and collect information include:

- Presenting papers at conferences.
- Publishing papers in trade journals.
- Actively participating in organizations such as the AUMWG and the National Association of Abandoned Mine Land Programs.
- Maintaining an active website.
- Facilitating relationships with historical preservation organizations.

C3.0 Anticipated Project Risks and Uncertainties

The DRUM safeguard program is a unique opportunity to target specific mining-related hazards in a manner which emphasizes participation of land management agencies and state and tribal AML offices. It maximizes the use of specific expertise and resources to efficiently accomplish program goals and objectives. Because the program involves innovative cross-utilization of various governmental agencies, a number of risks and uncertainties will need to be addressed. Some of the identified risks and uncertainties associated with project implementation include:

C3.1.1 DOE authority to fund and conduct safeguarding activities

LM leadership will define program limitations in terms of congressional or statutory authority, available financial resources, and program timeframes.

C3.1.2 Long-term LM priorities

LM will develop strategic planning to ensure that the safeguarding program is integral to the mission of Legacy Management.

C3.1.3 Cooperation and agreement by partner agencies on conceptual approach to safeguarding, maintenance, and transfer of responsibilities

LM and the appropriate land management agencies and state and tribal AML offices will need to establish the framework for agreements which address safeguard program administration, authorities, and responsibilities.

LM and the appropriate land management agencies and state and tribal AML offices will define productive relationships in order that time consumptive decision-making processes are addressed to minimize delays in accomplishing program objectives.

C3.1.4 NEPA responsibilities, timing, and restrictions

Completion of NEPA evaluations is a potential constriction in mine safeguarding project timelines. LM and partner agencies will consider adoption and utilization of existing AML safeguarding NEPA compliance procedures to provide an avenue for expedient NEPA approval.

State Historic Preservation Office approval for safeguarding projects has become a more time-consuming effort than has been the case in past years, creating a potential constriction point for safeguarding project implementation.

C3.1.5 Personnel availability (states and tribes, land management agencies)

The availability of personnel to conduct a mine safeguarding project needs to be considered and accommodated to effectively accomplish individual safeguard projects within a larger program schedule.

- Funding (states and tribes; land management agency matching funds)
 - State and tribal AML offices may have the opportunity to provide matching funds and personal services for safeguarding projects. Adequate planning for resource allocation is necessary so that state and tribal fiscal year planning is accommodated and that spending authority timeframes are considered. Similarly, federal partners may need to budget and allocate matching funds and potentially personal services to fulfill their roles in the program. Advanced planning and outreach are necessary so that sufficient funds and personnel are available to supplement program needs.
 - Contracting
 - A successful safeguarding program is dependent on an efficient purchasing system that can complete timely contracting processes to secure safeguarding services, hold performance bonds, process change orders, and close out the contract upon acceptance of the safeguards. Positioning LM and partner agencies to either use an existing system or create a system that can effectively function to meet these goals is critical to reasonably meet project performance timelines. To initiate and sustain a safeguarding program, a purchasing process which is responsive to the needs of the program, its partners, and specific acquisition quirks is needed. In the recent past, SMCRA-funded state and tribal AML offices offered the best alternative to address these needs. However, the autonomy of these purchasing organizations, competing

priorities, and lack of staffing resources may inhibit issuance and service of construction contracts within a framework that is acceptable to the program.

- LM and partner agencies, via the LMS contractor or through focused agreements with the purchasing systems affiliated with SMCRA-funded state and tribal AML offices, will need to establish and support a reliable, timely, and efficient purchasing system.
- Land management agency acceptance of the DRUM Program

LM intends to transfer responsibility for monitoring and maintenance of safeguarded mines to the affected land management agency. LM will work closely with the affected land management agencies to administratively transfer responsibilities for the safeguarded mines upon completion of monitoring safeguard performance.

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