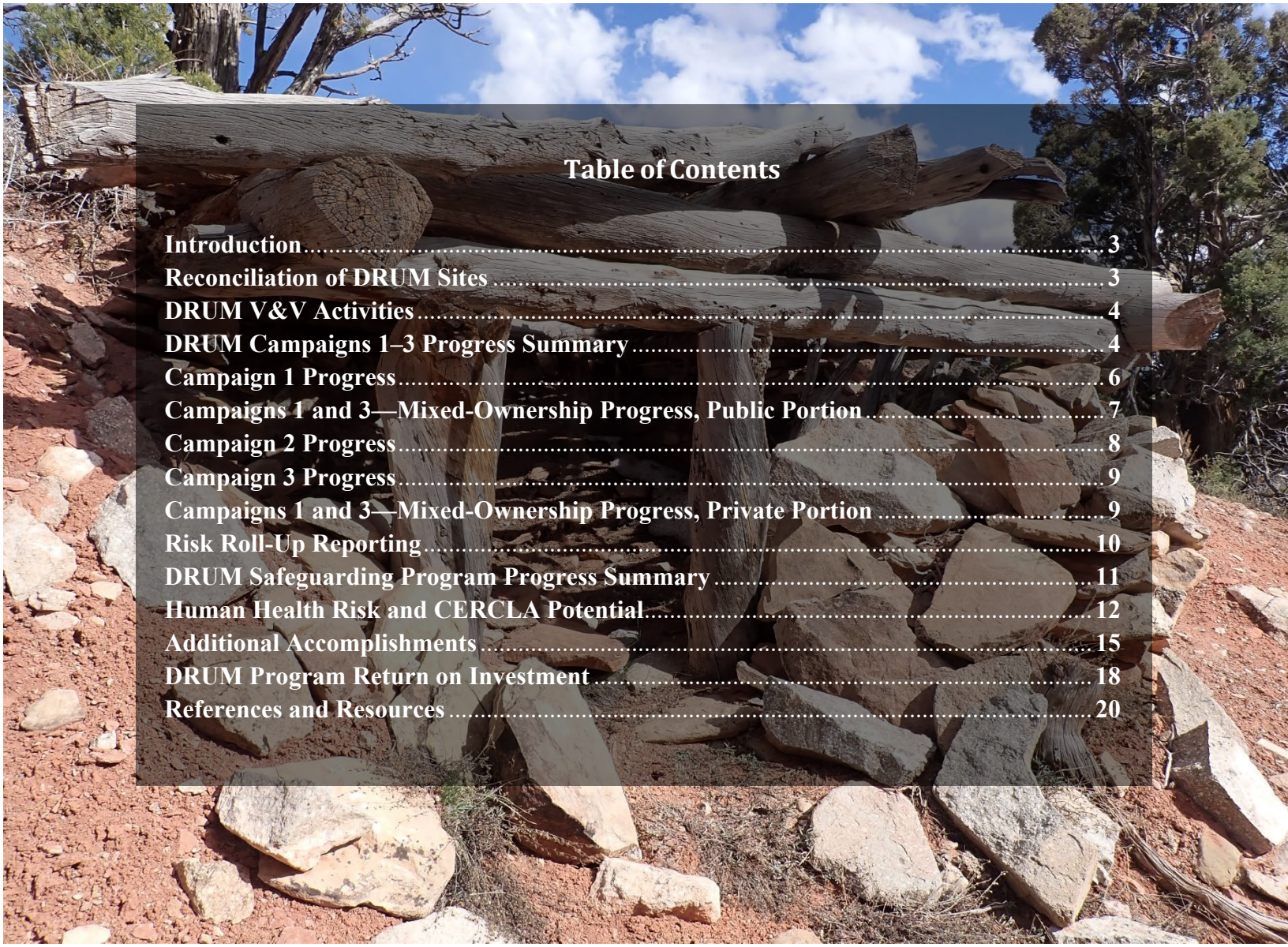
Mike Mine—Little Mountains Locality, Wyoming

DRUM PROGRAM MIDYEAR PROGRESS REPORT

January 1–June 30

2024



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Introduction

The 2014 *Defense-Related Uranium Mines Report to Congress* (DOE 2014b) (2014 Report to Congress) identified the potential physical and environmental risks posed by legacy abandoned uranium mines (AUMs) in the United States on public land, Native nation lands, and private property as mandated by the 2013 National Defense Authorization Act. This set of mines provided uranium ore for defense-related atomic energy activities from 1947 to 1970. To help quantify the remnant risks associated with these mines identified in the 2014 Report to Congress, the U.S. Department of Energy (DOE) Office of Legacy Management (LM) initiated the Defense-Related Uranium Mines (DRUM) Program in fiscal year (FY) 2017. The DRUM Program supports LM's strategic goal of "Protect[ing] human health and the environment" (Goal 1) and its strategic objective to "address the environmental legacy of defense-related uranium mining and milling sites" (DOE 2020a). DOE subsequently developed multiple campaigns to carry out verification and validation (V&V) fieldwork at these legacy mines. Mine-specific V&V reports document this information and serve as the basis for evaluating the risks posed by a group of mines, as presented in a risk roll-up report (public land) or a hazard summary (tribal land and private property).

This DRUM Program midyear progress report describes the program's achievements for the reporting period of January 1 through June 30, 2024. It provides information regarding reconciliation numbers; the progress of V&V Campaigns 1–3; risk roll-up reporting; the DRUM safeguarding program; human health risk and potential Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) actions; overall accomplishments since the program's initiation in July 2017; and the DRUM Program's return on investment.

Reconciliation of DRUM Sites

The DOE 2014 Report to Congress recognized that the U.S. Atomic Energy Commission ore production records were the most comprehensive and representative records identifying mines in the DRUM Program. The 2014 Report to Congress identified 4225 mines from these records, counting each purchase record as an individual mine. The estimated total number of mines changes as more information is obtained. The DRUM Program has confirmed that duplicate (two or more) purchase records exist for many mines, resulting in an overestimation of the total number of mines. Aside from merging duplicate records, the DRUM team occasionally discovers additional previously unreported purchase records that are added to the total number of mines. The total number of reconciled DRUM Program sites is 3472 (Table 1).

Table 1. Summary of Reconciled DRUM Sites

Number of DRUM sites in 2014 Report to Congress	**4225**
New sites and records added	373
Duplicate production records removed	(1126)
Total number of reconciled DRUM Program sites as of July 1, 2024	**3472**

Subsequent evaluation of these 3472 reconciled mines, conducted in preparation for field mobilization, revealed additional criteria that further reduced the final number of mines identified for field visits. For example, mines with active mining permits would not be visited. Table 2 summarizes the total number of mines identified for field visits.

Table 2. Summary of DRUM Sites Identified for Field Visits

Number of reconciled DRUM Program sites as of July 1, 2024	**3472**
Unconventional sites removed	(27)
Unlocatable records removed	(106)
Sites with active mining permits removed (not field evaluated)	(40)
Sites under CERCLA regulations removed (not field evaluated)	(212)
NPS sites removed (not field evaluated)	(4)
No V&V evaluation for other reasons (not field evaluated)	(2)
Total number of DRUM sites identified for field visits as of July 1, 2024[a]	**3081**

Note:
[a] Includes one unconventional site that was field evaluated by request and counted as a Campaign 1 and 3 mixed-ownership mine.

Abbreviations:
NPS = National Park Service

DRUM V&V Activities

V&V activities consist of the following: (1) a reconciliation step completed in the office to confirm land status, location, and ore purchase data for each mine and to remove duplicate purchase records from the DRUM Program database; (2) an inventory step to confirm the mine location in the field and to gather information regarding mine features and their potential hazards; (3) an environmental sampling step to collect chemical, radiological, and ecological data; and (4) a report preparation step. Field V&V work is completed after inventory and environmental sampling are complete or after inventory is complete for mines that do not require sampling. Draft and final reports are prepared for each mine following completion of V&V activities. Draft reports are generally submitted within 120 business days after V&V work is completed. Final reports are prepared after LM reviews and approves the draft reports. A V&V report is considered complete when LM accepts the report, and the acceptance date is recorded in the DRUM Program database.

During the 2023 field season, V&V activities were focused in areas with a high density of mines, centered on substantially completing Campaign 1 V&V work in Arizona, California, Colorado, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming. During the first half of 2024, Campaign 1 V&V activities have shifted to focus efforts on Arizona, California, Colorado, Idaho, Montana, Nevada, New Jersey, New Mexico, Washington, and Wyoming, where the remaining Campaign 1 DRUM sites are, and Campaign 1 is scheduled to be complete by the end of 2024. LM continues to focus on Campaign 2 V&V activities on Native nation lands in 2024, primarily focusing efforts on areas with the largest density of DRUM sites, which are on Navajo Nation lands. V&V fieldwork at mines in the Northern AUM region, specifically in the Sanostee, Teec Nos Pos, and Red Valley Chapters of the Navajo Nation, continued this year. V&V fieldwork at mines in the North Central AUM region, specifically in the Oljato Chapter of the Navajo Nation, began in April 2024.

DRUM Campaigns 1–3 Progress Summary

The DRUM Program's eighth field season began on March 4, 2024. The focus of this season's fieldwork through June 30, 2024, has been on Campaign 1 (U.S. Bureau of Land Management [BLM]-managed land in Arizona, California, Colorado, Idaho, Montana, South Dakota, and

Wyoming; U.S. Forest Service [USFS]-managed land in California and Montana; state-managed land in Wyoming), Campaign 2 (Navajo Nation lands in Arizona, New Mexico, and Utah), Campaign 3 (private property in Colorado), and Campaign 1 and 3 mixed-ownership mines (BLM-managed land and private property in Colorado). Table 3 outlines the program's progress for the reporting period and its overall progress by campaign.

Table 3. DRUM Program Progress by Campaign

DRUM Program Progress by Campaign						
Campaign	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024**	**V&V Field Visits Completed January 1– June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024[a]**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1– June 30, 2024**	**V&V Reports Completed as of June 30, 2024**
Campaign 1	2219	19	2181	38	57	2162
Campaign 1 portion of mixed public and private ownership[b,c,d]	123[b]	20	117[b]	6	11	103[b]
Campaign 3 portion of mixed public and private ownership[b,c,d]	123[b]	22	31[b]	92	0	0
Campaign 2	210	26	89	121	26	63
Campaign 3	529	15	16	514	0	0
Totals for all campaigns	**3081**	**102[e]**	**2434[e]**	**771[e]**	**94[e]**	**2328[e]**

Note:

[a] Includes 14 mines deemed inaccessible and seven mines where a stakeholder has denied access (both cases are considered V&V complete).

[b] Includes one unconventional site that was field evaluated by request and was counted as a Campaign 1 and 3 mixed-ownership mine.

[c] Mixed public and private ownership mines are displayed separately for tracking purposes. Due to access restrictions, the field teams may visit the private portion of the mine at a different time than the public portion.

[d] Ongoing V&V work has identified land ownership discrepancies at some private DRUM mines, affecting the number of Campaign 1 and Campaign 3 mixed-ownership mines.

[e] The total includes both the public portion and the private portion of mixed public and private ownership mines.

The following sections and the associated tables describe each V&V campaign's progress in greater detail by land ownership.

Campaign 1 Progress

Campaign 1 field activities began in FY 2017. As of June 30, 2024, V&V field visits have been conducted at over 98% of identified Campaign 1 mines. The estimated completion date for Campaign 1 field activities is December 24, 2024. V&V progress for Campaign 1 only mines is presented in Table 4 and Table 5.

Table 4. Campaign 1 Progress – Mines on Public Land

Campaign 1—Mines on Public Land						
Land Management Agency	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024**	**V&V Field Visits Completed January 1– June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1– June 30, 2024**	**V&V Reports Completed as of June 30, 2024**
BLM	1568	13	1560	8	28	1547
USBR	2	0	2	0	0	2
DOD	1	0	1	0	0	1
Local municipality	3	0	0	3	0	0
NPS	35	0	35	0	2	35
State	85	1	75	10	7	74
USFWS	2	0	2	0	0	2
USFS	307	4	294	13	16	290
Mixed public ownership	216	1	212	4	4	211
Total	**2219**	**19**	**2181**	**38**	**57**	**2162**

Abbreviations:
DOD = U.S. Department of Defense
NPS = National Park Service
USBR = U.S. Bureau of Reclamation
USFWS = U.S. Fish and Wildlife Service

Campaigns 1 and 3—Mixed-Ownership Progress, Public Portion

Table 5. Campaign 1 Progress – Mines on Both Public Land and Private Property

Campaigns 1 and 3—Mines on Mixed-Ownership Land						
Land Management Agency	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024[a]**	**V&V Field Visits Completed January 1–June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024[a]**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1–June 30, 2024**	**V&V Reports Completed as of June 30, 2024[a]**
Campaign 1 portion of mixed public and private ownership	123	20	117	6	11	103
Total	**123**	**20**	**117**	**6**	**11**	**103**

Note:

[a] Includes one unconventional site that was field evaluated by request and counted as a Campaign 1 and 3 mixed-ownership mine.

Campaign 2 Progress

Campaign 2 field activities began in FY 2022. V&V field visits were conducted on three mines on Laguna Pueblo land in August 2022. Field activities at mines on Navajo Nation land began in FY 2023 (October 2022). The estimated completion date for Campaign 2 field activities is September 30, 2027. V&V progress for mines in Campaign 2 is presented in Table 6.

Table 6. Campaign 2 Progress—Mines on Native Nation Lands

Campaign 2 – Mines on Native Nation Lands							
Land Management Agency	**Local Management Office**	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024**	**V&V Field Visits Completed January 1– June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1– June 30, 2024**	**V&V Reports Completed as of June 30, 2024**
BIA	Navajo Nation	195	26	84	111	26	58
BIA	Hualapai	1	0	0	1	0	0
BIA	Pueblo of Laguna	3	0	3	0	0	3
BIA	Spokane	2	0	2	0	0	2
BIA	Tohono O'odham	1	0	0	1	0	0
BIA	Uintah and Ouray	1	0	0	1	0	0
BIA	Zia Pueblo	1	0	0	1	0	0
BIA	Pueblo of Zuni	1	0	0	1	0	0
Mixed	BLM and private	1	0	0	1	0	0
Mixed	BIA and private	1	0	0	1	0	0
Mixed	BIA and state	1	0	0	1	0	0
Private[a]	NA	2	0	0	2	0	0
Total		**210**	**26**	**89**	**121**	**26**	**63**

Note:
[a] The total of private mines includes two mines that are categorized as Campaign 2 due to pending discussions of ownership transfer to the Navajo Nation as of June 30, 2024.

Abbreviation:
BIA = U.S. Bureau of Indian Affairs
NA = not applicable

Campaign 3 Progress

V&V work at Campaign 3 mines officially began on March 4, 2024. However, V&V field visits were conducted at four mines on private property early in the DRUM Program; three were completed in Utah under a potential land donation agreement between the landowner and BLM in 2019. The three mines in Utah were never transferred to public ownership and have since been designated as Campaign 3 mines. The estimated completion date for Campaign 3 field activities is September 30, 2028. V&V progress for mines in Campaign 3 is presented in Table 7 and Table 8.

Table 7. Campaign 3—Mines on Private Property

Campaign 3—Mines on Private Property						
Land Management Agency	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024**	**V&V Field Visits Completed January 1–June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1–June 30, 2024**	**V&V Reports Completed as of June 30, 2024**
Private	524	13	15	508	0	0
Mixed (DOE and private)[a]	3	0	0	3	0	0
Mixed (BLM and private)[a]	2	2	2	0	0	0
Total	**529**	**15**	**17**	**511**	**0**	**0**

Note:
[a] The total number of mixed-ownership mines includes three mines on DOE land and private property and two mines on BLM land and private property that are categorized as Campaign 3 mines as of June 30, 2024.

Campaigns 1 and 3—Mixed-Ownership Progress, Private Portion

Table 8. Campaign 3 Progress—Mines on Both Public Land and Private Property

Campaigns 1 and 3—Mines on Mixed-Ownership Land						
Land Management Agency	**Reconciled Mines Identified for V&V Field Visits as of June 30, 2024[a]**	**V&V Field Visits Completed January 1–June 30, 2024**	**Total V&V Field Visits Completed Through June 30, 2024[a]**	**V&V Field Visits Remaining as of June 30, 2024**	**V&V Reports Completed January 1–June 30, 2024**	**V&V Reports Completed as of June 30, 2024[a]**
Campaign 3 portion of mixed public and private ownership	123	22	29	94	0	0
Total	**123**	**22**	**29**	**94**	**0**	**0**

Note:
[a] Includes one unconventional site that was field evaluated by request and counted as a Campaign 1 and 3 mixed-ownership mine.

Risk Roll-Up Reporting

Preparing risk roll-up reports that record the mines within identified V&V project areas is an integral aspect of DRUM Program reporting because it links V&V activities to the "DRUM Safeguarding Program Progress Summary" section below. Project areas may be defined by localities, land management agency field offices, or other logical geographical groupings created by land management agencies. Risk roll-up reports are only created for Campaign 1 mines because they assign mines rankings for chemical, radiological, and radium-226 risks, and Campaign 2 and Campaign 3 mines are not evaluated for these risks. A risk roll-up report is considered complete when it is accepted by LM. Risk roll-up reports finalized during this reporting period cover mines for which V&V reports were finalized before and during the same reporting period. The following is a list of the areas for which risk roll-up reports were completed between January and June 2024:

- Black Hills National Forest East (nine mines) in southwestern South Dakota on USFS-administered land (DOE 2024k)
- Black Hills National Forest Central (15 mines) in southwestern South Dakota on USFS-administered land (DOE 2024j)
- Glen Canyon National Recreation Area (11 mines) in southern Utah and northern Arizona on NPS-administered land (DOE 2024s)
- Bighorn Canyon National Recreation Area and Cody Field Office (four mines) in southern Montana and northern Wyoming on NPS-administered and BLM-administered land (DOE 2024i)
- Black Hills National Forest East Central (14 mines) in southwestern South Dakota on USFS-administered land (DOE 2024l)
- Black Hills National Forest North Central (eight mines) in southwestern South Dakota on USFS-administered land (DOE 2024m)
- Canyonlands National Park (nine mines) in southern Utah on NPS-administered land (DOE 2024p)
- Black Hills National Forest Northwest (15 mines) in southwestern South Dakota on USFS-administered land (DOE 2024n)
- BLM Utah Western Field Offices (nine mines) in western Colorado on BLM-administered land (DOE 2024w)
- Coronado National Forest (five mines) in southern Arizona on USFS-administered land (DOE 2024q)
- Black Hills National Forest West Central (11 mines) in southwestern South Dakota on USFS-administered land (DOE 2024o)
- Fremont and Trachyte Localities (17 mines) in southern Utah on BLM-administered land (DOE 2024r)
- Marysvale Locality (eight mines) in southern Utah on BLM-administered land (DOE 2024t)
- North and South Belfield Localities (three mines) in North Dakota on USFS-administered and state-administered land (DOE 2024u)
- South San Rafael Locality and Remaining Price Field Office (15 mines) in southern Utah on BLM-administered land (DOE 2024v)

DRUM Safeguarding Program Progress Summary

Physical hazards are mining-related features that pose potential harm to human health or safety and are recognized as the primary risk at DRUM sites. Physical mining-related features that pose threats to human safety include open vertical mine entries (shafts, some vents, and subsidence features) as well as horizontal mine entries (adits and declines). In some instances, a remnant topographic surface feature, such as a highwall, may also pose a human safety hazard. Concurrence on those features that need to be safeguarded allows LM and partner agencies to initiate hazardous mine feature safeguard projects. Therefore, concurrence is an important tool in safeguarding the public and wildlife from the inherent physical hazards posed by open mine features.

LM has expanded its safeguarding assistance to partner agencies through existing agreements to promote collaboration. In addition to the agreements with land management agencies and state abandoned mine lands programs, LM has a financial agreement with Bat Conservation International (BCI) to bolster the overall safeguarding capacity of the program and anticipates that the funding and scope of existing Cooperative Agreements will be maintained. To protect the well-being of members of the public who visit DRUM sites, LM and partner agencies are prioritizing safeguarding physical hazards, primarily mine entries, identified by the DRUM Program. LM is collaborating and providing funding to allow partners to complete these safeguard projects and provides project management oversight to ensure that safeguarding is fiscally efficient, preserve project timelines, and effectively prevent public access to hazardous features, while honoring the cultural and ecological value of the mines and their environments. Additional information about the process can be found in the *Defense-Related Uranium Mines (DRUM) Safeguarding Program Management Plan* (LMS/DRM/S33217).

The DRUM Program has identified 5793 hazardous mine features at 2336 mines that may require safeguarding. Table 9 shows the number of mines with physical hazards by state and the estimated total cost of safeguarding. The estimated cost of constructing mine safeguards may be reevaluated following completion of additional mine safeguard projects.

Since starting safeguarding work in 2020, the DRUM Program has facilitated the safeguarding of 1085 hazardous features as of June 30, 2024. Mine closure work occurred in the east Henry Mountains and Manti-La Sal areas between January and June 2024. Planning for projects in the east Calamity Mesa, Monogram Mesa, and BLM Uncompahgre Field Office areas has been ongoing, with these projects scheduled to begin in fall 2024. These 2024 safeguarding projects will address an estimated 380 hazardous mining-related features at DRUM sites on BLM and USFS land and private property.

Table 9. Mines with Potential for Safeguarding (Cumulative Through June 30, 2024)

State	Mines Risk Screened	Mines with Physical Hazards	Potential Features for Safeguarding	Total Costs for Safeguarding ($ millions)[a]
Arizona	88	56	308	$5.54
California	8	6	64	$1.15
Colorado	968	605	1964	$35.35
Montana	13	11	57	$1.02
Nevada	18	17	87	$1.57
New Mexico	86	39	103	$1.85
North Dakota	3	1	1	$0.018
Oregon	1	1	13	$0.234
South Dakota	99	75	298	$5.36
Utah	948	643	2746	$49.43
Washington	2	0	0	$0
Wyoming	94	53	152	$2.74
Total	**2328[b]**	**1507**	**5793**	**$104.27**

Notes:
[a] Total costs were calculated using the figure of $18,000 multiplied by the number of potential features to be safeguarded.
[b] This includes all mines at which V&V work has been completed, regardless of land management or ownership status.

Human Health Risk and CERCLA Potential

Land management agencies utilize their authority under CERCLA to address releases, or potential releases, of hazardous substances. Mines on public lands with a “high” or “medium” score for chemical or radiological risks could be further investigated by the land management agencies, potentially leading to CERCLA response actions. Of the 2265 public mines that have been risk screened to date, approximately 282 mines (12%) could require further analysis via the CERCLA process.

The DRUM Program can further refine this assessment by applying the risk-modifying factors to the screening process so that only mines ranked “high” for suitability for camping and “high” or “medium” for ease of access are considered for CERCLA response actions; this would reduce the percentage of mines requiring further CERCLA analysis to 2%. Table 10 shows the mines with “high” or “medium” risk rankings for chemical or radiological hazards (without applying the above-mentioned modifying factors) and the potential costs associated with remediation.

Table 10. Public Mines That Are Potential Candidates for Remediation (CERCLA) Actions
(Cumulative Through June 30, 2024)

State	Mines Risk Screened	"High" Chemical Risk Ranking	"Medium" Chemical Risk Ranking	"High" Radiological Risk Ranking	"Medium" Radiological Risk Ranking	"High" Radium-226 Risk Ranking[a]	"Medium" Radium-226 Risk Ranking[a]	Potential CERCLA Mines (Remediation Process)[b]	Potential CERCLA Costs (Remediation) ($ million)[c]
Arizona	55	4	0	0	3	4	4	11	$14.3
California	8	0	0	0	0	0	1	1	$1.3
Colorado	968	20	29	0	12	6	48	94	$122.2
Montana	13	4	1	0	0	0	2	6	$7.8
Nevada	18	2	1	0	2	1	2	5	$6.5
New Mexico	58	0	3	0	0	NA	NA	3	$3.9
North Dakota	3	0	0	0	0	0	0	0	NA
Oregon	1	0	0	0	0	0	0	0	NA
South Dakota	99	1	0	0	1	0	2	4	$5.2
Utah	948	14	98	0	20	11	24	146	$189.8
Wyoming	94	0	3	0	2	4	4	12	$15.6
Total	**2265[d]**	**45**	**135**	**0**	**40**	**26**	**87**	**282**	**$366.6**

Notes

[a] Starting in March 2020, LM began evaluating radium-226 concentration on a separate risk track; therefore, only 1248 mines have been screened for this risk.

[b] Fifty-one mines had more than one elevated risk ranking (e.g., both a "medium" chemical risk ranking and a "medium" radiological risk ranking). Since one CERCLA action would address any elevated risk rankings at the same mine, these were subtracted from this column to avoid double counting.

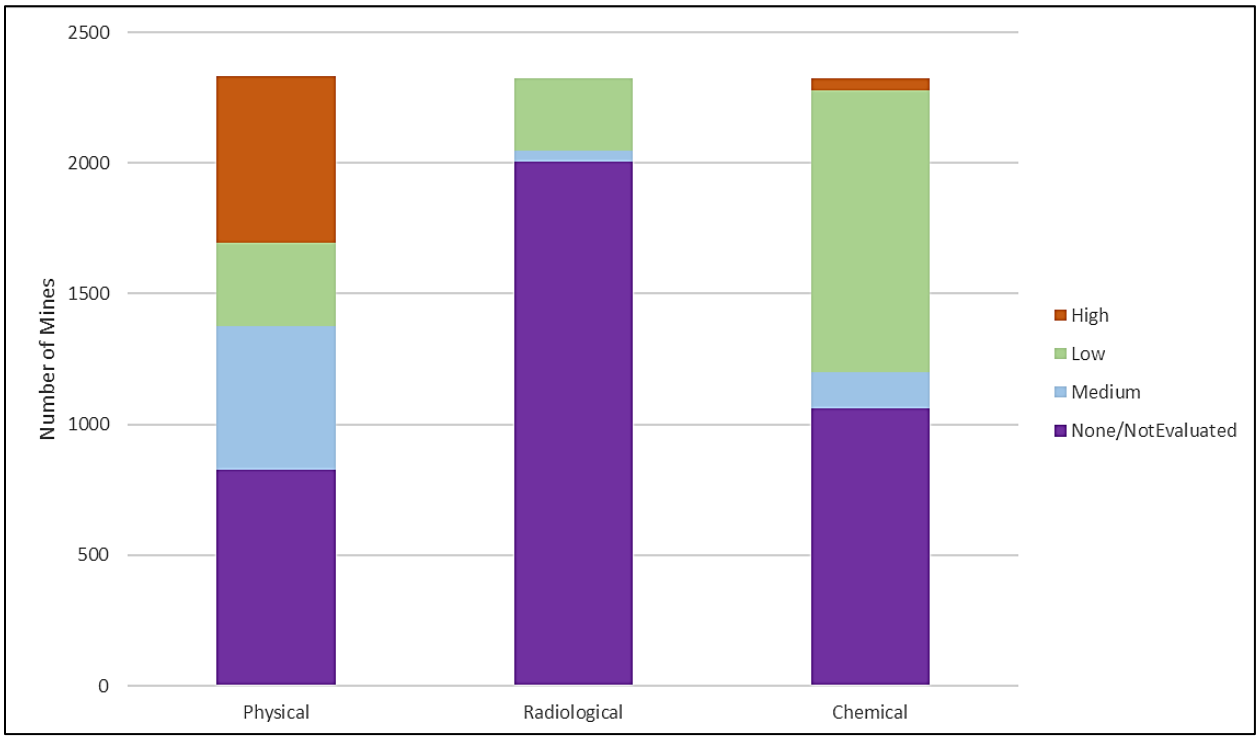
[c] The potential CERCLA cost of $1.3 million per remediated mine was calculated using data from Table 4 in the *Defense-Related Uranium Mines Cost and Feasibility Topic Report* (DOE 2014a).

[d] This only includes mines on public land and the public portions of mixed-ownership mines for which V&V reports have been completed.

Abbreviation:

NA = not applicable

Figure 1 below shows the rankings of mines for physical, radiological, and chemical risks as of June 30, 2024. While "high," "medium," and "low" physical hazards could be considered for safeguarding activities ("low" hazards [e.g., prospects, trenches] are not always addressed, but they are often safeguarded when equipment is onsite for other high-priority mine features), only mines with "high" or "medium" radiological and chemical risks may be considered for future remedial (CERCLA) work. Fifty-one mines exhibited more than one "high" or "medium" radiological and chemical risk ranking. In the cases of mines that exhibit multiple elevated chemical, radiological, or radium-226 risks, all risks would be addressed concurrently during a single remediation event. To avoid overestimating the potential number of remediations that may be considered, potential CERCLA actions at the fifty-one mines exhibiting multiple risk factors were considered as single remediation events. As a result, 282 mines may be considered for future remedial (CERCLA) work.



Note: Starting in March 2020, LM began evaluating radium-226 concentration on a separate risk track; therefore, only 1248 mines have been screened for this risk.

Figure 1. Mine Physical, Radiological, and Chemical Risk Rankings

Unlike mines on public land, mines on tribal lands and private property are not scored for chemical and radiological risks; therefore, the risk-modifying factors cannot be used to determine potential CERCLA response actions at those mines. To estimate the number of mines that could require further analysis via the CERCLA process, any mine on tribal lands or private property with at least one constituent exceeding the residential screening level (ResSL) will be counted. Table 11 shows the number of tribal mines with a ResSL above 1 and the potential costs associated with remediation.

Potential CERCLA response actions are currently not included for mines on private property. DRUM Campaign 3 started during calendar year 2024, and completed V&V reports are not yet available for further analysis.

LM will collaborate with the land management agencies for concurrence on safeguarding priorities and planning, but CERCLA determinations are completely at the discretion of the land management agencies for public lands, the Navajo Nation Environmental Protection Agency for tribal lands, and the U.S. Environmental Protection Agency (EPA) for private property.

Table 11. Tribal Mines That Are Potential Candidates for Remediation (CERCLA) Actions (Cumulative Through June 30, 2024)

State	Mines Risk Screened[a]	Potential CERCLA Mines (Remediation Process)	Potential CERCLA Costs (Remediation) ($ millions)[b]
Arizona	33	28	$36.4
New Mexico	28	22	$28.6
Washington	2	0	$0
Total	**63**	**50**	**$65.0**

Notes:
[a] This includes mines only on tribal lands with V&V reports that have been completed.
[b] The potential CERCLA cost of $1.3 million per remediated mine was calculated using data from Table 4 in the *Defense-Related Uranium Mines Cost and Feasibility Topic Report* (DOE 2014a).

Additional Accomplishments

- Prepared or revised the following Field Operations Plans that describe reconciled mine locations and provide guidance for a logical approach to field V&V work in specific geographic areas:
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 3 Mines on Private Property in Pennsylvania* (DOE 2023a) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 3 Mines on Private Property in Montana* (DOE 2024g) covering five mines
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 2 Mines on the Pueblo of Zia, New Mexico* (DOE 2024c) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 2 Mines on the Pueblo of Zuni, Arizona* (DOE 2024d) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 2 Mines on the Hualapai Indian Reservation, Hualapai Tribe, Arizona* (DOE 2024b) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 2 Mines on the Tohono O'odham Indian Reservation, Tohono O'odham Nation, Arizona* (DOE 2024e) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 3 Mines on Private Property in New Mexico* (DOE 2024h) covering 78 mines
  - *Defense-Related Uranium Mines Field Operations Plan for Campaign 2 Mines on the Ute Indian Tribe, Uintah and Ouray Reservation, Utah* (DOE 2024f) covering one mine
  - *Defense-Related Uranium Mines Field Operations Plan for Mines in Arizona Statewide* (DOE 2020b) covering 58 mines
  - *Defense-Related Uranium Mines Field Operations Plan for Mines on Wyoming Public Lands* (DOE 2019) covering 113 mines

- — *Defense-Related Uranium Mines Field Operations Plan for Campaign 3 Mines on Umetco Minerals Corporation Property* (DOE 2023c) covering 109 mines
- — *Defense-Related Uranium Mines Field Operations Plan for Campaign 3 Mines on Private Property in Southwestern Colorado* (DOE 2023b) covering 114 mines
- — *Defense-Related Uranium Mines Field Operations Plan for Remaining Sites in Colorado* (DOE 2022) covering nine mines

- Completed the following Campaign 1 support activities:
  - — Conducted training during the winter months for DRUM personnel to prepare for the 2024 field season, including office-based training, field training in Yellow Cat, Utah, job safety analysis, and DRUM field season readiness review preparation
  - — Submitted *Environmental Review Form* (LM-Form-4-20.3-4.0) materials and an associated State Historical Preservation Office memorandum for 2024 V&V activities on federal and state lands and private property on January 9, 2024
- Completed the following Campaign 2 support activities:
  - — Continuing participation in meetings with the Navajo Nation Working Group, which comprises the Navajo Nation Environmental Protection Agency, the Navajo Abandoned Mine Lands Reclamation Department, EPA Region 9, the U.S. Bureau of Indian Affairs, LM, and the LMS contractor
  - — Completed an ad hoc request to prepare a hazard summary, DRUM Campaign 2's equivalent of a Campaign 1 risk roll-up, for mines on the Navajo Nation, starting with the Northern AUM region FOP
  - — Submitted a list of mines pending access approval in the Northern AUM region and North Central AUM region FOPs in response to an ad hoc request
  - — Participating in monthly Navajo Nation Working Group meetings
- Completed the following Campaign 3 support activities:
  - — Submitted the DRUM Program Campaign 3 fact sheet
- Completed the following safeguarding program support activities:
  - — Participated in monthly safeguarding planning and collaboration meetings with LM, BCI, and BLM for projects being developed in Utah and with LM, BCI, and the Colorado Division of Reclamation, Mining, and Safety (DRMS) for projects being developed in Colorado.
  - — Participated in safeguarding planning and collaboration meetings with LM, BCI, and BLM for a project being developed in Montana, with LM, BCI, and the Wyoming Department of Environmental Quality for a project being developed in Wyoming, and with LM and NPS for potential projects in national parks.
  - — Updated partnerships and interagency agreements with BLM, USFS, and NPS to support continued program collaboration.
  - — Developed a DRUM safeguarding graphic tracking the number of safeguards completed.

- — Participated in a Colorado safeguarding conference with Colorado DRMS, the BLM Colorado State Office, and BCI in Gateway, Colorado, from March 25–28. Participants discussed closure methods for uranium mines as well as identification and protection of archaeological resources and wildlife. Participants also visited several DRUM sites in the Uravan area to see closure work already completed.
- — Received data from safeguard projects and uploading the data into the DRUM Program database from the following project locations:
  - Freeport McMoRan Inc., southern Utah (56 safeguards)
  - Freeport McMoRan Inc., southwestern Colorado (51 safeguards)

- Prepared and submitted responses to ad hoc requests, as necessary:
  - — Uploaded all V&V reports, the file geodatabase, and a hazardous features spreadsheet for the BLM Wyoming State Office and state land to the electronic file transfer site
  - — Updated monthly DRUM progress graphics, updating Campaign 1 ore cart and Campaign 2 ore bin graphics and developing new DRUM progress graphics, Campaign 1 remaining field visits, and Campaign 3 ore bin graphics
- Completed the following contract deliverables support activities:
  - — Uploaded all V&V reports and risk roll-up reports that were approved during the first quarter of FY 2024 on lands managed by BLM in Arizona, Colorado, Utah, and Wyoming.
  - — Submitted the contract deliverable, "Produce and maintain a master schedule, using the 'Critical Path Method' (CPM), which shows, at minimum, the schedule for each Campaign and FOP, and the overall campaign targets as listed in section 3.13. The schedule shall also include the major tasks in preparation for and in direct support to field V&V activities, such as, but not limited to, V&V Workplans, Field Operations Plans, obtaining access agreements" for Campaign 2.
  - — Submitted monthly the contract deliverable, "Report monthly to communicate active, settled, and potential future litigation related to DOE, potential liabilities for DOE, and other uranium mining related lawsuits that may directly or indirectly affect or change LM's programs related to uranium mines and mills."
  - — Submitted the contract deliverable, "Produce Field Operation Plans needed for the calendar years 2024, 2025, and 2026 field seasons."
  - — Submitted the contract deliverable, "Submit draft final DRUM Annual Report covering January–December for the calendar year," providing details on program activities and accomplishments in 2023, project planning for 2024, and an updated program timeline.
  - — Submitted the contract deliverable, "Review and update the DRUM V&V Work Plans for Campaign 2."
  - — Submitted the contract deliverable, "Produce and maintain a master schedule, using the 'Critical Path Method' (CPM), which shows, at minimum, the schedule for each Campaign and FOP, and the overall campaign targets as listed in section 3.13. The schedule shall also include the major tasks in preparation for and in direct support to field V&V activities, such as, but not limited to, V&V Workplans, Field Operations Plans, obtaining access agreements" for Campaign 3.

— Submitted the contract deliverable, "Submit a letter confirming the status of all Campaign 1 V&V field visits."

— Submitted updated DRUM V&V Work Plans for Campaign 1, Campaign 2, and Campaign 3.

DRUM Program Return on Investment

The 2014 Report to Congress identified 4225 potential uranium mines on federal, state, and tribal lands and private property. Of these, the report estimated that 2500 mines were on public land. Although the report did not describe all the potential liabilities related to uranium mines, it estimated that 80% of the mines would require safeguarding (referred to as "reclamation" in the report), and 20% would require environmental remediation. Safeguarding involves mitigating mining-related physical hazards, generally by building barriers at entries to underground mines so people cannot access them. Reclamation is the process of restoring mined land as required for a postmining land use approved by a regulatory authority. This process may include reshaping waste rock piles and other mining-related disturbances to reduce potential erosion and blend the mine site with the bordering undisturbed landscape. AUM remediation typically involves isolating contaminants or pollutants from the surrounding environment, generally by consolidating waste materials and performing environmental restoration work.

The 2014 Report to Congress estimated that mines exhibiting threats to human safety would require an average of three safeguards each at an estimated cost of $18,000 per constructed safeguard, or an average unit cost of $54,000 per affected mine. It also estimated that mines requiring remediation under CERCLA may require an average unit cost of $1,300,000 per mine based on Table 4 of the *Defense-Related Uranium Mines Cost and Feasibility Topic Report* (DOE 2014a). The maximum remediation cost for each mine size category was multiplied by the percentage of mines in that size category to derive the estimated cost per mine of $1,300,000 (rounded).

Implementation of DRUM Campaign 1 (V&V work at mines on public land) and Campaign 2 (V&V work at mines on tribal lands) has substantially reduced the potential costs of reclamation and remediation in the following two ways: (1) by removing duplicate mine records from the DRUM Program database, thereby decreasing the estimated total number of existing mines, and (2) by refining the estimated number of physical hazards and environmental risks by applying risk scoring assessments based on observed mine conditions. To date, LM has removed 1126 duplicate records from the database and identified 829 mines that present no physical hazards and 1996 mines with no environmental risks.

As of June 30, 2024, the DRUM Program database identified 2342 mines on public land (2219 Campaign 1 mines plus the public portions of 123 Campaign 1 and 3 mixed-ownership mines), 210 mines on tribal lands, and 652 mines on private lands (529 Campaign 3 mines plus the private portions of 123 Campaign 1 & 3 mixed-ownership mines). These numbers will fluctuate until all three campaigns are completed. Analysis of the risk scoring assessments completed to date shows that approximately 63% of mines on public land and 13% of mines on tribal lands will require safeguarding of physical hazards compared to the 80% estimated in the 2014 Report to Congress. However, DRUM Program field inventory data generally validate the 2014 Report to Congress estimate that an average of three safeguards will be required per mine where hazardous entries are identified. These updated estimates result in a safeguarding cost

reduction of approximately $28,404,000 for public land (Table 12) and $18,095,400 for tribal lands (Table 13).

Whereas the 2014 Report to Congress estimated that 20% of mines would require further evaluation via the CERCLA process, DRUM fieldwork completed to date reduces this estimation for mines on public land to 12%. When implemented, the CERCLA process will be handled by the appropriate land management agencies. If this trend continues, the resulting potential remediation scope will be reduced from 500 mines (the 2014 Report to Congress estimate) to approximately 282 mines, representing an approximate cost reduction of $283,400,000 (Table 12).

Unlike mines on public land, for which long-term chemical and radiological risks are assessed using a scoring process, mines on tribal lands and private property are not assessed for long-term chemical and radiological risks. Instead, analytical results are compared to screening benchmarks for chemical constituents and radium-226 in tables and bar charts. These chemical and radiological data are provided to tribal land agencies, U.S. government agencies, and private property owners to allow sufficient flexibility to establish priorities based on needs, requirements, and budgets. Due to this difference in risk assessment and scoring, it is difficult to determine which mines will require additional evaluation under CERCLA. This estimate of mines potentially requiring additional evaluation is complicated by the wider variety of exposure scenarios on tribal lands and private property compared to public lands. Tribal lands exposure scenarios include recreational, livestock rancher, residential, and Navajo Nation surrogate residential exposure scenarios. Private property exposure scenarios include recreational, livestock rancher, and residential exposure scenarios. Additionally, there have been changes to EPA regional screening levels (RSLs) for chemical and radiological constituents since the 2014 Report to Congress. For example, in 2023, EPA changed the residential RSLs for lead (reduced by 50%), cadmium (reduced by 90%), and nickel (reduced by 7%).

For the purpose of estimating the number of mines to be subjected to additional CERCLA evaluation, any mine on tribal lands or private property with at least one constituent exceeding the lowest applicable ResSL will be counted. DRUM fieldwork completed to date suggests that 24% of mines on tribal lands have at least one ResSL exceedance. If this trend continues, the resulting potential remediation scope will be reduced from 91 mines to 50 mines, representing an approximate cost reduction of $53,300,000 for tribal lands (Table 13)

Return on investment calculations are currently not included for mines on private property (Campaign 3). DRUM Campaign 3 started during calendar year 2024, and completed V&V reports are not yet available for further analysis.

For FYs 2017 through 2023, the DRUM Program's total expended costs are approximately $39,690,000, or about $5,670,000 per year. The total projected program expenditure of $68,040,000 (an average of $5,670,000 per year for FYs 2017 through 2028) has the potential to reduce costs by $380,599,400, a return on investment of almost 6:1.

Table 12. Estimated Versus Projected DRUM Program Actions and Expenditures at Mines on Public Land

	2014 Report to Congress Estimates	Program Estimates as of June 30, 2024[a]	Difference
Total number of mines	2,500	2,341[b]	159 mines
Estimated percentage of mines requiring safeguards	80%	63%	17%
Estimated number of mines to safeguard	2,000	1,474	526 mines
Estimated safeguard construction cost per mine	$54,000	$54,000	$0
Estimated cost to complete safeguards	$108,000,000	$79,596,000	$28,404,000
Estimated percentage of mines requiring CERCLA remediation	20%	12%	8%
Estimated number of CERCLA-eligible mines	500	282	218 mines
Estimated CERCLA remediation cost per mine	$1,300,000	$1,300,000	$0
Estimated cost to complete CERCLA remediation	$650,000,000	$366,600,000	$283,400,000
Estimated total safeguarding and CERCLA remediation cost	$758,000,000	$446,196,000	$311,804,000

Notes:
[a] This is the total number of mines that have been identified for V&V work as of June 30, 2024.
[b] Excludes one unconventional site that was field evaluated by request and counted as a mixed-ownership mine (Campaigns 1 and 3).

Table 13. Estimated Versus Projected DRUM Program Actions and Expenditures at Mines on Tribal Lands

	2014 Report to Congress Estimates	Program Estimates as of June 30, 2024[a]	Difference
Total number of mines	453	210	243 mines
Estimated percentage of mines requiring safeguards	80%	13%	67%
Estimated number of mines to safeguard	362	27	335 mines
Estimated safeguard construction cost per mine	$54,000	$54,000	$0
Estimated cost to complete safeguards	$19,569,600	$1,474,200	$18,095,400
Estimated percentage of mines requiring CERCLA remediation	20%	24%	−4%
Estimated number of CERCLA-eligible mines	91	50	41 mines
Estimated CERCLA remediation cost per mine	$1,300,000	$1,300,000	$0
Estimated cost to complete CERCLA remediation	$118,300,000	$65,000,000	$53,300,000
Estimated total safeguarding and CERCLA remediation cost	$137,869,600	$66,474,200	$71,395,400

Note:
[a] This is the total number of mines that have been identified for V&V work as of June 30, 2024.

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