

Water-Filled Pit at Wild Goose 5 & 6 (LM ID 5808) Mine, Southeast of Riverton, Wyoming

DRUM PROGRAM ANNUAL PROGRESS REPORT

January 1–December 31

2023

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Purpose

This annual progress report for the U.S. Department of Energy (DOE) Office of Legacy Management (LM) Defense-Related Uranium Mines (DRUM) Program provides details on 2023 program activities and accomplishments and project plans for 2024. Additional information on the program is available in other documents and through the contact information provided at the end of this document. The information presented in this report is stored in a continually updated database and represents data that were queried on January 2, 2024.

Background

The 2014 *Defense-Related Uranium Mines Report to Congress* (DOE 2014 b) (Report to Congress) identified 4225 uranium purchase records in 19 states, revealing an unknown degree of liability from a unique set of abandoned uranium mines (AUMs) in the United States. These mines provided uranium ore to the U.S. Atomic Energy Commission (AEC) for defense-related activities from 1947 to 1970. Using the list of 4225 mines as a starting point, mine reconciliation efforts correlated each mine with a specific geographic location and production size. Subsequent evaluation resulted in a reduction of the total number of reconciled mines to 3472. This adjustment was based on many factors but was primarily due to resolution of duplicate mine records and the addition of new mine records. Table 1 summarizes the results of the DRUM Program’s reconciliation efforts.

Table 1. Summary of DRUM Program Reconciliation as of December 31, 2023

Total mine records ^a	4225
Duplicate records removed	(1126)
New mine records ^b	373
Mines with no V&V visit required ^c	(389)
Mines requiring V&V visits	3083
Field V&V visits to complete ^d	3183

Notes:

^a Number of mine records identified in the 2014 Report to Congress.

^b This includes 40 EPA “orphan” mines added to the list of DRUM mines.

^c This includes sites regulated under CERCLA, sites with active mining permits, unconventional sites, and unlocatable mine records.

^d This includes sites that have mixed ownership (generally public and private) and require more than one field visit to complete V&V activities for the entire mine.

Abbreviations:

CERCLA = Comprehensive Environmental Response Compensation, and Liability Act

EPA = U.S. Environmental Protection Agency

V&V = verification and validation

In response to the Report to Congress, LM initiated DRUM Program Campaign 1 in 2017 to conduct field verification and validation (V&V) activities using existing mine information and collect screening level site-specific data at 2329 legacy mines on public land administered by federal and state agencies. Field V&V work for Campaign 2 began in fiscal year (FY) 2022, which kicked off the assessment of 210 DRUM sites on tribal lands. Campaign 3, which will address an estimated 645 DRUM sites on private property, is scheduled to begin field V&V work in FY 2024.

Program Mission, Objectives, Scope, and Methods

The overall DRUM Program mission is to identify DRUM sites that pose potentially unacceptable risks to human health and the environment and improve strategies for the allocation of government resources to address these risks. More specifically, the DRUM Program mission is to: (1) correlate individual mines with ore production and location information, (2) inventory mine features and complete screening level sampling of mine sites, (3) provide risk screening information to help prioritize any potential future actions, and (4) identify potential environmental or physical concerns.

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).

In support of its mission and goals, the objectives of the DRUM Program are to:

- Share existing information and collect site-specific data at each mine to identify physical safety hazards or human health and environmental risks.
- Perform program-specific risk scoring and ranking of these mine hazards.
- Improve the data quality and content of the DRUM Program database and partner agency databases.
- Exchange program results and information with federal, tribal, and state governments.
- Quantify the resources necessary to mitigate the physical hazards posed by these sites and work with partner agencies to leverage resources to address mines with priority physical safety hazards.

The V&V process has three sequential steps: (1) reconciliation, (2) field inventory and environmental sampling, and (3) technical report preparation. These comprise the scope and methods utilized for the V&V process to achieve program objectives.

During the reconciliation step, DRUM personnel review available data to assess the location, ownership, land management status, and production of the mines. This includes reviewing AEC ore purchase records, company records, available mine maps, and federal and private libraries and collections.

Typical challenges encountered during reconciliation include inaccurate location information, duplicate records, multiple mines listed under one record, and missing records. In some cases, mine locations remain in an unknown status until DRUM personnel can find additional data.

The reconciliation process ensures that the most accurate location data are available to field teams before they conduct field V&V activities. As mines in designated geographic areas are reconciled, they are compiled into project areas used by land management agencies and field teams to coordinate field activities.

In the field inventory and environmental sampling step, field teams locate each mine site and map the existing features (e.g., adits, shafts, structures, waste rock piles). These activities include describing physical mine conditions, identifying mining-related features, assessing the physical hazards posed by each feature, evaluating ecological and environmental hazards, and assessing the ease of public access to the mine and signs of recent recreational use. Field teams collect

environmental samples to determine the presence of selected radionuclides and chemicals in waste rock, soil, sediment shed areas, and surface water (when present). In addition, environmental sampling includes performing a gamma radiation survey of the mechanically disturbed area of the mine. Field data and observations are used to perform risk rankings for each mine. Field teams collect and record data electronically and conduct a rigorous quality assurance/quality control process before uploading to the DRUM Program database.

In the report preparation step, DRUM personnel develop V&V reports for each mine. Each report summarizes the V&V efforts that: (1) confirmed the current conditions and location of the mine; (2) recorded information associated with mine features, such as adits, shafts, and waste rock piles; and (3) provided the primary hazard rankings for physical hazards and potential risks to human health and the environment. Each V&V report also includes additional factors that influence risk rankings, such as current ecology and ease of public access. Risk screening is a systematic approach to evaluating risks associated with the mines. The DRUM team conveys risk-screening information to partner agencies via risk roll-up reports. An outgrowth of these activities is safeguarding physical mine hazards identified during V&V operations and evaluated and documented during risk roll-up reporting.

After completing the V&V steps, LM and its partner agencies collaborate as a cohesive team to safeguard physical hazards posed by remnant mining-related features at DRUM sites. Safeguarding involves the construction of barricades designed to prohibit public access to hazardous adits, shafts, subsidences, hazardous highwalls, and other excavated mine features. It may also remove or secure dilapidated structures. The scope and relative degree of the hazard presented by each feature are documented in risk roll-up reports prepared by the DRUM Program for use by land management agencies.

V&V Summary

This section presents a summary of 2023 V&V activities and accomplishments. DRUM teams completed field visits at 202 mine locations in 2023 for Campaigns 1 and 2. In addition, six records were removed from the DRUM Program database during the reconciliation process because they were redundant records of the same mine (i.e., duplicate records). Table 2 presents a summary of field V&V activities.

Lessons learned from the 2022 field season identified areas where field staff needed extra support and led to improvements in the 2023 field inventory methodology and refinements to mine V&V protocols to ensure consistency in the application of program data collection standards. Some of these improvements included managing fatigue with shorter field rotations and greater monitoring, more open communication regarding supplies and equipment issues, implementation of new data collecting software, new gamma radiation collection instrumentation, and additional training in water sampling procedures, plant identification, and so on. The DRUM team also completed extensive training to prepare for the 2023 field season.

DRUM personnel completed 235 V&V reports in 2023 and have completed 2228 V&V reports since the program's inception. The *DRUM Program Midyear Progress Report, January 1–June 30, 2023* (DOE 2023jj) presented additional analysis of the project's status and its progress.

Table 2. Summary of V&V Field Activities

State	Field V&V Visits Completed ^a	
	CY 2023	Project to Date
Colorado	2	968
Utah	23	951
Arizona	74	87
Wyoming	48	91
New Mexico	25	87
South Dakota	0	96
California	8	8
Nevada	18	18
Montana	2	13
North Dakota	1	3
Oregon	1	1
Washington	0	2
Total	202	2325

Note:

^a This is the total number of mine V&V site visits accomplished.

Abbreviation:

CY = calendar year

Field V&V operations are organized into logical project areas referred to as Field Operations Plans (FOPs) for ease of reference. Table 3, Table 4, and Table 5 indicate the total number of V&V visits completed and yet to be completed within each FOP, and the summary sections that follow describe the field activities conducted within each FOP visited in 2023 and those that will be completed within the FOP in 2024. These summaries and tables are organized by campaign (summary sections are only included for Campaign 1 and Campaign 2 because no Campaign 3 V&V activities occurred in 2023) and then by state.

Campaign 1 Progress

Table 3. Summary of V&V Activities for Campaign 1

FOP	Field V&V Visits Completed Before 2023	Field V&V Visits Completed in 2023	Field V&V Visits Remaining
Arizona	0	45	4
Black Hills and Northern Rockies	109	2	9
California	0	9	13
Arapaho-Roosevelt National Forest	13	0	0
Bull Canyon – Tres Rios	124	0	0
Bull Canyon – Uravan-Paradox	37	0	0
Remaining Sites in Colorado	5	1	3
Gateway	201	0	0
Gypsum Valley	95	0	0
Northern Slick Rock	102	0	0
Southern Slick Rock	131	0	2
UFO	80	0	0
USFS Region 2	94	1	6
Northern Montrose County	92	0	0
Henry Mountains	123	0	0
Buckmaster Draw	37	0	0
Green River	26	0	0
Manti-La Sal	88	0	0
Moab	42	0	0
Monticello	198	2	0
Red, White, and Fry Canyons and Deer Flats	77	0	0
San Rafael	124	0	0
Thompson Phase I	53	0	0
Thompson Phase II	18	0	0
Utah Statewide	41	2	0
Remaining Sites in Utah	42	0	0
Idaho	0	0	6
National Park Service	7	30	0
Nevada	0	17	1
New Jersey	0	0	1
Grants	37	0	5
New Mexico Statewide	21	0	9
Oregon	0	1	0
Pilot Mines	41	0	0
Washington Public Lands	0	0	3
Wyoming Public Lands	43	47	9
Totals	2101	157	71

Abbreviations:

UFO = Uncompahgre Field Office

USFS = U.S. Forest Service

Colorado

Remaining Sites in Colorado FOP: Three Mines Remaining

This project area covers southern and central Colorado (Figure 1) and includes a total of nine mines. Mines in this FOP are on U.S. Bureau of Land Management (BLM)-administered land, U.S. Forest Service (USFS)-administered land, or public locally administered land managed by the City and County of Denver and Jefferson County. DRUM field teams conducted V&V activities at one mine in this FOP in 2023. DRUM field teams are planning to visit the remaining three mines in 2024.

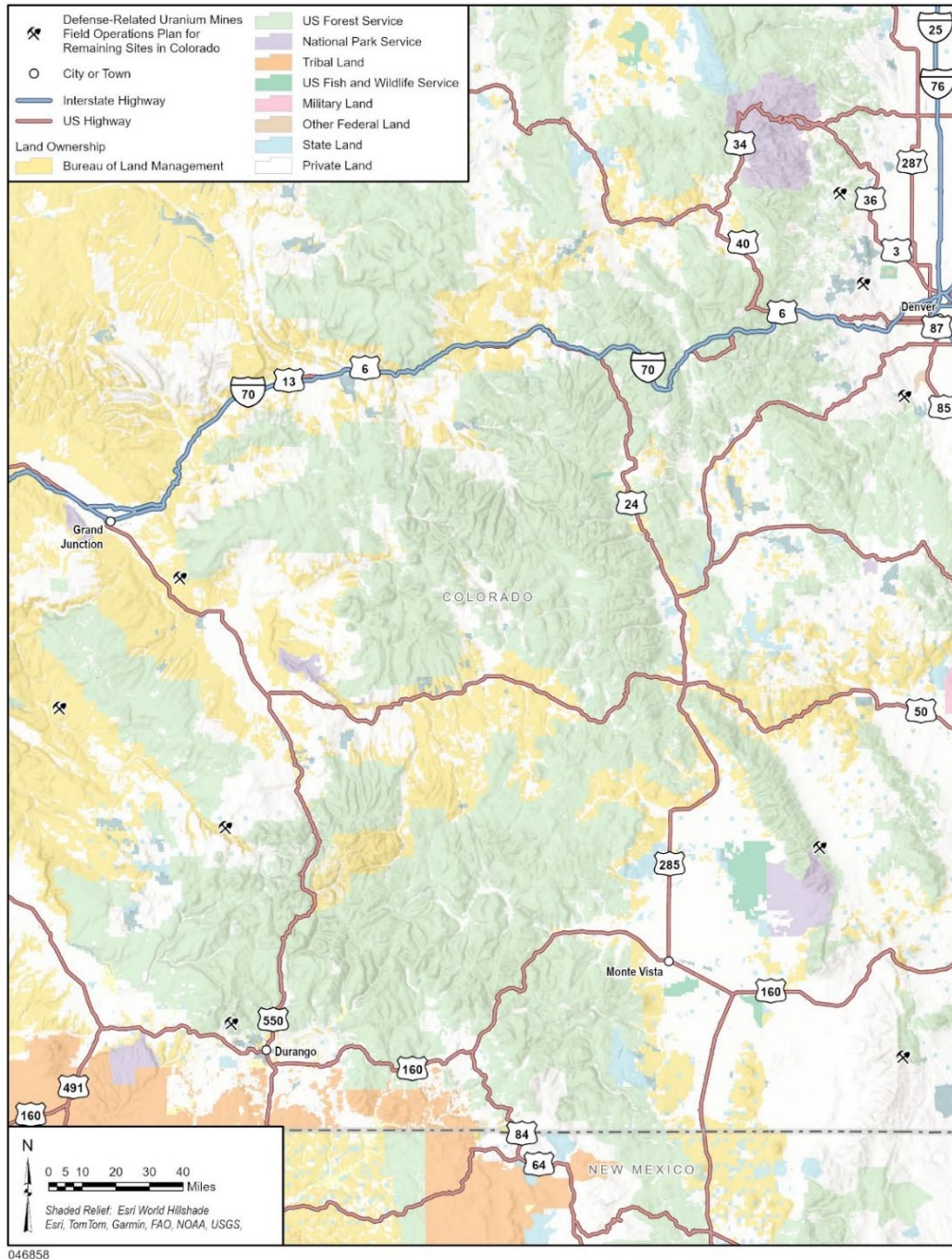


Figure 1. Mines in the Remaining Sites in Colorado FOP

USFS Region 2 FOP: Six Mines Remaining

This project area covers western and central Colorado (Figure 2) and includes a total of 101 mines. Mines in this FOP are on USFS-administered land, BLM-administered land, state land, U.S. Department of Defense land, or mixed-ownership land (i.e., BLM-administered land and USFS-administered land or BLM-administered land and private property). In 2023, the DRUM team designated one mine in this FOP as inaccessible due to terrain and private property, thereby removing it from the list of mines that remain to be visited. DRUM field teams are planning to visit the remaining six mines in 2024.

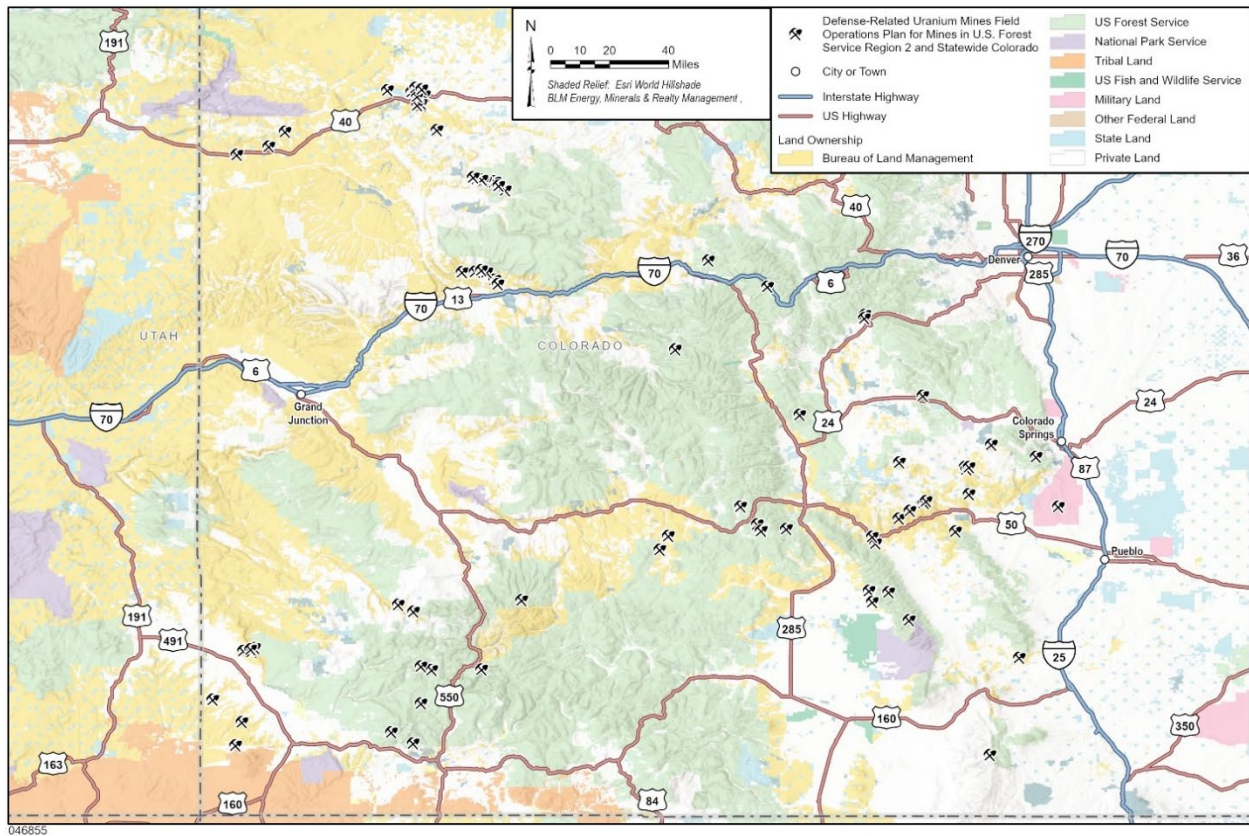


Figure 2. Mines in the USFS Region 2 FOP

National Park Service (NPS)

NPS Sites FOP: No Mines Remaining

This project area covers national parks in Arizona, Montana, and Utah (Figure 3) and includes a total of 41 mines. Mines in this FOP are managed by NPS units or other NPS-managed lands. DRUM field teams conducted V&V activities at 30 mines in this area in 2023, closing out this FOP. NPS has requested that four mines be removed from further consideration for V&V activities by the DRUM Program.

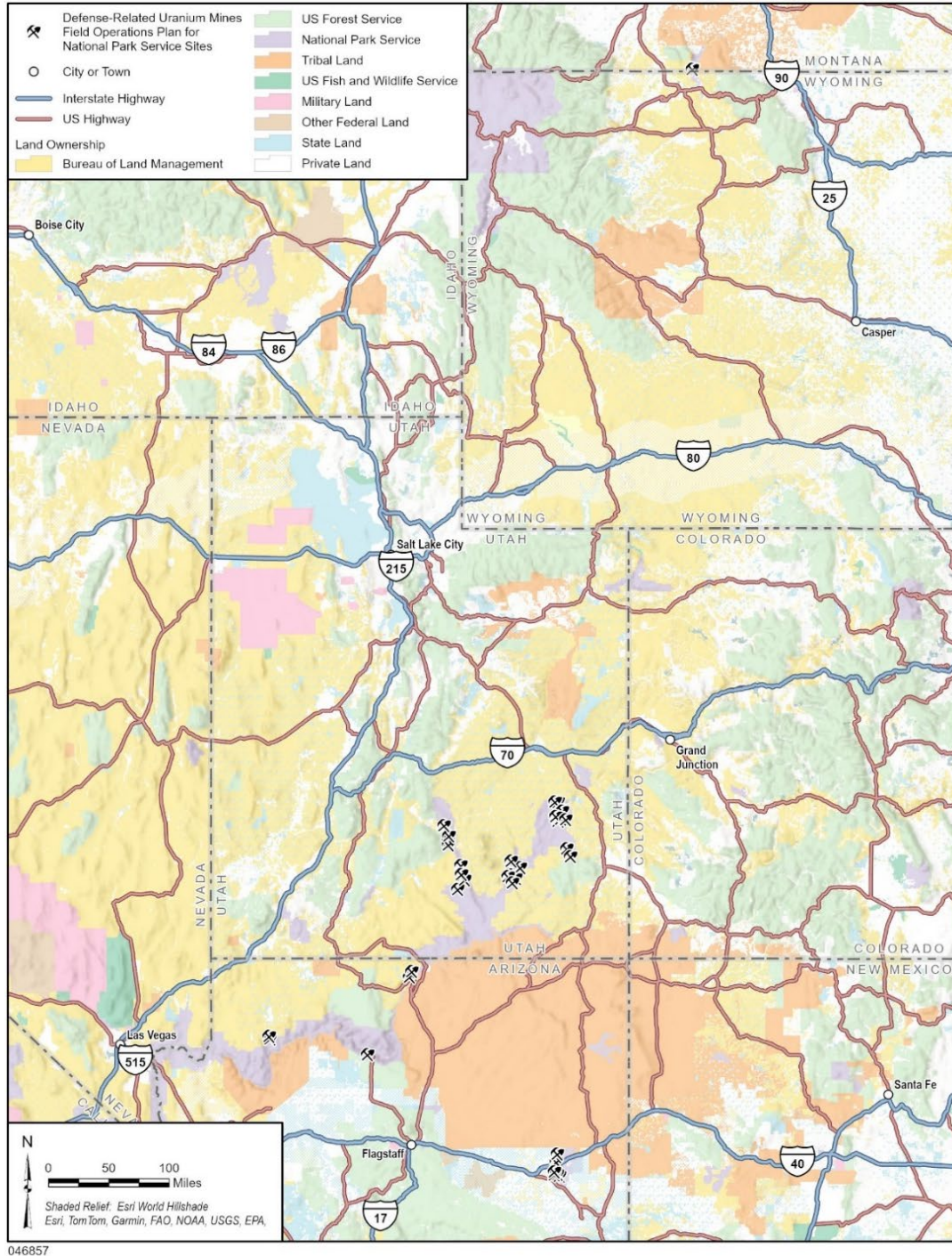


Figure 3. Mines in the NPS Sites FOP

Nevada

Nevada FOP: One Campaign 1 Mine Remaining; Three Campaign 3 Mines Remaining

This project area covers the state of Nevada (Figure 4) and includes a total of 21 mines. Mines in this FOP are on USFS-administered land, BLM-administered land, or private property. DRUM field teams conducted V&V activities at 17 mines in this FOP in 2023. DRUM field teams are planning to visit the remaining mine on public land in 2024 and address the three mines on private property during Campaign 3.

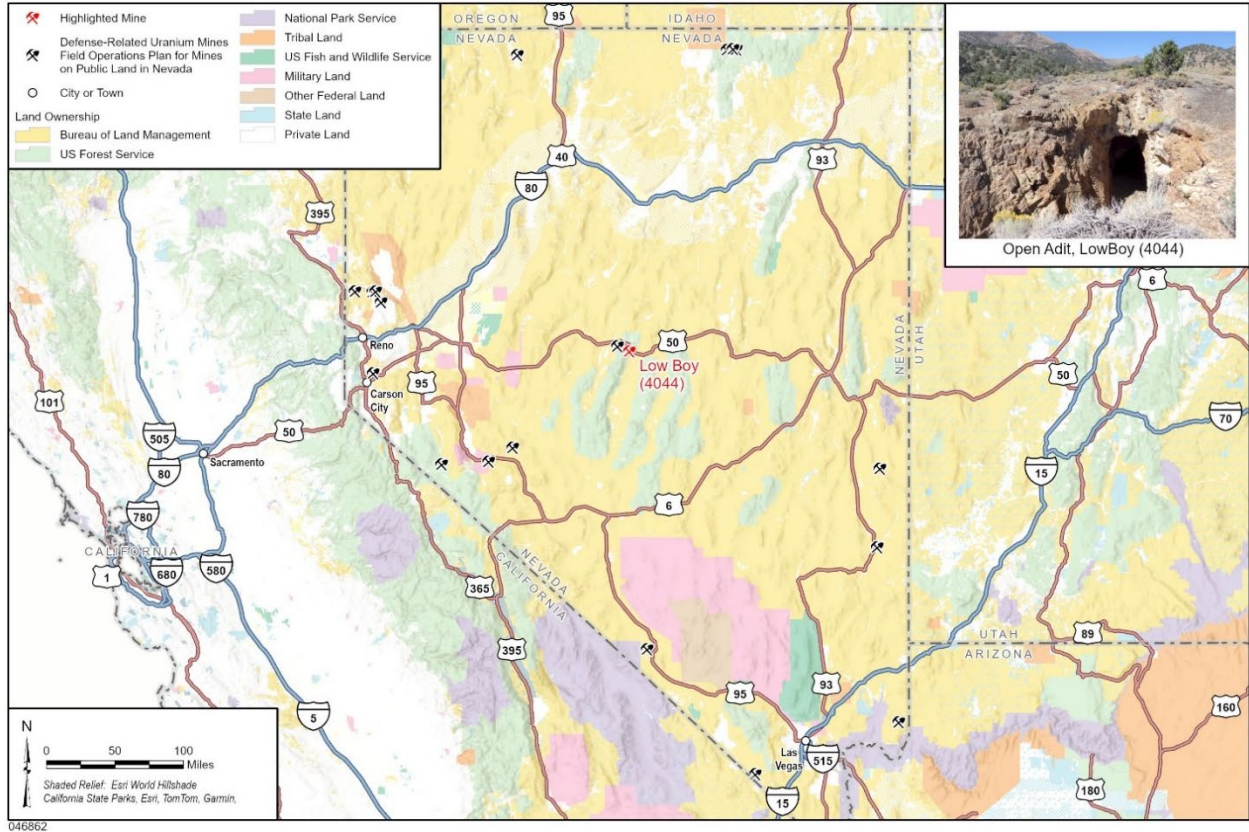


Figure 4. Mines in the Nevada FOP

Utah

Monticello FOP: No Mines Remaining

This project area covers San Juan County in southeastern Utah (Figure 5) and includes a total of 208 mines. Mines in this FOP are on BLM-administered land, State of Utah School and Institutional Trust Lands Administration (SITLA)-administered land, USFS-administered land, or mixed-ownership land (i.e., BLM-administered land and private property, BLM-administered land and SITLA-administered land, or SITLA-administered land and private property). DRUM field teams conducted V&V activities at two mines in this area in 2023, closing out the FOP. Eight mines in this FOP have active mining permits and will not be visited.

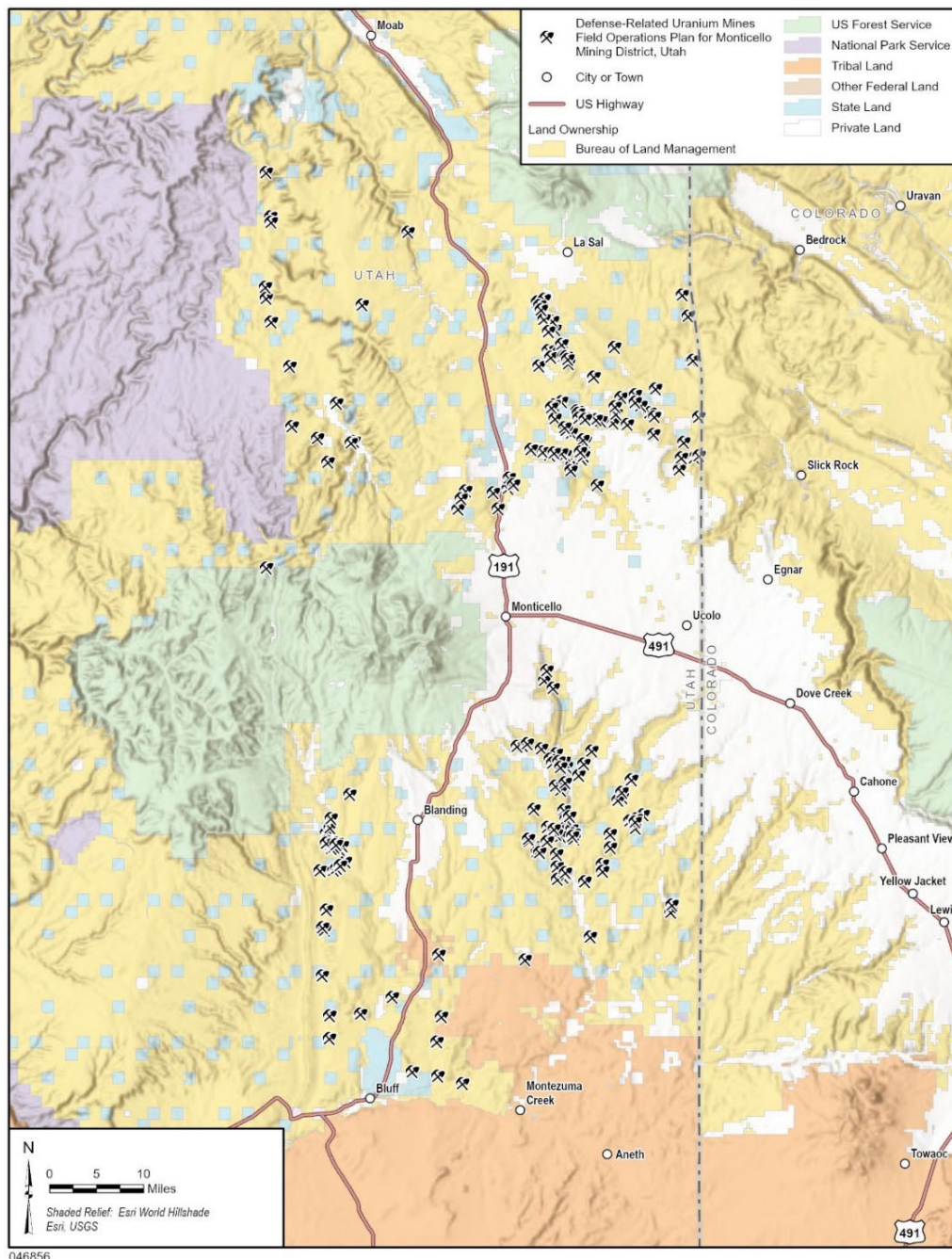


Figure 5. Mines in the Monticello FOP

Utah Statewide Mining Districts FOP: No Mines Remaining

This project area covers the Salt Lake, Uintah, Thomas Range, and Last Chance Desert Mining Districts throughout Utah (Figure 6) and includes a total of 43 mines. Mines in this FOP are on BLM-administered land, USFS-administered land, SITLA-administered land, or mixed-ownership land (i.e., BLM-administered and SITLA-administered land). DRUM field teams conducted V&V activities at two mines in this area in 2023, closing out the FOP.

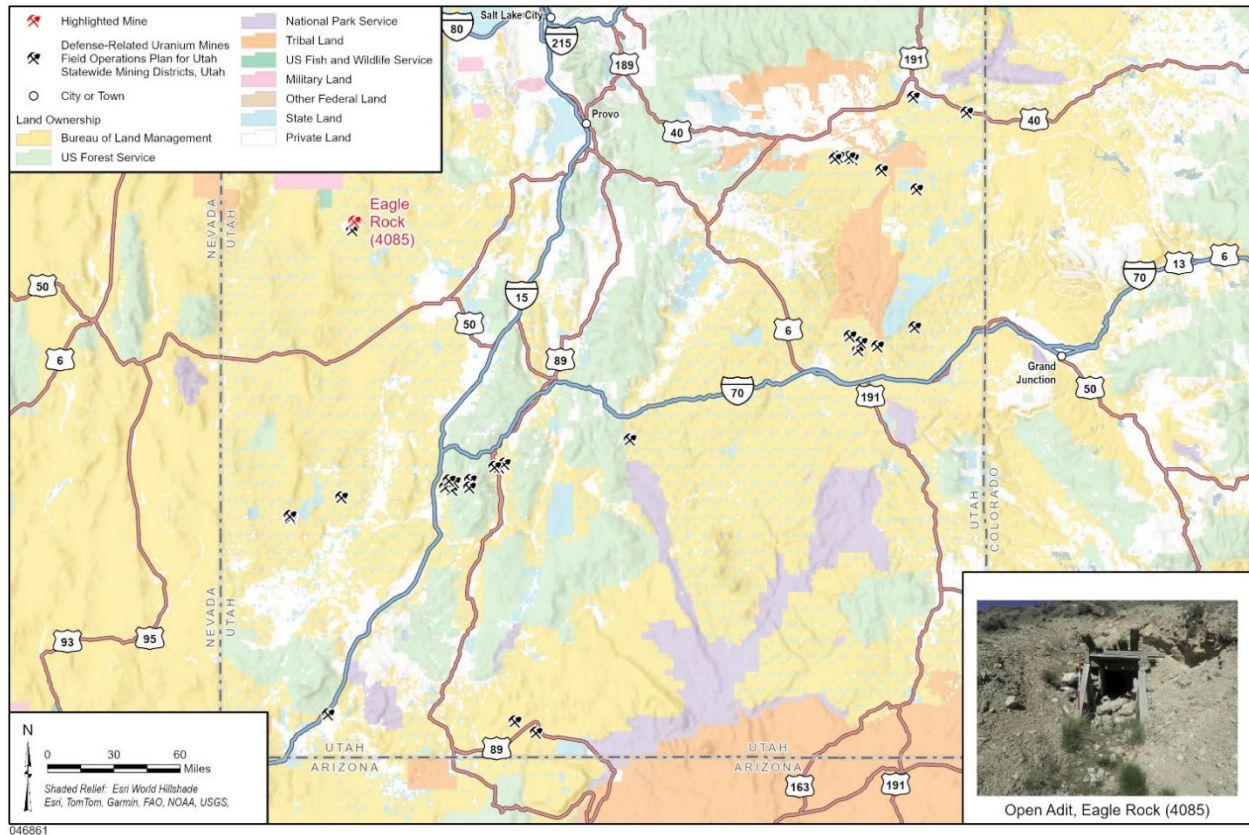


Figure 6. Mines in the Utah Statewide Mining Districts FOP

South Dakota

Black Hills and Northern Rockies Region FOP: Nine Mine Mines Remaining

This project area covers portions of South Dakota, North Dakota, Montana, and Wyoming (Figure 7) and includes a total of 121 mines. Mines in this FOP are on USFS-administered land, BLM-administered land, public land managed by the State of North Dakota, or mixed-ownership land (i.e., private property and USFS-administered land or private property and BLM-administered land). DRUM field teams conducted V&V activities at two mines in this area in 2023. DRUM field teams are planning to visit the remaining nine mines in 2024. One mine in this FOP will not be visited due to pending litigation related to the Tronox Inc. settlement.

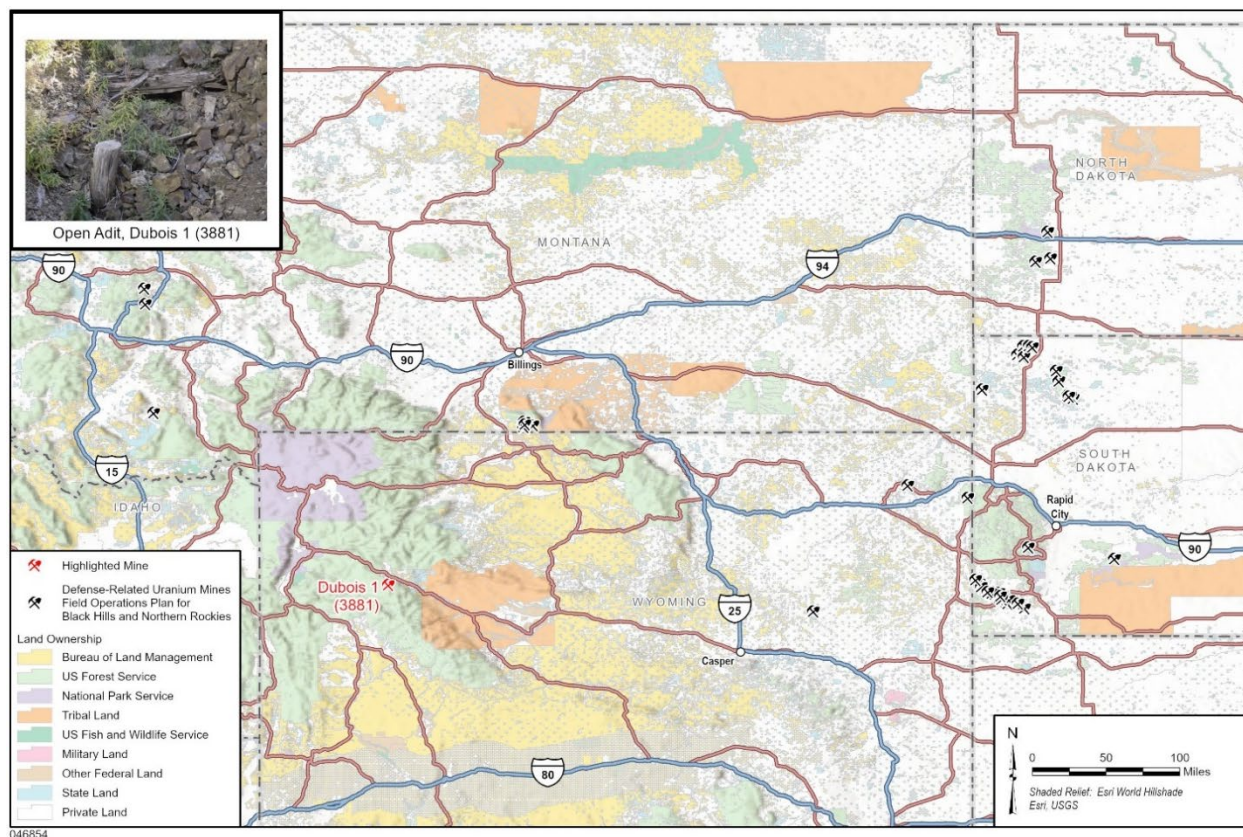


Figure 7. Mines in the Black Hills and Northern Rockies Region FOP

Wyoming

Wyoming Public Lands FOP: Nine Campaign 1 Mines Remaining

This project area covers the state of Wyoming (Figure 8) and includes a total of 119 mines. Mines in this FOP are on BLM-administered land, state land, public locally administered land managed by the City of Rawlins, or mixed-ownership land (i.e., BLM-administered land and private property; BLM-administered and NPS-administered land; BLM-administered and state-administered land; BLM-administered land, state-administered land, and private property; or state-administered land and private property). DRUM field teams conducted V&V activities at 47 mines in this FOP in 2023. DRUM field teams will visit the remaining nine mines in 2024. The FOP includes 12 mines that have active mining permits, one mine that has active remediation occurring, and seven mines that could not be located during the reconciliation process; none of these 20 mines will be visited.

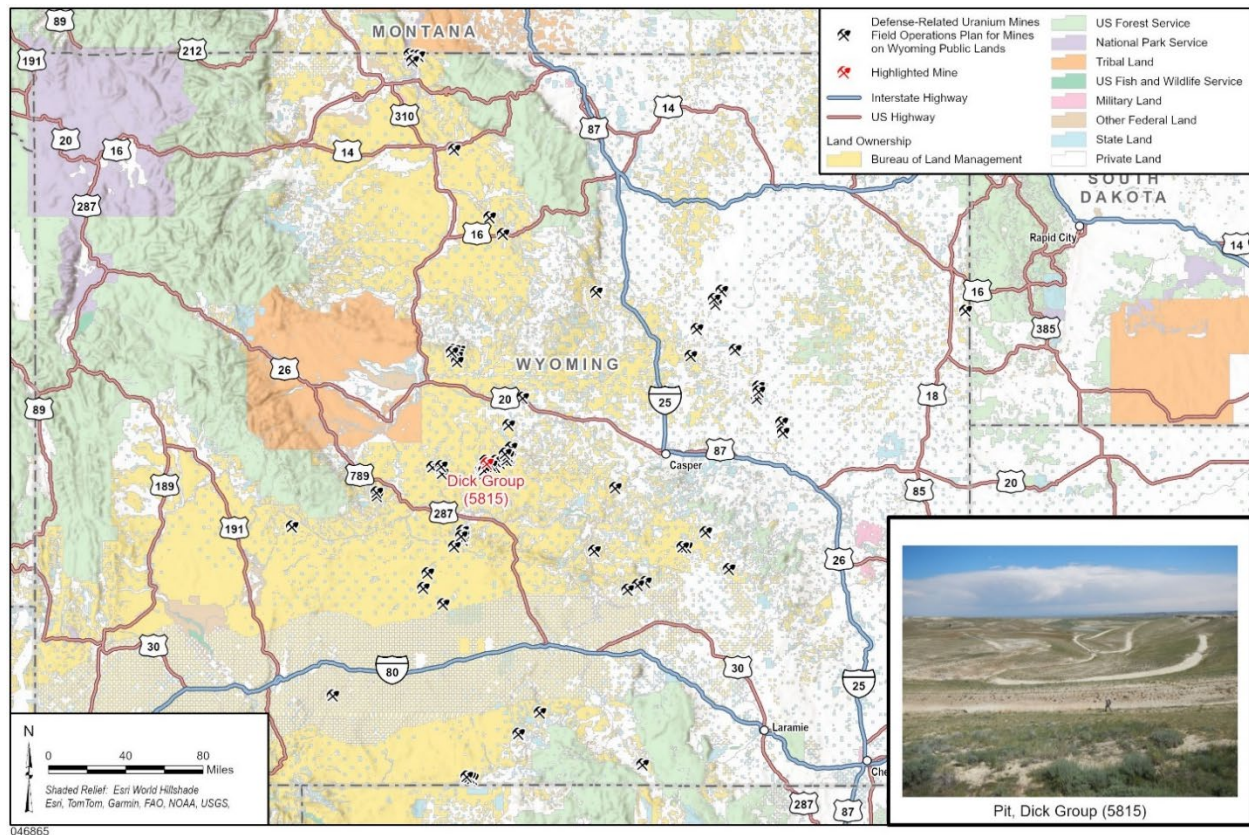


Figure 8. Mines in the Wyoming Public Lands FOP

Arizona

Arizona FOP: Four Mines Remaining

This project area covers the state of Arizona (Figure 9) and includes a total of 57 mines. Mines in this FOP are on USFS-administered land, BLM-administered land, state land, U.S. Bureau of Reclamation (USBR)-administered land, or mixed-ownership land (i.e., BLM-administered and state-administered land; USBR-administered and state-administered land; or state-administered land and private property). DRUM field teams conducted V&V activities at 45 mines in this FOP in 2023. DRUM field teams are planning to visit the remaining four mines in 2024. Eight of the mines in this FOP are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and will not be visited.

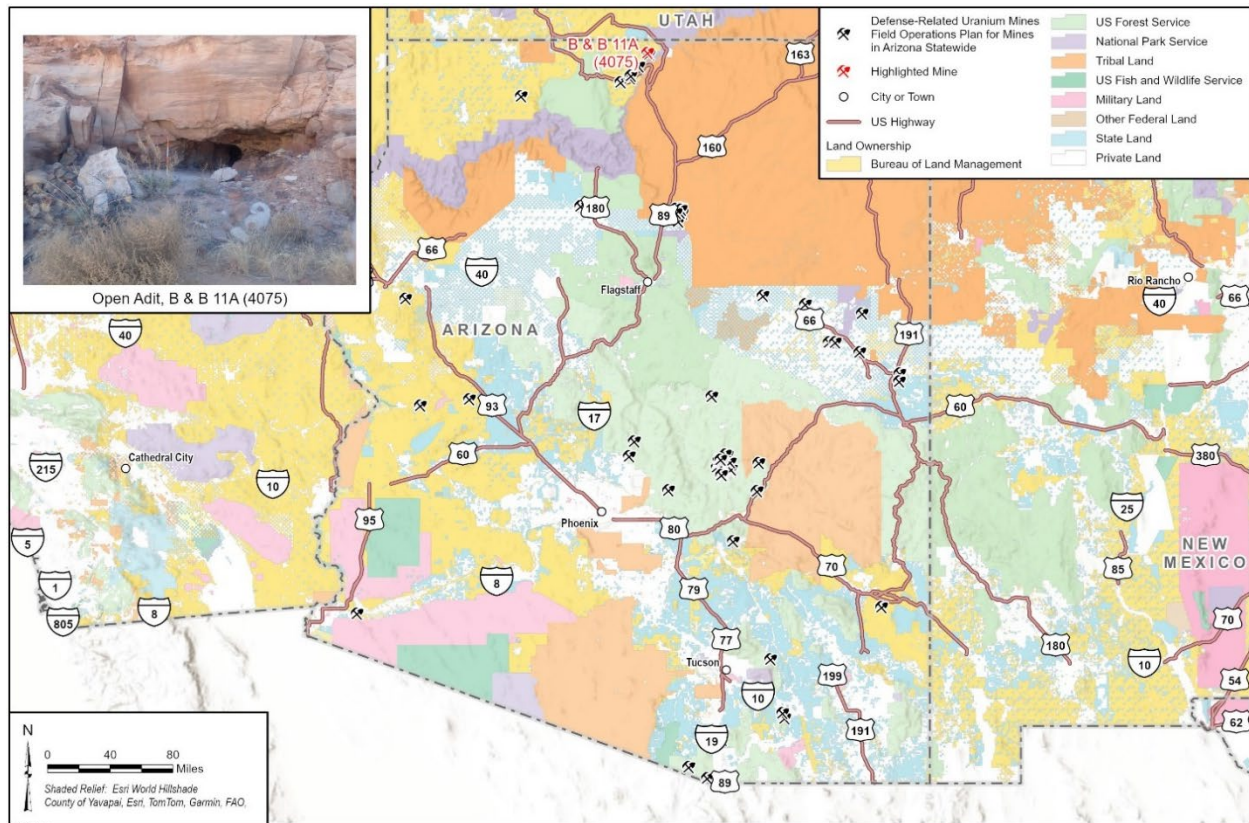


Figure 9. Mines in the Arizona FOP

California

California FOP: 13 Campaign 1 Mines Remaining; One Campaign 3 Mine Remaining

This project area covers the state of California (Figure 10) and includes a total of 24 mines. Mines in this FOP are on USFS-administered land, BLM-administered land, mixed-ownership land (i.e., BLM-administered and state-administered land), or private property. DRUM field teams conducted V&V activities at nine mines in this FOP in 2023. DRUM field teams are planning to visit the remaining 13 mines on public land in 2024 and address one mine on private property during Campaign 3. One mine in this FOP is regulated under CERCLA and will not be visited.

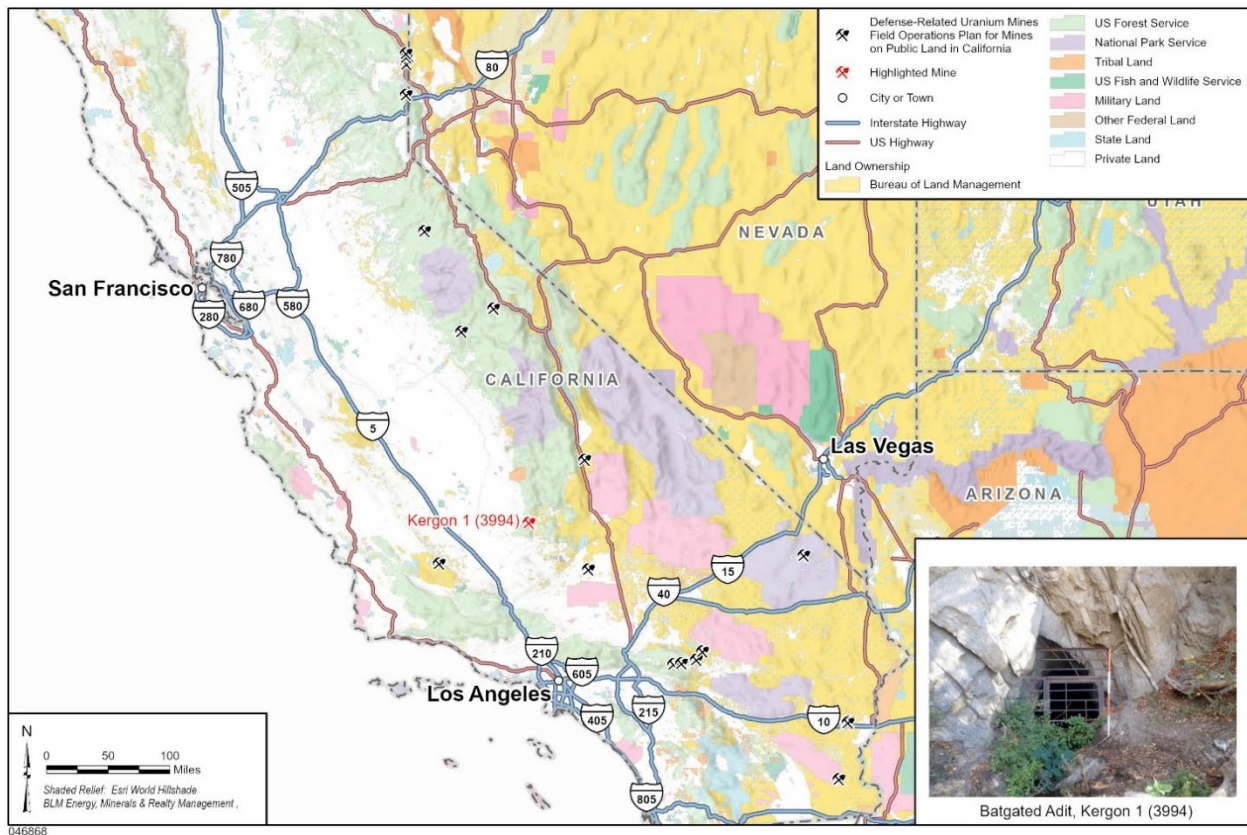


Figure 10. Mines in the California FOP

Oregon

Public Land in Oregon FOP: No Mines Remaining

This project area covers the state of Oregon (Figure 11) and includes a total of three mines. Mines in this FOP are on BLM-administered land, USFS-administered land, or mixed-ownership land (i.e., USFS-administered land and private property). DRUM field teams conducted V&V activities at one mine in this area 2023, closing out the FOP. Two mines in this FOP are regulated under CERCLA and will not be visited.

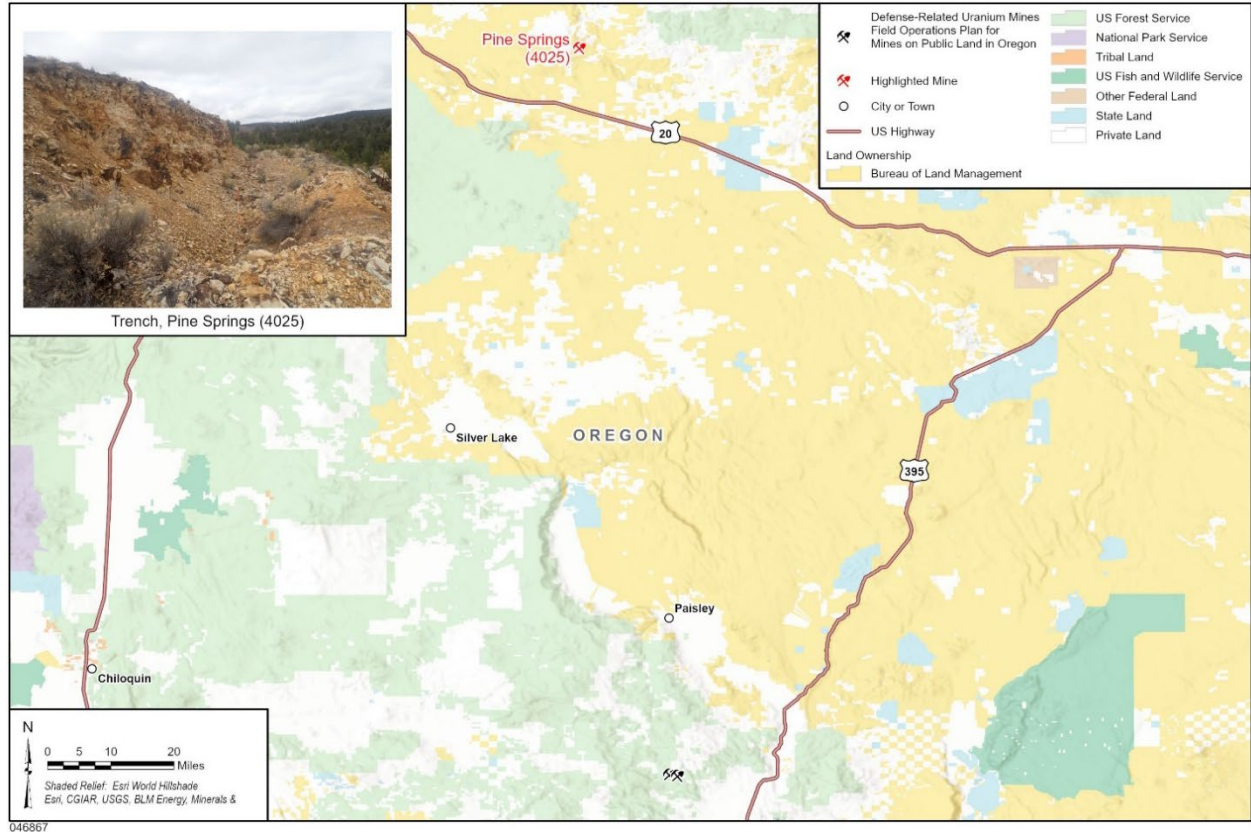


Figure 11. Mines in the Public Land in Oregon FOP

Campaign 2 Progress

Table 4. Summary of V&V Activities for Campaign 2

FOP	Field V&V Visits Completed Before 2023	Field V&V Visits Completed in 2023	Field V&V Visits Remaining
Northern AUM Region, Navajo Nation	13	45	12
Central AUM Region, Navajo Nation	0	0	5
Eastern AUM Region, Navajo Nation	0	0	19
North Central AUM Region, Navajo Nation	0	0	44
Southern AUM Region, Navajo Nation	0	0	5
Western AUM Region, Navajo Nation	0	0	57
Pueblo of Laguna	3	0	0
Pueblo of Zia	0	0	1
Pueblo of Zuni	0	0	1
Hualapai Indian Reservation, Hualapai Tribe	0	0	1
Tohono O'odham Indian Reservation, Tohono O'odham Nation	0	0	1
Ute Indian Tribe, Uintah and Ouray Reservation	0	0	1
Spokane Indian Reservation	2	0	0
Totals	18	45	147

Arizona, New Mexico, and Utah

Northern AUM Region, Navajo Nation FOP: 12 Mines Remaining

This project area covers the northern portion of the Navajo Nation, which shares geography with parts of Arizona, New Mexico, and Utah (Figure 12) and includes a total of 70 mines. Mines in this FOP are on Navajo Nation-administered land or mixed-ownership land (i.e., BLM-administered and Navajo Nation-administered land). DRUM field teams conducted V&V activities at 45 mines in this FOP in 2023. DRUM field teams are planning to visit the remaining 12 mines in 2024.

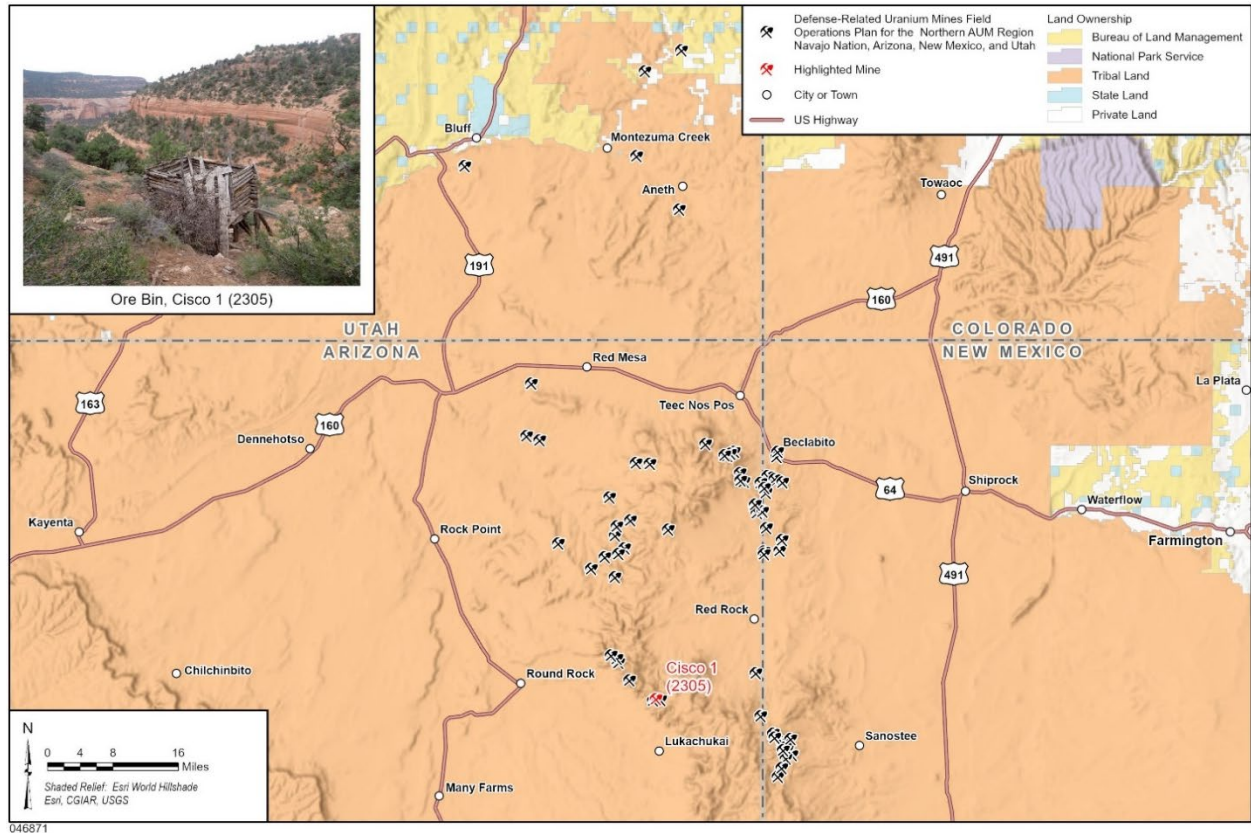


Figure 12. Mines in the Northern AUM Region, Navajo Nation FOP

Campaign 3 Progress¹

Table 5. Summary of V&V Activities for Campaign 3

FOP	Field V&V Visits Completed Before 2023	Field V&V Visits Completed in 2023	Field V&V Visits Remaining ^a
Arizona Private	0	0	10
California	0	0	1
Colorado Private	0	0	57
Montana Private	0	0	5
Nevada	0	0	3
New Mexico Private	0	0	74
North and South Dakota Private	0	0	38
Pennsylvania Private	0	0	1
Southwestern Colorado Private	2	0	109
Texas and Oklahoma Private	0	0	29
Umetco	4	0	107
Utah Private	0	0	47
Washington Private	0	0	9
Wyoming Private	0	0	46
Wyoming Powder River Basin	0	0	102
Total	6	0	638

Note:

^a The number of field V&V visits remaining will fluctuate depending on mine access.

¹ No individual FOP summary sections are included for Campaign 3 because no V&V visits occurred on private property in 2023.

Programmatic Accomplishments

The DRUM Program had a very successful year. Every facet of the program—including management, reconciliation, field and report staff, data and records management, environmental compliance, safety and health, quality assurance, stakeholder engagement, business services (e.g., technical editing), project services (e.g., analytical laboratory), and realty services—contributed to its success. With the DRUM Program, LM has created a “center of excellence” providing thoughtful leadership; best practices and expertise; strategic partnerships; and meaningful engagement, research, support, and training for the inventory, assessment, and safeguarding of abandoned defense-related uranium mines.

The DRUM Program accomplished the following programmatic activities in calendar year 2023 (listed by fiscal month rather than calendar month):

January 2023

- Reached a milestone of 2000 V&V reports completed for the program.
- Participated in multiple meetings regarding access to public land.
- Received data from the completed Carpenter Flats/Carpenter Ridge safeguarding project and successfully uploaded the data to the DRUM Program database.
- Developed the FOPs for the Charlotte Rutherford mine in New Jersey (DOE 2023p), mines on public land in California (DOE 2023l), mines on public land in Washington (DOE 2023o), mines on public land in Idaho (DOE 2023m), and mines on public land in Oregon (DOE 2023n).

For work on Campaign 2, program personnel:

- Met representatives of the Navajo Nation for chapter house meetings to present the DRUM V&V activities for March and April 2023.
- Provided maps of mine sites for the Beclabito and Red Mesa Chapter Houses.

February 2023

- Received data from the completed Jamestown and Sullivan’s Travels safeguarding project and successfully uploaded the data to the DRUM Program database.
- Received data from the completed Yellow Cat and Temple Mountain safeguarding project and successfully uploaded the data to the DRUM Program database.
- Completed the contract deliverable, “Produce Field Operations Plans needed for the calendar year 2023 field season.”
- Received data from the completed Mineral Canyon safeguarding project and successfully uploaded the data to the DRUM Program database.
- Completed the contract deliverable, “Submit a review letter identifying those program documents that require an update and highlight the portions that need to be updated.”
- Completed the contract deliverable, “Submit the final DRUM Program Reconciliation Report.”

- Published the DRUM Program’s annual report for calendar year 2022 (DOE 2023a), providing details on 2022 program activities and accomplishments, project planning for 2023, and an updated program timeline.
- Completed the contract deliverable, “Submit final DRUM V&V Work Plan for Campaign 1.”
- Conducted additional spring training in preparation for the upcoming field season. Training topics included field training, DRUM lessons learned, training wrap-up, and summary.
- Prepared and submitted a risk roll-up report for the mines in the southern part of the Radium Group Locality (25 mines) in western Colorado on BLM-administered land (DOE 2023ff).

For work on Campaign 2, program personnel:

- Met representatives from the Beclabito Chapter House to obtain mine access.
- Submitted the 2023 Northern AUM FOP mine V&V schedule.

March 2023

- Conducted the DRUM 2023 field season readiness review.
- Started the seventh year of conducting V&V field visits to mines on public land on March 6 in Arizona and Nevada.
- Started the second year of conducting V&V field visits to mines on tribal lands on March 8 on the Navajo Nation in New Mexico.
- Completed the contract deliverable, “Prepare a final draft DRUM Report to Congress.”
- Revised the FOPs for mines in Nevada statewide (DOE 2022b), mines in Arizona statewide (DOE 2020b), mines in the Monticello Mining District (DOE 2020c), mines in the Northern AUM Region, Navajo Nation (DOE 2022a), mines on public land in California (DOE 2023l), mines on public land in Washington (DOE 2023o), mines on public land in Idaho (DOE 2023m), mines on public land in Oregon (DOE 2023n), the Charlotte Rutherford mine in New Jersey (DOE 2023p), mines in Utah statewide (DOE 2022d), mines in the southern portion of the Slick Rock Mining District (DOE 2021b), and the remaining sites in Colorado (DOE 2022c).
- Participated in a safeguarding meeting about planned 2023 closures and overlapping DRUM mine features.
- Hosted the quarterly Abandoned Uranium Mines Working Group (AUMWG) meeting virtually.

For Campaign 2, program personnel:

- Met with representatives of the Navajo Nation from the Beclabito and Sanostee Chapter Houses to obtain access to mine sites for V&V activities.
- Submitted the first two Navajo Nation DRUM V&V reports (for the Johnny McCoy [LM ID 2176] and Chester Mud 1 [LM ID 6473] mines).

April 2023

- Reviewed an administrative *Environmental Review Form* (LM-Form-4-20.3-4.0) related to safeguarding on public land.
- Received access for 58 Campaign 1 DRUM sites.
- Received access for 23 Campaign 2 DRUM sites.
- Prepared and submitted a risk roll-up report for the mines in the Pryor Mountains Locality (17 mines) in Montana on BLM-administered land and USFS-administered land (DOE 2023dd).

For work on Campaign 2, program personnel:

- Provided maps of DRUM sites for the Teec Nos Pos and Aneth Chapter Houses on the Navajo Nation.

May 2023

- Revised the FOPs for USFS Region 2 (DOE 2018), New Mexico statewide (DOE 2017a), Black Hills and Northern Rockies (DOE 2019b), Grants Mining District, New Mexico (DOE 2017b), and Wyoming public lands (DOE 2019a).
- Completed the “4.26.23 Draft DRUM Master Schedule Campaign 1 3.6.2023 – 3.31.2024.”
- Completed an ad hoc request to upload 96 V&V reports for mines in the Black Hills and Custer National Forests to the South Dakota electronic file transfer (EFT) folder.
- Completed the “Work Plan Deviation—Approach for Utilizing Aerial Gamma Radiation Survey Data.”
- Completed all V&V reports for the 2022 field season, which included 333 reports in total.
- Received a rating of “superior” for the paper “Radiological Screening Levels and Gamma Survey Methodologies for Characterization of U.S. DOE Legacy Uranium Mining Sites—An Update presented in Session #021 Radiological Waste Characterization Methods” from the Waste Management Symposium 2023 conference.
- Participated in safeguarding planning meetings with Bat Conservation International (BCI).
- A DRUM team member received praise from LM for displaying outstanding performance and ongoing support to LM and the DRUM safeguarding program:

I wish to pass along to you my appreciation for Candice Long’s past and most current program support opportunity. On Tuesday May 16, I contacted Ms. Long, without prior notification or warning, to participate on an in-progress problem solving call with Bat Conservation International’s Director of Subterranean Programs, Jason Corbett, and myself. Ms. Long immediately responded to my request and promptly logged-in to the call. Ms. Long’s participation was professional, courteous, and her knowledge provided immense value to the conversation regarding a strategy to quickly spend down \$800k of cooperative agreement funding. Ms. Long’s eagerness to participate with value added commentary is no surprise to me. I have counted on her multiple times in similar situations with similar results. As such, I regret not sending this letter sooner. I commend Ms. Long’s professionalism and helpfulness towards meeting the safeguard program’s mission objectives and, personally, I thank her for helping me.

- Prepared a risk roll-up report for the mines in the northern portion of the Radium Group Locality (18 mines) in western Colorado on BLM-administered land (DOE 2023ee).

For work on Campaign 2, program personnel:

- Presented the Uranium 101 Workshop on the DRUM Program’s behalf in the Kayenta Township, Arizona.
- Participated in a field trip with the Navajo Abandoned Mine Lands Reclamation Department and Navajo Nation Resource Fair.
- Completed a DRUM information sheet and flyer for DRUM Program work on the Navajo Nation.

June 2023

- Completed the upload of USFS Custer and Black Hills National Forests V&V reports to the EFT site.
- Completed the *Environmental Restoration Group, Inc. RadScout Instrument Evaluation for Defense-Related Uranium Mines Program Gamma Radiation Surveys* (DOE 2023kk).
- Participated in the LM/LMS all hands meetings at the LM Operations Center at Westminster, Colorado, for planning Campaigns 1, 2, and 3.
- Participated at the annual hybrid AUMWG meeting in Denver, Colorado.
- Completed the updated “Work Plan Deviation—Approach for Utilizing Aerial Gamma Radiation Survey Data” for use of gamma radiation survey data obtained by the National Nuclear Security Administration for large open-pit uranium mines in Wyoming.
- Prepared a risk roll-up report for the mines in the Monogram Mesa Locality (21 mines) in western Colorado on BLM-administered land (DOE 2023z).
- Completed and updated the *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* (LMS/DRM/S33217).

July 2023

- Provided list of hazardous features identified from risk roll-up reports in process during the month of June and a list of reclamation in lieu of royalties features identified for safeguarding on Uranium Leasing Program lease tracts where hazardous DRUM mine features overlap for consideration for inclusion in upcoming DRUM Program safeguarding projects.
- Completed the contract deliverable, “Submit a master schedule for completing Campaign 1 and execution of Campaigns 2 and 3.”
- Participated in the DRUM midseason Operating Experience and team building exercises.
- Completed maps for DRUM Campaign 3 mines for the U.S. Environmental Protection Agency (EPA) Regions 6 and 9.
- Completed an update to the *DRUM Verification and Validation Work Plan Campaign 1* (DOE 2023gg) (V&V Work Plan Campaign 1) relating to changes in field data collection methods with the use of newly acquired software from Juniper Systems, Inc. (Uinta).
- Participated in safeguarding planning meetings with BCI.
- Prepared and submitted risk roll-up reports for the mines in:
 - Browns Hole Locality (15 mines) in eastern Utah on BLM-administered land (DOE 2023s).

- The eastern portion of the Horseshoe Group Locality (22 mines) in western Colorado on BLM-administered land (DOE 2023w).
- The western portion of the Horseshoe Group Locality (17 mines) in western Colorado on BLM-administered land (DOE 2023x).
- Bluff-Butler Wash Locality (12 mines) in eastern Utah on BLM-administered land (DOE 2023r).
- Mercantile Group and Legin Group Localities (19 mines) in western Colorado on BLM-administered land (DOE 2023y).
- Big Gyp Locality (15 mines) in western Colorado on BLM-administered land (DOE 2023q).

For work on Campaign 2, program personnel:

- Completed the DRUM Program section in an overview document for an LM-1 group visit to the Navajo Nation on July 14, 2023.

August 2023

- Revised the FOPs for California (DOE 2023i), Nevada (DOE 2022b), Wyoming public lands (DOE 2019a), and the Gypsum Valley Mining District (DOE 2021a).
- Prepared the risk roll-up report for Ouray Locality (nine mines) in northeastern Utah on BLM-administered land (DOE 2023bb).
- Completed an update to the *Defense-Related Uranium Mines Verification and Validation Work Plan Campaign 2: Navajo Nation* (DOE 2023hh) (V&V Work Plan Campaign 2) relating to changes in field data collection methods with the use of newly acquired software from Juniper Systems (Uinta).
- Prepared a list of mines and associated hazardous features identified from mines in the Custer National Forest area for advanced safeguarding planning.
- Participated in a safeguarding meeting with BCI for scheduling regarding safeguarding activities in the Pryor Mountains Locality in Wyoming.
- Completed an ad hoc request which required uploading 139 V&V reports for upcoming safeguarding projects in Colorado from the following areas:
 - Golden Rod Group Locality
 - Long Ridge Locality
 - Mercantile Group Locality
 - Big Gyp Locality
 - Eastern Horseshoe Group Locality
 - Western Horseshoe Group Locality
 - Central Little Gyp Locality
 - Northern Little Gyp Locality
 - Southern Little Gyp Locality

— Monogram Mesa Locality

— Wild Steer Locality

- Updated the *Defense-Related Uranium Mines Data Management Plan* (LMS/DRM/S19467) (Data Management Plan).
- Completed an update to the DRUM V&V Work Plan Campaign 1 regarding the use of the Environmental Restoration Group, Inc. RadScout as the DRUM gamma radiation survey instrument.
- Provided training to DRUM radiological control technicians on the use of the RadScout gamma radiation survey instrument system.

In preparation for Campaign 2 on Navajo Nation land, program personnel:

- Participated in a tour to the Valley View (LM ID 6467) mine with the LM-1 group in the Red Valley Chapter House, Arizona, as part of a larger tour of LM sites on the Navajo Nation.
- Received approval for an increase the frequency of V&V work at DRUM mines on the Navajo Nation.

September 2023

- Completed the contract deliverable, “Draft DRUM Mid-year Progress Report covering January–June for the calendar year.”
- Completed the contract deliverable, “Submit documentation of submittal of Risk Roll-Up Reports for project areas through period of performance.”
- Attended the annual National Association of Abandoned Mine Land Programs conference in Chicago, Illinois.
- Completed the contract deliverable, “Prepare a final draft DRUM Report to Congress.”
- Completed the contract deliverable, “Submit documentation of ad hoc program requests through period of performance.”
- Completed the contract deliverable, “Submit draft DRUM V&V Reports for field activities conducted through 5/31/2023 – due 130 business days after completing V&V field visit.”
- Completed the contract deliverable, “For Campaigns 1 & 2, report the number of field Verifications and Validations (V&V) completed for each Campaign. The report shall include, by Campaign, both the total number of V&Vs completed for Campaign beginning to date, and the number of V&Vs completed in this 6-month POP #2 extension.”
- Revised the FOP for the remaining sites in Colorado (DOE 2022c).
- Participated in a safeguarding meeting with BCI for safeguarding activities in Utah.
- Prepared risk roll-up reports for the mines in:
 - Newton Locality (eight mines) in central Utah on USFS-administered land (DOE 2023aa).
 - Custer National Forest (23 mines) in South Dakota on USFS-administered land (DOE 2023u).

For work on Campaign 2, program personnel:

- Participated in community outreach at the 75th Annual Navajo Nation Fair in Window Rock, Arizona.
- Submitted a spreadsheet correlating EPA AUMs with DRUM mines in the Lukachukai Mountain Mining District.
- Revised the DRUM V&V Work Plan Campaign 2 to reflect recent software and hardware changes implemented in the recently updated the V&V Work Plan Campaign 1.

October 2023

- Participated in a meeting to discuss safeguarding projects with BCI and the Colorado Division of Reclamation, Mining, and Safety.
- Completed an ad hoc request for the quarterly file geodatabase export that includes safeguarding information.
- Completed an ad hoc request to provide a hazardous features spreadsheet and a file geodatabase export to the Colorado Division of Reclamation, Mining, and Safety.
- Completed an ad hoc request to upload 69 USFS V&V reports for the Edgemont Locality in South Dakota and a spreadsheet regarding public and mixed ownership, along with V&V statuses, to the EFT site.

For work on Campaign 2, program personnel:

- Participated in a public information meeting regarding V&V activities at the Sanostee Navajo Nation Chapter House.

November 2023

- Participated in safeguarding planning meetings.
- Completed 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 [of the DRUM Program statement of work]. 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 Work Plans, Field Operations Plans, and obtaining access agreements.”
- Submitted a V&V Work Plan Campaign 1 deviation for the Emerald 1 mine (LM ID 4038) regarding sampling procedures.
- A DRUM team member (Zack Schuler) received praise from LM for displaying excellent leadership skills and safety consciousness at the Uraniumaire (LM ID 6139) mine during oversight activities.

As I am typing up my oversight report for Uraniumaire, I am reminded how good of a job Zack did out there. He did a great job of navigating a difficult mine and basically orchestrating the work of two teams. He was very mindful of the temperatures (over 100) and made sure the team members were staying hydrated and taking breaks when appropriate. He really has grown as a leader and did an exceptional job. I was very impressed by him. Very calm and even keeled individual.

- Prepared the FOPs for Campaign 3 mines on private property in southwestern Colorado (DOE 2023f), Umetco property (DOE 2023k), private property in Colorado (DOE 2023c), private property in Utah (DOE 2023h), and private property in the Powder River Basin (DOE 2023e).

For work on Campaign 2, program personnel:

- Attended the triennial Navajo Nation/Hopi Tribe meeting in Sedona, Arizona.
- Attended the Navajo Abandoned Uranium Mines Project Cultural Sensitivity Training in Flagstaff, Arizona.

December 2023

- Participated in safeguarding planning meetings with the Colorado Division of Reclamation, Mining, and Safety, BLM, and BCI.
- Submitted the amended *NEPA Categorical Exclusion Evaluation (CXE) Form* (LM-Form-4-20-5.0) (LM 31a-19) for DRUM Program V&V visits in Arizona.
- Prepared the FOPs for Campaign 3 mines on private property in Wyoming (DOE 2023j), Texas and Oklahoma (DOE 2023g), North Dakota and South Dakota (DOE 2023d), Washington (DOE 2023i), and Arizona (DOE 2023b).
- Prepared risk roll-up reports for the mines in:
 - Dry Valley Locality (19 mines) in Utah on BLM-administered land (DOE 2023v).
 - Capitol Reef National Park (eight mines) in central Utah on NPS-administered land (DOE 2023t).
 - Petrified Forest National Park (six mines) in Arizona on NPS-administered land (DOE 2023cc).

For work on Campaign 2, program personnel:

- Participated in a Navajo Nation working group meeting.

Risk Screening

To date, for Campaign 1, program results indicate that physical hazards (e.g., open shafts and adits) at the mines pose the greatest risk to the public, with roughly 51% of the mines ranked “high” or “medium” for physical hazards, whereas only 2% of the mines were ranked “high” and “medium” for radiological hazards, and 8% were ranked “high” or “medium” for chemical hazards. These estimates reflect mining-related physical hazards associated with uranium ore-extraction operations and suggest the need for future safeguarding to mitigate the risk presented by physical features. Structures, another category of hazardous features that was previously included in evaluations of physical risks, were not considered and were ranked separately. This adjustment was made to ensure that earthen mine features (e.g., open shafts, adits) would be the main priority for safeguarding while also documenting risks related to structures. LM will address the handling of structures individually with each land management agency because each agency addresses structures differently, if at all.

The DRUM team prepared V&V reports for each mine and risk roll-up reports for groups of mines in the same area (e.g., mining district, national forest) so land management agencies can set priorities for that region and develop potential physical hazard safeguarding projects.

Safeguarding

The DRUM Program assisted land management agencies with safeguarding physical hazards posed by some mine features at ten different project areas in western Colorado, eastern Utah, and Montana. These hazards were primarily open adits, shafts, and subsidence features.

Table 6 summarizes the 2023 safeguarding projects and lists the cooperating land management agencies and state abandoned mine lands (AML) offices. These safeguarding projects demonstrate the collaborative relationships between the DRUM Program and cooperating state AML offices and land management agencies.

Table 6. 2023 Safeguarding Projects

State	Project Area	Features Safeguarded	Cooperating AML Office	Cooperating Land Management Agency
Colorado	Spud Patch	48	Colorado DRMS	BLM Tres Rios Field Office
Colorado	Bishop Canyon	19	Colorado DRMS	BLM Tres Rios Field Office
Colorado	Bishop Point	21	Colorado DRMS	BLM Tres Rios Field Office
Colorado	Wedding Bell and Bachelor Draw	45	Colorado DRMS	BLM Tres Rios Field Office
Colorado	Rimrock Blues, Starlight, and Fawn Springs	29	Colorado DRMS	BLM Tres Rios Field Office
Utah	Eastern Henry Mountains - Freeport	6	Freeport McMoRan Inc.	BLM Richfield Field Office
Utah	Manti-La Sal	49	BCI	BLM Moab Field Office
Utah	Yellow Cat	82	BCI	BLM Moab Field Office and SITLA
Utah	Kane Creek/Brumley Ridge Phase 1	7	Utah AMRP	BLM Moab Field Office
Montana	Pryor Mountains	3	WDEQ	BLM Billings Field Office
Total Safeguards Installed		309		

Abbreviations:

AMRP = Abandoned Mine Reclamation Program
 DRMS = Division of Reclamation, Mining, and Safety
 WDEQ = Wyoming Department of Environmental Quality

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 lessening mining-related physical hazards, generally by building barriers at entries to underground mines so people cannot access them. Reclamation is the process of restoring essential geomorphic functions at previously mined locations. 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 DRUM Campaign 2 (V&V work at mines on tribal lands) has substantially reduced the potential costs of reclamation and remediation. The DRUM Program reduces these potential costs and liabilities in two ways: (1) removing duplicate mining records from the DRUM Program database, thereby decreasing the estimated total number of existing mines and (2) 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 781 mines that present no physical hazards and 1862 mines with no environmental risks.

As of December 31, 2023, the DRUM Program database identified 2329 mines on public land (2213 Campaign 1 mines plus the public portions of 116 Campaign 1 and 3 mixed-ownership mines) and 210 mines on tribal lands. These numbers will fluctuate until both the public land and tribal lands 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 \$28,566,000 for public land (Table 7) and \$18,095,400 for tribal lands (Table 8).

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 to 9% on public land. 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 212 mines, representing an approximate cost reduction of \$374,400,000 (Table 7).

Unlike mines on public land, for which long-term chemical and radiological risks are assessed using a scoring process, mines on tribal lands will not be scored for chemical and radiological risks. Instead, chemical and radiological data are provided to tribal land agencies and U.S. government agencies 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 compared to public lands. Tribal lands exposure scenarios include recreational, livestock rancher, residential, and Navajo Nation surrogate 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 RSLs for lead (reduced by 75%), 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 with at least one constituent exceeding the lowest applicable residential screening level (ResSL) will be counted. DRUM fieldwork completed on tribal lands to date suggests that 22% of mines have at least one ResSL exceedance. If this trend continues, the resulting potential remediation scope will be reduced from 91 mines to 46 mines, representing an approximate cost reduction of \$58,500,000 (Table 8). For fiscal years 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 fiscal years 2017 through 2028) has the potential to reduce costs by \$402,966,000, a return on investment of almost 6:1.

Return on investment calculations are not included for mines on private property (Campaign 3). DRUM Campaign 3 began during calendar year 2024.

Table 7. Estimated Versus Projected DRUM Program Actions and Expenditures at Mines on Public Land

	2014 Report to Congress Estimates	Program Estimates as of December 31, 2023 ^a	Difference
Total number of mines	2,500	2,329 ^b	181 mines
Estimated percentage of mines requiring safeguards	80%	63%	NA
Estimated number of mines to safeguard	2,000	1,471	529 mines
Estimated safeguard construction cost per mine	\$54,000	\$54,000	\$0
Estimated cost to complete safeguards	\$108,000,000	\$79,434,000	\$28,566,000
Estimated percentage of mines requiring CERCLA remediation	20%	9%	NA
Estimated number CERCLA-eligible mines	500	212	288 mines
Estimated CERCLA remediation cost per mine	\$1,300,000	\$1,300,000	\$0
Estimated cost to complete CERCLA remediation	\$650,000,000	\$275,600,000	\$374,400,000
Estimated total safeguarding and CERCLA remediation cost	\$758,000,000	\$355,034,000	\$402,966,000

Notes:

^a This is the total number of mines that have been identified for V&V work as of December 31, 2023.

^b Excludes one unconventional site that was field evaluated by request and counted as a mixed-ownership mine (Campaigns 1 and 3).

Abbreviation:

NA = not applicable

Table 8. Estimated Versus Projected DRUM Program Actions and Expenditures at Mines on Tribal Lands

	2014 Report to Congress Estimates	Program Estimates as of December 31, 2023 ^a	Difference
Total number of mines	453	210	243 mines
Estimated percentage of mines requiring safeguards	80%	13%	NA
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%	22%	NA
Estimated number CERCLA-eligible mines	91	46	45
Estimated CERCLA remediation cost per mine	\$1,300,000	\$1,300,000	\$0
Estimated cost to complete CERCLA remediation	\$118,300,000	\$59,800,000	\$58,500,000
Estimated total safeguarding and CERCLA remediation cost	\$137,869,600	\$61,274,200	\$76,595,400

Note:

^a This is the total number of mines that have been identified for V&V work as of December 31, 2023.

Abbreviation:

NA = not applicable

Strategic Partnerships

LM strives to maintain and encourage collaborative partnerships with BLM, USFS, NPS, and the States of Colorado, Montana, New Mexico, South Dakota, North Dakota, Utah, Wyoming, Nevada, Oregon, Arizona, and California. LM also collaborates with EPA Regions 6 and 9 on program V&V assessment and risk-screening methods on tribal lands. LM continues to revise partnership agreements among various federal, state, and nonprofit entities to not only accomplish the V&V work but also safeguard physical safety hazards at these AUMs. Most notably, DOE has a Cooperative Agreement with BCI that provides long-term access to the spectrum of project development, environmental review (including National Environmental Policy Act documentation), and design and construction services needed to safeguard mines on public land.

Collaboration with a multitude of federal and state entities on the DRUM Program supports a one-government approach with financial agreements. This provides access to agency expertise, involving managing abandoned mines on public land and critical input into work plans, schedules, data reviews, conclusions, and safeguarding projects. State AML programs in Colorado and Utah have been used to inventory private property intermixed with public land, providing valuable planning information needed to support the DRUM Program.

In 2023, the DRUM Program continued V&V work on its tribal lands campaign. In July 2023, the DRUM team received approval to increase the frequency of V&V work at Campaign 2 mines.

2024 Planned Activities

At the end of 2023, LM has completed V&V fieldwork at nearly 97% of the mines in Campaign 1. Campaign 1 V&V fieldwork is scheduled for completion in 2024. LM reconciled all DRUM locations at the end of 2021 and will continue into 2024 as the program crosswalks mine lists with EPA and tribal AML programs. LM will continue to expand its partnerships with states and agencies for field activities scheduled through 2024. Included in the implementation of Campaign 1 is LM's plan to leverage resources to assist partner agencies in addressing priority physical hazards identified by the program. Through a process of collaboration and concurrence, with hazards defined during V&V activities, LM and partner agencies determine priorities and optimize available resources for safeguarding physical hazards.

V&V Field Operations

The field teams will visit several locations during the 2024 field season, which lasts from March through December, as weather allows. The teams are scheduled to perform V&V work at DRUM sites in the:

- Little Colorado, Central Arizona, Northern Arizona, and Western Arizona Mining Districts, Arizona.
- North Central AUM Region, Navajo Nation, Arizona and Utah.
- Northern AUM Region, Navajo Nation, Arizona and New Mexico.
- Western AUM Region, Navajo Nation, Arizona.
- Basin and Range, Mojave Desert, Sierra Nevada, and Reno Mining Districts, California.
- Front Range, Slick Rock, Gypsum Valley, Uravan, Bull Canyon, Maybell, Tallahasee Creek, Cortez, Cochetopa, and San Juan Mining Districts, Colorado.
- Nacimiento Jemez, Sabinoso, San Jose, Cuchillo Negro, Tucumcari, Datil, Elk Mountain, and Grants Mining Districts, New Mexico.
- Northwest and Stanley Mining Districts, Idaho.
- Butte Mining District, Montana.
- Salt Lake, Reno, and California Mining Districts, Nevada.
- Stanhope Mining District, New Jersey.
- Pennsylvania Mining District, Pennsylvania.
- Black Hills Mining District, South Dakota.
- Black Hills, Wind River Basin, Laramie, Great Divide Basin, Powder River Basin, Butte, and Shirley Basin Mining Districts, Wyoming.
- Northwest Mining District, Washington.

The field teams are poised to complete V&V field activities at approximately 71 mines on public land in calendar year 2024. For each project, a FOP will provide coordination instructions to the teams for the inventory and environmental sampling activities so that fieldwork is conducted efficiently. FOPs convey to LM and partner agencies information pertinent to the V&V activities at the specific project area. Also, contingencies are in place to ensure that field teams always have a DRUM site to inventory and assess. Although weather (e.g., late seasonal snow) or a

natural disaster (e.g., smoke from a wildland fire) may affect field teams, they will have other options, allowing them to safely continue fieldwork.

Campaign 2

V&V fieldwork on Campaign 2, which addresses DRUM sites on tribal lands, started in 2022. This will continue with plans to complete V&V activities at approximately 64 Navajo Nation mines in 2024.

Campaign 3

V&V fieldwork on Campaign 3, which addresses DRUM sites on private property, is scheduled to start in 2024, with 123 mines on the V&V schedule. Field V&V work at DRUM sites on private property will be subject to obtaining approved access by private landowners.

Safeguarding Program

In 2024, the DRUM Program will increase the number of safeguarded features, with additional projects planned in Colorado and Utah. In Colorado, the DRUM Program will safeguard an estimated 53 hazardous mine features on land managed by BLM's Grand Junction and Uncompahgre Field Offices and six hazardous mine features on private property. The DRUM Program is planning this safeguarding work in the East Calamity Creek, Monogram Mesa, and Carpenter Ridge areas. In Utah, the DRUM Program has planned safeguarding projects in the eastern Henry Mountains, where 191 hazardous features will be safeguarded, and in the Kane Creek and Brumley Ridge areas, where 147 hazardous features will be safeguarded. In total, the DRUM Program is planning to safeguard 397 hazardous mine features in 2024.

Safeguarding projects are initiated as a follow-up to the DRUM Program's risk roll-up reports, which document physical hazards presented by individual features at mines. LM works with affected land management agencies as they concur with the need to safeguard specific mine features in specific geographic areas. Land management agencies, state AML offices, LM, and BCI will collaborate to complete environmental reviews, develop designs and construction specifications, and contract and manage safeguard construction.

Program Plans

The activities performed by the DRUM Program are represented in numerous documents that provide specific guidance and direction for successful completion of tasks or project activities.

These documents include:

- The *Defense-Related Uranium Mines Program Management Plan* (LM-Plan-3-23-1.0, LMS/POL/S15809) (Program Management Plan).
- The V&V Work Plans.
- The *Defense-Related Uranium Mines Quality Assurance Program Plan* (LMS/DRM/S15867) (QAPP).
- The *Defense-Related Uranium Mines Safety Plan* (LMS/DRM/S15804) (DRUM Safety Plan).

- FOPs.
- The Data Management Plan.
- The *Defense-Related Uranium Mines (DRUM) Mine Safeguarding Program Management Plan* (Safeguarding Program Management Plan).

A summary of each plan is provided below.

Program Management Plan

The Program Management Plan defines how LM will execute the DRUM Program, set goals, and effectively communicate program strategies and objectives to the partner agencies. It is the primary guiding document of the program. LM issued a revised Program Management Plan in May 2022.

The revised plan addresses V&V activities for the three DRUM campaigns, including safeguarding of physical safety hazards. It describes how LM, the Legacy Management Support (LMS) contractor, and partner agencies will work as a cohesive team to execute the DRUM Program. The next revision to the plan is scheduled for May 2024.

V&V Work Plans

The V&V Work Plans provide data objectives, direction, and methodologies regarding how LM and partner agencies will collect, store, and report information gathered during V&V activities at mines on public and tribal lands. This includes inventorying mining-related features by using digital technology, radiological data collection, soil and water sampling (if required), photo documentation of mining-related features, in-field and office-based data quality assurance procedures, and reporting. LM developed separate V&V Work Plans for Campaign 2 for the Navajo Nation (DOE 2023hh) and the Pueblo of Laguna (DOE 2022e). LM also developed a separate V&V Work Plan for mines that fall under Campaign 3 (DOE 2023ii). LM updates and reviews each V&V Work Plan annually.

QAPP

The QAPP describes the procedure for ensuring 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 existing documentation of mine conditions. The next revision to this plan is scheduled for September 2024.

DRUM Safety Plan

The DRUM Safety Plan defines the requirements of the LMS Worker Safety and Health Program and the Integrated Safety Management System. These high-level programs establish the parameters for how the LMS contractor safely performs program activities. The DRUM Safety Plan replaced the previous *Defense-Related Uranium Mines Health and Safety Plan* in spring 2020 and is updated as necessary.

FOPs

FOPs detail activities to be performed on lands administered by partner agencies within discrete operational areas. Each FOP provides contact information for the relevant personnel from LM, the LMS contractor, and partner agencies; identifies the mines where DRUM personnel will perform V&V activities; provides information pertinent to mine access; describes special circumstances and restrictions that need to be addressed before, during, or after V&V activities; and includes emergency contacts and locations of medical facilities near planned V&V activities. Each FOP is updated as necessary.

Data Management Plan

The Data Management Plan describes the tasks, processes, and procedures for managing DRUM Program data. This plan identifies responsibilities, outlines data sources and locations, and provides insight into the quality control checks, capabilities, and queries that can be done related to the DRUM Program database.

Safeguarding Program Management Plan

LM issued the Safeguarding Program Management Plan in 2021. This plan addresses how LM—in collaboration with land management agencies, state and tribal AML offices, the LMS contractor, and BCI—implements safeguarding and follow-up monitoring and maintenance activities. The next revision to this plan is scheduled for June 2025.

Abbreviations List

AEC	U.S. Atomic Energy Commission
AML	abandoned mine lands
AUM	abandoned uranium mine
AUMWG	Abandoned Uranium Mines Working Group
BCI	Bat Conservation International
BLM	U.S. Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
DRUM	Defense-Related Uranium Mines
EFT	electronic file transfer
EPA	U.S. Environmental Protection Agency
FOP	Field Operations Plan
FY	fiscal year
LM	Office of Legacy Management
LMS	Legacy Management Support
NPS	National Park Service

QAPP	Quality Assurance Program Plan
ResSL	residential screening level
RSL	regional screening level
SITLA	School and Institutional Trust Lands Administration
USBR	U.S. Bureau of Reclamation
USFS	U.S. Forest Service
V&V	verification and validation

Additional Information

Additional information about the DRUM Program, including the 2014 Report to Congress, other program documents, ongoing projects, and updates, is available at the following DOE website: <https://www.energy.gov/lm/defense-related-uranium-mines-program>.

For more information about the DRUM program, please contact:

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