

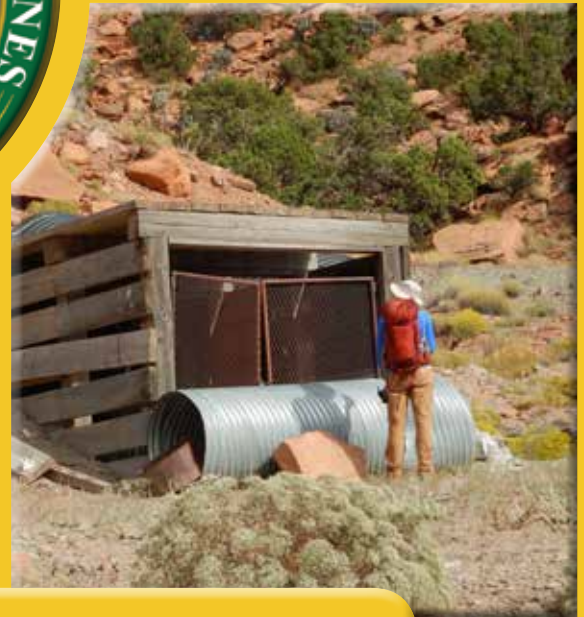
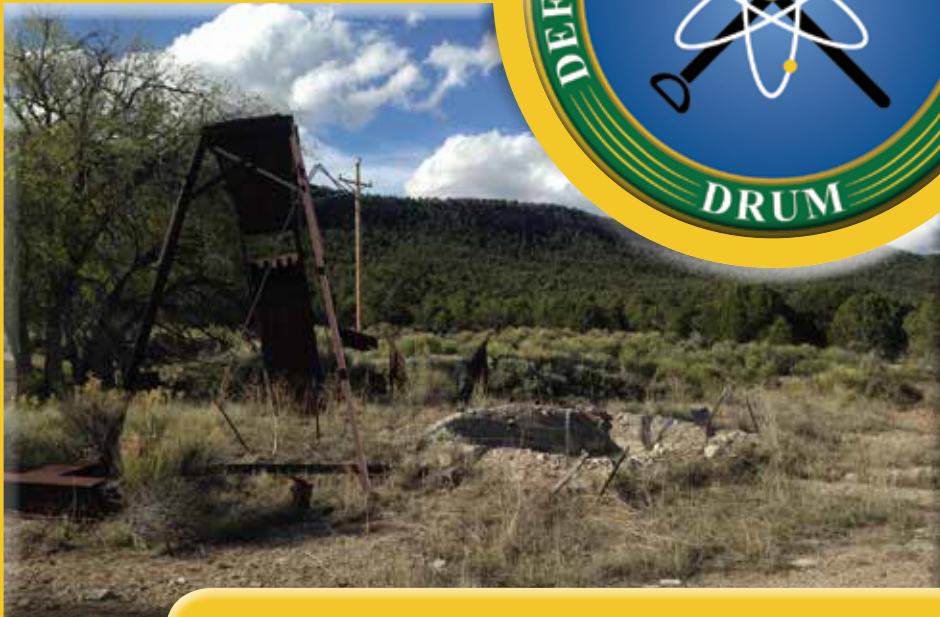


U.S. DEPARTMENT OF
ENERGY

Legacy
Management

Defense-Related Uranium Mines FY 2017 Annual Report

(October 1, 2016–September 30, 2017)



<https://www.energy.gov/lm/defense-related-uranium-mines-program>



**This document was printed on paper manufactured
with post-consumer waste as part of
LM's commitment to environmental responsibility.**

**Using recycled paper conserves resources,
saves energy, and reduces pollution.**

Counterclockwise from top left:

Bleak Mine adit.

Deer Mine shaft.

Bulls Eye Mine adit.

Ore bins and loadout at the Wedge 1 Mine.

Table of Contents

Executive Summary	2
Introduction	3
DRUM Initiative	4
DRUM Program	5
Major FY 2017 Achievements	6
Abandoned Uranium Mines Multiagency Working Group	7
Program Costs to Verify and Validate 2,500 DRUM Sites	8
Program Plans	9
Partner Summaries	10
Public Affairs	11
Status of DRUM Projects	12
Program Results	17
Acronym List	Inside Back Cover

Candy Mine adit, White Canyon District, Utah, BLM-administered land.

Executive Summary

In 2013, Congress directed the U.S. Department of Energy (DOE), in consultation with the Secretary of the U.S. Department of the Interior (DOI) and the Administrator of the U.S. Environmental Protection Agency (EPA), to conduct a review and prepare a report on abandoned uranium mines across the nation that provided ore for U.S. defense-related activities. DOE assigned the Office of Legacy Management (LM) to take the lead, and we submitted the *Defense-Related Uranium Mines* report to Congress in August 2014.

We based the report on our initial compilation and evaluation of U.S. Atomic Energy Commission (AEC) (DOE's predecessor agency) ore production records and other readily available data received from other federal agencies and affected states and tribes. We learned that many records that were evaluated, including the AEC production records, did not provide complete information regarding location; reclamation and remediation status; and risks to public health, safety, and the environment.

We executed the Defense-Related Uranium Mine (DRUM) program in fiscal year (FY) 2017 (October 1, 2016 - September 30, 2017) to fill in these data gaps and provide accurate information that can help decision-makers prioritize mines for additional action (including determinations of no further action). The DRUM program is a partnership between DOE, federal land management agencies, and state mine programs to verify and validate (V&V) the condition of 2,500 mines, using a recreational use exposure scenario, on federal public land by 2022.

Project managers, geologists, environmental scientists, and engineers from LM and our contracted support organization, LM Support (LMS), as well as our partner agencies, are conducting V&V activities to determine the current condition of the mines. We will share information we obtain with the U.S. Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the respective states to help them make defensible decisions about what, if any, actions should be taken to address physical hazards or potential environmental releases from the mines.

By the end of FY 2017, we completed V&V of 362 mines—the majority of which are located on federal public land—exceeding our 300-mine goal. Through the use of cooperative agreements, state mine programs complimented LMS field efforts by performing mine inventories primarily on state and private land.

We completed an initial risk scoring assessment of 113 mines on federal public land in Colorado and Utah. Mines on federal public land are primarily accessed for recreational use, such as camping; therefore, the primary focus was on physical safety, radiological risks, and chemical risks. Preliminary analysis of the 113 mines has shown:

- The main risks are derived from physical hazards, such as open, easily entered, and unstable portals, as well as large unstable structures associated with historic mining operations. These are immediate threats to humans and wildlife. Approximately 58 percent of the evaluated mines ranked high or medium for physical safety hazards, and may require some action by the land management agencies.
- Approximately 35 percent of the evaluated mines ranked low or none for physical safety, chemical, and radiological hazards. They are candidates for no further action by the land management agencies. None of the mines ranked high for human health risk for either chemical or radiological hazards. Approximately 16 percent of the mines ranked medium for chemical or radiological hazards.
- Although this dataset cannot be fully predictive of the remaining sites, we anticipate the observed trends will continue.

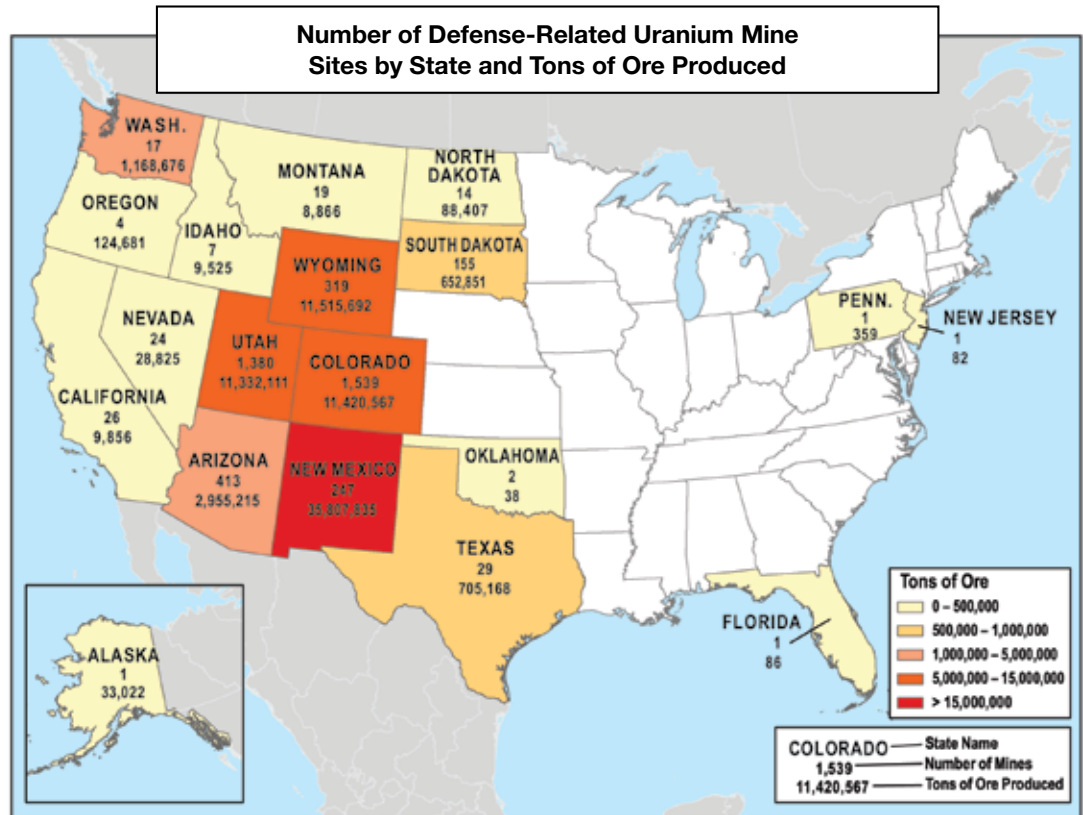
The DRUM report to Congress estimated a range of costs to reclaim and remediate mines categorized by mine size. Based on the risk scoring results for 113 mines, we estimate the federal government could realize up to \$150,000,000 in cleanup cost avoidance.

Introduction

The National Defense Authorization Act of Fiscal Year 2013 (enacted January 2013) mandated that the U.S. Department of Energy (DOE) consult with the U.S. Department of Interior (DOI) and the U.S. Environmental Protection Agency (EPA) to prepare a report to Congress on abandoned uranium mines from which uranium ore was produced for U.S. defense purposes. DOE assigned the Office of Legacy Management (LM) to lead the report effort, which was submitted to Congress in August 2014 and was based on our initial compilation and evaluation of U.S. Atomic Energy Commission (AEC) production records and other readily available data provided by other federal agencies and affected states and tribes.

To prepare the 2014 *Defense Related Uranium Mines* report, we developed four topic reports: mine location and status, priority ranking for reclamation and remediation, potential cost and feasibility for reclaiming or remediating the mines, and health and safety risks. The report to Congress documented numerous data gaps related to these mines, including three major issues: 1) the status of reclamation and remediation could only be confirmed at 15 percent of the mines, 2) location data was not always accurate (including information in the AEC records), and 3) information about whether the mines pose risks to public health and safety and the environment was insufficient.

As a follow-up to the report to Congress, we implemented activities to verify and validate (V&V) mine conditions to fill in data gaps realized during development of the report.



Data in the figure is from the 2014 DRUM Report to Congress.

DRUM Initiative



Wild Steer Mine overview, Jo Dandy District, Colorado, BLM-administered land.

The DOE DRUM Initiative was executed in 2016 and established a partnership between DOE, federal land management agencies, and state abandoned mine lands programs. The DRUM Initiative focused on V&V activities at DRUM sites to help determine their location and condition. We executed Memoranda of Understanding and Interagency Agreements with the U.S. Bureau of Land Management (BLM) state offices of Colorado, New Mexico, and Utah, as well as with U.S Forest Service (USFS) Region 2 in 2016. This allowed us to form and strengthen partnerships with various federal and state entities to further efforts in filling data gaps about the mines, reduce collecting duplicative information, and share pertinent data efficiently between all agencies.

The DRUM Initiative built on the 2014 report to Congress, which found that 4,225 mines exist across the nation. These mines provided uranium ore to the AEC for defense-related activities between 1947 and 1970. Most mines are located on federal public

land and are abandoned. We started the DRUM program by conducting a pilot program to test V&V activities for 43 mines in Colorado and Utah. Activities included:

- Exchanging information with other federal agencies and state governments to improve mine-specific data quality
- Performing field inventories to document mine conditions
- Conducting gamma surveys, soil sampling, and applicable water sampling

The pilot program provided field teams with the opportunity to test equipment, instrumentation, and sampling protocols. The pilots also developed a priority ranking methodology to determine whether the mines pose potential risks to human health and the environment. Finally, the first mine report template to document field activities, lab results, and priority rankings was developed.

DRUM Program

Working with our partner agencies, LM made substantial progress toward our goals and objectives in FY 2017.

Goals and Objectives

The goals of the DRUM program are to improve data quality and content in the DOE DRUM database, reconcile the location of mines, conduct site-specific inventory and environmental sampling at mines, and perform risk scoring assessments. Additionally, our goal is to provide sufficient information to agencies that administer federal public land to help them make defensible decisions about what, if any, actions should be taken to address physical hazards or potential release of contaminants from the mines. DOE's objective for the DRUM program is to complete V&V activities at 2,500 mines located on federal public land by 2022. The DRUM project aligns with Goal 1 of the LM 2016–2025 Strategic Plan “to protect human health and the environment.”



Nil Trace Mine reclaimed waste rock dump, Jo Dandy District, Colorado, BLM-administered land.

Major FY 2017 Achievements

In October 2016, we obtained funding to execute the DRUM program. Four programmatic documents were completed to establish the framework for V&V field work: *Program Management Plan*, *V&V Work Plan*, *Quality Assurance Program Plan*, and the *Health and Safety Plan*. Federal staff increased from one to four full-time positions in winter 2017 to manage and administer the new program. In turn, LMS ramped up its support for the program, and by August of 2017, had expanded from one to four field teams working on DRUM V&V activities. We completed V&V of 362 mines in FY 2017, exceeding the goal of 300. FY 2017 projects included:

- Long Park, Club Mesa, Eagle Basin and Bitter Creek areas, in the BLM Uncompahgre Field Office, Colorado
- Arapaho and Roosevelt National Forests in Colorado

- Thompson Area (Yellow Cat District), in the BLM Moab Field Office, Utah
- Red, White, Fry Canyons and Deer Flats Districts, in the BLM Monticello Field Office, Utah.

We also developed a comprehensive risk scoring assessment methodology to rank mines for physical hazards as well as chemical and radiological risks. A preliminary risk scoring assessment was performed on 113 mines. Approximately 58 percent of the evaluated mines ranked high or medium for physical safety hazards, and may require some action by land management agencies. The first phase of the DRUM database upgrade was completed on September 30, 2017. The upgrade included improvements to the existing interface, database, and reporting functionality.



Left: Parco 25 Mine bat-gated ventilation shaft, Yellow Cat District, Utah, BLM-administered lands. Right: Merry Widow Mine ore chute and bin, Uravan District, Colorado, BLM-administered land.



Abandoned Uranium Mines Multiagency Working Group

The Abandoned Uranium Mines Working Group is a consortium of federal agencies working together to address the physical hazards as well as the human health and environmental challenges posed by abandoned uranium mines across the nation (the majority of the mines are defense-related). This working group was formed after the 2014 DRUM report to Congress was completed to maintain dialogue between the agencies. By marshalling the resources of multiple federal agencies, the group works with states and tribes to identify and address high-priority mines in a cost-effective, coordinated, and well-managed fashion. The working group is led by LM and is comprised of directors, managers, and senior technical abandoned mine leads from: DOE, EPA, BLM, USFS, the Bureau of Indian Affairs, and the National Park Service. The document titled *Addressing Human and Safety Risks of Abandoned Uranium Mines: Proposed Multiagency Strategy* guides the activities of the working group. A five-year action plan accompanies this strategy and identifies what the agencies will accomplish by 2021. The working group holds monthly calls and two face-to-face meetings each year to discuss its progress in addressing the problems posed by abandoned uranium mines and to share technical approaches in assessing, reclaiming, and remediating the mines.



Abandoned Uranium Mines Working Group representatives in front of the Edgar Experimental Mine in Idaho Springs, Colorado.

Program Costs to Verify and Validate 2,500 DRUM Sites

Our focus on environmental responsibility for historic uranium mining and milling impacts have been heightened over the past few years due to environmental litigation, which has resulted in large multi-million dollar settlements. When faced with the potential liability of having to reclaim or remediate a large number of mines with unknown conditions, DOE undertook a proactive approach by initiating the DRUM program.

Generally, costs of remediation far exceed costs to mitigate physical hazards or of taking no action at mines that do not pose risks. The DRUM V&V process of identifying mines that pose no potential chemical or radiological risks nor require further

analysis will help the federal government develop a more accurate assessment of its potential cost liabilities.

The estimated cost to complete V&V of 2,500 mines on federal public land by 2022 is approximately \$30,000,000. The estimated range of costs to reclaim or remediate mines based on their production quantity could vary widely. Based on our analysis of 113 mines, we estimate 95 of these mines present no or low potential chemical or radioactive risks. The federal government could realize up to \$150,000,000 in cleanup cost avoidance if these 95 mines are identified as requiring no further action.



*Left: Uracop 3 Mine looking northeast at waste rock slope over hillside, Red, White, and Fry Canyons and Deer Flat Districts, Utah, BLM-administered public land
Right: Merry Widow Mine, double ore bin with tressel, Long Park, Club Mesa, Eagle Basin, and Bitter Creek, Colorado, BLM-administered land.*



Program Plans

Program Management Plan

The *Program Management Plan* defines how the LM and our contractor team will execute the DRUM program, set goals, and effectively communicate program strategies and objectives to the partner agencies. V&V is designed to be a joint effort among LM, the LMS contractor, and partnering federal and state agencies. The plan describes the four main projects: mine data reconciliation, field inventory, environmental sampling, and data management. The *Program Management Plan* was completed in July 2017.

Verification and Validation Work Plan

The *Verification and Validation Work Plan* guides all DRUM V&V activities and was finalized in July 2017. This plan provides structure and guidance for the successful coordination between field personnel and partnering agencies about how to prepare for and implement V&V activities. Activities include reconciling mine locations; performing field inventories; documenting physical hazards; surveying gamma radiation levels; collecting soil and water samples for chemical and radiological laboratory analysis; and scoring and ranking mines based on potential physical hazards, chemical risks, and radiological risks. In addition, the plan documents the rationale and develops consistency in procedures and methodologies used to achieve program goals and objectives. This plan contains detailed guidance on all phases of DRUM program activities.

Field Operations Plans

A *Field Operations Plan* (FOP) is prepared for each defined project area after reconciliation efforts are complete. FOPs are meant to convey to LM, LMS, and partner agencies information pertinent to the V&V activities being undertaken at the specified project area (such as a mining district). Each FOP is unique to the requirements of the individual field area and is meant to supplement the *Verification and Validation Work Plan*, as circumstances require. Each FOP is developed in coordination with the appropriate partner agency, and will describe the unique issues, such as access and roles and responsibilities of agencies, to ensure all required data are collected.



Bulls Eye Mine gated adit with snow shed and vent pipe, Red, White, and Fry Canyons and Deer Flat Districts, Utah, BLM-administered public land.

Partner Summaries

New Partners

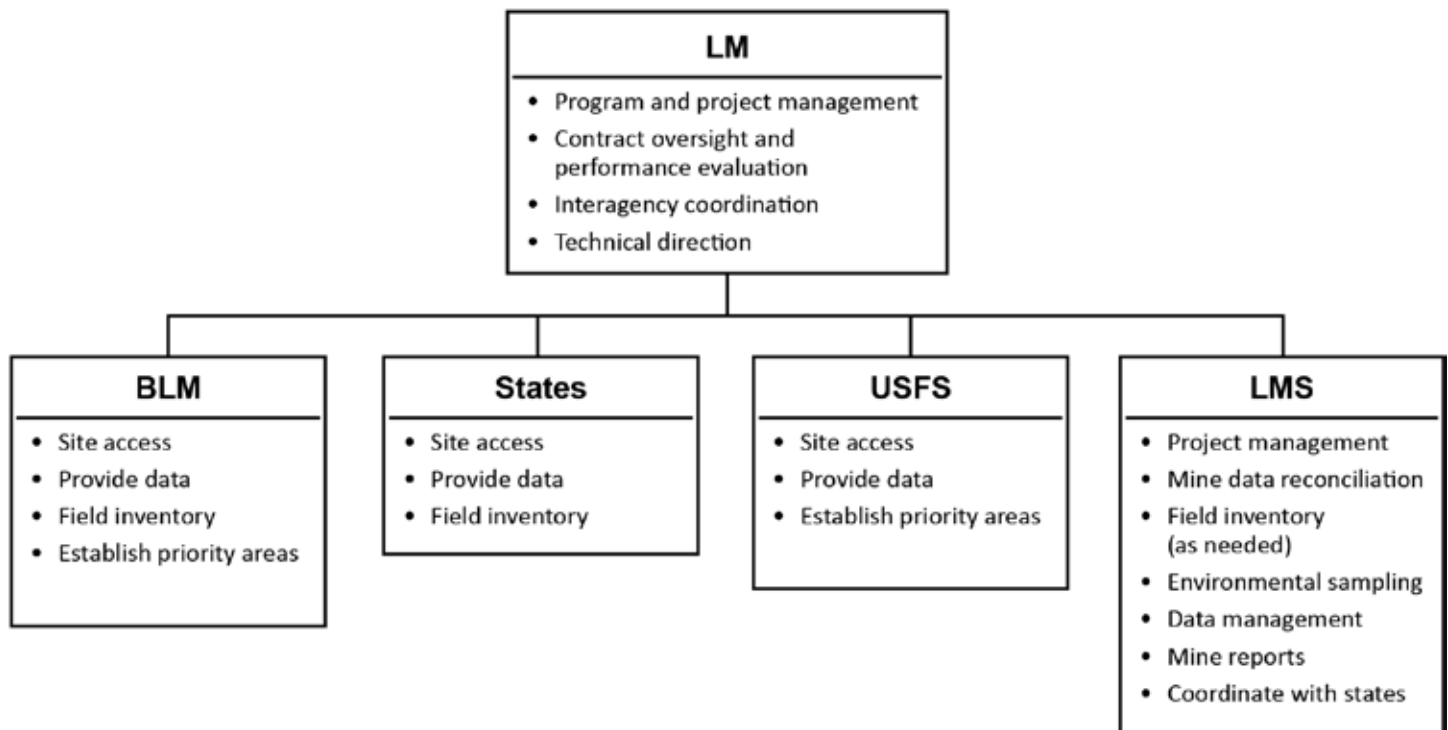
In FY 2017, we executed cooperative agreements with the Utah Abandoned Mine Reclamation Program (AMRP) and Colorado Division of Mining Reclamation and Safety (CDRMS) to obtain their expertise for the inventory of mines on federal public, state, and private land. We also executed a Memoranda of Understanding with the BLM Wyoming State Office and an Interagency Agreement with USFS Region 4 to expand V&V work into Wyoming and onto USFS-administered land in Utah, Idaho, Nevada, and parts of western Utah. These partner agencies add to the success of the DRUM program as they have inventory and land management expertise, past experience with local mines, the authority to access private and state lands, and refined location data.

Partnering agencies have also collected and contributed a large amount of the inventory data that was used for V&V activities in 2017.

Partners' Activities

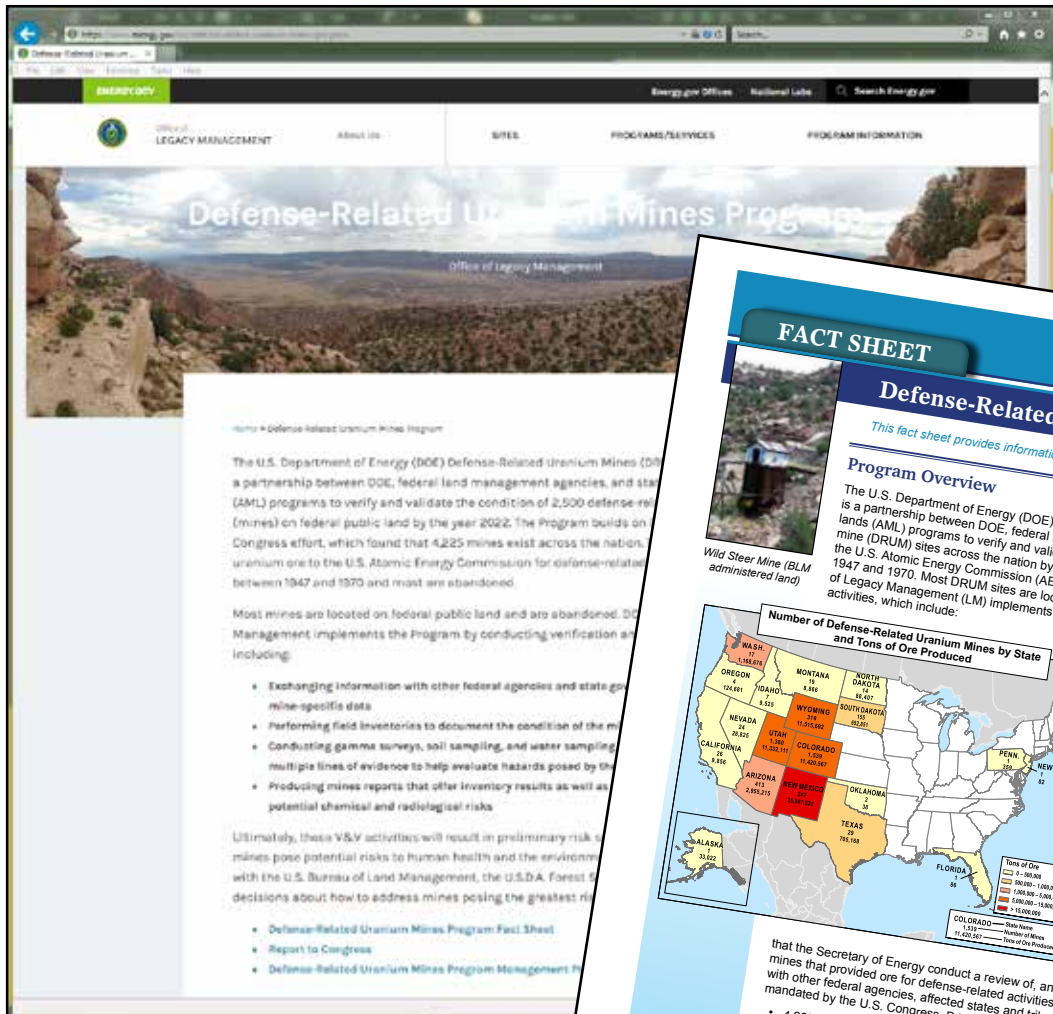
Utah AMRP inventoried mines under the direction of the BLM Utah State Office for the Red, White, and Fry Canyons, and Deer Flat Districts project in summer and fall of 2017. The inventory mine data was used to populate the database and prepare for V&V activities.

CDRMS performed inventory activities on patented mining claims as well as private lands and USFS lands in Colorado. The majority of these mines were located in the Long Park, Eagle Basin, and Club Mesa areas of the Uravan Mining District. The remaining sites were within the Arapaho and Roosevelt National Forests.



Public Affairs

In FY 2017, we established a DRUM program website at <https://www.energy.gov/lm/defense-related-uranium-mines-program> to provide public access to fact sheets and other program information, such as the *Program Management Plan*. We also received stakeholder inquiries about the mines and our field work. Stakeholders were provided links to the DRUM report to Congress, topic reports, and links to several other agency websites that contain mine information.



FACT SHEET

U.S. DEPARTMENT OF ENERGY Legacy Management

Defense-Related Uranium Mines Program

This fact sheet provides information about the Defense-Related Uranium Mines program.

Program Overview

The U.S. Department of Energy (DOE) Defense-Related Uranium Mines program (Program) is a partnership between DOE, federal land management agencies, and state abandoned mine lands (AML) programs to verify and validate the condition of 2,500 defense-related uranium mine (DRUM) sites across the nation by 2022. These DRUM sites provided uranium ore to the U.S. Atomic Energy Commission (AEC) for defense-related activities that occurred between 1947 and 1970. Most DRUM sites are located on public lands and are abandoned. DOE Office of Legacy Management (LM) implements the Program by conducting verification and validation activities, which include:

- Exchanging information with other federal agencies and state governments to improve the quality of mine-specific data
- Performing field inventories to document mining-related facilities at each DRUM site
- Conducting environmental sampling to evaluate safety and health risks
- Producing reports that document physical safety hazards at DRUM sites, as well as potential risks to human health and the environment

Report to Congress

DOE obtained its authority for the Program under Section 3151 of the National Defense Authorization Act for Fiscal Year 2013. The Act mandated with other federal agencies, affected states and tribes, and the public to develop the report, as mandated by the U.S. Congress. DOE finalized the report in August 2014, which documented:

- 4,225 DRUM sites across the nation provided uranium ore to AEC
- Over 90 percent of DRUM sites are located in Arizona, Colorado, New Mexico, Utah, and Wyoming
- The status of reclamation and remediation could only be confirmed at 15 percent of DRUM sites
- Field visits at a small subset of mines demonstrated location data obtained by DOE had a number of inaccuracies

The Report to Congress documented that many data gaps still exist about DRUM sites. DOE determined that further review of DRUM sites was needed to fully meet the Act's mandate. For more information, please visit the Report to Congress web page at <https://energy.gov/lm/defense-related-uranium-mines-report-congress>.

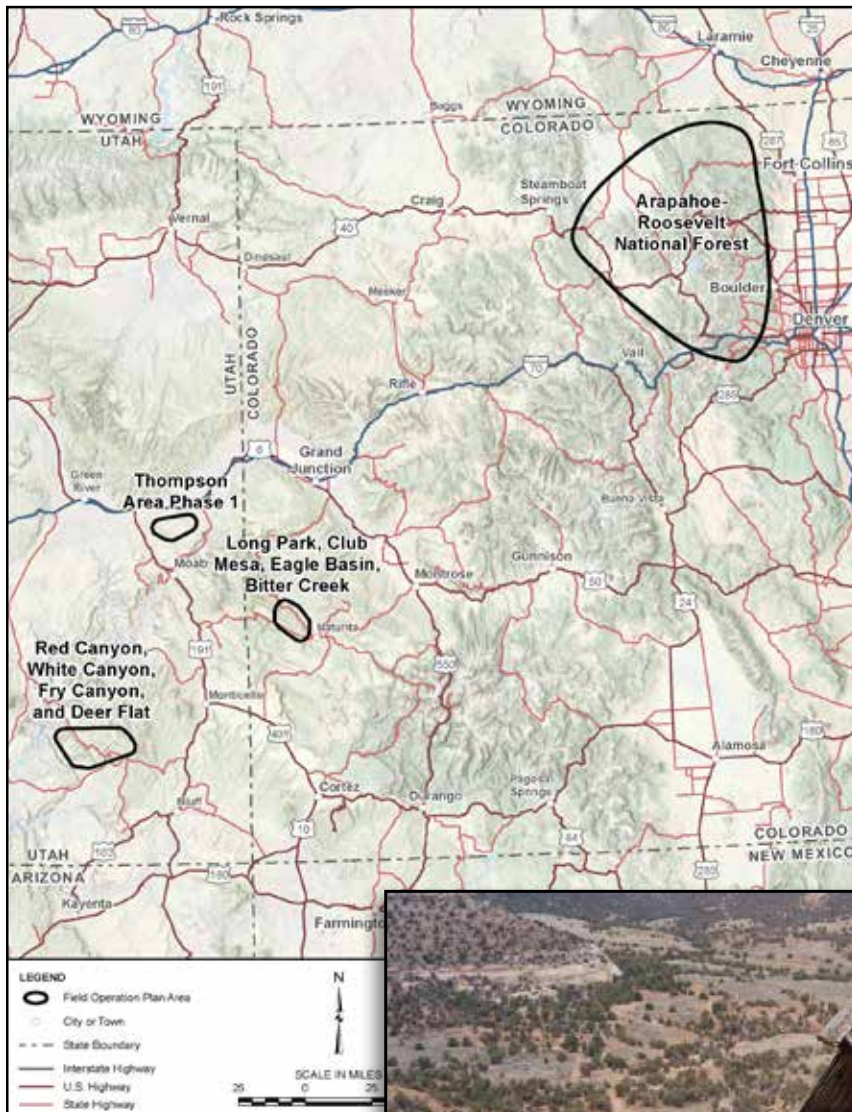
Number of Defense-Related Uranium Mines by State and Tons of Ore Produced

State	Number of Mines	Tons of Ore Produced
ALASKA	1	33,522
ARIZONA	433	2,952,215
CALIFORNIA	26	6,456
COLORADO	116	11,603,867
FLORIDA	35	792,169
ILLINOIS	1	11,421,167
INDIANA	1	11,421,167
IOWA	1	11,421,167
KANSAS	1	11,421,167
KENTUCKY	1	11,421,167
LOUISIANA	1	11,421,167
MARYLAND	1	11,421,167
MASSACHUSETTS	1	11,421,167
MICHIGAN	1	11,421,167
MINNESOTA	1	11,421,167
MISSISSIPPI	1	11,421,167
MISSOURI	1	11,421,167
MONTANA	16	4,386
NEBRASKA	1	11,421,167
NEVADA	24	3,415
NEW HAMPSHIRE	1	11,421,167
NEW JERSEY	1	11,421,167
NEW YORK	1	11,421,167
NORTH CAROLINA	1	11,421,167
NORTH DAKOTA	1	11,421,167
OHIO	1	11,421,167
OKLAHOMA	2	11,421,167
OREGON	16	10,481
PENNSYLVANIA	1	11,421,167
RHODE ISLAND	1	11,421,167
SOUTH CAROLINA	1	11,421,167
SOUTH DAKOTA	1	11,421,167
TENNESSEE	1	11,421,167
TEXAS	29	792,169
UTAH	139	11,343,919
VERMONT	1	11,421,167
VIRGINIA	1	11,421,167
WASHINGTON	17	138,824
WEST VIRGINIA	1	11,421,167
WISCONSIN	1	11,421,167
WYOMING	216	11,514,822

Status of DRUM Projects

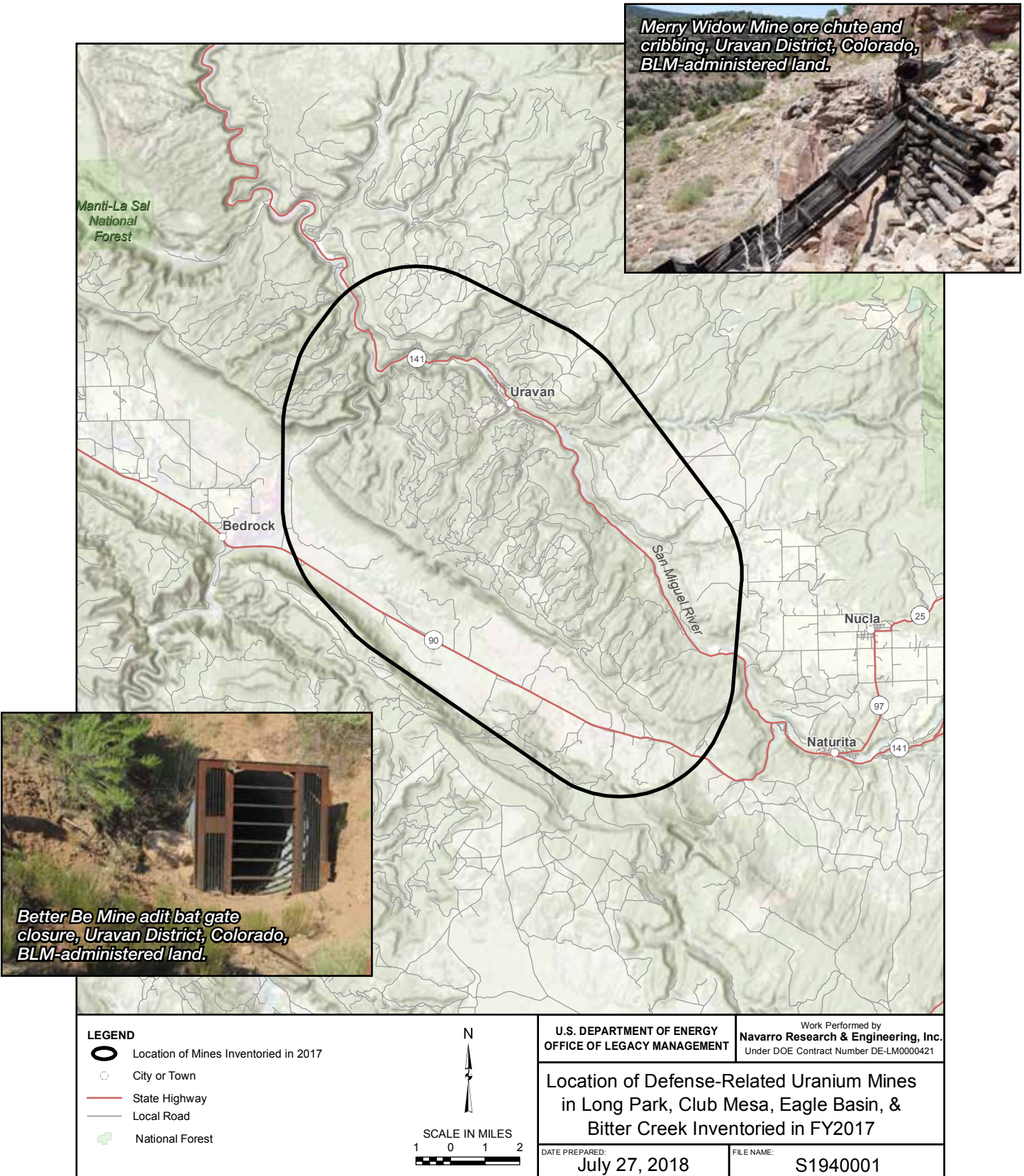
Long Park, Club Mesa, Eagle Basin, and Bitter Creek Project

This project was located in the southwestern portion of Colorado. The majority of the mines in this district targeted sandstone deposits, which are often exposed on elevated cliff edges overlooking valleys. This area is where the oldest uranium mines in the state are located, dating back to the radium boom. The mineral occurrences here directly coincide with vanadium, which is often 5–6 times more abundant by volume in ore. The project covered mines in the Uravan District, which includes the Long Park, Club Mesa, Eagle Basin, and Bitter Creek areas. V&V activities were performed at 60 mines on private land and 71 mines on federal public land administered by the BLM Uncompahgre Field Office. CDRMS completed inventory activities at mines on private land, and DRUM teams completed V&V at mines on BLM-administered land.

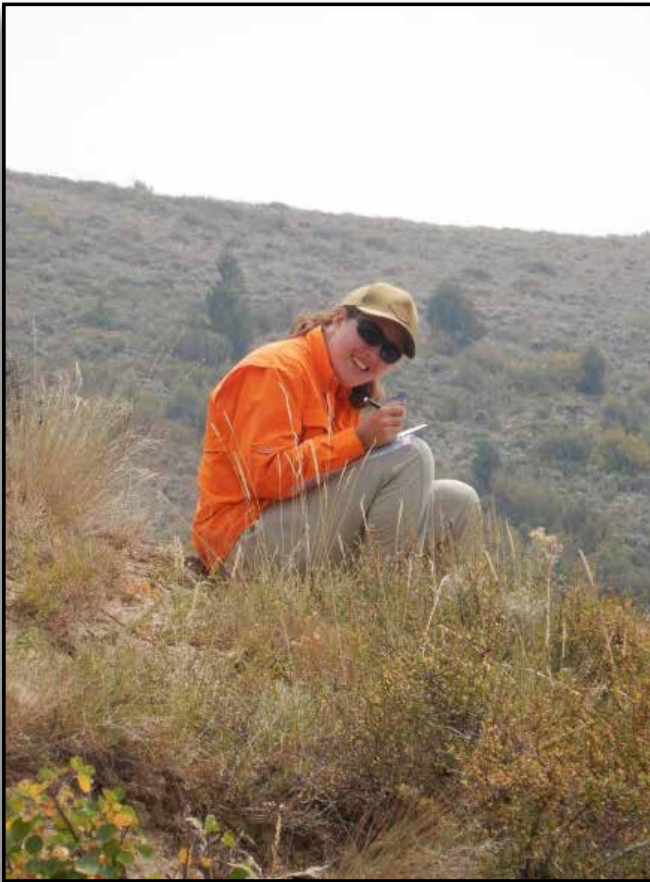


Tramp Mine unstable ore chute, Uravan District, Colorado, BLM-administered land.

Status of DRUM Projects (continued)



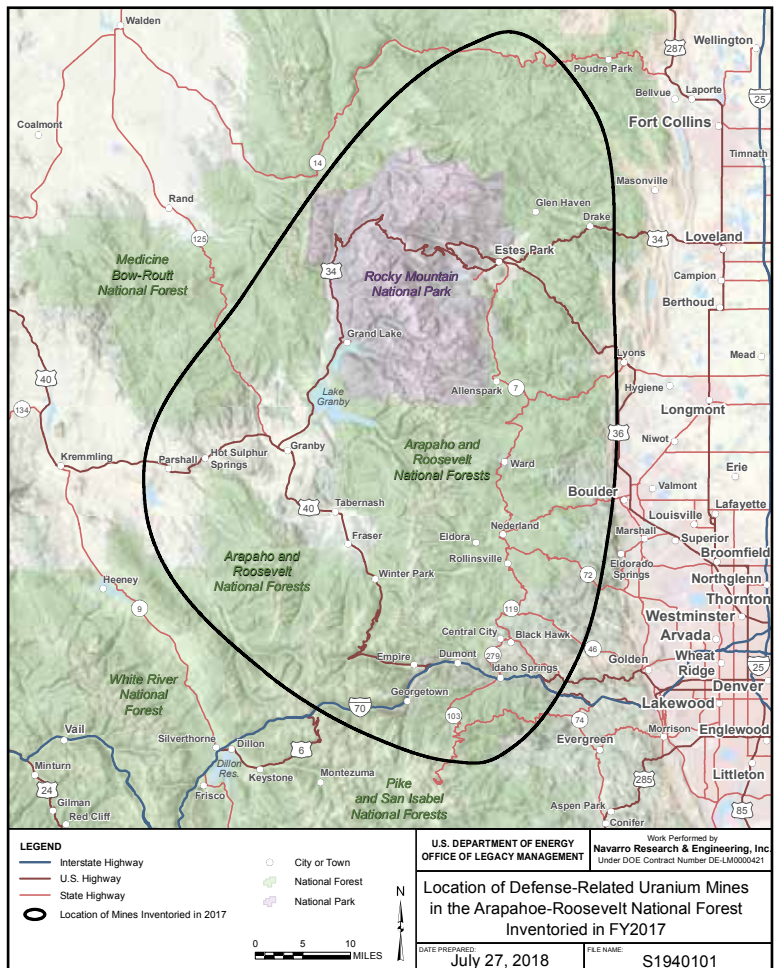
Status of DRUM Projects (continued)



DRUM ecologist taking notes at the Lucky Jack Mine, Front Range District, Colorado, BLM-administered land.

Arapaho and Roosevelt National Forests Project

This project is forecasted to be complete in FY 2018. It is located in north-central Colorado. The uranium that was mined was located in one of two deposit types: numerous small, isolated deposits or larger, higher grade and important vein deposits. Along the Front Range uplift, several uranium deposits in sandstones are associated with carbonaceous material. The project includes eight mines on USFS-administered land in the Arapaho and Roosevelt National Forests, two mines on BLM-administered land, one mine on State of Colorado land, one mine on Boulder County Open Space land, one mine with mixed USFS-administered land and private land, and 27 mines on private land. CDRMS was the state agency that performed inventory on all of the mines located on private lands. The DRUM team completed environmental sampling on a total of 10 mines in FY 2017.



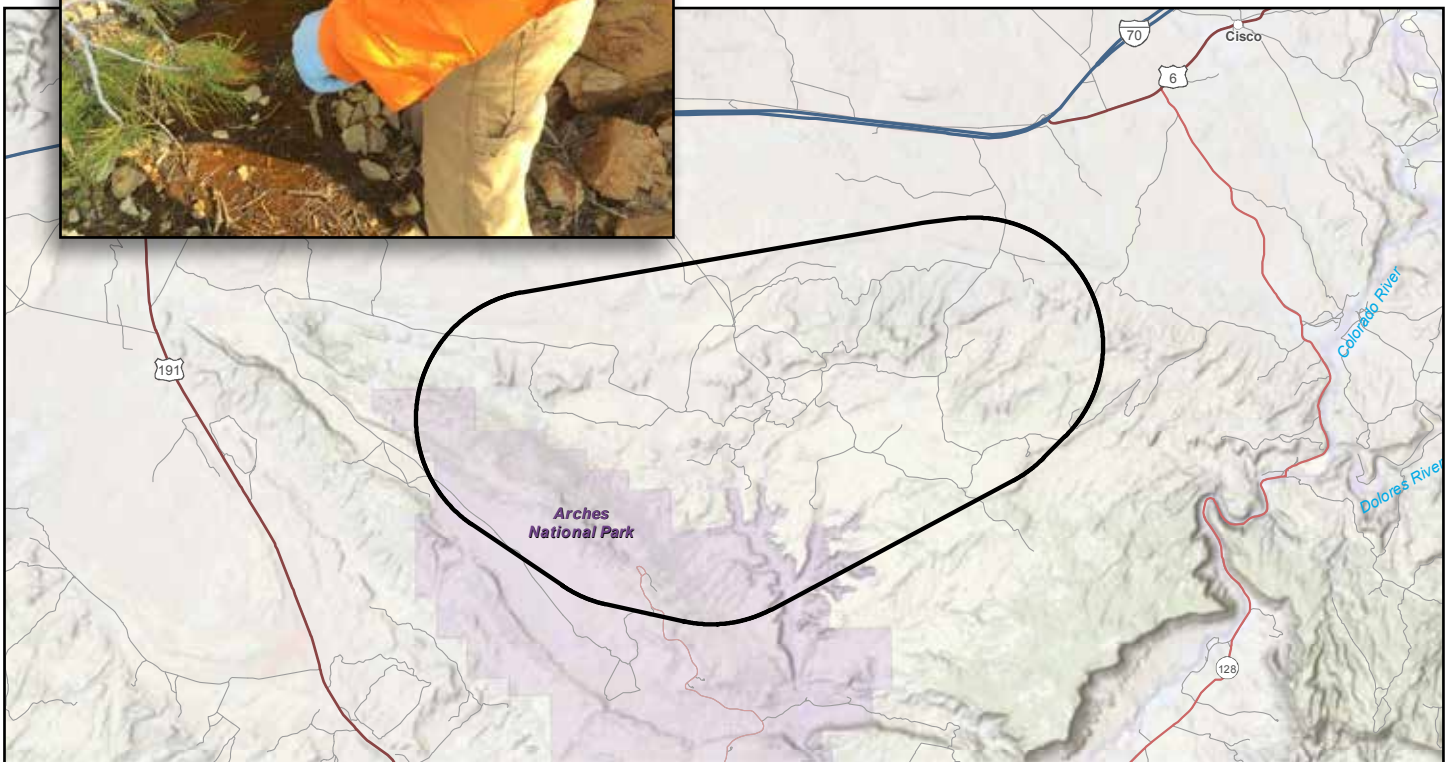
Status of DRUM Projects (continued)



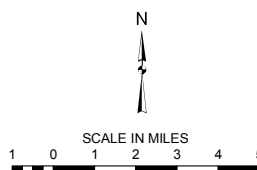
Thompson Area (Yellow Cat District) Project

This project was located in the east-central edge of Utah. Uranium in this district tends to be concentrated around fossilized vegetation debris deposits. Most of these mines are small and shallow underground workings. This project covered 61 mines in the Yellow Cat District of the Thompson Area north of Arches National Park. Fifty-eight mines are on land administered by the BLM Moab Field Office, and three mines are on School and Institutional Trust Lands Administration land. Our DRUM team completed V&V at mines on federal public land, and Utah AMRP performed inventory activities at mines on state land.

Telluride Mine adit, Yellowcat District, Utah, BLM-administered land.



LEGEND	
	Location of Mines Inventoried in 2017
	Interstate Highway
	U.S. Highway
	State Highway
	Other Road
	Local Road
	City or Town
	National Park



U.S. DEPARTMENT OF ENERGY OFFICE OF LEGACY MANAGEMENT	Work Performed by Navarro Research & Engineering, Inc. Under DOE Contract Number DE-LM0000421
	Location of Defense-Related Uranium Mines in Thompson Area Phase I Inventoried in FY2017
DATE PREPARED: July 27, 2018	FILE NAME: S1939901

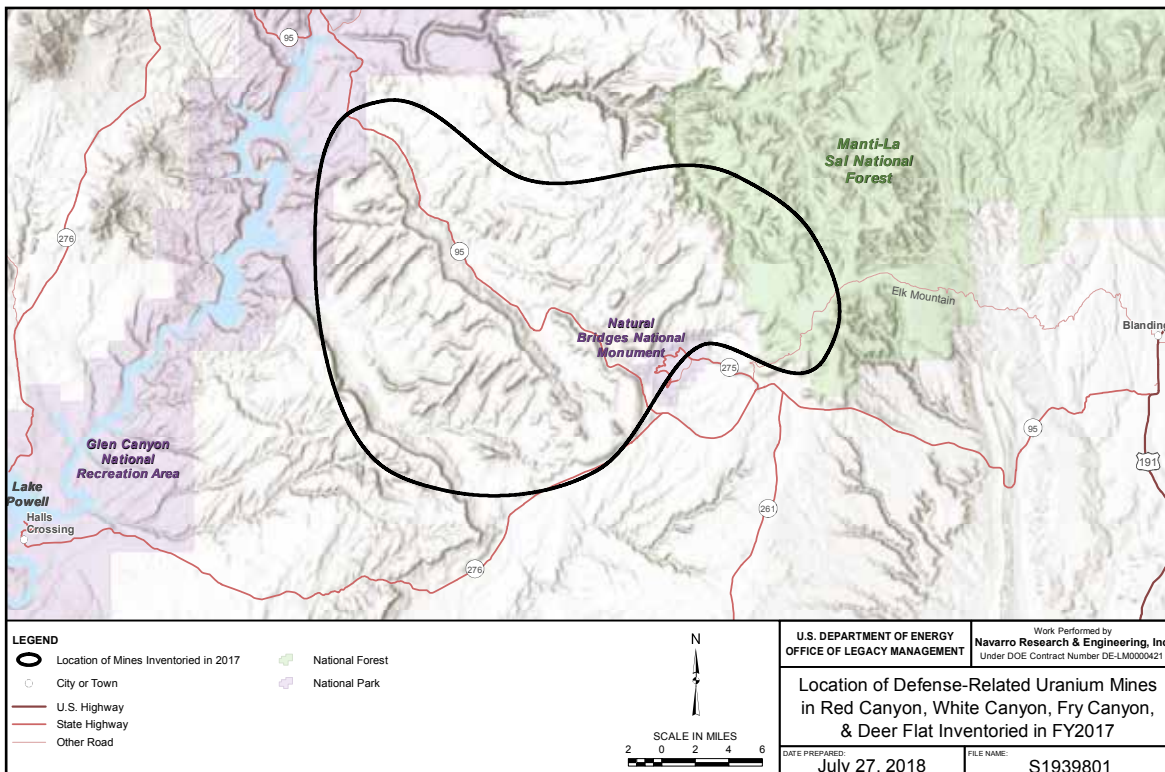
Status of DRUM Projects (continued)

Red, White, Fry Canyons and Deer Flats Districts Project

This ongoing project is forecasted to be completed in FY 2018. It is located in the southeastern corner of Utah. Uranium occurrences in these localities are mainly located in the exposed flanks of mesas. Deposits also contain significant copper and vanadium concentrations. The dominant mining method was underground random room and pillar, but several deposits were mined in open pits. This project covers 76 mines and one former upgrade (concentrator) facility. It includes 66 mines and the former upgrade facility on land administered by the BLM Monticello Field Office, six mines on USFS-administered land, two mines on School and Institutional Trust Lands Administration land, and two mines on mixed-ownership land. Utah AMRP completed inventory activities at mines on BLM-administered and state land. The DRUM team completed V&V at 13 of the 19 total mines in the Red Canyon locality portion of this project in FY 2017.



Marquee Mine overview, White Canyon District, Utah, BLM-administered land.



Program Results

Program Progress Measures

During FY 2017, DRUM teams completed V&V activities on 362 of the 2,500 mine locations scheduled to be evaluated by 2022.

Risk Scoring Assessment

In an effort to create preliminary trending and analysis on DRUM results, an initial sample dataset of 113 mines on federal public land in Colorado and Utah was selected and analyzed to tally up physical hazards and potential chemical and radiological risks posed by the mines. The mines selected included sites where the collection of V&V field data and lab analysis of soil samples were complete and quality checked. We assumed these mines would be accessed for recreational uses, such as camping, so the focus of this analysis was on the primary hazards of physical safety, radiological risk, and chemical risk. However, we also included modifying factors, such as ease of access, that provide additional analysis for the land management agencies in their decision-making priorities.

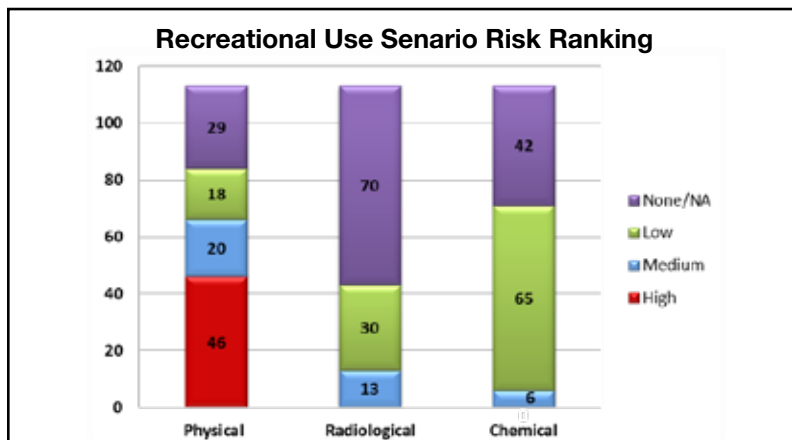


The Risk Scoring Assessment ranking options were high, medium, low, or none/not applicable. The main risks consistently identified at mines are from physical hazards, with the radiological and chemical risks being much less prevalent. The high rankings for physical hazards were mostly open vertical shafts, easily entered, and unstable adits, and large unstable structures associated with historic mining operations.

Over half the mines evaluated produced fewer than 1,000 tons of ore. Approximately 20 percent were very small, producing fewer than 25 tons of ore. No very large mines were represented in this dataset.

There is a general correlation between larger production and physical hazards. However, some smaller mines also had significant physical hazards.

The mines that were more likely to have physical hazards mitigated tended to be the mines that had a larger amount of production. A number of mitigated mines, such as those with closed portals, still present hazards



due to unstable structures, such as large wooden ore bins or chutes. In addition, the integrity of some closures has been compromised, indicating the need for periodic surveillance and maintenance.

The larger production mines generally have better access, are more complex, and present multiple hazards. However, there is no apparent relationship between production volume and the radiological or chemical risk ranking.

Program Results (continued)

When we extrapolate this dataset to the rest of the sites that have completed V&V in 2017, the main risks associated with mines are physical safety hazards. The radiological and chemical risks are much lower based on the recreational use exposure scenario. The key takeaways are as follows:

- 47 of the evaluated mines ranked low or none for physical hazards; 100 ranked low or none for radiological hazards; and 107 ranked low or none for chemical risks. These mines may be candidates for no further action by the land management agencies.
- 66 of the mines ranked high or medium for physical safety hazards and could require some action by the land management agencies.
- 19 mines ranked medium for chemical and/or radiological risks. When modifying factors, such as site access or camping suitability, are taken into consideration, land management agencies may need further study.
- No mines ranked high for either chemical or radiological risks.



Uracop 3 Mine adit with sloughing in portal, Red, White and Fry Canyons and Deer Flat Districts, Utah, BLM-administered public land.

Program Results (continued)

In conclusion, this analysis shows trends similar to those observed by the land management agencies and private industry. The main risk driver continues to be physical hazards that are immediate threats to humans and wildlife.



Left: Yellow Circle unstable ore bin, Moab District, Utah, BLM-administered land. Top right: open mine adit. Bottom right: closed mine adit.



Defense-Related Uranium Mines program site tour, DOE and BLM partners, southwest Colorado.

Acronym List

AEC	U.S. Atomic Energy Commission
AML	abandoned mine lands
AMRP	Abandoned Mine Reclamation Program
BLM	U.S. Bureau of Land Management
CDRMS	Colorado Division of Mining Reclamation and Safety
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DRUM	defense-related uranium mine
EPA	U.S. Environmental Protection Agency
FOP	Field Operations Plan
LM	DOE Office of Legacy Management
LMS	LM Support contractor
ULP	Uranium Leasing Program
USFS	U.S. Forest Service
V&V	verify and validate



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

**Defense-Related
Uranium Mines FY 2017
Annual Report**

<https://energy.gov/lm>