TEN-YEAR PLAN

Federal Actions to Address Impacts of Uranium Contamination on the Navajo Nation

DRAFT

2020-2029

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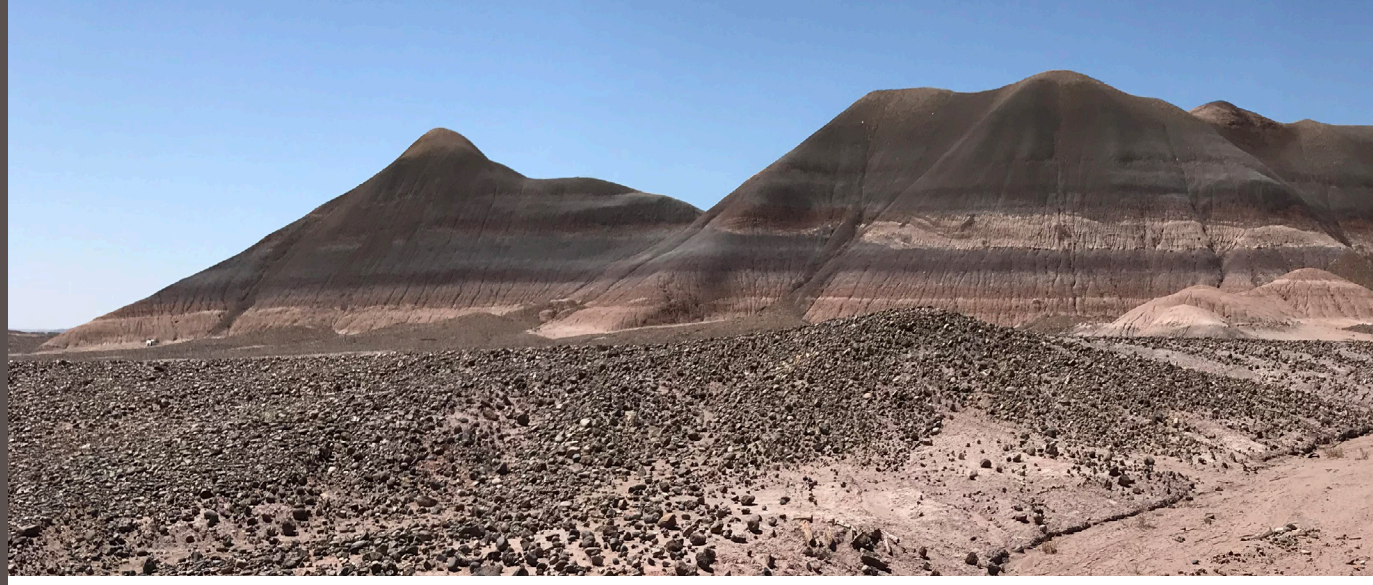
EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

The federal government continues to address the legacy of uranium contamination on the Navajo Nation. This Ten-Year Plan builds on the work of the two previous Five-Year Plans (2008-2012 and 2014-2018), including the Tronox Addendum to the 2014-2018 Five-Year Plan. This plan makes adjustments based on information gained during the previous Five-Year Plans and identifies the next steps in addressing the human health and environmental risks associated with the legacy of uranium mining on the Navajo Nation.

The Navajo Nation is actively engaged in all aspects of this work, and the accomplishments would not be possible without the involvement of the Navajo Nation Office of the President and Vice President, Navajo Nation Council, Navajo Nation Environmental Protection Agency (NNEPA), Navajo Nation Abandoned Mine Lands Reclamation Program (Navajo AML), Navajo Nation Uranium Mill Tailings Remedial Action Department (UMTRA), Navajo Nation Department of Health (NNDOH), Navajo Department of Justice, Chapter officials, community members, and other organizations.

The following federal partners will work with the Navajo Nation to implement this plan: the Environmental Protection Agency (EPA), Department of Energy (DOE), Nuclear Regulatory Commission (NRC), Department of Interior's Bureau of Indian Affairs (BIA), Department of Health and Human Services (IHS), Agency for Toxic Substances and Disease Registry (ATSDR), National Institute of Health (NIH), and Centers for Disease Control and Prevention (CDC). While the past 10 years represent a significant start in addressing the legacy of uranium mining and milling on the Navajo Nation, much more work remains.

SUMMARY OF GOALS FOR THE NEXT TEN YEARS

Abandoned Uranium Mines

Complete assessments at 230 mine sites and complete cleanup plans/ designs at the 46 priority mine sites.
Help to build institutional capacity for the Navajo Nation

Former Mills

Continue long-term groundwater remediation, monitoring, surveillance, and maintenance activities for Shiprock, Tuba City, Monument Valley, and Mexican Hat.

Contaminated Structures

Assess and scan structures in the six abandoned uranium mine regions and refer those with elevated levels of radiation to EPA for follow-up actions.

Water

EPA will continue assessing the San Mateo Creek Basin and conduct water studies at the Claim 28 mine, the Northeast Church Rock / Quivira mining complex, and the Saytah/George Simpson 1 Incline mine to be funded by the US/Navajo Phase 2 settlement.

Drinking Water

IHS and EPA will continue to increase access to safe drinking water in the abandoned uranium mine regions of the Navajo Nation by funding high-ranking water infrastructure projects with available funds.

Health

IHS will continue to provide community-based services, radiation exposure screening and education program services, collaborate with NNDOH epidemiology program, and coordinate training with ATSDR to clinicians and health care providers on non-occupational exposure to uranium.

Community Involvement

Expand community outreach through increased communication and coordination about uranium related issues. Federal partners will coordinate efforts to engage communities in understanding and guiding efforts related to uranium exposure on the Navajo Nation.

Workforce Development

Through contracts, grants and training build the capacity of Navajo Nation workforce and businesses to perform investigation and cleanup work at mine sites".

EXECUTIVE SUMMARY

SUMMARY OF ACCOMPLISHMENTS (2008 – 2019)

Protecting Human Health and the Environment at Abandoned Uranium Mines and Former Uranium Ore Processing Mill Sites

523
Mines completed preliminary site screens

113
Mines assessed to determine amount and extent of contamination, if any.

4
Ongoing Site Remediations conducted at former uranium mill sites including groundwater cleanup at multiple sites and disposal cell long-term surveillance and monitoring.

4
Mill Site Analyses used technical applications such as a computer simulated groundwater flow model, radiological assessment of stained soils, and installation of meteorological weather stations.

230
Mines funded through enforcement agreements and settlements valued at $1.7 billion
and

11
Mines have an Engineering Evaluation/Cost Analysis, one has been completed and ten are in review.

1 **Design Plan** completed for Northeast Church Rock mine cleanup.

11 **Million Dollars** completed for Northeast Church Rock mine cleanup.

Addressing Water Issues and Contaminated Structures

3809
Homes provided access to piped water in the six abandoned uranium mine regions.

1
Watershed Assessment completed in the Cove Wash area, which contains 42 abandoned uranium mines.

2
Water studies obtained funding through U.S./Navajo Phase 2 settlement, including Claim 28.

1100+
Structures assessed for contamination ***and***

50+
Structures were remediated.

Conducting Health Studies and Coordinating Outreach and Education

740
Mother-infant pairs participated in the Birth Cohort Study to identify health outcomes in a population exposure to uranium.

90
Community Health Representatives trained by the Navajo Nation Department of Health.

15
Chapters with completed Community Involvement Plans that cover 193 abandoned uranium mine sites.

20+
Outreach events organized by the interagency Community Outreach Network to enhance community understanding of the multi-agencies work to address uranium contamination on the Navajo Nation.

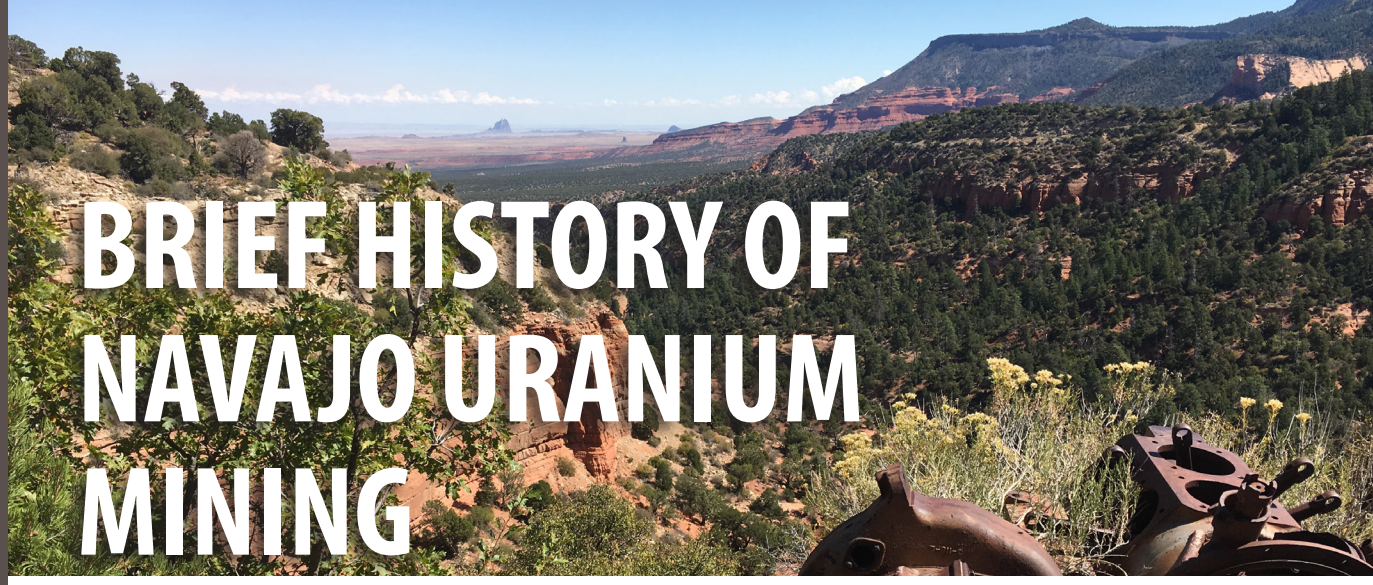
Providing Economic Opportunities

8
Navajo Owned Businesses received grants or contracts to contribute to the work.

200+
Jobs provided to Navajo members.

30+
Internships provided to study impacts of uranium issues.

HISTORY



BRIEF HISTORY OF NAVAJO URANIUM MINING

The Navajo Nation encompasses more than 27,000 square miles in the Four Corners area of Arizona (AZ), New Mexico (NM), and Utah (UT). The unique geology of the region renders the Navajo Nation rich in uranium, a radioactive ore in high demand after the development of atomic power and weapons at the close of World War II in the 1940s. Approximately 30 million tons of uranium ore was extracted during mining operations on or near the Navajo Nation from 1944 to 1989. The federal Atomic Energy Commission was the sole purchaser of uranium until 1966. The Atomic Energy Commission continued to purchase ore until 1970, although sales to the commercial industry began in 1966. Many Navajo people worked at the mines and mills, often living and raising families nearby.

Uranium mining and milling activities no longer occur on the Navajo Nation, but the legacy of these activities remains, including the presence of abandoned uranium mines, former mill sites, and homes built with mine and mill waste. Elevated uranium and other elements are associated with mine and mill sites, although the same elements also occur naturally at elevated levels in rock, soil, surface water, and groundwater across the Navajo Nation and the broader Four Corners region. Health effects from exposure to these elements can include lung cancer and impaired kidney function.

Among Navajo miners, millers, and their families, the health consequences of uranium mining and milling have been widespread. In 2000, Congress expanded the Radiation Exposure Compensation Act to provide monetary compensation to individuals who had been diagnosed with certain cancers and other serious diseases due to their exposure to radiation while employed in the uranium industry. Over 1,431 claims have been awarded on behalf of Navajo uranium miners, millers, and ore transporters for illnesses tracing to occupational radiation exposure.

At a hearing held in October 2007, representatives of the Navajo Nation delivered testimony before the United States House Committee on Oversight and Government Reform on the impacts of uranium mining and milling on the Navajo Nation. At this hearing, the committee requested that EPA, along with BIA, NRC, DOE, and IHS, develop the first Five-Year Plan (2008-2012) as part of a coordinated effort among federal agencies to address uranium contamination. ATSDR and CDC also contributed to health objectives. The agencies prepared a second Five-Year Plan (2014-2018), building on the work in the previous plan. This Ten-Year Plan (2019-2028) represents the federal government's commitments to continue working with the Navajo Nation to reduce health and environmental risks and find long-term solutions to remaining uranium issues on the Navajo Nation. As with prior plans, the federal agencies conducted government-to-government consultation with the Navajo Nation during the development of this Ten-Year Plan.

TIMELINE

1940s
- Uranium discovered on the Navajo Nation, resulting in mining of more than 30 million tons of ore

1947
- Atomic Energy Commission created, and becomes sole purchaser of uranium ore for defense-related purposes

1950
- A rush to mine uranium begins in many areas of the Navajo Nation

1954
- Shiprock mill begins processing uranium ore

1955
- Monument Valley mill begins processing uranium ore

1956
- Tuba City mill begins processing ore

1957
- Mexican Hat mill begins processing uranium ore and copper

1965
- Mexican Hat mill ceases operation

1966
- Tuba City mill ceases operation
- Atomic Energy Commission announces that it will stop purchasing ore in 1970, and sales to the nuclear power industry begins

1968
- Monument Valley mill ceases operation
- Shiprock mill ceases operation

1970
- Atomic Energy Commission stops purchasing uranium ore, and the nuclear power industry becomes the sole purchaser of milled uranium
- EPA created
- Congress enacts National Environmental Policy Act

1972
- Navajo Environmental Protection Commission created

1974
- Atomic Energy Commission abolished and Energy Research and Development Administration and U.S. NRC created

1975
- NRC created with a mission that includes regulation of nuclear materials

1977
- Energy Research and Development Administration dissolved and DOE created

1978
- Uranium Mill Tailings Radiation Control Act establishes the federal government's requirements for the cleanup of legacy sites and the long-term care and management of legacy and active uranium mill sites

1979
- United Nuclear Corporation's Church Rock uranium mill spills waste into the Puerco River, the largest radioactive spill in U.S. history

1980
- Congress enacts the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund
- ATSDR created to implement health-related sections of laws that protect the public from hazardous wastes

1986
- CERCLA amended to increase focus on human health problems posed by hazardous waste sites and to encourage greater citizen participation in decisions regarding how to clean up sites
- DOE completes surface remediation of the former Shiprock mill and continues to monitor the site

1988
- NNAML created

1989
- Last uranium mine near the Navajo Nation closed

1990
- NNAML begins addressing physical hazards at abandoned uranium mines
- DOE completes remediation of the Tuba City mill and continues to monitor the site
- EPA conducts interim removal actions at five uranium mines in eastern Navajo Nation
- Congress enacts Radiation Exposure Compensation Act

1993
- Congress convenes joint hearing on uranium waste on the Navajo Nation

1994
- EPA investigates mines and conducts an aerial radiation survey in the King Tutt Mesa area of the Red Valley Chapter
- DOE moves contaminated material from the Monument Valley mill to the Mexican Hat disposal cell.

1995
- Navajo Nation Environmental Protection Agency created
- DOE completes remediation of the former Mexican Hat mill site and continues to monitor the site

1997
- EPA develops a three-step process to investigate abandoned uranium mines on the Navajo Nation, including aerial radiation surveys, water sampling, and surveys of potentially contaminated homes.
- DOE conducts aerial radiation survey of 1,144 square miles of the Navajo Nation over a three-year period

1998
- U.S. Army Corps of Engineers begins sampling water sources in areas of abandoned uranium mines and at potentially contaminated

2000
- U.S. Congress expands the Radiation Exposure Compensation Act (RECA)
- Navajo Superfund Program created
- EPA publishes the Navajo Abandoned Uranium Mines Project Atlas
- EPA, NNEPA, and NNAML embark on a project to identify and locate uranium mines on the Navajo Nation, and gather information about the mines and potential impacts

2002
- EPA develops the Abandoned Uranium Mine Project Management Plan in partnership with NNEPA

2007
- EPA publishes the Navajo Abandoned Uranium Mine Screening Assessment Report and Atlas with Geospatial Data
- U.S. House Committee on Oversight and Government Reform convenes hearing on legacy of uranium mining on the Navajo Nation

2008
- Navajo Nation CERCLA statute enacted
- First Five-Year Plan created by EPA, DOE, NRC, BIA, and IHS
- EPA removes waste from Skyline mine that had migrated near homes

2009
- At the Northeast Church Rock mine, 200,000 tons of contaminated material is removed from a residential area and returned to the mine site for safe storage
- EPA filed a claim in the Tronox bankruptcy that yielded $13 million in the initial settlement

2010
- ATSDR initiates the Navajo Birth Cohort Study, first uranium exposure epidemiological study on the Navajo Nation

2014
- Second Five-Year Plan created by EPA, DOE, NRC, BIA, IHS, and CDC/ATSDR
- U.S. Government Accountability Office issues report on the federal government's progress to implement the Five-Year Plan

2015
- Tronox bankruptcy settlement provides $1 billion to clean up more than 50 abandoned uranium mines on or near the Navajo Nation
- Community Outreach Network created by ATSDR, BIA, DOE, EPA, IHS, NRC, NNEPA, NNAML, and NNDOH
- The Navajo Nation approves creation of the Diné Uranium Remediation Advisory Commission
- The Navajo Nation and the United States enter into the Phase 1 Navajo Abandoned Uranium Mine Environmental Response Trust to assess 16 priority mines

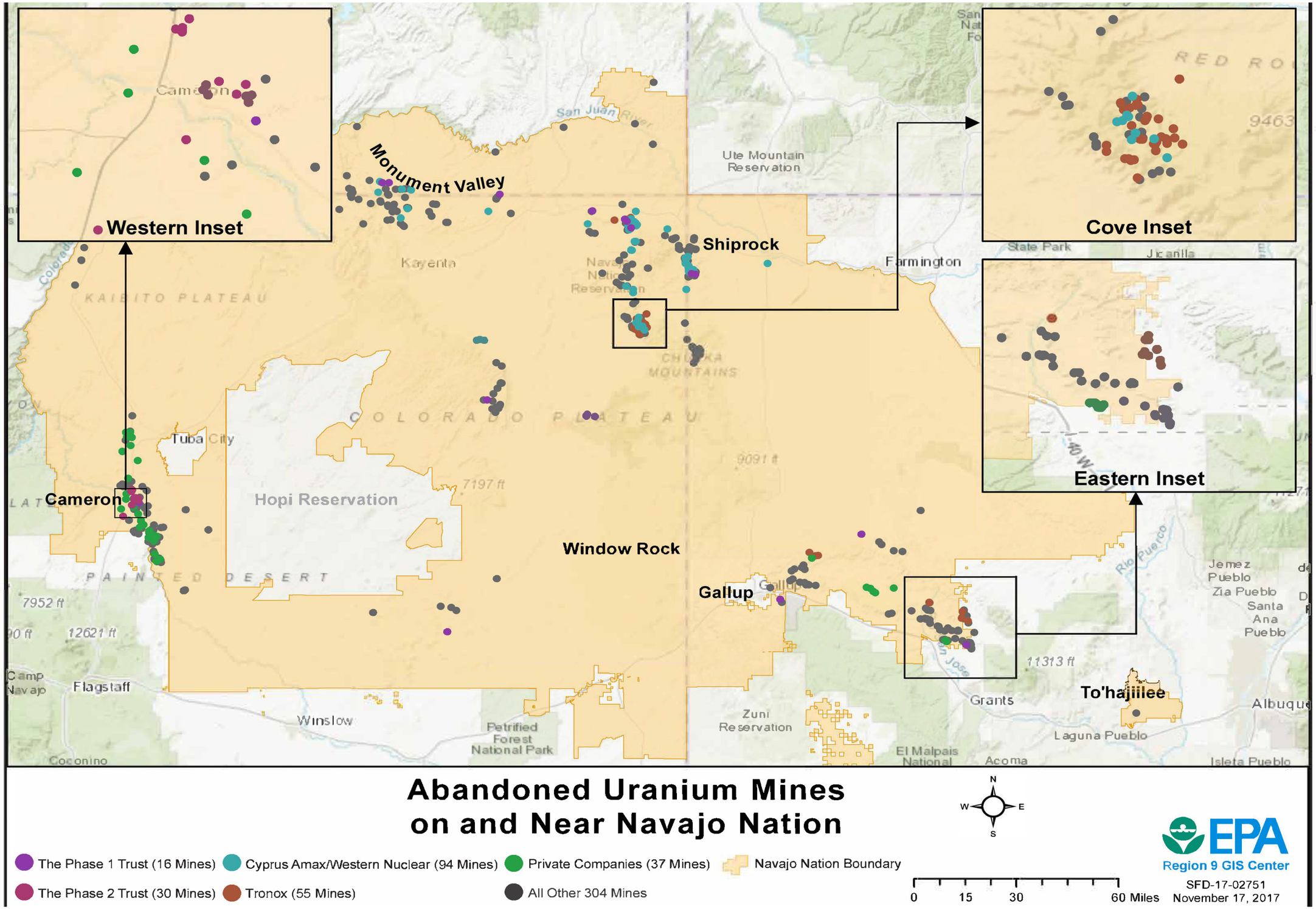
2016
- The Navajo Nation and the United States enter into the Phase 2 Navajo Abandoned Uranium Mine Environmental Response Trust to clean up the 16 priority mines in Phase 1 Trust, assess 30 mines, and conduct two water studies
- DOE completes pilot studies to remediate contaminated groundwater at the former Monument Valley mill
- DOE establishes Community Outreach Office

2017
- United States and the Navajo Nation enter into a settlement agreement with Cyprus Amax and Western Nuclear to clean up 94 mines
- EPA awards first multimillion dollar Tronox contract to a Navajo-owned business
- EPA awards $85 million contract to assess abandoned uranium mine sites on the Navajo Nation

2018
- First meeting of the Diné Uranium Remediation Advisory Commission
- EPA awards a nearly $1 million contract to a Navajo-owned business
- Design of the Northeast Church Rock mine
- The ATSDR-funded Birth Cohort Study was completed; the study has transitioned to the National Institute of Health's Environmental Influences on Child Health Outcomes (ECHO) Program

2019
- EPA completed 85 mines assessments (Removal Site Evaluations) and time-critical actions at nearly 30 mines
- Community Outreach Network began conducting Uranium 101 at Chapter Houses

ABANDONED URANIUM MINES



ABANDONED URANIUM MINES

BACKGROUND

EPA and NNEPA have identified 523 abandoned uranium mines on or near the Navajo Nation, with more than 1,000 mine features such as rim strips, mine openings, and waste piles. This includes 485 abandoned uranium mines on the Navajo Nation and 38 abandoned uranium mines within 1 mile of the Navajo Nation in the neighboring states of New Mexico (30 mines), Arizona (6 mines), and Utah (2 mines). Since 1989, Navajo AML conducted significant reclamation at many of the sites on the Navajo Nation, but their work did not include fully assessing and mitigating risks related to radiation exposure. From 2008 through 2012, EPA conducted screening level assessments of the 523 abandoned uranium mines. Based on these assessments, EPA and NNEPA prioritized 46 mines, including 43 mines with elevated radiation levels near where people live and 3 mines that may affect water resources.

By the end of 2019, detailed assessments were completed at 113 mines, which included 43 priority mines near homes. Involving community members and other interested stakeholders is an important part of the mine assessment and cleanup process. EPA Community Involvement Plans, developed with community input, describe how EPA will provide Navajo Nation community members with accurate, timely, and understandable information that is considerate of their communication preferences and culture. Community Involvement Plans also document how EPA will coordinate with community members and tribal leaders to ensure that EPA understands community concerns and considers community goals in its decision-making process.

The Navajo Abandoned Mine Lands Reclamation Program closed portals like the one shown here at the Charles Keith mine.

In 2016, EPA Community Involvement Coordinator spoke at a community meeting about abandoned uranium mine work progress in the Cove area.

Geoprobe taking soil samples 10 feet below the surface at the Mariano Lake Mine.

ABANDONED URANIUM MINES: SUMMARY OF ACCOMPLISHMENTS (2008 – 2019)

Assessment of Abandoned Uranium Mines with Detailed Assessments of those Most Likely to Pose Environmental or Health Problems

- ✓ EPA and Navajo Nation EPA entered into enforcement agreements and settlements to assess and cleanup 230 of 523 abandoned uranium mines on and near the Navajo Nation and an additional 16 Tronox mine sites in the Grants Mining District of New Mexico.
- ✓ EPA, in coordination with Navajo Nation, completed field work assessments of 113 mines that provide information needed to determine the extent and volume of contamination at these mines.
- ✓ Preliminary assessments and site investigations were completed at seven mine claims located in two watershed areas:
  - Section 9 Lease at the Little Colorado River near Cameron, AZ; and
  - Mesa I Mines 10 through 15 at Cove Wash near Cove, AZ.
- ✓ Additional studies were conducted at Cove mines including water, crop irrigation, and livestock study.

Advancements toward cleanup of the Northeast Church Rock Mine Site and Additional High Priority Abandoned Uranium Mine Sites

- ✓ UNC/GE, under a Settlement Agreement with USEPA, completed the Northeast Church Rock mine cleanup plan (or "remedy") design.
- ✓ UNC/GE submitted License Amendment Request and NRC has initiated their safety and environmental reviews.
- ✓ Time-critical actions at nearly 30 sites were completed, 14 of which are priority mines, to reduce potential risks to human health of residents near the abandoned uranium mines.

REPORT OF FUNDING

EPA and the Navajo Nation have secured funding to assess and cleanup 230 of 523 abandoned uranium mines on or near the Navajo Nation and an additional 16 Tronox mines in the Grants Mining District of New Mexico. This funding is largely derived from a combination of enforcement agreements and settlements valued at over $1.7 billion. This amount includes funding from the United States secured through settlements with the Navajo Nation (Trust Settlements) and through settlements with private companies (Tronox Settlement). On top of this, EPA has consistently invested up to $5 million per year toward investigating and cleaning up contaminated structures and supporting the involvement of Navajo agencies in the assessment and cleanup process. The following table gives an overview of the estimated total budget from all funding sources, approximate number of mines covered by each funding source, and amount spent up until the end of 2019.

NAME OF AGREEMENT	FUNDING SOURCE	EPA ROLE	NUMBER OF MINES	BUDGET	SPENT TO DATE
Tronox Settlement	Bankruptcy Settlement	Lead	55	$1 billion	$41.2 million
Cyprus Amax and Western Nuclear Settlement	U.S. Settlement with Cyprus Amax and Western Nuclear	Oversight	94	$670 million	$7.3 million
Trust Settlements	U.S. Settlement with Navajo Nation	Oversight	46	$21.8 million	$14.3 million
Settlement Agreements with Private Companies	Enforcement Agreements	Oversight	37	To be determined	$9.6 million*
EPA	U.S. Government Appropriation	Lead	5	$4-5 million/yr	$29 million

*This amount only represents EPA's oversight costs to date.

SETTLEMENT AGREEMENTS

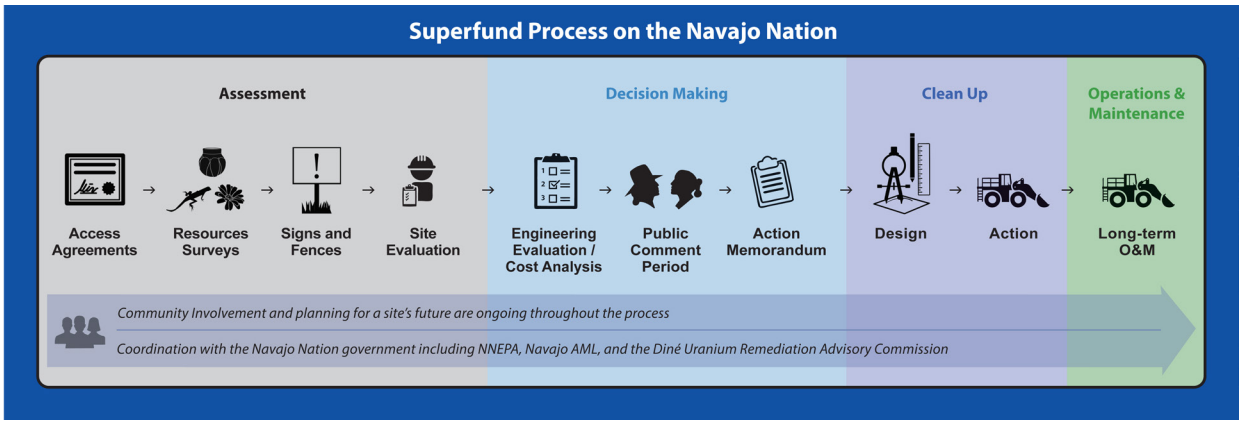
Funding or work commitments to assess and cleanup mine sites are secured through enforcement agreements with potentially responsible parties and settlements with the United States. Such settlements have enabled EPA to leverage a relatively small contribution of federal funding to begin the assessment and cleanup process at 230 of the abandoned uranium mines on and near the Navajo Nation and 16 Tronox mines in the Grants Mining District of New Mexico.

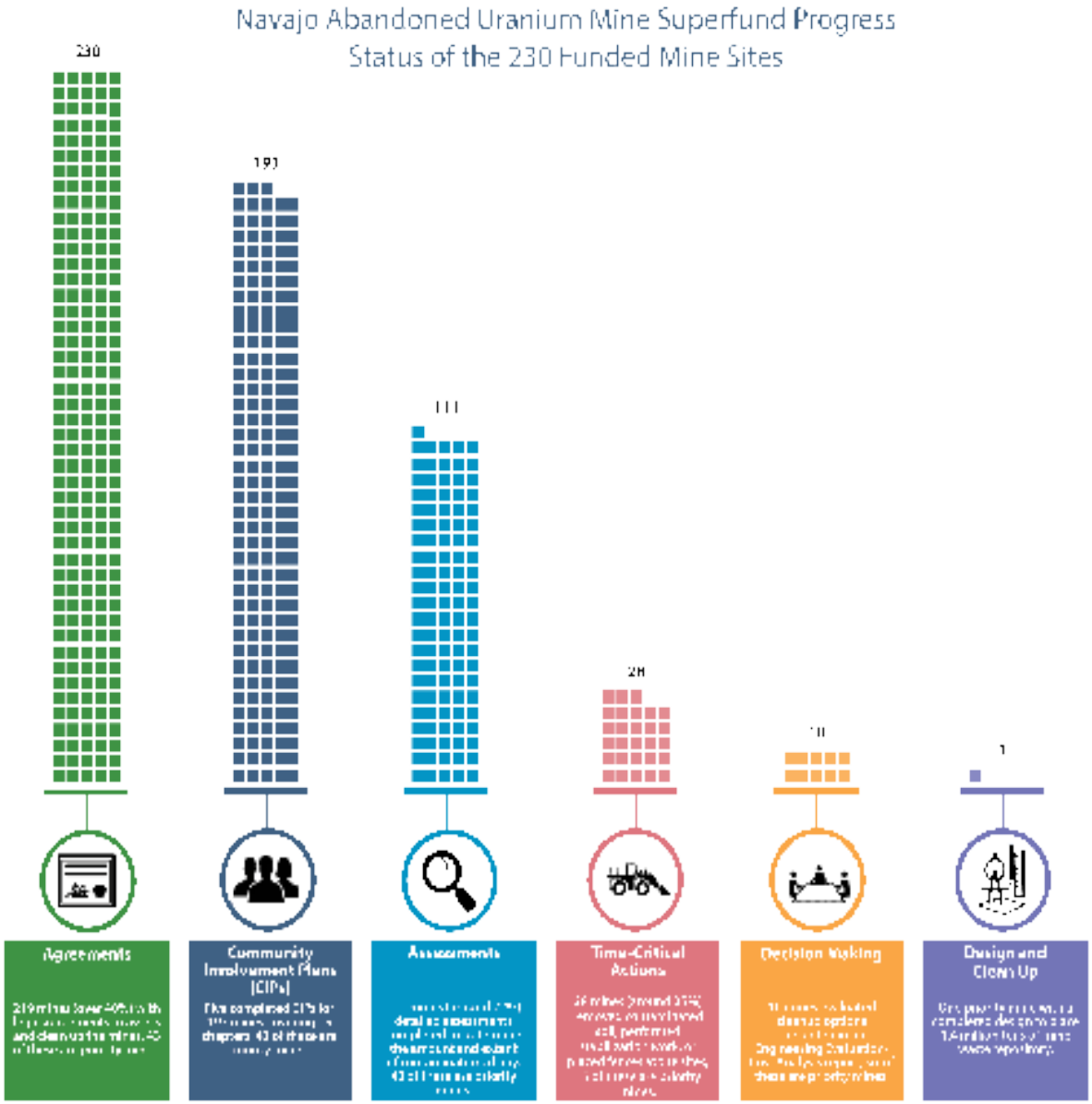
Summary of Enforcement Agreements and Settlements Valued at Over $1.7 Billion

TRONOX SETTLEMENT	When Tronox, a successor to Kerr-McGee, filed for bankruptcy in 2009, EPA and the Navajo Nation, among others, filed claims and received settlements in the bankruptcy. The United States, on behalf of EPA and other agencies, then filed a lawsuit against Anadarko, another successor of Kerr-McGee, seeking additional funding for the abandoned uranium mines. The United States and others involved ultimately achieved a $5 billion national settlement in 2014, of which EPA received almost $900 million for cleanup of more than 50 abandoned uranium mines associated with Kerr-McGee. This includes 16 Tronox mines in the Grant Mining District of New Mexico. In addition, EPA received close to $90 million for the Quivira mine. The Navajo Nation received $44 million. The funds allocated to EPA are mandated by the court to be spent by EPA to address contamination at the abandoned uranium mines listed in the Tronox settlement.
CYPRUS AMAX AND WESTERN NUCLEAR SETTLEMENT	The United States on behalf of EPA and other federal agencies entered into a historic settlement with Cyprus Amax and Western Nuclear in 2017 for the cleanup of 94 abandoned uranium mines on the Navajo Nation. The settlement requires Cyprus Amax and Western Nuclear to perform the work. The United States will pay approximately half of all costs, including EPA and the Navajo Nation Environmental Protection Agency oversight costs, through a trust funded at $335 million. Cyprus Amax and Western Nuclear will fund the other half of the work. This settlement has an estimated value of $600 million.
SETTLEMENT AGREEMENTS WITH PRIVATE COMPANIES (BABBITT RANCHES, BNSF, CHEVRON, EL PASO NATURAL GAS, ENPRO, HOMESTAKE, UNITED NUCLEAR CORPORATION)	EPA has entered into settlement agreements with seven parties to assess contamination or take other removal actions at 37 abandoned uranium mines, and to install interim safety measures such as fencing and signage. EPA intends to enter into additional agreements to clean up the mines, as necessary. EPA funds the Navajo Nation Environmental Protection Agency oversight of these agreements via grants.
PHASE 1 SETTLEMENT AND PHASE 2 SETTLEMENT	The Navajo Nation negotiated with the United States to address the U.S. Atomic Energy Commission's role in developing historical uranium mining on Navajo lands. As a result, the United States and the Navajo Nation entered into two legal agreements (the Phase 1 Settlement in 2015 and the Phase 2 Settlement in 2016) that provide funds to assess and clean up 16 "priority" mines (as needed), assess an additional 30 mines, and conduct two water studies located on the Navajo Nation. The Navajo Nation has selected Navajo trustees to manage the trust funds and do the work under the oversight of EPA and the NNEPA. The United States provided $13.2 million for the Phase 1 settlement, and $8.5 million as the initial payment for the Phase 2 settlement. The agreements also provide for payments of the EPA and the NNEPA oversight costs. Both agencies have received $800,000 as the initial amount for oversight costs.

ABANDONED URANIUM MINE CLEANUP PROGRESS

EPA is addressing abandoned uranium mines on the Navajo Nation through EPA's Superfund program in partnership with NNEPA's Superfund program. This section provides an outline of the Superfund process and the status of work performed at the 523 abandoned uranium mines on or near the Navajo Nation, including the 46 priority mines.





COMMUNITY INVOLVEMENT

The EPA Superfund Program places a high value on public participation during investigation and cleanup of abandoned uranium mine sites. EPA believes that allowing communities to have a voice in the decision-making process often leads to better environmental results.

The Community Involvement Coordinators (CIC) in the Superfund Division are the conduit between Navajo communities and technical staff working on abandoned uranium mine projects on the Navajo Nation. Working in coordination with NNEPA, CICs are assigned to specific projects to assist communities in their interaction with EPA and ensure that technical staff are aware of issues that concern the public in relation to the work EPA is doing. As liaisons between the community and technical staff, CICs provide opportunities for two-way communication throughout the life of a remediation project.

During the past five years, EPA has implemented several significant steps aimed at meeting the following objectives:

- Provide Navajo communities with accurate, timely, and understandable updates about EPA's assessment and cleanup activities;
- Educate Navajo communities about the Superfund process and translate risk assessment and technical aspects of the cleanup process in the Navajo language;
- Relay questions and concerns expressed by community members and local leaders for EPA to consider in its decision-making process, including those related to reuse goals;
- Develop fact sheets, flyers, and other communication tools related to site work;
- Work with potential responsible parties and other entities that are lead for cleanup to assist in communication and coordination between those entities, agencies, and community members;
- Facilitate engagement with the Navajo Nation government; and
- Support NNEPA's goal of implementing Diné Fundamental Law and consideration of the Navajo traditional lifeway, traditional ecological knowledge, and laws of nature in the cleanup process.

In 2017, EPA Community Involvement Coordinator discusses past mining activity and abandoned uranium mine concerns with a community member, the information is captured in a Community Involvement Plan.

In 2015, EPA hired two CICs with extensive knowledge of working with rural Navajo communities. These CICs are from the Navajo Nation and are fluent in the Navajo language. Last year, the two CICs were reassigned to work out of offices in Window Rock and Flagstaff, Arizona. This has given EPA consistent presence on the Navajo Nation and significantly strengthened EPA's understanding of community concerns, interests, and Navajo lifeways and EPA's ability to work with the Navajo Nation government. The CICs are able to communicate effectively about the abandoned uranium mine work with the communities and convey input from the community members for consideration in the decision-making process.

EPA also develops Community Involvement Plans (CIP) for uranium-impacted communities on the Navajo Nation. The CIP is a tool used to better understand the community, the Navajo culture, and concerns from community members that are obtained through interviews. The CIP outlines specific outreach activities to ensure that information sharing and dialogue regarding EPA's activities in that community is participatory and meaningful. To date, EPA has finalized five CIPs for 193 of the mine sites, encompassing 15 Chapters.

In 2018, Community Involvement Coordinator held a Tachee- Blue Gap meeting to inform residents of the abandoned uranium mine cleanup progress.

ASSESSMENTS

From 2008 through 2012, EPA and NNEPA conducted screening level assessments of 523 abandoned uranium mines (AUM). In coordination with the Navajo Nation, EPA developed criteria to prioritize work at AUMs based on the level of radiation and proximity to homes and sensitive environments. This screening-level assessment led EPA to focus initial efforts on conducting detailed assessments referred to as removal site evaluations at 46 mine sites (referred to as "priority mine sites").

The purpose of a removal site evaluation is to determine the extent and volume of contaminated material as a result of historical mining activities. This assessment includes collection of data related to historical mining activities, obtaining access agreements, conducting biological and cultural surveys, and implementing interim actions where needed to prevent radiation exposure (e.g., posting signs, fencing around the mine site, and covering contaminated soil). Through settlement agreements, EPA has secured funding and work commitments to perform detailed assessments of 230 of the 523 AUMs on or near the Navajo Nation. At the end of 2019, detailed assessments were completed at 113 mine sites, which included 43 priority mine sites.

Cove and Lukachukai Mines

From 1950 to 1967, uranium ore was mined throughout the Lukachukai Mountains in the Cove and Lukachukai Chapters of the Navajo Nation. Uranium ore was stored at two transfer stations in Cove before it was moved to a nearby mill to be processed.

There are over 50 abandoned uranium mines in this area, including four priority mines. The Tronox settlement funds 31 of these mines and the transfer station, and the Cyprus Amax settlement funds nine mines. In 2018, using Tronox funds, EPA completed the field work for detailed assessments at 31 Tronox-funded mines. This included a completed Irrigation and Farm Plot Study, as well as an ongoing livestock study to assess the potential exposure pathways. EPA also partnered with Diné College to conduct a Cove Wash Watershed Assessment.

Diné College Interns conducting Cove Stream Health Survey

Tse Tah Mines Area

From the 1940s to 1960s, uranium ore was mined in the Tse Tah area of the Navajo Nation. Beginning in the 1990s, the Navajo AML Reclamation Program addressed physical hazards at these mines. Funds are available to assess and clean up 31 of the 38 abandoned uranium mines in Tse Tah, 81 percent of the mines in Tse Tah, nine of which are priority mines. Funds to assess and clean up the mines are provided by:

- Two legal settlements between Navajo Nation and the United States for three mines;
- A legal settlement with Cyprus Amax for 27 mines; and
- The Tronox settlement for one mine.

Under the direction of EPA, detailed investigations are complete at three of the mines and will be complete at the other 28 mines by 2020. In 2019, a community liaison was hired for the Tse Tah area to keep residents informed and engaged in the assessment and cleanup progress.

Phase 1 Trustee's team of experts assessing soil samples at Tse Tah abandoned uranium mine.

TIME-CRITICAL ACTIONS

One of EPA's primary goals is to expedite risk reduction through implementation of time-critical actions to control or minimize ongoing threats to human health and the environment in advance of implementing a final remedy at a mine site. During the assessment phase, EPA may determine that a time-critical action is appropriate and will take quick action to respond to an imminent threat of human or ecological exposure and/or prevent further migration of contaminants or further environmental degradation.

To date, time-critical actions have been performed at nearly 30 mine sites, 15 of these are priority mines. This includes posting signs, erecting fences around areas of contamination, stabilizing mine waste with covers, and consolidating mine waste in interim repositories.

El Paso Natural Gas Mines

From the 1950s-1960s, uranium ore was mined by different companies, including El Paso Natural Gas, in the Cameron area of the Navajo Nation. While the Navajo AML program addressed many of the physical hazards associated with these mines, EPA and NNEPA are working to address remaining chemical and radiological hazards that may pose a risk to community members.

In 2013, EPA signed a legal agreement called an Administrative Order on Consent with El Paso Natural Gas to assess 19 abandoned uranium mine sites in the western Navajo Nation, two of these are priority mines. To inform residents of the dangers of being on or near the uranium mines, El Paso Natural Gas conducted a time-critical action to post signs near the mines to minimize the exposure risks. In 2019, the two priority mines had detailed assessments completed.

Some mines may have signs, like this one, located behind the Cameron Trading Post.

Skyline Mine

From 1944 to 1962, uranium ore was mined at the Skyline mine located on top of a mesa in Monument Valley, Utah. As part of regular mining operations, a gondola was used to transport ore from the Skyline mine to the foot of the mesa where it was loaded into trucks for transport. During the late 1990s, portions of the Skyline mine on top of the mesa were closed by the Navajo AML program. Due to the steep terrain, residual mine waste at the eastern edge of the mesa and the bottom of the mesa were not removed during mine closure activities.

EPA has not been able to identify a potentially responsible party but because this is one of the 46 priority mines, EPA has performed interim cleanup actions to minimize exposure to contamination. In 2011, 25,072 cubic yards of uranium mine waste and contaminated soils were excavated and transferred to the on-site repository. In 2018, under an EPA grant, Navajo Nation AML took actions to address erosion issues at the on-site repository.

In 2011, EPA conducted an interim action at the Skyline mine to remove uranium waste and transfer to an on-site repository.

DECISION MAKING

The next step after the assessment phase is completed is to make decisions that include an evaluation of cleanup options. Evaluation findings are summarized in an Engineering Evaluation/Cost Analysis. In partnership with government partners, including NNEPA, EPA uses the Engineering Evaluation/Cost Analysis to evaluate and select a preferred cleanup option. EPA presents the Engineering Evaluation/Cost Analysis and preferred cleanup option to the community during a public meeting, which is followed by a public comment period. EPA uses this additional feedback from the community to select a cleanup option and issue an Action Memorandum, which documents and reserves funding for the decision. The Action Memorandum includes a response to the public comments received at the public meeting or submitted in writing during the comment period. In addition to the public comment period, a formal consultation with the Navajo Nation takes place presenting and receiving input on the preferred alternative.

In 2009, EPA completed the first Engineering Evaluation/Cost Analysis report at the Northeast Church Rock mines. In 2019, four more Engineering Evaluation/Cost Analysis draft reports were completed covering a total nine mines at Mac and Black Jack, Quivira, Mariano Lake, and Ruby Mines. Six of these mines are priority mines.

Mac and Black Jack Mines

From 1959 to 1971, uranium ore was mined at the four Mac and Black Jack Mines located in the Mariano Lake and Smith Lake Chapters. In 2014, Homestake Mining Company entered into a settlement agreement with EPA to assess four abandoned uranium mines, two of which are priority mines.

In 2018, the removal site evaluation reports, which determine the extent of contamination on the four mines, were completed. Homestake is conducting an Engineering Evaluation/Cost Analysis to identify and evaluate all potential cleanup options, and a draft was submitted to EPA in 2019. Cleanup options will include consolidating mine waste in an on-site repository and transporting mine waste to an off-site licensed disposal facility.

Before and after photos of hazards mitigation work by iina' ba' at Black Jack #1 Mine completed in 2018.

Ruby Mines

From 1975 to 1985, uranium ore was mined at the four Ruby Mines located in the Smith Lake Chapter in the eastern area of the Navajo Nation. In 1985, Western Nuclear, Inc. (Western Nuclear) completed reclamation efforts at the Ruby Mines by covering the waste rock with clean soil under the direction of the Bureau of Land Management and BIA.

In 2015, Western Nuclear, the potentially responsible party, completed removal site evaluations defining the extent of contamination at the four mines, two of these are priority mines. In 2016, Western Nuclear, entered into a settlement agreement with EPA to perform an Engineering Evaluation/Cost Analysis report that is part of the decision-making process to evaluate potential cleanup options for the mine sites. Western Nuclear is working with other potentially responsible parties of nearby abandoned uranium mine sites, Chevron and Homestake, to evaluate cleanup alternative options of combining the waste from all the mines in one repository.

DESIGN AND CLEAN UP

At this point in the Superfund process, EPA or the potentially responsible party can begin the design and construction of cleanup on the mine site. As early in the process as possible, EPA works with government partners including NNEPA and BIA, as well as the impacted communities to return sites to productive uses. The community is informed of any planned work, truck traffic, and health and safety precautions. After EPA determines that the physical construction at a site is complete, activities are put in place to ensure that the cleanup actions will protect human health and the environment over the long-term. For example, these activities may include routine maintenance at the site, such as making sure signs and fences are intact or repositories are effectively containing, and preventing exposure to mine waste rock. In 2018, the design of the Northeast Chruch Rock cleanup was completed and approved by EPA for submission to NRC as part of a license amendment request.

Northeast Church Rock

The Northeast Church Rock mine was one of the highest producing uranium mines on the Navajo Nation and became the highest priority for cleanup because it is near a Navajo residential community. Uranium ore from the Northeast Church Rock mine and the Old Church Rock mine was milled at the adjacent United Nuclear Corporation (UNC) mill. UNC operated the uranium mill from 1977 to 1982. The mill, designed to process 4,000 tons of ore per day, extracted uranium by application of conventional crushing, grinding, and acid-leach solvent extraction methods.

UNC, a company owned by the General Electric Company (GE), is responsible for cleaning up the Northeast Church Rock mine, a priority mine, and reclaiming the UNC mill site. UNC/GE has moved more than 200,000 tons of contaminated soil from within the residential community to the mine waste pile, which is temporarily covered and stabilized. On September 24, 2018, UNC/GE completed a design to place approximately 1 million cubic yards of mine waste in a permanent repository on the former UNC Mill site. In 2018, UNC/GE submitted a UNC Mill site License Amendment Request to NRC to place the mine waste on the mill waste disposal cell. After completing a review of the License Amendment Request for completeness, NRC held a public scoping meeting in Gallup in March 2019 to get stakeholder input on the Environmental Impact Statement it is preparing in support of its review of the License Amendment Request. Several agencies, including NNEPA, New Mexico Environment Department, DOE, NRC, EPA Regions 6 and 9, and a representative from Red Water Pond Road Community Association assisted by a representative from EPA's Technical Assistance Services for Communities contractor, were involved in the remedial design of the mine waste repository to ensure that the proposed work does not negatively affect the existing mill waste disposal cell.

The NRC staff estimates completion of the safety and environmental reviews of the License Amendment Request by 2022. Dependent upon NRC approval of the License Amendment Request for the UNC Mill Site, UNC/GE would enter into a consent decree with EPA and begin the transportation and disposal of the mine waste.

UNC/GE is also cleaning up groundwater contamination from the UNC mill site tailing cells, which were filled with the acid-leachate slurry during the milling operation. Water from the slurry has migrated into the subsurface and contaminated water beneath the site. The UNC Mill site was placed on the National Priorities List in 1983 and groundwater remediation is ongoing. Surface remediation has been completed except for two evaporation ponds that are still in use as part of the EPA groundwater cleanup. Groundwater cleanup has been ongoing at the site for more than 30 years. The groundwater contamination is soon to cross over to Navajo Nation on the north end of the mill site boundary.

North East Church Rock cleanup photo circa 2009

GOALS FOR THE NEXT 10 YEARS

EPA will work with NNEPA toward completing the investigation and cleanup at the 230 mine sites where EPA and the Navajo Nation have secured funding or a commitment to perform work. The following table reflects the milestones supporting this goal. These milestones will be reported on annually.

Milestone	Number of Mine Sites by Year*							
	2022	2023	2024	2025	2026	2027	2028	2029
Assessment	84		100					
	46							
EE/CA		30	4		30		50	
	20		26					
Design			30	4		30		50
		20		26				
Cleanup				30	4		30	
			20		26			

Priority mine sites are shown in yellow-shaded rows.

EPA will continue to conduct time-critical response actions at sites found to pose an imminent and substantial endangerment to human health and the environment.

EPA will work with the Navajo Nation to bolster the capacity of Navajo Nation agencies, including NNEPA and Navajo AML, to perform assessments, cleanups, and the long-term operation and maintenance of cleanups at abandoned uranium mine sites. Milestones supporting this goal are listed below and will be updated and reported on annually.

- By 2022, develop a plan, including an implementation schedule, for expanding NNEPA's role in overseeing and conducting the assessment and cleanup of mine sites.
- By 2024, develop a plan, including an implementation schedule, for Navajo Nation agencies to implement long-term operation and maintenance measures at mine sites.
- Once finalized, these plans will be appended to this Ten-Year Plan.

USEPA and NNEPA tour to Hoskie Tso #1 Site tour, Indian Wells , AZ. Summer 2019.

EPA will continue to involve communities and Chapter officials in the assessment and cleanup process to ensure that EPA understands community concerns and considers community goals in the CERCLA decision-making process.

EPA will continue to coordinate closely with the Navajo Nation to ensure that the Navajo Nation government is consulted and that traditional ecological knowledge and Diné Fundamental Law is incorporated in the CERCLA decision-making process.

EPA will work with the Navajo Nation to develop an approach for implementing long-term operation and maintenance measures at mine sites, including roles and responsibilities, to ensure that the selected cleanup options remain protective of human health and the environment.

EPA will continue to work with the Navajo Nation and federal partner agencies to find additional sources of funding and/or support to complete detailed assessments at the approximately 300 abandoned uranium mines that are not presently funded under existing settlement or enforcement agreements.

EPA will continue to explore avenues for EPA to have a greater field presence on and near the Navajo Nation to effectively implement and support the goals described in this plan.

URANIUM MILL TAILINGS RADIATION CONTROL ACT (UMTRCA) SITES

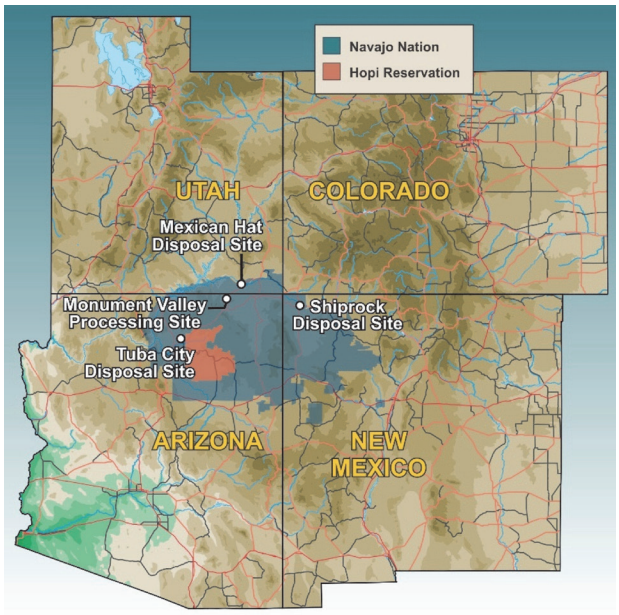
BACKGROUND

DOE Office of Legacy Management (DOE-LM) is responsible for long-term surveillance and maintenance of four former uranium-ore-processing mill sites within the Navajo Nation: (1) Mexican Hat, UT, Disposal Site; (2) Monument Valley, AZ, Former Processing Site; (3) Shiprock, NM, Disposal Site; and (4) Tuba City, AZ, Disposal Site.

DOE-LM remediated the four sites according to standards developed by EPA. After closure of the processing mills, DOE-LM placed radioactive tailings in NRC-approved engineered disposal cells. NRC has formal regulatory responsibility over DOE's long-term stewardship responsibilities at the three disposal sites on the Navajo Nation that have been transferred to DOE-LM under an NRC general license and the former mill site in Monument Valley.

As part of its long-term stewardship responsibilities, DOE-LM maintains and monitors disposal sites at three sites on the Navajo Nation—Mexican Hat, Shiprock, and Tuba City—to ensure they remain protective of human health and the environment. DOE-LM monitors groundwater and surface water at all four former mill sites and conducts routine maintenance activities such as repairing signs and fences, managing vegetation on the disposal cells, and repairing erosion damage that may threaten access to the disposal cells and property within the long-term care boundary. DOE-LM also performs active remediation of groundwater at the Shiprock and Tuba City sites.

NRC has regulatory authority for at the former mill and disposal sites on the Navajo Nation that have been transferred to DOE-LM. NRC reviews and provides comments on reports developed by DOE-LM regarding the sites, conducts inspections of the sites in conjunction with DOE-LM, and provides regulatory review of DOE-LM implementation of the Long-Term Surveillance Plan and groundwater Compliance Action Plan, as appropriate. If DOE-LM revises the Long-Term Surveillance Plan or Groundwater Compliance Action Plan for the sites, NRC will review and, as appropriate, provide comments and concur on the revision before DOE implements the plan.



Locations of the four former uranium-ore-processing mill sites within the Navajo Nation.

In conjunction with NRC's formal regulatory authority, DOE-LM also engages directly with the Navajo Nation and the Hopi Tribe, both of whom review and comment on DOE-LM documents and work plans. DOE-LM works in consultation with the Navajo Nation Division of Natural Resources and the Hopi Tribe,

both of whom participate in long-term surveillance and monitoring, groundwater compliance, and public participation at the four DOE-LM sites. The Navajo AML/UMTRA Department engages directly with NNEPA to facilitate in those reviews; however, NNEPA does not possess regulatory oversight or authority over DOE-LM because that function exists with NRC. DOE-LM conducts community outreach by organizing open houses and site tours and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.

DOE-LM remains committed to increasing outreach activities to tribal communities that have been affected by uranium. This commitment includes funding for a Community Outreach Network Liaison position and maintaining an office in the Navajo Nation capitol city, Window Rock, AZ. The office supplies a touch-down space for Network members to work while they are in Window Rock and serves as a centralized resource for uranium information for the public. Both the Network liaison and office have been key in raising the awareness of the collaborative efforts of the Network. For a more detailed list of outreach activities, please see pages 34-37.

Former Mills: Summary of Accomplishments (2008 – 2019)

Protection of Human Health and the Environment at Former Uranium Processing Sites

- ✓ DOE conducted annual inspections and performed routine maintenance at the four UMTRCA sites.
- ✓ DOE performed groundwater restoration at two former mill sites: Shiprock, New Mexico and Tuba City, AZ.
- ✓ NRC provided regulatory oversight of DOE including inspections at the former mill sites and reviewing and commenting on DOE reports and workplans.
- ✓ DOE worked with the Navajo Nation to create and implement an outreach and communication plan. NRC participated in community outreach and quarterly DOE/Navajo/Hopi coordination meetings.

REPORT OF FUNDING

Actual costs of activities regarding the four former uranium-ore-processing mill sites within the Navajo Nation and the Window Rock Community Outreach Office (not including NRC oversight costs) were:

2017: $3.9 million **2016:** $3.5 million

DOE engages with students on a groundwater model

FORMER MILLS PROGRESS

This section summarizes activities, accomplishments, funding, and goals pertaining to the Tuba City, Monument Valley, Mexican Hat, and Shiprock sites.

Tuba City Site

Site Remediation

- **1989:** Surface remediation and construction of engineered disposal cell completed.
- **1990-2018:** Disposal cell long-term surveillance and monitoring.
- **2002-2014:** Operation of the groundwater treatment plant.
- **2014-2018:** Treatment of groundwater by extraction and evaporation.

Public Outreach

- **2008-2018:** Increased community outreach via community open houses and site tours, information booths at community events, and informational materials.

Technical Work

- **2016-2018:** Application of a computer-simulated groundwater flow model to identify potential groundwater movement.
- **2017-2019:** Evaluation of aquifer characteristics and geochemical properties affecting contaminant migration. Evaluation of enhanced evaporation methods.
- Establishment of a Technical Working Group with the Navajo Nation and Hopi Tribe.

Regulatory Compliance

- Groundwater monitoring and analysis in accordance with existing monitoring plans, with results published on public DOE-LM website.

Monument Valley Site

Site Remediation

- **1998-2016:** Conducted phytoremediation and groundwater injection pilot studies to develop potential site groundwater remediation options**.**
- **1994-2018:** Long-term groundwater monitoring and maintenance following surface remediation at the site.

Public Outreach

- **2008-2018:** Increased community outreach via community open houses, door to door notifications, and outreach coordination with Navajo AML/UMTRA Program Department at community events and annual fairs.

Technical Work

- **2009-2010:** Completion of Radiological Assessment of Stained Soils at the Monument Valley Processing Site.
- **2016:** Completion and issuance of final pilot study titled "Monitored Natural and Enhanced Attenuation of the Alluvial Aquifer and Subpile Soils at the Monument Valley, Arizona, Processing Site: Final Pilot Study Report."
- **2015-2017:** Completion with the University of Arizona of pilot study of in situ biosequestration for remediation of uranium in alluvial groundwater.

In 2016, Site Ecologist discusses previous research at the Monument Valley former processing site during a site visit.

Regulatory Compliance

- **1994-Present:** Groundwater monitoring and analysis in accordance with existing monitoring plans, with results published on public DOE-LM website.

Mexican Hat Site

Site Remediation

- **2008-2018:** Disposal cell long-term surveillance and monitoring.
- **2008-2018:** Visual monitoring of site groundwater seep locations, although groundwater quantity was not sufficient for sampling.

Public Outreach

- **2008-2018:** Increased public outreach via community open houses, door to door notifications, and community outreach coordination with Navajo AML/UMTRA Department at community events and annual fairs.

Technical Work

- **2016-2017:** Initial Environmental Evaluation of disposal cell with focus on depressions during March 2016 annual site evaluation; draft report titled "Mexican Hat UMTRCA Disposal Cell Northeast Slope Cover Depressions Evaluation Report" submitted to Navajo AML/UMTRA Department for review and comment.

- **2017:** Installation of meteorological weather station, baseline ground-based Light Detection and Ranging survey, and acquisition of global positioning system-grade survey data of settlement plates on top slope of the disposal cell.

Regulatory Compliance

- **2008-2018:** Annual site inspections, inspection of groundwater seeps, and completion of a draft report titled "Seep Monitoring Evaluation Report at the Mexican Hat, Utah, UMTRCA Title I Disposal Site"—all in accordance with the long-term surveillance and monitoring plan.

- Groundwater monitoring and analysis in accordance with existing monitoring plans, with results published on public DOE-LM website.

Shiprock Site

Site Remediation

- **1994-2018:** Disposal cell long-term surveillance and monitoring.

- **2003-2018:** Treatment of groundwater by extraction and evaporation.

Public Outreach

- **2008-2018:** Increased public outreach via community open houses, door to door notifications, and community outreach coordination with Navajo AML/UMTRA Department.

Technical Work

- **2003-2013:** Evaluation of Sampling Optimization with regards to groundwater sampling, and completion of a report titled "Optimization of Sampling at the Shiprock, New Mexico, Site."

- **2006-2018:** Evaluation of phytoremediation as a potential site remediation activity.

- **2011-2017:** Conducted isotopic analysis of groundwater in Many Devils Wash to verify non-mill signature.

- **2017-2018:** Evaluation of Flow Processes in the Shiprock, New Mexico Floodplain with completion of a report titled "Flow Processes in the Floodplain Alluvial Aquifer at Shiprock, New Mexico, Disposal Site."

- **2008-2018:** Evaluation of remediation system performance, with completion of specific trench performance reports and annual performance reports.

Regulatory Compliance

- **2002-2018:** Guidance of current groundwater remediation via the site's Groundwater Compliance Action Plan.

- **2002-2018:** Continued discussions with the Navajo Nation concerning institutional controls for applicable sites (water-drilling and grazing restrictions are the only anticipated institutional controls).

- **2002-2018:** Groundwater monitoring and analysis in accordance with existing monitoring plans, with results published on public DOE-LM website.

- **2008-2018:** Groundwater monitoring and analysis in accordance with existing monitoring plans, with results published on public DOE-LM website.

GOALS FOR THE NEXT 10 YEARS

This section describes short-term (3-year), medium-term (5-year), and long-term (10-year) goals of activities at the Tuba City, Mexican Hat, Monument Valley, and Shiprock sites.

Short Term (3-Year)

Tuba City Site

- Continue further evaluations of contaminant source material and evaluate alternative compliance strategies. Submit a draft Revised Groundwater Compliance Action Plan (GCAP) to stakeholders for review. After consultation with stakeholders and Tribal agencies, submit the revised draft GCAP to NRC for review and concurrence. Address all comments, obtain NRC concurrence, finalize, and implement the revised groundwater compliance strategy. Potential strategies include no remediation (alternate concentration limits, institutional controls, and long-term monitoring) or active remediation (water treatment for aquifer restoration, or for plume containment). If land use or well drilling must be controlled as part of the revised GCAP, negotiate controls with Navajo Nation agencies. Develop methods for ensuring effectiveness of controls.
- Monitor conditions as the revised groundwater compliance strategy is implemented and takes effect.
- Continue community outreach by conducting open houses and site tours, door to door notifications, and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.
- Continue discussions with the Navajo Nation to secure relevant and appropriate institutional controls.

Mexican Hat Site

- Perform targeted cover investigation along the northeast side slope of the disposal cell.
- Understand the cause(s) of depression features observed along the toe and lower portions of the northeast side slope.
- Assess need for corrective actions at the site to address the depression features along the northeast side slope.
- Continue visual observations of seep during annual site inspections.
- Continue community outreach by conducting open houses and site tours, door to door notifications, and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.

Valinda Shirley, Remedial Project Manager, Navajo Superfund Program, measuring gamma radiation at a site in Mexican Water.

- Continue discussions with the Navajo Nation to secure relevant and appropriate institutional controls.

Monument Valley Site

- Submit draft GCAP to NRC after consultation with stakeholders and Navajo agencies.
- Continue discussions with the Navajo Nation to secure durable and enforceable institutional controls.

Shiprock Site

- Continue suspension of active groundwater remediation and continue the evaluation of alternatives for the groundwater remediation system evaporation pond liner.
- Evaluate effectiveness of the current groundwater remediation approach and conduct studies to develop and support future remediation efforts.
- Prepare an Environmental Assessment of options for the evaporation pond.
- Revise the GCAP for the site.
- Conduct site characterization studies to support the drafting of the revised GCAP.
- Submit a draft revised GCAP for tribal partners to for review. After consultation with stakeholders and Tribal agencies, submit the revised draft GCAP to NRC for review and concurrence.
- Begin implementation of revisions to the groundwater compliance strategy to the site, including decommissioning with the existing pond liner and disposal of affected waste material.
- Continue community outreach by conducting open houses and site tours, participation in community events and attendance and Chapter House meetings, and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.
- Continue discussions with the Navajo Nation to secure relevant and appropriate institutional controls.

Medium Term (5-Year)

Tuba City Site

- If the revised compliance strategy is effective and acceptable to stakeholders, and does not include use of the existing groundwater treatment system and evaporation pond, decommission the treatment system and pond.
- If the office and shop buildings are no longer needed to support operation of a groundwater treatment system, possibly repurpose these buildings for community outreach, providing information about site history (mill operation, surface remediation, groundwater remediation, long-term monitoring).
- Continually evaluate effectiveness of the revised groundwater compliance strategy to ensure that regulatory requirements are met.
- Continue community outreach by conducting open houses and site tours, and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.

The Tuba City Disposal Site near Tuba City, AZ.

Mexican Hat Site

- Develop Corrective Action Plan, if needed.
- Obtain Navajo Nation and NRC concurrence on the GCAP.
- Continue visual observations of seep during annual site inspections.

- Continue community outreach by conducting open houses and site tours, and meeting regularly with cooperating agencies and Chapter leaders regarding project updates.
- Continue discussions with the Navajo Nation to secure relevant and appropriate institutional controls.

Shiprock Site

- Complete construction activities to decommission the evaporation pond liner, pending the results of the Environmental Assessment and regulatory approval.
- Continue to implement any revisions to the groundwater remediation compliance strategy described in the revised GCAP.
- Continue community outreach by conducting open houses and site tours, participation in local events, attending Chapter House meetings, door to door notifications, and meeting regularly with cooperating agencies, local stakeholders and Chapter leaders regarding project.

Long Term (10-Year)

Tuba City Site

- Continue long-term groundwater monitoring and continue to use the site for community outreach, if alternate concentration limits and institutional controls compliance strategy continue to be effective.
- Continue operation of remediation system, monitor remediation progress, and evaluate performance. Revise the GCAP, if necessary.
- Continue to engage research facilities such as Savannah River National Laboratory for technical assistance to evaluate DOE-LM's recommendations, not limited to evaluating approaches to remedial action methods.
- Continue community outreach by conducting open houses and site tours, door to door notifications, participate in local events, and meeting regularly with cooperating agencies and Chapter meetings.

Mexican Hat Site

- Implement corrective actions along the northeast side slope, if needed.
- Continue community outreach by conducting open houses and site tours, door to door notifications, and meeting regularly with cooperating agencies, local stakeholders, and Chapter leaders regarding project updates.

The Mexican Hat Disposal Cell with the Hat Rock formation in the background near Mexican Hat and Halchita, UT.

Monument Valley Site

- Continue long-term groundwater monitoring, surveillance, and maintenance activities.
- Investigate research technologies pertaining to groundwater remediation.
- Continue community outreach by conducting open houses and site tours, door to door notifications, and meeting regularly with cooperating agencies, local stakeholders, and Chapter leaders regarding project updates.

Shiprock Site

- Continue long-term groundwater remediation, monitoring, surveillance, and maintenance activities.
- Continue community outreach by conducting open houses and site tours, door to door notifications, and meeting regularly with cooperating agencies, local stakeholders, and Chapter leaders regarding project updates.

NRC'S OVERSIGHT OF DOE-LM'S ACTIVITIES AT THE FORMER MILL SITES

NRC's role at the Navajo Nation sites is oversight of DOE-LM as the general licensee. NRC does not perform specific site management or corrective actions, but ensures that DOE-LM complies with the long-term management plans and requirements pertaining to the sites. In this role, NRC has reviewed and provided comments on DOE-LM groundwater and performance reports regarding the Shiprock and Tuba City sites, and groundwater reports regarding the Monument Valley site. NRC also reviewed and provided comments on other reports developed by DOE-LM to support DOE-LM's management of these sites. For example, NRC reviewed and provided comments to DOE-LM on the Shiprock floodplain model, the Many Devils Wash position paper, and proposed changes to groundwater monitoring at the Shiprock site. Regarding the Tuba City site, NRC staff reviewed and commented on the Interim Treatment Evaluation Plan, draft groundwater flow plan and model, proposed groundwater monitoring locations, enhanced evaporation system, shutdown of the Tuba City treatment system, and DOE-LM's analysis of alternate treatment approaches to address groundwater at the site.

NRC will continue to oversee DOE activities at these sites and to review and provide comments on DOE-LM's groundwater reports regarding the disposal and former mill sites. For example, NRC will review and, if acceptable, concur on the Tuba City and Monument Valley GCAPs when these are developed, and will work with DOE-LM to resolve any issues related to the depressions on the Mexican Hat site cover. NRC will review and, if acceptable, concur on DOE-LM's plans for decommissioning the Shiprock evaporation pond, and will concur on the revised GCAP for the Shiprock site if found acceptable.

CONTAMINATED STRUCTURES

BACKGROUND

Uranium mining or milling waste was used by some residents as building material for their homes. The homes or other structures may also have been contaminated by mined radioactive materials in dust and soil brought into homes on shoes and clothing. If such structures are occupied, residents' health may be at risk from gamma and alpha radiation.

EPA and NNEPA's Contaminated Structures Program evaluates structures on the Navajo Nation that may have been constructed using abandoned mine materials or built on or near abandoned uranium mines.

CONTAMINATED STRUCTURES: SUMMARY OF ACCOMPLISHMENTS (2008-2019)

Assessment and Cleanup of Contaminated Structures

- ✓ Since 2008, the EPA and NNEPA surveyed over 1,500 structures within one mile of an abandoned uranium mine.
- ✓ EPA remediated over 50 structures that were found to pose a health risk.
- ✓ EPA removed contaminated soil from areas outside 18 homesites.

REPORT OF FUNDING

EPA has spent over $20 million assessing structures and performing cleanup when structures were found to pose health risks from mining-related materials. This funding has gone to EPA contractors and to Navajo Nation agencies to support this work. The amount of future funding will depend on the number of assessments and cleanups that will be needed, which is expected to decline.

GOALS FOR THE NEXT 10 YEARS

- Conduct radiological assessments at additional structures beyond one mile of an abandoned uranium mine that meet program criteria to determine if there is a potential health risk to residents, targeting outreach in the six abandoned uranium mine regions.
- Implement removal actions where contaminated structures and surrounding soils are found to pose a risk to residents.
- By 2021, finalize a program manual that includes field procedures for assessment.
- By 2023, the agencies will have a standard data sharing agreement that covers relevant and digital data for the structures program and gives EPA and NNEPA full and equal access to records.
- Work with the Navajo Nation to bolster the capacity of Navajo Nation agencies so that NNEPA can assess homes for the Contaminated Structures Program by 2023, coordinating with EPA as appropriate. The following milestones will need to be achieved prior to NNEPA assessing homes:
    - EPA and NNEPA will need to jointly finish a program manual, including field procedures for assessment;
    - EPA and NNEPA staff will need to complete mutual training on technical and program procedures;
    - EPA and NNEPA will identify dedicated technical and programmatic leads and will need to have sufficient staff resources devoted to the structures program; and
    - NNEPA will need to have access to sufficient contracting support that can implement the field procedures in the program manual.

Contractors, along with EPA and NNEPA, evaluating a yard with radiation-specific instruments and survey equipment. It takes about three hours to evaluate inside and outside the home.

CONTAMINATED STRUCTURES

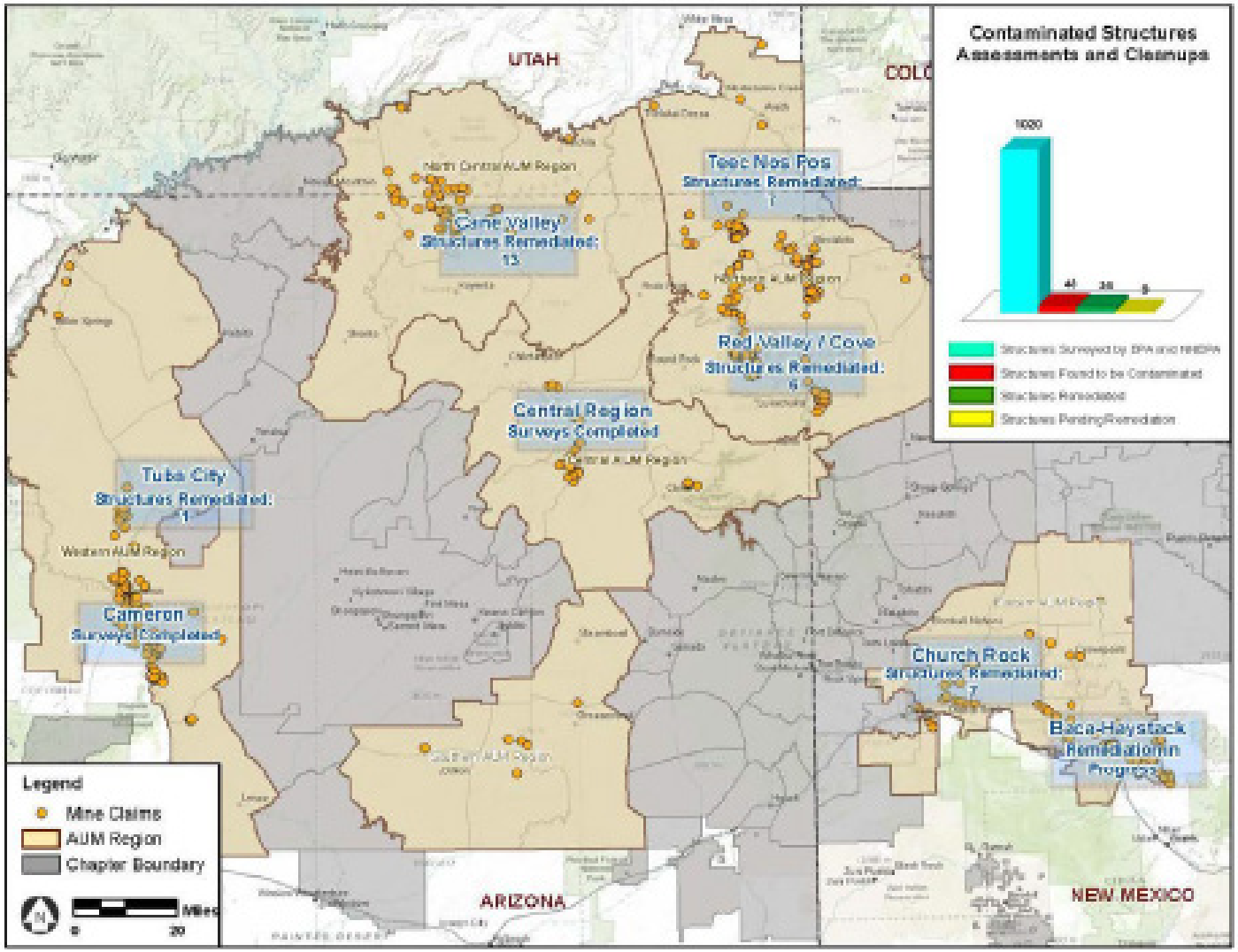


Figure XX. Map of Contaminated Structures Assessments and Cleanups (note this is 2008 map, EPA will replace for 2019 map)

WATER

BACKGROUND

EPA and the Navajo Nation are concerned about the impacts abandoned uranium mines may have on surface water and groundwater. EPA and the Navajo Nation agreed to assess potential impacts on water resources at surface mines, underground "dry" mines above groundwater, underground "wet" mines below groundwater, and "leach" mines where acid was used on site to extract ore.

WATER: SUMMARY OF ACCOMPLISHMENTS (2008-2019)

Assess Potential Impacts on Water Resources

- ✓ EPA determined uranium mining and milling caused groundwater contamination in the San Mateo Creek Basin. EPA has engaged potentially responsible parties to investigate the extent of groundwater contamination. At the same time, EPA continues to work toward proposing the San Mateo Creek Basin to the Superfund National Priorities List, or "Superfund list." Formal consultation with the Navajo Nation on the proposed listing occurred on February 14, 2018.
- ✓ EPA, NNEPA, and Diné College assessed the Cove Wash Watershed, which contains 42 abandoned uranium mines. The assessment found elevated uranium concentrations in surface water and groundwater around and below the historically mined areas.
- ✓ The U.S./Navajo Phase 2 Trust Settlement provided for two studies to investigate potential impacts to surface water and groundwater at two mines: including one at the Claim 28 priority mine in the Tachee-Blue Gap chapter, and the other at the Saytah/George Simpson 1 Incline mine in the Tolikan chapter.
- ✓ Detailed assessments for over 50 mines included sampling any nearby water sources.

REPORT OF FUNDING

Tronox settlement funds of $3.3 million were used to conduct the Cove Wash Watershed Assessment. Tronox settlement funds of $2.35 million were used to study the impact of Tronox mines on the San Mateo Creek Basin groundwater contamination. The U.S./Navajo Phase 2 settlement provided for funds to conduct two water studies, including one at the Claim 28 mine in the Blue Gap Chapter.

WATER

GOALS FOR THE NEXT 10 YEARS

Detailed mine assessments will continue to include sampling nearby water sources.

- EPA will complete two studies to investigate potential impacts to surface water and groundwater under the U.S./Navajo Phase 2 Trust Settlement: Claim 28 priority mine in the Tachee-Blue Gap chapter and the Saytah/George Simpson 1 Incline mine in the Tolikan chapter.
- EPA will conduct a study to investigate potential impacts to surface water and groundwater from underground mines at the Northeast Church Rock/Quivira mining complex.
- EPA will coordinate closely with NNEPA to ensure that cleanup options implemented at abandoned uranium mine sites are protective of surface water and groundwater.
- EPA will continue assessing the San Mateo Creek Basin under enforcement agreements with potentially responsible parties and, as appropriate, these results will be used to inform similar water studies on the Navajo Nation.
- The results of water studies will be used to evaluate if and to what extent surface and groundwater on the Navajo Nation is impacted by abandoned uranium mines and develop cleanup strategies.

DRINKING WATER

BACKGROUND

Approximately 15 percent of the Navajo Nation population obtains drinking water from unregulated sources, such as livestock wells, springs, private wells, or watering points. Navajo Nation policy prohibits the use of these unregulated sources for human consumption. However, some residents in remote areas on the Navajo Nation drink water from unregulated sources due to lack of access to piped water. These water sources are susceptible to contamination from bacteria, and may also contain heavy metals including radionuclides. These contaminants may be naturally occurring or may be the result of mining. During the first Five-Year Plan, elevated levels of radionuclides were identified in 29 out of 240 unregulated water sources sampled, and residents were warned not to drink from these water sources.

DRINKING WATER: SUMMARY OF ACCOMPLISHMENTS (2008-2019)

Assessment of Contaminated Water Sources, and Provision of Alternative Water Supplies

- ✓ During the first Five-Year Plan, elevated levels of radionuclides were identified in 29 out of the 240 unregulated water sources sampled, and residents were warned not to drink from these water sources.
- ✓ EPA completed a time-critical action in Cove, AZ which included posting warning signs at contaminated wells.
- ✓ IHS, EPA, and U.S. Department of Housing and Urban Development completed water infrastructure projects that provided first access to piped water for 3,809 homes in the abandoned uranium mine regions of the Navajo Nation.

REPORT OF FUNDING

IHS, EPA, and U.S. Department of Housing and Urban Development provided almost $200 million for water infrastructure projects that provided first access to piped water for 3,809 homes in the abandoned uranium mine regions of the Navajo Nation.

Workers from Navajo Engineering and Construction Authority construct this IHS funded water line extension to provide first service of safe drinking water to 26 homes in Cottonwood.

GOALS FOR THE NEXT 10 YEARS

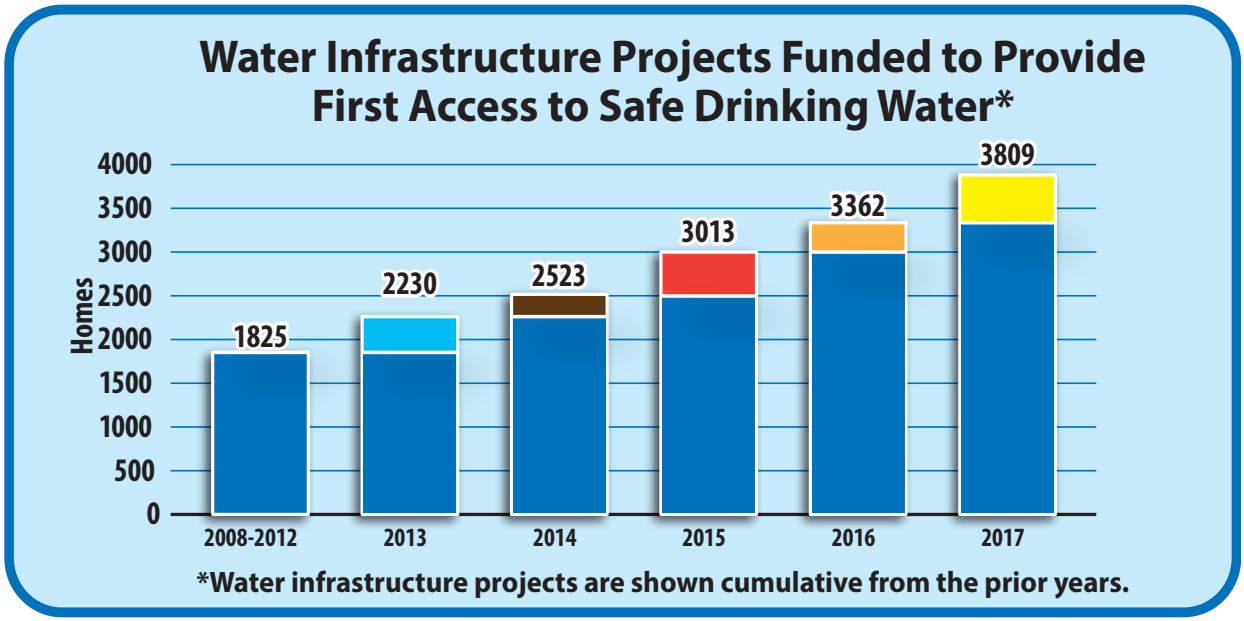
- IHS and EPA will continue to increase access to safe drinking water in the abandoned uranium mine regions of the Navajo Nation by funding high-ranking water infrastructure projects with available funds. Naturally elevated levels of uranium and other metals have been reported in water sources in these areas.

Sanders Drinking Water

In 2014, EPA awarded a $120,000 Environmental Justice Collaborative Problem-Solving grant to the Tolani Lake Enterprises to assess water sources in the Rio Puerco/Little Colorado River watershed. At that time, Tolani Lake Enterprises identified exceedances of drinking water standards for radionuclides at a school, a residential area, and nearby livestock water sources in Sanders, AZ.

Drinking water wells that were found to be contaminated have been either taken off-line or have a point of entry filtration system to remove contaminants. In April 2016, the Navajo Tribal Utility Authority (NTUA) purchased the Arizona Windsong public water system that served a community in Sanders. Wells of the former Arizona Windsong water system were taken offline and the residents are now served by the NTUA New Lands water system. In addition, a treatment plant to remove uranium went on-line in July 2017 at the Sanders Unified Elementary School to treat the water being served at the school.

These water sources in Sanders, AZ are near the Navajo "New Lands," and approximately 50 miles downstream from the 1979 UNC mill tailings spill—the largest radioactive release in U.S. history—and mine dewatering discharges in the Eastern Agency. Beginning in 2020, EPA will conduct a study at the Northeast Church Rock/Quivira mining complex to evaluate if and to what extent mining activities impacted surface water and groundwater. Results of this study could lead to efforts to remediate surface water and groundwater if there are impacts related to mining which pose human health or environmental risks.



TUBA CITY DUMP SITE

BACKGROUND

The Tuba City Dump (TCD) is located just off Highway 160, east of Tuba City and the Village of Moenkopi in Coconino County, AZ. BIA operated the TCD as an open municipal waste dump from the 1950s until 1997. It covers about 40 acres and includes about 330,000 cubic yards of material; 95 percent is on Hopi land, and 5 percent is on Navajo Nation land. Most of the waste in the TCD was burned before it was buried. Federal law requires that the TCD was to be properly closed by 1997, but it remains open.

Residents of the Tuba City and Moenkopi communities expressed concerns that the TCD may have received uranium mill wastes from the Rare Metals uranium mill located four miles east of the dump on Highway 160.

In 2017, BIA, under the Superfund law, completed a remedial investigation/feasibility study (RI/FS) to investigate both the contents of the TCD as well as whether there could be impacts to groundwater or drinking water sources from waste in the TCD.

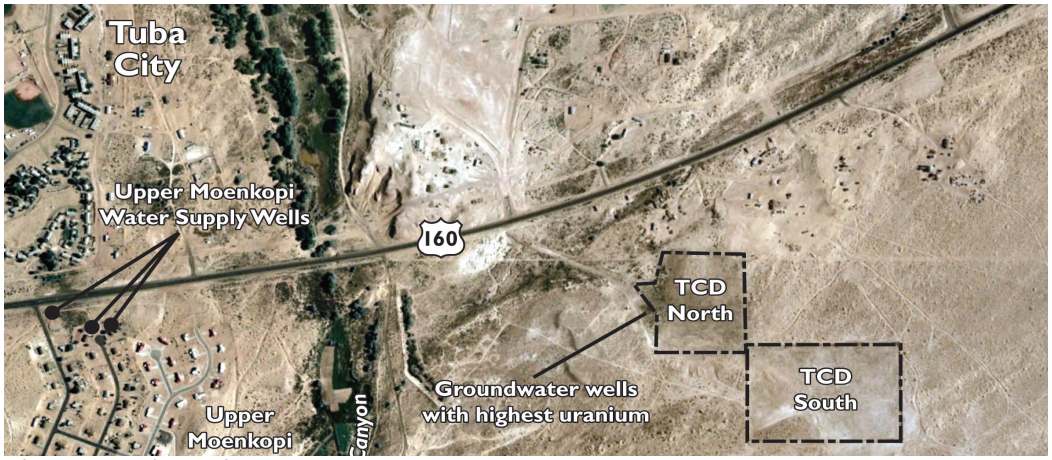
The investigation included scans, analyses and tests from hundreds of soil and waste cores and trenches within the TCD and surrounding land, sediments, and drainages. The investigation also included the installation and associated groundwater modeling and analyses of more than 70 groundwater monitoring wells in both the shallow and deep groundwater.

The TCD is primarily composed of soil, ash, glass, brick, and burned municipal debris. Leachate from the TCD causes naturally occurring uranium and strontium in the TCD to dissolve into shallow groundwater more than they would without the TCD. Uranium and strontium in the shallow groundwater decrease

TUBA CITY DUMP: SUMMARY OF ACCOMPLISHMENTS (2008 – 2019)

Cleanup of the Tuba City Dump Site

- ✓ In 2009, BIA completed interim action studies and the Interim Action Report. Studies included:
  - Studies of the waste in the TCD including surface and downhole radioactivity surveys, borings, core samples and analyses, and test pits.
  - Analysis of the movement of groundwater, and potential threats to the Moenkopi drinking water supply wells and springs.
  - Groundwater sampling and aquifer testing to evaluate groundwater flow direction and water quality.
- ✓ In 2009, BIA completed the fencing the perimeter of the TCD and develop closure options.
- ✓ In 2010, BIA completed the RI/FS Work Plan.
- ✓ In 2017, BIA completed a remedial investigation and feasibility study to identify whether mill waste was disposed at the TCD.
- ✓ BIA conducted periodic ground water monitoring.



Tuba City Dump and surrounding areas.

to background levels in the immediate vicinity of the TCD. Groundwater studies show that shallow groundwater contaminated by the TCD has not and will not migrate beyond Pasture Canyon to the Moenkopi drinking water wells.

As a result of these studies, (1) no evidence of uranium above background levels or radioactivity in the TCD was identified and (2) drinking water from the Moenkopi Springs is safe and cannot be affected by the TCD. The Hopi Tribe and Navajo Nation were, and continue to be, actively involved in the remedial investigation and assessment of cleanup options. EPA and BIA continue to coordinate efforts to select and implement a cleanup option.

While the TCD was found not to contain the uranium waste that was originally feared, it remains an illegal open dump with burned waste and needs to be closed in accordance with federal law.

SUMMARY OF FUNDING

BIA's expenditures to assess the TCD included $3.0 million to conduct interim action studies and complete the Interim Action Report and RI/FS work plan, and $4.8 million to implement the RI/FS.

GOALS FOR THE NEXT 10 YEARS

- In 2020, BIA and EPA will complete formal consultation with the Hopi Tribe and Navajo Nation.
- By 2021, EPA and BIA will enter into an Administrative Order on Consent under the Resource Conservation and Recovery Act to implement the final cleanup and closure of the TCD.
- By 2021, subject to Hopi Tribal approval to use Hopi land for a new solid waste, BIA and EPA will reach consensus with the Hopi Tribe and Navajo Nation with the cleanup option.
- By 2023, subject to Hopi Tribal and Navajo Nation consensus with the cleanup option, BIA will complete the design plans to implement the cleanup option.
- By 2024, subject to Congressional funding and Hopi Tribal and Navajo Nation consensus with the cleanup option, BIA will begin waste removal at the TCD, implementing the cleanup option which currently involves the removal of the TCD waste to a newly constructed repository. The repository will be lined and covered. The TCD area will be restored such that the land will be available for future use/development.

BACKGROUND

ATSDR's involvement in the Health Section of the 2014 Five-Year Plan included the Navajo Birth Cohort Study (NBCS), training for community health representatives (CHR), and provision of community education materials per the "Health Studies Section" goals outlined in the 2014 Five-Year Plan.

HEALTH PROGRESS: SUMMARY OF ACCOMPLISHMENTS (2014-2019)

Conduct Navjo Birth Cohort Study and Health Education Activities

- ✓ Navajo Birth Cohort study funded, with participation of 740 mother-infant pairs and 230 fathers, to identify health outcomes in a population exposed to uranium and ensure intervention to reduce the impact of birth defects and developmental delays.
- ✓ ATSDR, EPA, and IHS deliver training to 90 Community Health Representatives from the Navajo Nation Department of Health.
- ✓ ATSDR participated in five outreach events and developed and distributed educational health handouts and posters.

Birth Cohort Study

CDC/ATSDR provided funding to the University of New Mexico (UNM), the Navajo Nation Department of Health, and the Navajo Area IHS to continue the NBCS. The NBCS is the first prospective epidemiologic study of pregnancy and neonatal outcomes in a uranium-exposed population (Goal d.i in the 2014 Five-Year Plan).

From 2013 through 2017, 781 pregnant Navajo women were enrolled in the study, along with 230 fathers. Subsequently, 98 mothers withdrew from the study. A total of 740 infants were born and had follow-up assessments through the first year of life.

Maternal surveys included an enrollment survey, food frequency survey, and post-partum survey, and fathers were administered an enrollment survey. Infant surveys included ages and stages questionnaires at 2, 6, 9, and 12 months.

Biological samples, including blood and urine, were collected from the mother at time of enrollment in the study and at time of delivery. At delivery, infant samples were collected of urine and cord blood;

between 2-6 months and at 12 months infant urine was collected. The samples were analyzed for 36 metals/metal compounds.

Home environmental assessments were conducted for enrolled participants. The assessments included gamma radiation measurement, indoor air sampling for radon analysis, and dust and drinking water sampling for analysis for specific metals.

Report-back letters were provided to all study participants. The letters included individual biomonitoring results, home environmental assessment results, and frequently asked questions (Goal a.i in the 2014 Five-Year Plan).

Enrollment of pregnant Navajo women ended in July 2017. All infants graduated from the program by July 2018.

From 2013 to 2016, 2,500 community members, physicians, and researchers were educated about the study and preliminary results via 15 community outreach activities. Additionally, 21 videos were created and are available at https://youtu.be/kcJebbN4e_I (Goal d.iii in the 2014 Five-Year Plan).

Health Care Staff Training

Outreach, training, and networking for health professionals has occurred—in person and via teleconference leadership calls with NBCS stakeholders, including technical assistance and training on medical record abstraction.

Staff moderated and presented a symposium at the 2015 International Society for Exposure Science. In 2015, staff delivered a presentation to the National Indian Health Board, and the Journal of Environmental Health published a blog article titled "CDC Your Health, Your Environment."

CHR Training

In December 2014, ATSDR, EPA, and IHS delivered a training to 90 NNDOH CHRs at Window Rock, AZ. The trainees then delivered the Uranium Awareness Posters (see below) to 110 Navajo Chapter houses. ATSDR coordinated a refresher training for 90 CHRs presented by ATSDR, EPA, and IHS in December 2015 at Farmington, NM (Goal in the 2014 Five-Year Plan).

Provision of Community Education Materials, Handouts, and Resources

ATSDR participated in five outreach events. ATSDR brought the Uranium Awareness Fact Sheets and the Resource list, discussed uranium exposure pathways and ways to reduce exposure, and learned from Navajo people about their experiences with uranium. Events included the following:

April 2016 – Monument Valley community (UT) Open House with Five-Year Plan agencies.

October 2016 – Tuba City community and Hopi Tribe (AZ) Open House with Five-Year Plan agencies and site tour with DOE of the rare metals site.

January 2017 – Community Outreach Network Open House in Window Rock, AZ. ATSDR staffed a table to talk with Tribal Council members, and distributed binders of materials.

March 2017 – Shiprock community (NM) Open House with Five-Year Plan agencies.

September 2017 – Navajo Nation Fair, Window Rock, AZ; Community Health Outreach and Education, and the Five-Year Plan agencies shared a table at the fair (Goal a.iii in the 2014 Five-Year Plan).

REPORT OF FUNDING

In September 2013, the second cooperative agreement was awarded to UNM for continuation of the NBCS; the study was completed in August 31, 2018. The birth cohort has transitioned to a new study funded as part of the National Institute of Health's Environmental Influences on Child Health Outcomes (ECHO) Program.

GOALS FOR THE NEXT 10 YEARS

IHS Provision of Community-Based Services

- Provision of opportunities for community feedback.
- Provision of specific health education to the community.

- Provision of information to the community concerning the ten-year plan and findings from the last phase of the five-year plan.
- Provision of medical screening evaluations to non-occupationally exposed individuals.
- Provision of follow-up for those already screened.
- Continued assurance that all information is available in the individual's home health record .
- Assurance of continuity of care for affected individuals.
- Uranium screening performed at all IHS healthcare facilities will become part of the permanent patient record with the ICD-10 codes for exposure to uranium.
- Health promotions/disease prevention program will launch an new community education program to include uranium exposure in the medical history during healthcare visits.
- Community based cancer screening to improve early detection of cancer.

IHS Provision of Radiation Exposure Screening and Education Program (RESEP) services

- Continuation of IHS services to those with potentially compensable health conditions.

IHS Collaboration with NNDOH Epidemiology Program

- Continued evaluation of cancer cases by geographic location of cancer patient's residence and known radiation exposure sources.
- Evaluation of health status of descendants of uranium miners/mill workers.
- Design and establishment of a longitudinal human health impact study.

ATSDR and IHS Health Care Staff Training

- Coordination between ATSDR and IHS to provide training to clinicians and other health care providers on health effects of non-occupational exposure to uranium, and documentation of an exposure history.
- Coordination with NNDOH to develop materials and provide training to CHRs. Training topics to include health effects of non-occupational exposure to uranium and other tools for effective health education and outreach (Uranium 101 – See Community Outreach).
- Coordination with the other agencies and attendance at conference calls and meetings.
- Provision of orientation and continuing education to providers in Navajo Area IHS.
- Provision of orientation and continuing education to community-based staff in the Navajo area.

Reduce Your Contact with Uranium and Radiation

Steps to keep yourself safe:

- Stay away from abandoned mines and mills
- Find out if your home is a contaminated structure
- Use regulated water for human needs
- Never use unregulated water for human needs - even if it looks ok
- Use good water hauling practices to keep your water clean
- Get regular cancer screenings, like pap tests, mammograms, colonoscopies, and other cancer screenings

COMMUNITY INVOLVEMENT

BACKGROUND

Community involvement is an important part of the work to address the legacy of uranium contamination on the Navajo Nation. Each federal agency involves communities in the specific work it does, providing updates and ensuring that community members can help shape decisions affecting their community. The Community Outreach Network (Network) was formed in 2015 by the federal and Navajo Nation agencies working on abandoned uranium mine issues: ATSDR, BIA, DOE, EPA, IHS, NRC, NNEPA, NNAML, and NNDOH. The Network plans and coordinates outreach events to enhance community understanding of the work agencies are doing to address uranium contamination on the Navajo Nation. Together, these activities have resulted in an unprecedented level of outreach to communities.

Primarily, the Network:

- Shares information about abandoned uranium mines and former uranium mills and how communities can be engaged,
- Increases general understanding of uranium issues, and
- Communicates how each agency addresses and provides services regarding uranium issues.

The Network ensures broad information sharing and partnership building with Navajo communities. All agencies strive to deliver outreach that is culturally sensitive, considerate of Navajo community preferences and culture, and presented appropriately to each specific audience. The Network conducts outreach by attending and providing information at local Chapter meetings and community events, conducting presentations, distributing informative materials, and communicating with tribal legislative committees and executive leadership.

COMMUNITY INVOLVEMENT: SUMMARY OF ACCOMPLISHMENTS (2014-2019)

Conduct Coordinated Outreach and Education

- ✓ Over 20 outreach events organized or attended by the interagency Community Outreach Network.
- ✓ Increased agency coordination and communication by selecting a Community Network Liaison, participating in monthly calls an annual meetings, developing and distributing educational outreach material.
- ✓ Expanded educational outreach through the development and implementation of "Uranium 101" workshops, participation in STEM events at local schools, and training 90 Community Health Representatives.
- ✓ Opened and staffed the Community Outreach Network Office in Window Rock.

COMMUNITY INVOLVEMENT PROGRESS

The following highlight some of the ways that the various Network agencies worked together to achieve the goal of coordinating outreach and education.

- **Community Outreach Liaison:** In 2015, a Community Outreach Liaison was hired to connect tribal community members and leaders with the Network agencies. The liaison also facilitates communication among the agencies and coordinates participation in local events on behalf of the network. A public affairs specialist and an administrative assistant assist the liaison.
- **Community Outreach Office and Visitors Center:** In June 2016, a community outreach office and visitor center opened in Window Rock, AZ. The office is a resource for the Network and participating agencies and programs, and provides community members information on uranium issues and cleanup work. In 2018, the Network hosted a media event to increase awareness about the office and invite the public to visit.
- **Uranium Awareness Posters and Graphics:** In 2014-2015, ATSDR led interagency activities to create an awareness poster, three fact sheets, and training to accompany these materials. EPA and IHS were supporting agencies. Capacity building training included a presentation to 90 Community Health Representatives of NNDOH. The trainees delivered posters to 110 Navajo Chapter houses. The posters include site maps, hydrological information, and health and safety information. The fact sheets are widely distributed by multiple agencies, and appear on the EPA website.
- **Website:** A website with relevant information regarding uranium issues and links to resources has been developed: https://www.epa.gov/navajo-nation-uranium-cleanup/five-year-plan-address-impacts-uranium-contamination.
- **Resource List:** The Network created a resource list for communities with points of contacts for common uranium issues, such as the Radiation Exposure Compensation Act, safe drinking water, home radiation scans, and abandoned uranium mine areas. The list has become a valuable tool for the community, and has been distributed widely since its original release. The resource list is distributed at all outreach events to include Chapter house meetings, Health Fairs, Navajo Nation Fairs, public meetings, and the Community Outreach Network office. The resource list is maintained by the Community Outreach Liaison and can be found online at: https://www.epa.gov/navajo-nation-uranium-cleanup/five-year-plan-documents.

In September 2018, the Network organized a float for the parade during the Navajo Nation Fair and held an educational booth regarding uranium issues.

- **Uranium 101 workshop:** The Network created a Uranium 101 workshop curriculum to be provided upon request to Chapters affected by past uranium mining and milling. The goal of the workshop is to provide basic facts on uranium and radioactivity, ways to protect public health by limiting exposure to uranium, and information about health effects resulting from exposure to uranium.
- **Knowledge enhancement through courseware sharing:** In 2018, the Network worked with Navajo Technical University to pilot an offering of "Fundamental Health Physics" for students. This courseware sharing provides opportunity for Navajo Nation colleges and universities to share online course materials used at the NRC and enhance their capacity to train students in topics related to remediation efforts.
- **Community Open Houses, Site Tours, and Community Events:** The Network continues to host open houses, site tours, and participate in a variety of community events. The Network participates annually at Navajo Nation fairs in Crownpoint, Shiprock, Tuba City, and Window Rock.
- **Network Agency Coordination:** For more effective coordination and communication about uranium related issues, the Network's federal agencies and tribal departments, programs, and offices participate in monthly calls. These calls are for coordinating outreach and public information, such as development of a Uranium 101 community workshop curriculum. Additionally, the Network holds annual Network meetings that are used to discuss accomplishments, identify outreach opportunities, and address lessons learned from participating agencies and programs.

Network agencies also created agency specific outreach materials and hosted numerous community meetings. For example, DOE created the Legacy Management Navajo Nation Sites Fact Sheets, which provide background on DOE programs, description of clean up and long-term surveillance and maintenance activities, and contact information for each site. EPA has created fact sheets, participated in Chapter meetings, and hosted informational meetings in communities throughout the Navajo Nation where abandoned uranium mines are located. The NRC created a descriptive brochure on the distinct oversight role of the agency in DOE's long-term surveillance plans and the agency's ongoing outreach and engagement with the Navajo Nation. In addition, EPA and DOE are creating CIPs that describe how each agency will provide community members with accurate, timely, and understandable information that is considerate of their communication preferences and culture. The CIPs also document how each agency will coordinate with community members and tribal leaders to ensure that community concerns and goals are considered in the decision-making processes.

In September 2018, NNAML organized a STEM outreach event for youth at the Kirtland High School that Network agencies participated in.

GOALS FOR THE NEXT 10 YEARS

Federal and Navajo Nation agencies will conduct the following:

Short Term (3 Years)

- Market and support increased community use of the Community Outreach office.
- Expand community outreach to include:
  - » Chapter meetings
  - » Navajo Nation Council Committee meetings
  - » Navajo grassroots groups
- Host annual Network meetings for federal and tribal agencies, departments, programs, and offices.
- Educate the affected Navajo communities about the federal government's programs and processes. A clear explanation of the authorities and limitations will help community members understand the role of the federal government.
- Develop a Navajo language glossary to aid in translation of technical and scientific terminologies related to uranium.
- Conduct Uranium 101 workshops for Chapters and other audiences.

Medium Term (5 Years)

- Develop Uranium 101 materials for use by community organizations.
- Support Navajo Technical University goals for continued curriculum enhancements in radiation safety, including development of certificate or degree programs as determined and designed by the NTU faculty.
- Continue environmental health coordination and community health outreach.

Ongoing

- Improve communications on the radio, social media outlets, and short video spots using the Navajo language and story boards (posters).
- Continue to use qualified Navajo interpreters.
- Increase inclusion of Navajo Fundamental Law in work products and planning through discussions with NNEPA.
- Plan and organize outreach events annually at four of the Navajo Nation fairs.
- Log community concerns/information needs and past outreach activities by Chapter, Navajo agency, and date submitted and completed.
- Provide consistent and updated information about abandoned uranium mines to the Diné Uranium Remediation Advisory Commission, the Navajo Nation government, and the Tribal Council.

In September 2016, the Network held an educational booth regarding uranium issues at the Navajo Nation fair.

NAVAJO WORKFORCE DEVELOPMENT

BACKGROUND

EPA is committed to maximizing federal contract authorities to create safe jobs for Navajo workers, and build capacity for Navajo-owned businesses and institutions to perform this work. These opportunities will increase as cleanup work at the mines accelerates.

NAVAJO WORKFORCE DEVELOPMENT: SUMMARY OF ACCOMPLISHMENTS (2008 – 2019)

Provide Job Opportunities and Workforce Development throughout the Navajo Communities

- ✓ To date, over 200 jobs were provided to Navajo workers,
- ✓ EPA awarded over $16 million in cooperative agreements to Navajo Nation agencies and over $7.85 million in contracts to Navajo-owned businesses.
- ✓ EPA provided funds to eight Navajo businesses,

REPORT OF FUNDING

Since 2008, EPA awarded over $11 million to the NNEPA Superfund Program to support their oversight of this work and $3.08 million to Community Housing Infrastructure and Development for the replacement of 12 contaminated structures. And since 2016, EPA awarded $1.37 million to Navajo AML program for technical assistance and $809,467 to Diné College to determine the impact of abandoned uranium mines on the Cove watershed. EPA awarded $7.85 million to Navajo-owned businesses for work related to the abandoned uranium mines.

Work Provided to Navajo Owned Businesses

Dinétahdóó Cultural Resources Management (DCRM)	Iina Ba Inc.	Arrow Indian Contractors	Bitsui-Chavez Construction Co., LLC (Bitsui-Chavez)	Community Housing & Infrastructure Development (CHID)	Diné Construction	Various Navajo Interpreters	Clawson Excavating Inc.	Navajo Engineering & Construction Authority
Performed Cultural Resource surveys approxi	Performed land surveys for bridge design	Repaired bridge and excavated contaminated soils	Installed 9 signs and 7 fences at El Paso Natural Gas abando	Replaced contaminated homes with $3.1 M EPA grant	Construction of four homes in Church Rock	Navajo interpreters from various communities	Constructing road improvements	Constructs water infrastructure projects

NAVAJO WORKFORCE DEVELOPMENT PROGRESS

2012-2016

- EPA's Superfund Job Training Initiative trained 19 Navajo community members.
- NNEPA partnered with the Northern Arizona University Institute for Tribal Environmental Professionals on an environmental workforce development and job training program funded by EPA. A class of 36 Navajo community members graduated from a four-week training about hazardous waste operations, site worker safety standards, radiation hazards, other workplace health hazards, and cultural response to hazardous environments.

2017

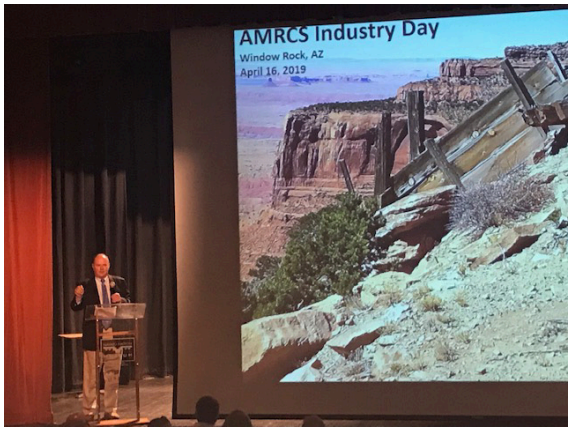
- EPA awarded Arrow Indian Contractors, a Navajo-owned company, a $3.85 million contract to clean up portions of the Quivira Mines. The mines are in the Coyote Canyon and Standing Rock Chapters on Navajo Nation in McKinley County, NM. The work included excavating contaminated soil and rebuilding the Red Water Pond Road bridge to accommodate heavy equipment. Arrow Indian Contractors also built and repaired roads and culverts as needed.
- EPA awarded Tetra Tech, Inc. (Tetra Tech) the Response, Assessment, and Evaluation Services contract, worth up to $85 million over 5 years. This is the first known contract solicitation that included evaluation criteria explicitly developed to encourage Navajo employment and training opportunities. Tetra Tech will initially assess uranium contamination at 30 abandoned uranium mines in and around the Navajo Nation. Tetra Tech will also partner with Navajo Technical University and local businesses to train Navajo members in professional positions related to assessment and cleanup work. In addition, Tetra Tech has committed to procure services and supplies, whenever possible, from Navajo-owned businesses, helping boost the local economy and create jobs. Under the contract, Tetra Tech will regularly report assessment, training, and purchasing results to the agency and the public.

2018

- EPA awarded Clawson Excavating, Inc., a Navajo-owned company, a nearly $1 million contract for the Cove Phase 1 Road Improvement Project.

2019

- EPA awarded a $918,911 contract to Clawson Excavating, Inc., a Navajo-owned company, for road improvements in Cove, AZ.
- EPA released a Request for Proposal for the Navajo Area Abandoned Mines response and Construction Services contract. The contract, worth an estimated $220 million, is open for proposals exclusively from small businesses.



I n 2019, EPA 9 Regional Administrator Mike Stoker met in Window Rock, AZ with Navajo Nation President Jonathan Nez and Navajo Nation Vice President Myron Lizer and co-regulators NNEPA to discuss mutual environmental priorities on workforce development with the abandoned uranium mine work.

GOALS FOR THE NEXT 10 YEARS

- Build capacity and hire Navajo individuals and companies
  - » Use contract evaluation criteria and outreach tools to maximizes employment opportunities for Navajo people while building capacity with local business and institutions to perform the work.
- Promote jobs and business opportunities with support of the Navajo Nation
  - » Encourage EPA and potentially responsible party contractors to advertise jobs on the Navajo Nation via different methods—radio, newspaper, or a centralized location where Navajo opportunities are published.
  - » Conduct "Industry Days" job fair for all major contract opportunities related to this program.
  - » Continue to attend and support outreach events and with other career development agencies.

The Quivira mine waste pile and the repaired bridge completed in 2018 by Arrow Indian Contractors, a Navajo-owned company.

AGENCY AUTHORITIES/ ROLES

FEDERAL AGENCIES

EPA

EPA addresses issues related to contaminated abandoned uranium mines and contaminated structures. EPA conducts this work under CERCLA. EPA also approves BIA's work at Tuba City Dump under a settlement agreement entered into pursuant to CERCLA, and will select the remedy at this site. In addition, EPA funds construction of drinking water infrastructure projects under the Safe Drinking Water Act.

BIA

BIA serviced Tuba City Dump (near the Navajo town of Tuba City and the Hopi Villages of Moenkopi), which was used by the surrounding communities for 50 years until its administrative closure in 1997. BIA is a potentially responsible party at the site.

DOE

UMTRCA (1978) establishes DOE-LM for long-term surveillance and maintenance at the four former uranium mill processing sites within the Navajo Nation. DOE-LM operates groundwater remediation systems at the Tuba City, Shiprock, and Mexican Hat sites. UMTRCA also established NRC as the oversight authority for DOE-LM at the four sites.

NRC

NRC regulates and oversees DOE-LM's activities under UMTRCA at the three former uranium processing sites on the Navajo reservation that contain disposal cells, and oversees DOE-LM monitoring and maintenance activities at all four of the former processing sites.

Navajo Area IHS

The Navajo Area IHS provides health care to eligible American Indians through a network of hospitals and health centers. IHS also funds and develops water infrastructure projects to serve Navajo homes.

ATSDR

CDC, among other activities, conducts scientific research and provides health information to communities.

ATSDR protects communities from harmful health effects related to exposure to natural and man-made hazardous substances. We do this by responding to environmental health emergencies; investigating emerging environmental health threats; conducting research on the health impacts of hazardous waste sites; and building capabilities of and providing actionable guidance to state and local health partners.

NAVAJO NATION PARTNERS

NNEPA is a co-regulator, implementing the Navajo CERCLA law, Navajo Water Quality Standards, and the Navajo Safe Drinking Water Act.

NNEPA

NNEPA implements the Contaminated Structures Program and oversees the abandoned uranium mine cleanup process. Since 2008, EPA has provided $10 million to the Navajo Superfund Program for this work, and NNEPA has direct access to oversight funds for work at 140 mines. Additionally, NNEPA received $45 million from the Tronox settlement. For more information visit www.navajoepa.org.

NNAML

The NNAML provides technical assistance and expertise during the mine reclamation process. Since 2017, EPA provided over $1M to NNAML for this work.

NNUMTRA

The NNUMTRA Program oversees, monitors, and reviews remedial action work at the four uranium mill sites managed by DOE-LM. Since 2013, DOE-LM has provided $22.5M to the NNUMTRA Program for this Work.

NNDOH

NNDOH participates in health studies and conducts medical screenings related to uranium exposures.

Navajo Nation Engineering and Construction Authority

The Navajo Nation Engineering and Construction Authority builds water infrastructure projects, Navajo Tribal Utility Authority operates and maintains those systems, and NNEPA regulates them.

Other Partners

Other partners include Diné College, Navajo Technical University, and iiná bá, a local Navajo firm. EPA awarded over $800,000 to Diné College to help determine the impact of the mines in the Cove watershed and to conduct community outreach. EPA's Response, Assessment, and Evaluation Services contractor, Tetra Tech, will partner with the Navajo Technical University to provide trainings to build the capacity of Navajo people to support the mine cleanup work. They will also work with iiná bá for engineering assessment, environmental consulting and translation services.

For More Information, visit:

www.epa.gov/navajo-nation-uranium-cleanup