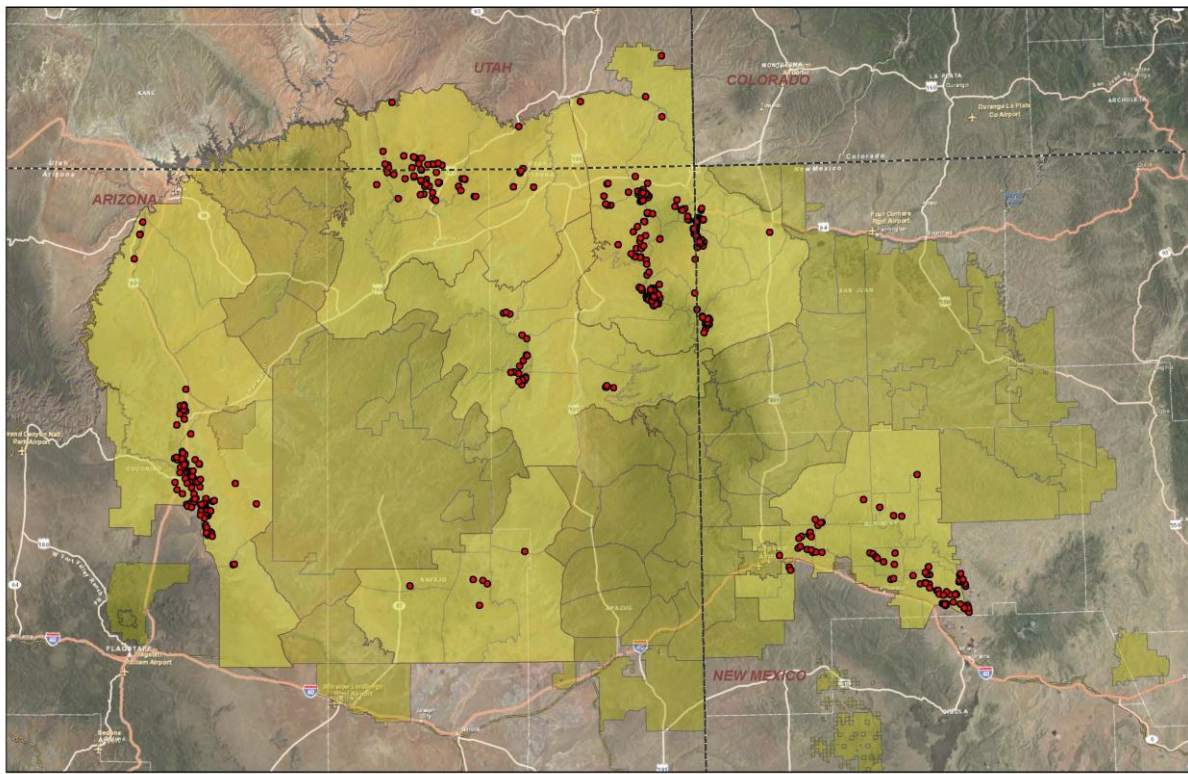


US EPA ARCHIVE DOCUMENT

2014

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



US EPA ARCHIVE DOCUMENT



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LIST OF ACRONYMS

| | |
|----------|--|
| AEC | Atomic Energy Commission |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| AUM | Abandoned Uranium Mine |
| BIA | Bureau of Indian Affairs |
| CDC | Centers for Disease Control and Prevention |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| DiNEH | Diné Network for Environmental Health |
| DOE | Department of Energy |
| FS | feasibility study |
| GCAP | Groundwater Compliance Action Plan |
| GE | General Electric |
| HAZWOPER | Hazardous Waste Operations and Emergency Response |
| HRSA | Health Resources and Services Administration |
| IAR | Interim Action Report |
| IHS | Indian Health Service |
| LTS&M | long-term surveillance and maintenance |
| NECR | Northeast Church Rock |
| NMED | New Mexico Environment Department |
| NNAML | Navajo Nation Abandoned Mine Lands Reclamation Program |
| NNEPA | Navajo Nation Environmental Protection Agency |
| NNDWR | Navajo Nation Department of Water Resources |
| NPL | National Priorities List |
| NRC | Nuclear Regulatory Commission |
| OSHA | Occupational Safety and Health Administration |
| RA | remedial action |
| RD | remedial design |
| RECA | Radiation Exposure Compensation Act |
| RESEP | Radiation Exposure Screening and Education Program |
| RI | Remedial Investigation |
| ROD | Record of Decision |
| TCD | Tuba City Dump |
| UMTRCA | Uranium Mill Tailings Radiation Control Act |
| UNC | United Nuclear Corporation |
| USEPA | United States Environmental Protection Agency |

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Executive Summary

In January 2013, the United States Environmental Protection Agency (USEPA), the Bureau of Indian Affairs (BIA), the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), the Indian Health Service (IHS), and the Agency for Toxic Substances and Disease Registry (ATSDR), in consultation with the Navajo Nation, completed a Five-year effort to address uranium contamination in the Navajo Nation. The effort focused on the most imminent risks to people living on the Navajo Nation. While the last five years represent a significant start in addressing the legacy of uranium mining, much work remains and the same federal agencies have collaborated to issue a second Five-Year Plan. The purpose of the second Five-Year Plan is to build on the work of the first plan, make adjustments based on information gained during this period, and plan the next steps in addressing the most significant risks to human health and the environment.

This Five-Year Plan has the following major objectives:

Objective 1: Assessment and Cleanup of Contaminated Structures—Navajo Nation Environmental Protection Agency (NNEPA) will assess and scan up to 100 homes per year and will refer those with elevated levels of radiation to USEPA for follow-up actions.

Objective 2: Assessment of Contaminated Water Sources and Provision of Alternative Water Supplies—Expand geographic focus for providing access to safe drinking water to all six abandoned uranium mine (AUM) regions, encompassing 55 Navajo Nation chapters.

Objective 3: Assessment of AUM Sites with Detailed Assessments of those Most Likely to Pose Environmental or Health Problems—Conduct detailed assessments at up to fifty of the highest priority mines.

Objective 4: Cleanup of the Northeast Church Rock Mine Site and Additional High Priority AUM Sites—Complete the design of the cleanup of the Northeast Church Rock mine site with input from the Navajo Nation, the community, and other agencies. For the United Nuclear Corporation to submit a License Amendment Request to the NRC for the disposal of the mine waste at United Nuclear Corporation Mill Site, and if approved, for EPA to negotiate a consent decree with GE to begin remedy construction. Conduct appropriate cleanup actions at mine sites that pose an unacceptable risk to residents or the environment.

Objective 5: Cleanup of the Tuba City Dump—Complete Remedial Investigation and Feasibility Study and select and begin implementing a remedy.

Objective 6: Protection of Human Health and the Environment at Former Uranium Processing Sites—Update the groundwater compliance strategy at Shiprock, NM and evaluate different treatment options for the Tuba City, AZ site.

Objective 7: Health Studies—Complete work on the Navajo Birth Cohort study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program, and Navajo Area IHS. Work with the Navajo Nation's Epidemiology Center and support their efforts to evaluate various cancer case rates by geographic location of cancer patient's

residence and known radiation exposure sources, and the health status of descendants of uranium miners/mill workers.

Introduction

The Navajo Nation encompasses more than 27,000 square miles, spread between the three states of Utah, New Mexico and Arizona in the Four Corners area. The unique geology of the region makes 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 four million tons of uranium ore were extracted during mining operations within the Navajo Nation from 1944 to 1986. The federal government (i.e., the Atomic Energy Commission [AEC]) was the sole purchaser of uranium until 1966. The AEC continued to purchase ore until 1970, although sales to the commercial industry began in 1966. The last uranium mine on the Navajo Nation shut down in 1986. Many Navajo people worked in and near the mines, often living and raising families in close proximity to the mines and mills.

Uranium mining and milling activities no longer occur on Navajo lands, but the legacy of these activities remains, including more than 500 abandoned uranium mine claims¹ with thousands of mine features such as pits, trenches, holes, etc., and some homes that were built from mine and mill site materials. In addition, there are drinking water sources with elevated levels of uranium, radium, and other metals. Uranium and other elements (selenium, arsenic, etc.) are associated with mine and mill sites, although the same constituents occur naturally at elevated levels in rock, soil, surface water, and groundwater across the Navajo Nation and the broader Four Corners region. Health effects as a result of non-occupational exposure to these elements can include lung cancer and impaired kidney function.

For Navajo miners and millers and their families, health consequences of uranium mining and milling have been widespread. In 2000, Congress expanded the Radiation Exposure Compensation Act (RECA) to provide monetary compensation to individuals who contracted certain cancers and other serious diseases following their occupational exposure to radiation while employed in the uranium industry during the Cold War arsenal buildup. As of April 4, 2014, 1,347 Navajos have received compensation under RECA for illnesses from occupational radiation exposure as uranium miners, millers, or ore transporters.

Summary of Work Completed 2008-2012

In October 2007, at the request of the United States House Committee on Oversight and Government Reform, the United States Environmental Protection Agency (USEPA), along with the Bureau of Indian Affairs (BIA), the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the Indian Health Service (IHS) developed a coordinated Five-Year Plan to address uranium contamination in consultation with the Navajo Nation. The Five-Year Plan was

¹ Note that the entire mine claim may not have been mined. Also, a mine claim may include multiple mine sites. We are utilizing mine claims in order to maintain consistency with the Navajo Abandoned Mine Lands Program that has a database of mines based on claims.

the first coordinated approach by the agencies, and outlined a strategy for gaining a better understanding of the scope of the problem and for addressing the greatest risks first.

Between 2008 and 2012, USEPA, BIA, NRC, DOE, IHS, and the Agency for Toxic Substances and Disease Registry (ATSDR) spent more than \$100 million to address uranium contamination on the Navajo Nation. This effort was guided by the Five-Year Plan. Details about this effort are described in a [January 2013 report](http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf) (<http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf>).

During the first five years, the agencies focused on collecting data, identifying the most imminent risks and addressing contaminated structures, water supplies, mills, dumps, and mines with the highest levels of radiation. During that time, more information was discovered about the scope of the problem and the work needed to be performed. The agencies agreed to develop a second Five-Year Plan based on information obtained and lessons learned over the last five years. All agencies are committed to continue working with the Navajo Nation to reduce the health and environmental risks and to find long-term solutions to the remaining uranium issues on Navajo lands.

This report is issued as a working draft for the purposes of informing the public of federal agency actions and for continuing consultation, communication, and cooperation with the Navajo Nation.

Objectives

Objective 1: Assessment and Cleanup of Contaminated Structures

Federal Agency: USEPA

Navajo Nation Agency: NNEPA

1. Background

Uranium mining or milling waste was occasionally used as sand for aggregate (in foundations and stucco) and contaminated stones were incorporated into the walls and floors of structures, including homes. Structures may also be contaminated by the presence of mined or naturally-occurring radioactive materials in outside dust and soil brought into homes on shoes and clothing. Also, native soil and bedrock with elevated uranium concentrations can contribute to elevated radiation readings in and around structures. If contaminated structures are occupied, there is a risk to inhabitants from gamma radiation and alpha radiation (e.g., radon gas) which is a potent lung carcinogen.

2. Current Status of Work

Between 2008 and 2012, USEPA and NNEPA surveyed 878 structures and, when found to pose a health risk, USEPA demolished and rebuilt or provided financial compensation for the structures. In total, 34 structures were addressed either through financial compensation or with a rebuilt home and contaminated soil was removed from eighteen yards. USEPA expects to complete construction of an additional eight homes by the fall of 2014.

Figure 1 shows areas where scanning assessments have been conducted by NNEPA and USEPA. During 2013 an additional 142 structures were scanned by NNEPA.

3. Goals for Next Five Years

- a. NNEPA will scan up to 100 homes per year and will refer those that show elevated levels of radiation to USEPA for follow-up actions.
 - i. These homes will be chosen based on proximity to abandoned mines and at the request of homeowners who believe their home may be impacted by uranium.
 - ii. Radon testing not completed in the first Five-Year Plan will also be included.
 - iii. Additional homes found to be of concern may be referred to USEPA for detailed surveys. USEPA may involve other federal agencies as appropriate.
- b. USEPA will follow up on homes referred by NNEPA with detailed assessments and remediation as necessary.
 - i. USEPA will conduct detailed assessments to determine whether the home poses a risk to residents. If demolition of a contaminated structure is necessary, USEPA generally will offer the residents either a replacement structure or financial compensation depending on the circumstances. Likewise, USEPA will provide temporary housing for residents as appropriate while remediation is conducted.

USEPA and NNEPA will work together to improve and streamline the process based on lessons learned during the last five years.

4. Specific Actions for Next Five Years

- a. NNEPA expects to scan 100 homes per year.
- b. USEPA expects to conduct remediation at up to ten homes per year (note that the number is dependent on the number of homes referred by NNEPA and the number found to pose a health risk).

5. Potential Limitations and Challenges

USEPA will continue to work with NNEPA and Navajo residents to secure access to structures and perform surveys. USEPA will continue to consult with NNEPA on potential actions including compensation and temporary relocation if demolition or partial removal is indicated. If USEPA finds that structures have high naturally occurring radon levels but low gamma radiation levels, then USEPA will involve the Navajo Nation Radon Program. USEPA will take removal actions where contaminated structures and surrounding soils are found to pose a risk to residents. However, land use issues may arise that are beyond USEPA’s ability to resolve if high radon levels are considered to be naturally occurring and thus will require the involvement of other Navajo agencies.

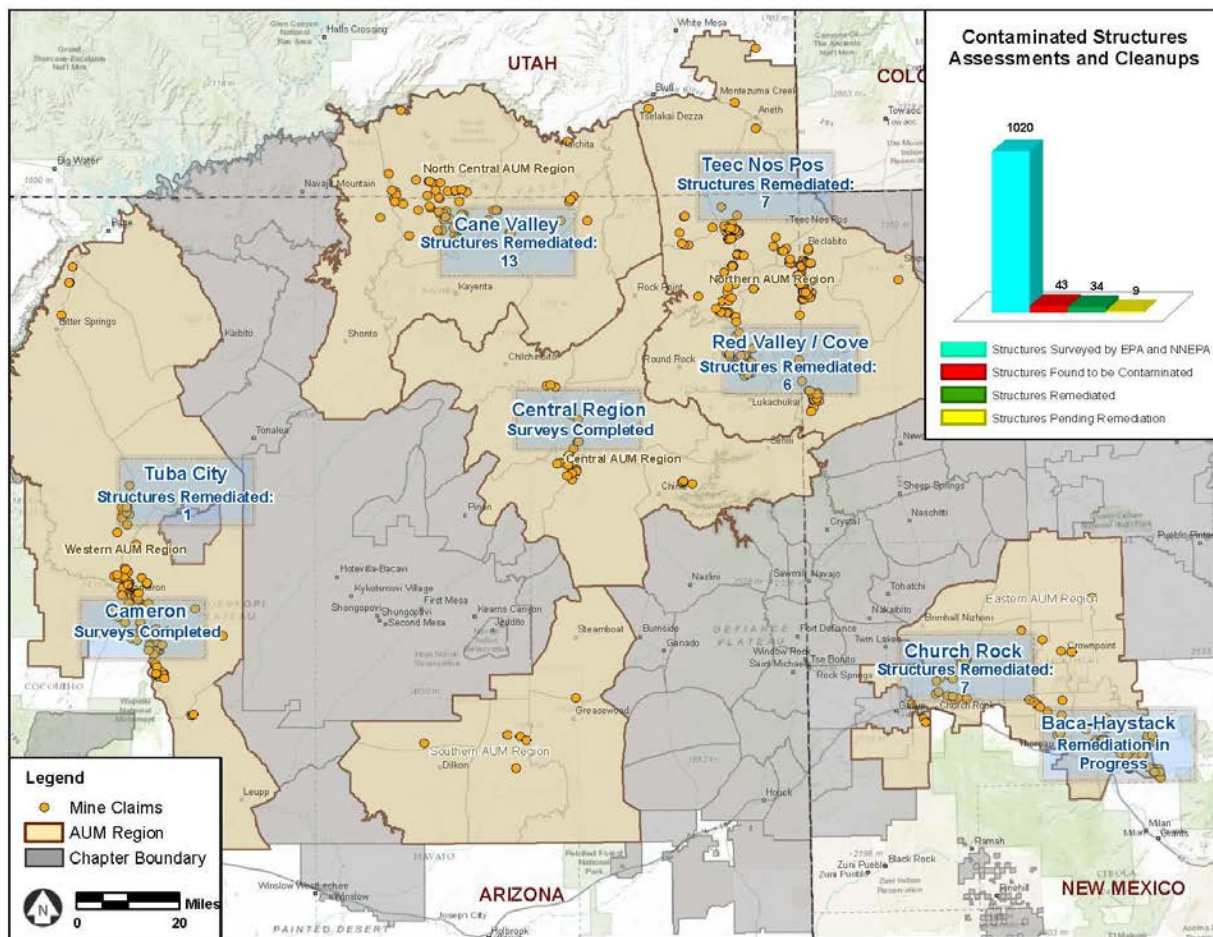


Figure 1. Map of Contaminated Structures Assessments and Cleanups

Objective 2: Assessment of Contaminated Water Sources, and Provision of Alternative Water Supplies

Federal Agencies: USEPA and IHS

Navajo Nation Agencies: NNEPA and NNDWR

1. Background

In 2008, the Centers for Disease Control and Prevention (CDC), USEPA, NNEPA and the Diné Network for Environmental Health (DiNEH) identified 29 unregulated water sources with levels of uranium and other radionuclides in excess of USEPA drinking water standards.

In response, NNEPA advised residents to only drink from regulated potable water sources and implemented a comprehensive public outreach campaign. Working together, CDC, NNEPA, USEPA, DiNEH, and the University of New Mexico met with residents and Chapter officials, posted warning signs, and issued public service announcements through the Navajo Times and local radio stations. Three unregulated wells that exceeded USEPA standards were shut down with the support of Navajo Chapter officials.

IHS identified water infrastructure needs for homes within a ten-mile radius of the 29 unregulated water sources with levels of uranium or other radionuclides exceeding drinking water standards. IHS, USEPA, and the Department of Housing and Urban Development provided approximately \$27 million for 14 projects that extend piped water to hundreds of homes near these unregulated water sources, and improve access to safe drinking water for over a thousand homes. USEPA also provided \$2.6 million to the NNDWR to implement a water hauling program to serve residents in remote areas that are not served by piped water.

2. Current Status of Work

IHS is working to complete design and construction of four projects funded at the conclusion of the original Five-Year Plan. The NNDWR continues to implement the water hauling program. Water deliveries under this program are occurring in the Western Agency, Eastern Agency, Chinle Agency, and Fort Defiance Agency.

3. Goals for Next Five Years

- a.** Complete water infrastructure projects funded during original Five-Year Plan. IHS will complete the Thoreau Extension, Leupp/Grand Falls Test Well, Mexican Water Walker Creek Extension, and the Church Rock Peretti Canyon Scattered Sites water infrastructure projects.
- b.** Increase access to safe drinking water in expanded geographic areas. The geographic focus for providing access to safe drinking water will expand to 55 Navajo Nation chapters. Naturally elevated levels of uranium and other metals have been reported in water sources in these areas. According to 2012 data from the IHS Sanitation Deficiencies System, there are 3,064 homes without piped water in those 55 chapters, and the one time construction costs would be approximately \$192 million to serve these homes lacking access to safe drinking water.

- c. Continue to implement water hauling program. NNDWR will continue to implement the Water Hauling Feasibility Study and Pilot Program. USEPA funding for the program has been extended through 2014. NNDWR is developing a feasibility study to identify options for the long-term sustainability of the program.

4. *Specific Actions for Next Five Years*

- a. Available funds will be awarded for high ranking water infrastructure projects. In 2013, \$22.8 million was provided to serve about 757 homes lacking access to safe drinking water in the 55 chapters. This includes \$7.3 million provided by the Navajo Nation, and \$15.5 million provided by IHS and USEPA.
- b. Projects funded under the original Five-Year Plan will be constructed, including: Thoreau Extension, Leupp/Grand Falls Test Well, Mexican Water Walker Creek Extension, and Church Rock Peretti Canyon Scattered Sites.
- c. NNDWR will continue to implement the Water Hauling Feasibility Study and Pilot Program and evaluate options for sustaining the program when USEPA funding ends, currently scheduled for December 2014, but may be extended into 2015.

5. *Potential Limitations and Challenges*

The number of homes served with piped water in the 55 chapters will be based on the amount of funds available, the ability of Navajo Tribal Utility Authority to operate and maintain water service to these homes, and other program requirements and prioritization processes. According to 2012 IHS data, 76 percent of the projects are economically infeasible, exceeding the IHS cost caps of \$84,500 per home for water and wastewater in Arizona, \$81,000 per home in Utah, and \$80,000 per home in New Mexico.

Even with the prior mitigation efforts, some residents may continue to drink water hauled from unregulated water sources that may have elevated levels of uranium or other constituents of concern.

NNDWR will evaluate options for sustaining the Water Hauling Feasibility Study and Pilot Program after USEPA funds expire on December 31, 2014.

Navajo livestock water sources are not regulated by USEPA or NNEPA. The Safe Drinking Water Act's definition of a public water system applies only to those systems that regularly serve an average of at least 25 people each day for at least 60 days per year or have at least 15 service connections.

Objective 3: Assessment of Abandoned Uranium Mines With Detailed Assessments of those Most Likely to Pose Environmental or Health Problems

Federal Agency: USEPA

Navajo Nation Agencies: NNEPA and NNAML

1. Background

From 2008 through 2012, USEPA and NNEPA conducted screening level assessments of 521 abandoned uranium mines, with detailed assessments of the 45 sites most likely to pose a threat to human health or the environment. Based on these assessments, the agencies have gained a better understanding of the scope of potential exposure to uranium contamination on the Navajo Nation and can better prioritize the work that remains to be done. The screening reports are available to the public and can be requested through USEPA's information request webpage at <http://www.epa.gov/region9/comments.html>.

For Navajo Nation uranium mine claim screening, USEPA considered contamination greater than twice the naturally occurring levels (background levels) of gamma radiation to be evidence of an observed hazardous release that may require further investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 United States Code Section 9601, et seq.). Of the total mine claims screened, 71 mine claims show levels of gamma radiation at less than two times background levels. Areas with levels that are at or below two times background levels should pose little or no current threat to residents.

Of the total mine claims screened, 177 mine claims show gamma radiation levels above two times but below ten times background levels. Long-term exposure to soils at these mines should be avoided. Residents should not build homes, corrals or other structures, and should not gather building materials from these sites. USEPA and NNEPA have initiated outreach to residents in these areas to provide warning of these conditions, and this work will continue over the next Five-Year Plan period.

Two-hundred and twenty-six (226) mine claims show gamma radiation levels higher than ten times background levels. Proximity of mines to homes is an important factor in determining risk to residents. Thirty-eight (38) of these mine claims are located within a quarter mile of a potentially inhabited structure.

2. Current Status of Work

In consultation with Navajo Nation, USEPA developed criteria to prioritize work at abandoned mines based on the level of radiation and proximity to homes and sensitive environments. As described in more detail below, USEPA and NNEPA have focused their efforts on 43 mine claims near residents and seven mine claims near sensitive areas.

To date, investigation or cleanup actions have been initiated at nine mine claims with elevated radiation and additional actions will be necessary. Of these nine mine claims, seven are considered high priority based on the criteria developed with NNEPA.

USEPA continues to search for Responsible Parties to pay for investigation and cleanup. USEPA has signed Administrative Orders on Consent with five Responsible Parties.

On April 3, 2014, the United States entered into a \$5.15 billion settlement agreement with Kerr McGee Corporation and some of its affiliates (“New Kerr McGee”) that, if approved by the U.S. District Court for the Southern District of New York (SDNY), would provide almost \$1 billion for USEPA Region 9 cleanup of 50 abandoned uranium mine sites on and very near the Navajo Nation. These mine sites were previously operated by corporate predecessors (“Old Kerr McGee”) of New Kerr McGee. The \$5.15 billion settlement would also provide substantial funding for cleanups at many other sites, including the Shiprock uranium mill site on the Navajo Nation. The settlement follows a determination by the SDNY that Old Kerr McGee had fraudulently conveyed billions of dollars in assets in an attempt to avoid environmental liabilities. Any portion of the settlement funds allocated to cleanup of the 50 Old Kerr McGee Navajo Nation uranium mine sites that is not needed for that purpose will be returned to the Hazardous Substance Superfund Trust Fund.

USEPA will amend Objectives 3 and 4 of this plan to reflect the work to be completed at the 50 abandoned uranium mines that are part of the settlement once the final settlement is approved and the full scope of work is determined.

3. Goals for Next Five Years

During the next five years, USEPA, NNEPA, and NNAML will conduct assessment and urgent cleanup work at mines most likely to pose a risk to human health or the environment. This includes mines that are known to exhibit:

- a.** Gamma radiation more than ten times background levels and located within a quarter mile of a potentially inhabited structure (38 mine claims).
- b.** Gamma radiation more than two times background and located within 200 feet of a potentially inhabited structure (five mine claims).
- c.** A potential impact to aquatic resources such as streams and wetlands (seven mine claims).
- d.** Mines targeted for actions from 2014 through 2018 are shown on Figure 2. Additional mine claims may be added if found to pose an imminent and substantial endangerment to health.

Work at mines located near potentially inhabited structures (bullets a and b, above) will include:

- a.** Conduct visual inspection and gamma scanning for radiation covering 100 percent of the mine claim surface area for 43 mine claims.
- b.** Conduct time-critical response actions at sites found to pose an imminent and substantial endangerment to health. Actions could include fencing, signage, stabilization, consolidation, and public outreach. Time-critical removal to an off-site disposal facility will be considered for small volumes (e.g., less than 500 cubic yards) of contaminated waste that pose a high risk to residents, if removal is found to be the most protective, cost effective, and implementable action available.

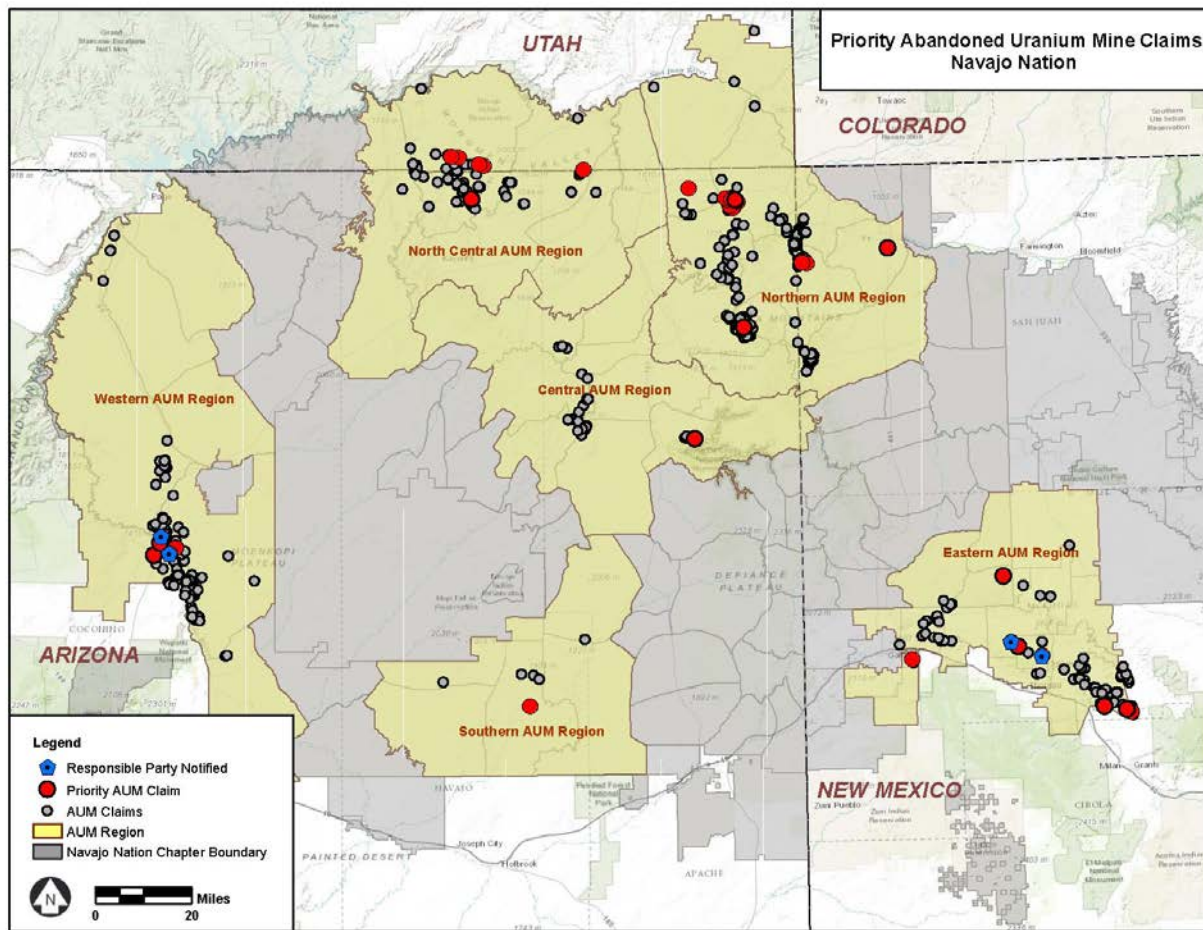


Figure 2. High Priority Abandoned Uranium Mine Sites

Mine claims likely to impact aquatic resources will require more detailed investigation and potential remedial action. From 2014 through 2018 the agencies will:

- Conduct preliminary assessments and site investigations at seven mine claims located in two watershed areas (Section 9 Lease at the Little Colorado River near Cameron, Arizona and Mesa I Mines 10 through 15 at Cove Wash near Cove, Arizona).
- Evaluate the suitability of these mines for listing on the Superfund National Priorities List (NPL).
- For mines listed on the NPL, initiate CERCLA remedial investigation and action per the Superfund National Contingency Plan.

USEPA will continue to search for and work with responsible parties to pay for investigation and cleanup of mines. To date, USEPA has signed administrative orders on consent with five responsible parties who are working to investigate and clean up a total of 25 mine claims, of which, six mine claims are considered high priority.

The NNAML used the Surface Mining Control Reclamation Act to conduct reclamation actions at approximately 90 percent of the uranium mines on the Navajo Nation. Reclamation actions are intended to address physical hazards; they do not necessarily address radiological risk. USEPA will partner more closely with NNAML to utilize their expertise during future cleanup efforts.

4. *Specific Actions for Next Five Years*

Evaluate up to ten mines per year. Conduct urgent actions at those that pose high health hazards.

5. *Potential Limitations and Challenges*

USEPA will continue its efforts to find and work with responsible parties to pay for assessment of mines.

Selection of final cleanup plans for mines is dependent on identification of suitable long-term disposal options for contaminated soil.

Objective 4: Cleanup of the Northeast Church Rock Mine Site and Additional High Priority Abandoned Mine Sites

Federal Agencies: USEPA, NRC and DOE

Navajo Nation and State Agencies: NNEPA and New Mexico Environment Department (NMED)

1. Background

Located near Gallup, New Mexico, the Northeast Church Rock (NECR) Mine site was identified by both Navajo Nation and USEPA as the highest priority abandoned uranium mine for cleanup prior to the initial Five-Year Plan. The mine adjoins the United Nuclear Corporation (UNC) uranium mill site that is a NPL cleanup project within USEPA Region 6. This inactive UNC mill site is also licensed by the NRC (see Figure 3). The mine is mostly on Navajo tribal trust land, while the mill is on privately owned land. At the request of the Navajo Nation, USEPA Region 9 is using Superfund removal authority to investigate and clean up the NECR mine site, in coordination with USEPA Region 6 which has CERCLA authority for the NPL mill site.

The historical timeline below identifies the major accomplishments that have been completed up to beginning of this Five-Year Plan in 2014. During the initial Five-Year Plan, USEPA had anticipated beginning construction of the NECR Mine Site cleanup. Instead, during this time period, USEPA focused on cleaning up the highest risk residential areas first while working with the community to select the long-term mine site cleanup remedy. USEPA and the responsible party conducted three large-scale interim cleanup actions to remove a total of approximately 150,000 cubic yards of contaminated soil, addressing all known soil contamination remaining on the reservation from the NECR mine site. These three actions were within the interim cleanup areas identified on Figure 3.

In addition to these interim actions, USEPA issued a cleanup plan in a 2011 Non-Time-Critical Action Memo for the NECR Mine Site. After thorough consideration and evaluation by USEPA and the Navajo Nation, and with significant involvement of the local Navajo community, USEPA selected excavation of approximately one million cubic yards of waste material from the NECR Mine Site. USEPA selected the NRC-licensed UNC Mill as the disposal site for the bulk of the mine waste to be placed in a repository above the existing tailings impoundment and further documented this decision in a 2013 Surface Soil Record of Decision (ROD) for the UNC Mill Site. This disposal location is contingent upon General Electric (GE)/UNC submittal of a license amendment application and NRC's approval of this license amendment. A small amount of higher level or "principal threat" waste will be sent to a licensed disposal facility. The cleanup plan selected in the 2011 Action Memo provides for unlimited surface use of the mine site after cleanup, voluntary alternative housing options during the cleanup for community members living near the mine, and job training and employment for interested local residents during the cleanup.

Historical Timeline

| Year | Action |
|-----------|---|
| 2005 | <ul style="list-style-type: none"> Navajo Nation requests USEPA take the lead for the NECR Cleanup. |
| 2006-2007 | <ul style="list-style-type: none"> Characterization of the Extent of Contamination at the Mine Site summarized in the Removal Site Evaluation Report. |
| 2007 | <ul style="list-style-type: none"> USEPA completed the first interim cleanup of approximately 6,000 cubic yards of contaminated soil from the yards of adjacent residences. |
| 2009 | <ul style="list-style-type: none"> USEPA completed and put out for public comment the Engineering Evaluation/Cost Analysis. Under USEPA oversight, General Electric (GE) completed a second interim cleanup of approximately 110,000 cubic yards of contaminated soils in a residential area adjacent to the NECR Mine. These soils were consolidated on a waste pile on the mine sites which was re-graded, covered with clean soil, and re-vegetated to provide stability during planning of the long-term NECR soil cleanup. |
| 2010-2011 | <ul style="list-style-type: none"> Extensive consultation with the Navajo Nation and the community on the Cleanup Plan. |
| 2011 | <ul style="list-style-type: none"> NECR Non-Time-Critical Removal Action Cleanup Plan Signed. |
| 2012 | <ul style="list-style-type: none"> Under USEPA oversight, GE completed a third interim cleanup of approximately 30,000 cubic yards in an additional residential area east of Red Water Pond Road. |
| 2013 | <ul style="list-style-type: none"> UNC Mill ROD for disposal of NECR waste at UNC Mill Site. Pre-Design Field Sampling at the NECR Mine and UNC Mill sites. |

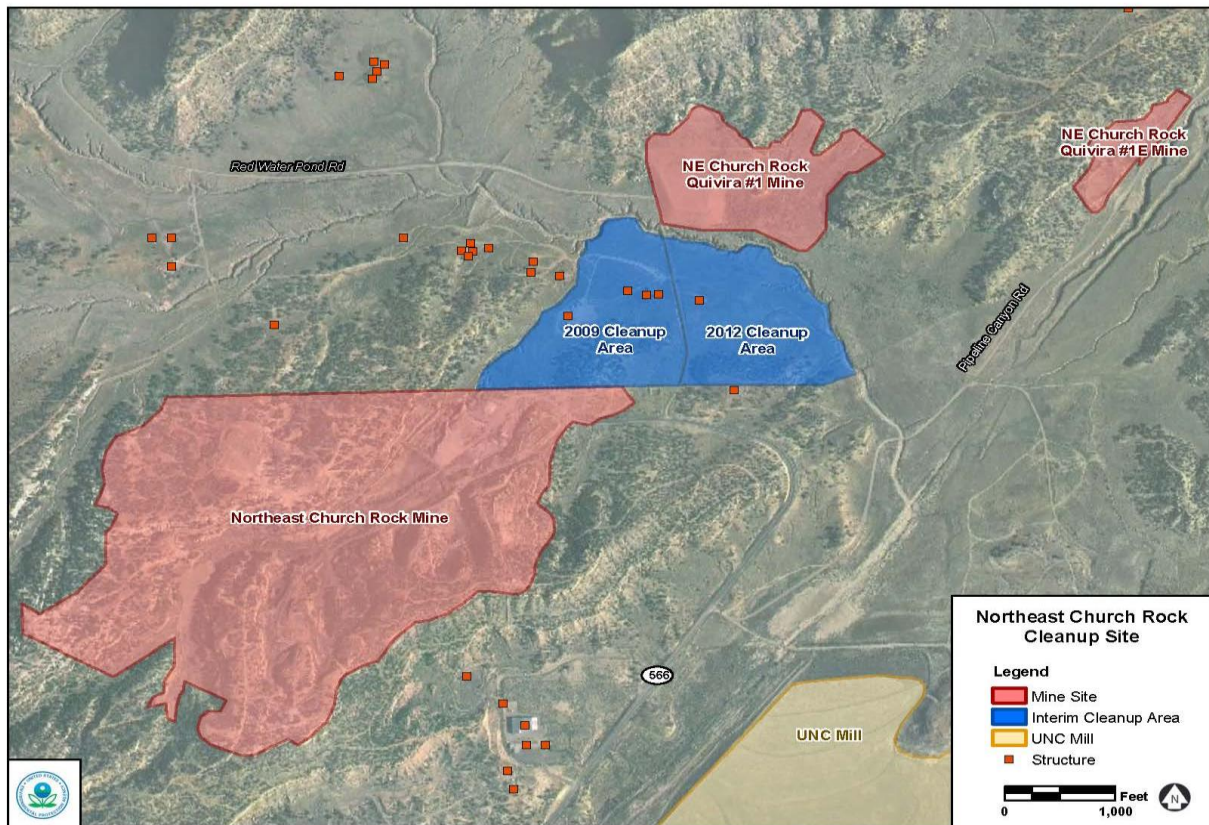


Figure 3. Northeast Church Rock Cleanup Site

2. Current Status of Work at NECR

In 2013, under federal oversight, UNC/GE completed a pre-design sampling effort on the NECR Mine and UNC Mill Sites to further inform the design process. The sampling effort helps to more accurately define the volume and characteristics of the mine waste and cover soils, as well as confirm the existing profile and properties of the UNC Mill's tailing impoundment. USEPA is currently in negotiations with UNC/GE to sign a settlement agreement to complete the NECR cleanup design process and to submit a license amendment to the NRC for review. A design review team has also been formed to coordinate the review process among the various agencies.

The design review team currently consists of USEPA Regions 6 and 9, NRC, NNEPA, NMED (regulatory agencies), and DOE. The team also includes a representative from the community assisted by a technical support representative from the Technical Assistance Services for Communities contract administered by USEPA.

3. Goals for Next Five Years

The primary goal for this Five-Year Plan is to successfully complete the design of the cleanup with input from the Navajo Nation, community, and other agencies and to begin construction cleanup activities if an NRC License Amendment is approved for the UNC Mill Site (see Figure 4).

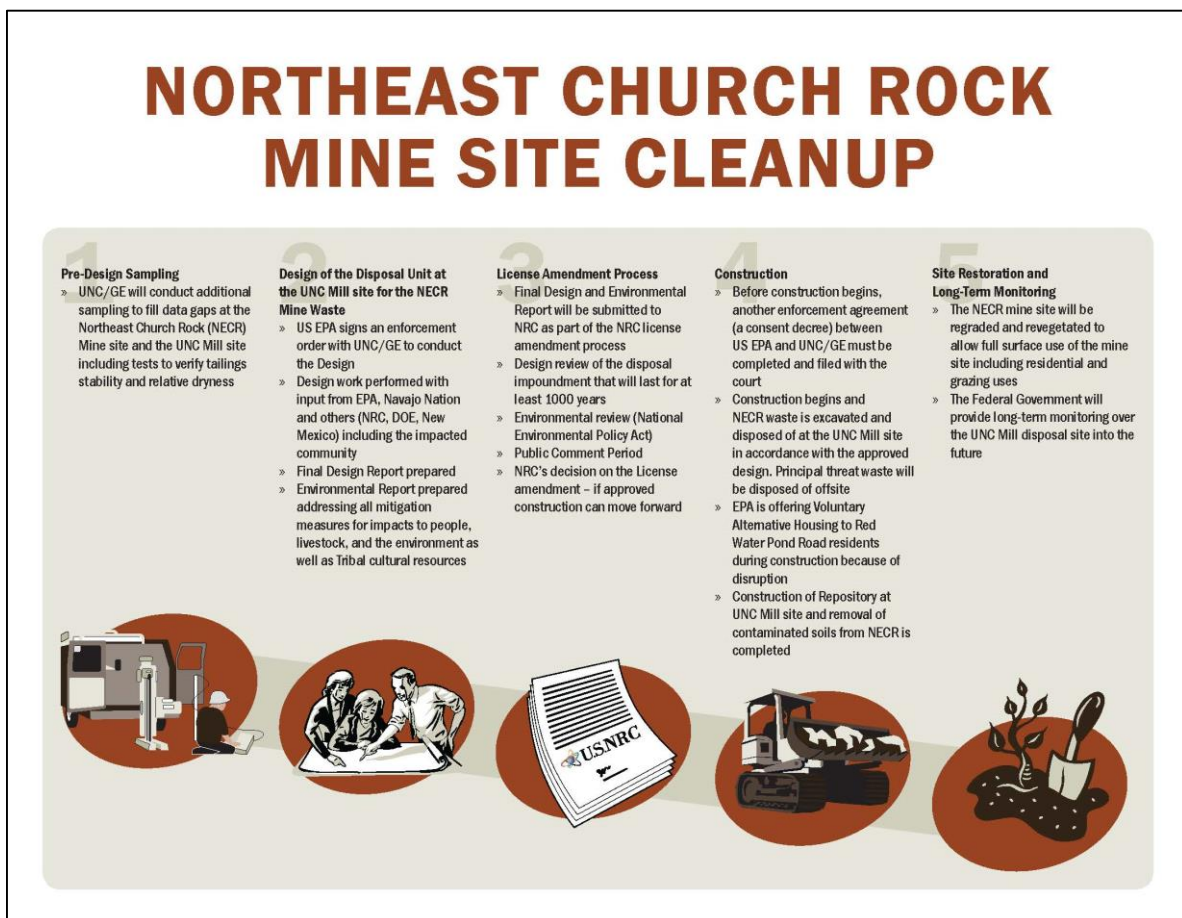


Figure 4. Cleanup Processes for the Northeast Church Rock Mine Site

4. Specific Actions for Next Five Years

During the next five-year planning period, UNC/GE is expected to initiate and complete the cleanup design under a Settlement Agreement with USEPA. UNC/GE is expected to submit the License Amendment Request to the NRC who will initiate their safety and environmental review of the request. Depending on the potential limitations and challenges discussed below, a license amendment decision may be issued before the end of the five-year planning period. If NRC approves the license amendment for the UNC Mill Site, GE could begin construction of a repository after entering into a consent decree with USEPA for the remedy construction. Finally, USEPA will work with the Navajo Nation to assess the need for additional NECR groundwater studies during the five-year planning period.

5. Potential Limitations and Challenges

There are many challenges to beginning project construction during this Five-Year Plan. Factors for potential delays in completing the cleanup design include the need for additional sampling events to fill any unanticipated data gaps identified during the design and environmental review processes.

The NRC staff estimates that completion of the safety and environmental reviews will take approximately two years after receipt of the application, assuming the information in the application is of sufficient scope and quality to allow the NRC staff to conduct its reviews. If there is a hearing for this action, the hearing process may take several years. Although the NRC can issue the license after completing its safety and environmental reviews under certain conditions, licensees may be reluctant to begin operations until the hearing is completed because the hearing can result in a reversal or modification of the NRC's decision to issue a license. Therefore, the time required from submission of the license application or amendment request to issuing or amending the license is estimated to take from two to five years, considering the safety and environmental reviews, and the hearing.

6. Status of Cleanup Work at Additional High Priority Mines

USEPA has conducted urgent cleanup actions at nine mine sites. Of these nine mine sites, five are considered high priority based on the criteria agreed on with NNEPA and described in the previous objective. These actions ranged from fencing and signage, to excavation and consolidation, to full removal and on-site disposal. These actions are described in the [January 2013 report](http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf) (<http://www.epa.gov/region9/superfund/navajo-nation/pdf/NavajoUraniumReport2013.pdf>).

In addition, USEPA signed administrative orders on consent with five responsible parties, identifying them as liable for assessment and cleanup of 25 mine claims.

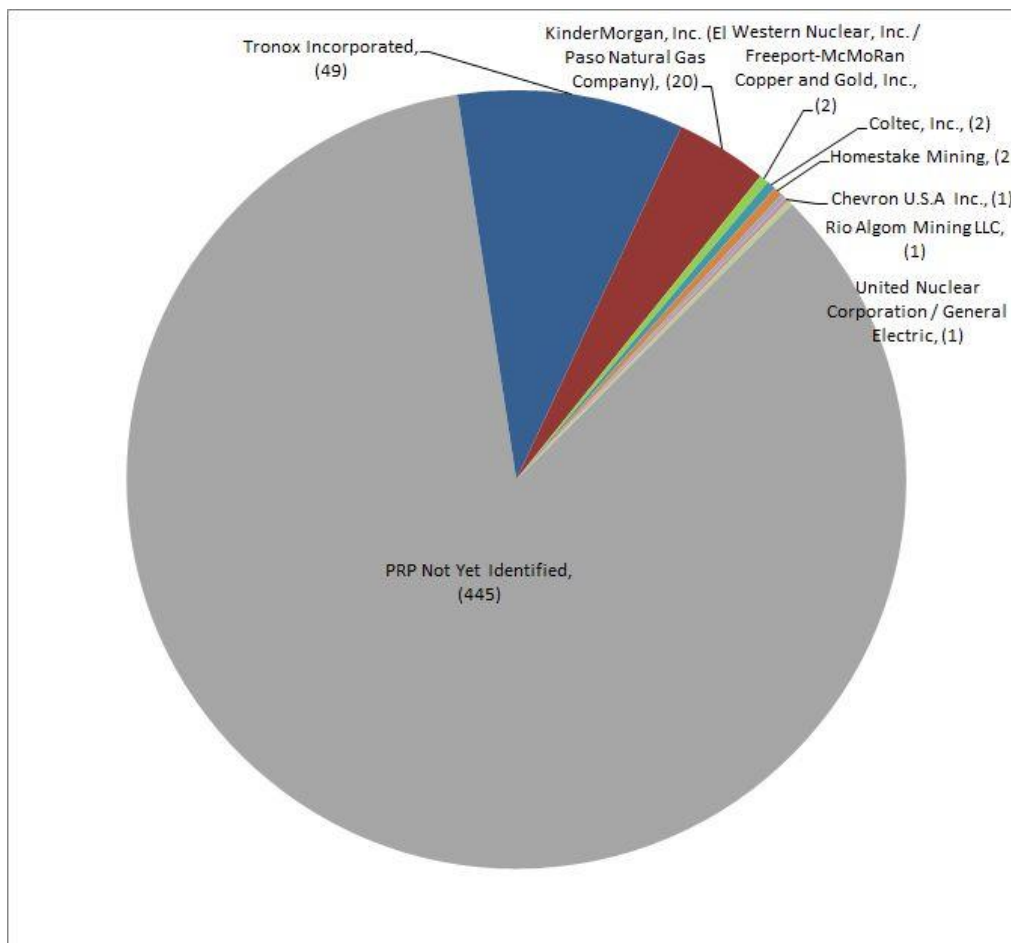


Figure 5. Identified Potentially Responsible Parties

7. Goals for Next Five Years

USEPA will continue efforts to identify responsible parties to conduct this work. USEPA currently has agreements with five parties to investigate 25 priority and other mine claims. USEPA has identified two additional responsible parties for assessment and future clean up at four mines, of which two are high priority. As described above, USEPA expects to conduct or oversee assessments first at the highest priority mine claims (up to 50). USEPA will seek to require responsible parties to conduct initial, urgent actions at sites that pose an unacceptable risk to nearby residents. Urgent actions will include activities such as fencing, signage, consolidation, and limited offsite disposal.

In addition, USEPA will prepare an addendum to this Five-Year Plan to include cleanup work for 50 mines under the Kerr McGee settlement.

8. Specific Actions for Next Five Years

USEPA or responsible parties will conduct urgent actions at sites determined to pose an unacceptable risk to nearby residents.

9. Potential Limitations and Challenges

USEPA will continue its efforts to find and work with responsible parties to pay for assessment of mines. Selection of final cleanup plans for mines is dependent on identification of suitable long-term disposal options for contaminated soil.

Objective 5: Cleanup of the Tuba City Dump Site

Federal Agencies: BIA and USEPA

Tribal Agencies: NNEPA and Hopi Tribe

1. Background

The Tuba City Dump (TCD) was used for more than 50 years as an open, uncontrolled dump receiving solid waste from local communities. During this time, the BIA maintained the TCD by covering trash and burying waste. It was the principal dump site in the Tuba City/Moenkopi area during this period. The TCD was closed to further dumping by BIA in August 1997. Information on wastes disposed of at the TCD is limited as the TCD was unmanned and unsecured. The TCD occupies land both on the Hopi Reservation and the Navajo Nation.

The TCD occupies approximately 41 enclosed acres and includes two primary disposal cells, identified as the “new disposal cell” (New Cell), and the “old disposal cell” (Old Cell). Based on studies conducted to date, it appears that dump related waste materials occupy approximately 7.7 acres of the New Cell and 13.9 acres of the Old Cell.

The BIA, the USEPA, and IHS, are working with the Hopi Tribe and Navajo Nation to address environmental concerns at the site. These concerns include persistent elevated levels of uranium, vanadium, radium 226/228, gross alpha, and beta activity, and other metals in the shallow groundwater at the site. Deeper groundwater and nearby drinking water supply wells have, to date, not exhibited elevated levels of the above constituents.

Approximately four miles northeast of the TCD is the Tuba City inactive uranium milling site (mill) that is currently being managed by the DOE under the Uranium Mill Tailings Radiation Control Act (UMTRCA) program. The Navajo Nation and Hopi Tribe have long maintained that waste from the mill was improperly disposed of at the TCD. A United States Geological Survey study, dated October 2006, suggests that the radionuclides in the shallow groundwater may be from a different formation than the native rock at the site. However, despite extensive subsurface investigations within the TCD, with a particular emphasis on the area near Monitoring Well #7 (the ground water well with the highest concentration of uranium), USEPA was not able to identify any milled material.

Since 1999, the BIA has been conducting assessment activities of uranium contamination of shallow and deep groundwater, springs, contaminant migration pathways, sources and receptors, for the purpose of formulating a final closure plan. The springs are used by the Hopi Tribe for religious and ceremonial purposes. Groundwater monitoring data indicates that uranium is present, at elevated levels, in the shallow groundwater which extends to the west and southwest of the TCD. Additionally, groundwater monitoring data has identified uranium at elevated levels in the shallow groundwater up-gradient of the TCD. This indicates that elevated uranium levels are not limited to the TCD. Other natural geochemical and topographic conditions appear to be contributing to elevated levels of uranium in the shallow groundwater.

Landfill characterization studies have not detected contamination in landfill materials at levels that constitute hazardous waste or radioactive waste. Soil vapor studies detected no hazardous waste

constituents and determined that methane was not migrating from the landfill. Both tribes want “clean closure” (removal of all waste).

2. Accomplishments at the TCD Site

Task 1: RI/FS Work Plan—In 2007, the BIA contracted to prepare the Remedial Investigation/Feasibility Study (RI/FS) Work Plan with the option for limited additional studies. The purpose of the RI/FS Work Plan was to identify the tasks and establish a schedule for a remedial investigation of the TCD and to develop remedial alternatives.

In December 2010, the RI/FS Work Plan was completed. The RI/FS Work Plan was delayed by the below listed tasks and accomplishments including: (1) the implementation of the limited additional studies; (2) the development of the Interim Action Report (IAR); and, (3) the implementation of the IAR recommendations.

Task 2: Limited Additional Studies—In 2008, based on the conceptual site model developed by BIA’s RI/FS Work Plan contractor and on information provided by the Hopi Tribe and Navajo Nation, limited additional studies and actions were necessary to assess and evaluate the potential imminent threat or risk to public health and the environment posed by the TCD.

- Additional wells were installed, including sentinel wells to assess water quality migrating from potential up-gradient sources northeast of the TCD and in Pasture Canyon, and to assess the lateral and vertical extent of potential impacts from the TCD. Two well clusters consisting of shallow and deep wells were installed on the west side of Pasture Canyon between the TCD and the Moenkopi water supply wells. These wells were intended to be used to identify any migration of potential contaminants toward the water supply wells.
- Baseline water monitoring was conducted on all 52 groundwater monitoring wells, three supply wells, seven springs, the irrigation pipeline water, and the Pasture Canyon Reservoir. In addition, discrete sampling was performed in up to 12 groundwater wells to assess water quality in near surface alluvium and bedrock. Each sample was analyzed for a comprehensive suite of analytes to differentiate differences in study background water quality and leachate from the TCD. The monitoring at the site increased the understanding of the groundwater contamination at the time and served as a snap shot in time against which to analyze migration of contaminants.
- Aquifer testing included installation of an extraction well, two observation wells, a 72-hour pump test, and slug testing of up to 19 wells.

Task 3: Interim Action Report—In 2008, in order to address data needs for the RI/FS Work Plan, limited additional studies were implemented. In August 2008, USEPA recommended that BIA complete an IAR to study the need and feasibility for conducting interim measures prior to the completion of the RI/FS. The IAR was completed in June 2009. The results of the IAR found no imminent threat to the Hopi community, water supply wells, irrigation water, springs, and seeps. Water wells west, across Pasture Canyon from the TCD were found not to be in imminent danger since groundwater appeared to migrate south-southeasterly toward Pasture Canyon.

The IAR proposed interim actions to mitigate immediate risks. These interim actions included: (1) fencing the limits of the waste in the Old Cell, (2) an investigation of the waste materials in the

vicinity of Monitoring Well 07 (MW-07) where elevated uranium readings had occurred, quarterly groundwater monitoring to monitor migration of contamination, and (3) additional supply well water studies. By August 2011, BIA completed the above actions associated with the IAR recommendations. BIA constructed a fence around the Old Cell. Through a BIA interagency agreement with USEPA, USEPA conducted the MW-07 investigation. This investigation did not find a uranium contamination source. Lastly, BIA funded the Hopi Tribe to conduct the quarterly groundwater monitoring and wellhead protection study.

Task 4: RI/FS Implementation—In June 2011, BIA began the RI/FS implementation. In July 2011, USEPA determined that the RI/FS Work Plan should be revised. From July 2011 through July 2012, BIA worked with USEPA and the stakeholders to revise the RI/FS Work Plan. The revised RI/FS Work Plan was approved in July 2012.

Radiological surveys and baseline risk assessment field efforts began in 2011 and continued through 2012 while the RI/FS Work Plan was being revised. After final approval of the RI/FS Work Plan in July 2012, the field investigation began. Under the RI field work, BIA installed and sampled an additional 46 groundwater monitoring wells (including 26 shallow wells, nine temporary shallow wells, and 11 deep wells), installed and sampled 84 sediment borings, and analyzed approximately 300 soil samples and 39 soil gas/landfill gas samples. BIA also performed additional aquifer tests, termed the Cone of Depression study, under conditions where supply wells were pumping, to assist in evaluating whether contamination from the TCD could cross Pasture Canyon and be pulled into the supply wells. These tests, and significant data on groundwater conditions and flow directions between the TCD and the supply wells, indicate that the Moenkopi water supply wells of the Hopi Tribe are not contaminated and that groundwater from the area of the TCD does not flow to the supply wells; therefore, the contamination is not able to be captured in the supply wells.

A baseline risk assessment was performed as part of the RI/FS. The purpose of the baseline risk assessment was to characterize the current and potential threats to human health. The health risk assessment evaluated chemicals of concern, exposure pathways, and potential receptors. This information was needed to determine whether a potential threat to human health or the environment exists. It will help in assessing the type of remedial actions or closure criteria to be applied at the TCD.

The BIA development of the alternatives phase of the RI/FS began during scoping when response scenarios were identified. The development of alternatives in the FS considered the remedial objectives, potential treatments, and various containment technologies that could satisfy the objectives. Screening and assembly of the technologies was based on their effectiveness, ease of implementation, and cost. The information collected in the RI was used as the basis for the alternatives presented in the FS.

3. Current Status of Work

The BIA submitted the Draft Final RI Report to USEPA on April 7, 2014 and the Draft FS Report on May 12, 2014. BIA plans to finalize the RI and FS Reports after review and comment by USEPA, Navajo Nation, and Hopi Tribe. The review and comment process is expected to take several months with finalization of both documents expected by the end of 2014.

After completion of the RI/FS Reports, USEPA will complete a ROD, the formal document that will identify the long-term cleanup remedy. Associated with this determination, USEPA will provide for a formal ROD public comment period that lasts either 30 or 60 days and hold a public hearing on its proposed cleanup remedy. After that period ends, USEPA is required to respond to public comments received and issue the ROD which formally selects the cleanup remedy to be implemented. This process should take about a year between the completion of the Final FS Report produced by BIA and the issuance of the ROD.

4. Specific Actions for Next Five Years

Once the remedy is selected, the BIA will begin the Remedial Design/Remedial Action (RD/RA) process. The RD is the phase of a CERCLA site where the technical specifications for cleanup remedies and technologies are designed. The RA follows the RD phase and involves the actual construction or implementation phase of site cleanup or remediation. The RD/RA uses the specifications outlined in the ROD to build the design and construct the remedy. The RD process is planned to take a year to be completed and approved. BIA expects to commence remedial action at the site within the Five-Year Plan window. However, the timeframe to complete the RA at TCD is heavily dependent upon the remedy selected.

Objective 6: Protection of Human Health and the Environment at Former Uranium Processing Sites

Federal Agencies: DOE and NRC

Navajo Nation Agencies: NNAML and NNEPA

1. Background

The DOE's responsibility for the four former mill sites on the Navajo Nation includes ground water remediation and long-term surveillance and maintenance. Although DOE has completed surface remediation at all four sites on the Navajo Nation, groundwater remediation continues at the Tuba City and Shiprock sites.

The NRC has oversight responsibility at the four former mill sites on the Navajo Nation that have been transferred to DOE under an NRC general license. The NRC oversees DOE as the licensee and federal agency responsible for the long-term surveillance and maintenance of the site.



Figure 6. Four Corners Area and the Navajo Nation Former Mill Sites

DOE continues to monitor the three disposal cells (Shiprock, New Mexico; Tuba City, Arizona; and Mexican Hat, Utah) to ensure they remain effective in protecting human health and the environment. DOE's long-term surveillance and maintenance (LTS&M) duties will continue at the three disposal cells for the foreseeable future. In addition, DOE has been conducting a multi-year phytoremediation pilot study at the Monument Valley site.

A site-specific long-term surveillance plan is written for each site outlining monitoring requirements and actions to be taken if erosion occurs, etc. DOE conducts annual inspections and performs routine maintenance, such as: repairing signs and fences, managing vegetation on the disposal cells (including controlling noxious weeds), repairing erosion damage on the disposal cells and property within the long-term care boundary, managing records, and conducting numerous other activities.

NRC reviews and provides comments on reports developed by DOE regarding the sites, conducts inspections of the sites in conjunction with DOE and, if DOE revises the long-term surveillance plan or ground water compliance action plan for the site, NRC will review and concur on the revision before it is implemented.

DOE recently extended its cooperative agreement with the Navajo Nation for groundwater cleanup for another five years through March 2017. DOE's Office of Legacy Management, in consultation with the Navajo Nation, has been addressing groundwater contamination at the four sites. (Note that at the Mexican Hat, Utah site, groundwater contamination is confined and the hydraulic conditions prevent the future use of groundwater within the area; therefore, no further remedial action is warranted at the site. Groundwater monitoring was also discontinued because not enough water was available to sample; however, if seeps form again, monitoring will be restarted and, depending on the sampling results, appropriate actions will be evaluated in cooperation with the Navajo Nation.)

2. Current Status of Work

Cleanup Progress

DOE funds maintenance of groundwater remediation activities and LTS&M at the four Navajo Nation sites for a cost of approximately \$4 million dollars annually. The groundwater compliance strategies are reviewed annually with the Navajo Nation to track progress toward cleanup standards in the groundwater plumes. DOE will continue to work with the Navajo Nation using the currently approved plans to complete its groundwater remediation responsibilities.

LTS&M Activities

DOE will continue to fund the Navajo Nation, under the Cooperative Agreement, to provide the resources to review and participate in DOE's activities during these long-term actions.

NRC Activities

NRC will continue conducting oversight activities at the four UMTRCA sites on the Navajo Nation. These activities include the review of annual DOE inspection reports and, for sites with ongoing groundwater remediation, the review of monitoring and performance reports. In addition, if changes to the long-term surveillance plan were proposed by DOE, NRC would review and concur on the revision. In addition to the site-specific activities at the four Navajo Nation sites,

NRC staff has been evaluating and resolving generic issues at UMTRCA Title I sites, including generic groundwater and policy issues related to UMTRCA Title I sites under DOE management that would be relevant to the Navajo Nation sites. The NRC also has a concurrence role on any cooperative agreement, or modification of cooperative agreement, DOE proposes to enter with the Navajo Nation, other Native American Tribe, or State for these sites, which obligation will be fulfilled, as appropriate, after these agreements are submitted to the NRC for review.

3. Goals for Next Five Years

- a.** Update the groundwater compliance strategy at Shiprock, New Mexico and evaluate different treatment options for the Tuba City, Arizona site.
 - i.** DOE will update the groundwater model and review the condition of existing monitoring wells at Tuba City.
 - ii.** DOE will work with the Navajo Nation to revise the groundwater compliance strategy by proposing new alternatives for Shiprock and Tuba City (2014). This will include working with the NRC to obtain its concurrence on the revised strategies.
 - iii.** DOE will continue its evaluation of naturally occurring groundwater constituents, such as those at Many Devils Wash, which appear to have been erroneously attributed to uranium milling. If such evidence continues to be supported by research results from DOE and evaluations by other independent agencies, groundwater efforts in the wash may end, although all parties agree that Many Devils Wash will not be an acceptable source of drinking water. Any changes to DOE's groundwater compliance approach (including changes to treatment actions in the wash) will be documented in an update to the Groundwater Action Plan, which requires Navajo Nation and NRC approval.
 - iv.** The NRC will conduct oversight activities at the four UMTRCA Title I sites on the Navajo Nation in accordance with NRC's responsibilities under the NRC regulations and the Atomic Energy Act and the UMTRCA. When DOE updates the compliance strategy at the Shiprock and Tuba City sites, NRC will review and concur, as appropriate, on any revisions DOE contemplates for the groundwater compliance activities. In addition, NRC has reviewed and provided comments on the DOE phytoremediation pilot project at the Monument Valley site and if DOE proposes to revise the Groundwater Compliance Action Plan (GCAP) for the site, the NRC will review and, if appropriate, concur on the revised GCAP.
- b.** DOE will continue to work with IHS and provide technical support as requested. In addition, DOE will work with IHS to hold joint workshops, as needed, to inform the public of the effectiveness of the mitigation of risks of radiation from uranium mill tailings.
- c.** DOE will work with the Navajo Nation to create and implement an outreach and communication plan. This will include activities such as continuing to work with Diné College, supporting summer interns, and developing an online media page. DOE's actions will be integrated with the broader interagency communication effort.
- d.** DOE will continue to support NNEPA's use of legally available Highway 160 funds to remediate mill site-related contamination in Tuba City, near the mill site. DOE funded the Navajo Nation through a cooperative agreement to conduct the remediation of the Highway 160 site, which was completed in 2011. The NRC reviewed the completion report and concurred that the cleanup met the 40 Code of Federal Regulations Part 192 cleanup

standards. The Navajo Nation is using remaining funds to remediate several structures that have mill site-related contamination. DOE will support the Navajo Nation by opening and operating the Grand Junction Disposal Cell for the disposal of the radiologically contaminated material. In addition, DOE will continue to offer and provide technical support to facilitate the remediation and hauling of the material for final disposal.

4. Specific Actions for Next Five Years

During the next five years, DOE plans to revise the groundwater compliance strategies for both the Shiprock and Tuba City disposal sites, as follows:

- Propose treatment alternatives and a revised groundwater compliance strategy at Tuba City.
- Develop strategies to enhance natural flushing in the floodplain aquifer and update the terrace strategy at Shiprock.
- Work with the Navajo Nation on selecting and implementing revised compliance strategies.
- Request NRC review and support their concurrence on the revised groundwater treatment approaches.
- Continue groundwater remediation at the Shiprock and Tuba City Disposal sites during this process.

During the next five years, the NRC will continue its oversight activities at the four UMTRCA sites on the Navajo Nation pursuant to its responsibilities under UMTRCA. The NRC will review DOE's treatment alternatives and revised ground water compliance strategies for the Tuba City and Shiprock sites and will work with DOE to address any issues that the NRC staff identifies during its reviews. If appropriate, the NRC will concur on the revised ground water compliance strategies before they are implemented by DOE.

In addition, DOE will work with NNEPA on a mutually agreed upon schedule to accept mill-site-related materials from any further cleanup using Highway 160 funds.

5. Potential Limitations and Challenges

Tuba City, Arizona Disposal Site—Due to the small amount of groundwater and long ground water travel times, the Tuba City disposal site's groundwater treatment system has not performed as expected. DOE has been pumping and treating groundwater at the Tuba City site for over ten years. The extraction rate of groundwater is very limited due to the slow travel times for the groundwater, and the small amounts of groundwater available in the aquifer. Although the treatment system has successfully removed uranium and other contaminants, this has had little effect on groundwater concentrations such that progress towards the compliance goal is not measurable. Studies have shown that the groundwater plume moves so slowly that it may never reach a point of exposure in Moenkopi Wash. During this Five-Year Plan, other alternatives to pumping and treating contaminated groundwater will be assessed.

Shiprock, New Mexico Disposal Site—During the first Five-Year Plan, DOE acquired a significant amount of data on the natural system and has a better understanding of the hydrology at the Shiprock disposal site; during Fiscal Years 2015 and 2016, DOE will continue working with the Navajo Nation to revise and update the GCAP to include this information. Challenges at the Shiprock Disposal Site include: 1) reaching agreement on a revised strategy for enhanced natural

flushing of the alluvial aquifer; 2) evaluating the need for continued active remediation on the terrace; 3) continuing a robust monitoring and technical data-collection program to support understanding system performance; and, 4) clearly communicating environmental risks to community members and others interested in or affected by the site.

Objective 7: Health Studies

Federal Agencies: IHS and ATSDR

Navajo Nation Agency: NNEPA

1. Background

Over the period of the last Five-Year Plan, the following was accomplished:

- a. University of New Mexico performed a study funded by the National Institutes of Health, on relationship between uranium in drinking water, kidney disease, and diabetes. Data from the study informed policy changes regarding uranium mining and remediation. The Navajo Area IHS participated in the study.
- b. Navajo Area IHS implementation of a Community Uranium Exposure Journey to Healing (CUEJTH) program consisting of medical screening of individual health histories and health status, and the provision of community based education and information gathering services across the Navajo reservation.
- c. Navajo Area IHS Radiation Exposure Screening and Education Program (RESEP) services funded by a Department of Health and Human Services, Health Resources and Service Administration (HRSA) grant targeting potentially compensation eligible individuals as a result of the RECA.
- d. Navajo Area IHS staff collaboration with the Navajo Nation Division of Health Epidemiology Program on a Navajo Nation cancer report and designation by the Epidemiology Program of a lead epidemiologist to work on uranium related issues.
- e. CDC-ATSDR collaboration with the Navajo Area IHS to conduct health care provider training on the impact of uranium and other heavy metals on the health of individuals.
- f. CDC-ATSDR funding provided to the University of New Mexico, the Navajo Nation Division of Health, and the Navajo Area IHS to implement a Navajo Birth Cohort Study of the health effects of non-occupational exposure on pregnancy outcomes and infant health.

2. Current Status of Work

The above items b, c, d, and f are currently ongoing activities.

3. Goals for Next Five Years

- a. Provision of Community Based Services.
 - i. Listen to community concerns and provide location specific health education to community residents.
 - ii. Provide medical screening evaluations to non-occupationally exposed individuals.
 - iii. CDC-ATSDR will provide community education materials (such as environmental health “frequently asked questions”), handouts, and resources.
 - iv. IHS will transfer health information from medical screening evaluations to each individual’s medical home health record.

- b. Provision of RESEP services. IHS will provide services as identified in the HRSA grant's Scope of Work to individuals with potentially compensable health conditions.
- c. Collaboration with the Navajo Nation Division of Health Epidemiology Program. IHS and ATSDR will work with the Navajo Nation's Division of Health Epidemiology Program supporting its efforts to:
 - Evaluate various cancer case rates by geographic location of cancer patient's residence and known radiation exposure sources.
 - Evaluate the health status of descendants of uranium miners/mill workers.
 - Evaluate the potential for a longitudinal human health impact study (as requested by the Navajo Nation to include physical, psychological and social parameters).
- d. CDC-ATSDR funded Navajo Birth Cohort Study.
 - i. Continue and complete work on the Navajo Birth Cohort study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program, and Navajo Area IHS.
 - ii. Consider the viability of expanding the laboratory component of the study.
 - iii. Conduct outreach education about study results to participants and Navajo Nation leaders and others at community gatherings.
 - iv. Develop a sustainability plan to evaluate the potential for follow up and/or surveillance of children from the Birth Cohort study beyond the research study period (with guidance and input from the Navajo Nation).
- e. Health Care Staff Training. Provide continuing education sessions to Navajo Nation hospital/clinic healthcare and community based staff.

4. Specific Actions for Next Five Years

Specific actions for the next five years within existing resources will include the provision of community based services by IHS staff as outlined in this plan under Objective 7 (Health Studies), item 3.a. (Goals for Next Five Years).

For the CDC-ATSDR funded Navajo Birth Cohort Study, the following actions are planned for the next five years within existing resources.

- Continue and complete work on the Navajo Birth Cohort Study in cooperation with the University of New Mexico, the Navajo Nation Community Health Representative Program and Navajo Area IHS.
- Continue outreach to potential study participants to achieve recruitment target of 1500 enrolled mothers and their infants.
- Consider the viability of expanding the laboratory component of the Birth Cohort Study to include other analytes such as polycyclic aromatic hydrocarbons.
- Disseminate study results to participants and Navajo Nation leaders and others at community gatherings.
- Continue to conduct developmental assessments of infants enrolled in the study at 2, 4, 6, 9 and 12 months.

- With guidance and input from the Navajo Nation, develop a sustainability plan to evaluate the potential for follow up and/or surveillance of children from the Birth Cohort Study beyond the research study period.

5. Potential Limitations and Challenges

The IHS will communicate through the U.S. Department of Health and Human Services American Indian / Alaska Native Health Research Advisory Council (HRAC) the needs for research as expressed by the Navajo Nation in order to attempt to overcome existing challenges through better communication and coordination with HRAC Federal partners.

Potential limitations for the Navajo Birth Cohort Study include on the ground recruitment of study participants.

Cross Cutting Strategies

Enhanced Coordinated Outreach and Education

Federal Agencies: All Federal Agencies

Navajo Nation Agencies: All Navajo Nation Agencies

1. Background

Based on experience gained during the last five years, in-person outreach and education play a very important role in informing residents about the potential impacts of exposure to radiation, radon, radium, uranium, and other heavy metals. The federal and Navajo Nation agencies have achieved success reaching out to residents by attending Chapter meetings and holding periodic stakeholder workshops. They have found it is most helpful to the Nation when representatives from agencies coordinate outreach efforts so that a multitude of issues raised by residents can be addressed by the appropriate representative. A coordinated outreach approach is outlined below.

2. Goals for Next Five Years

- a. Create a Community Outreach Network consisting of representatives from relevant federal and Navajo Nation agencies (including but not limited to: USEPA, NNEPA, NNAML, DOE, IHS, ATSDR, NRC, BIA). The Network will meet on a regular basis and support the following:
 - i. Community Outreach Coordinator who will lead the Network and who will be located on the Navajo Nation.
 - ii. A physical location that serves as an office and visitors' center where people can obtain information about uranium-related issues from all of the agencies involved in this effort. The office will be staffed by the Community Outreach Coordinator.
 - iii. Maintain a master outreach calendar that tracks outreach events planned by each agency.
 - iv. Develop an easily accessible website with relevant information regarding uranium issues with links to resources provided by all agencies.
 - v. Plan and organize two stakeholder workshops per year. Workshops will be located in different geographic locations on the Navajo Nation and will cover topics relevant to the interest in the area. Workshops will be planned with assistance from local grassroots organizations.
 - vi. Conduct a face-to-face community information effort by communicating with Navajo and Hopi residents in their homes and in small groups.
 - vii. Conduct a proactive media relations effort that educates reporters about uranium-related issues so they can disseminate that information to local residents through the news media.
 - viii. Develop a poster of relevant information regarding uranium mines, health and water impacts to be placed in health clinic waiting rooms and Chapter houses.
 - ix. Create a "Radiation 101" workshop that can be provided to Chapters at their request.
 - x. Develop a fact sheet that includes information and contacts from various agencies (e.g., RECA, safe drinking water, homes scans, and abandoned uranium mine areas).

3. *Specific Actions for Next Five Years*

- Draft a budget for the Network.
- Select outreach coordinator.
- Form outreach network and hold two to three meetings.
- Obtain an office space on the Navajo Nation.
- Develop master outreach calendar.
- Hold two workshops per year on the Navajo Nation.
- Create website of relevant information.
- Place relevant resources in the Community Outreach Office.
- Advertise availability of resources at the office.
- Develop and conduct “Radiation 101” workshops when requested.
- Begin needs assessments in affected chapters.

Workforce Development and Training

Federal Agency: USEPA

Navajo Nation Agency: NNEPA

1. Background

The actual work on the ground at various sites has identified the need for additional resources and attention to job training and workforce development for Navajo community members. The various cleanup actions to date mobilized federal government employees, Navajo Nation employees, and federal and Navajo Nation contractors. These projects highlight the opportunity to provide meaningful and safe involvement of Navajo community members as remediation project workers at future cleanup projects.

2. Current Status of Work

In summer of 2012, the Navajo Nation was the site for a USEPA Superfund Job Training Initiative project and 19 Navajo community members successfully completed the training. Currently, the NNEPA is partnering with the Northern Arizona University Institute for Tribal Environmental Professionals on an environmental workforce development and job training program from USEPA's Brownfields Program. An initial class of 20 Navajo community members will begin a training program in 2014.

3. Goals for Next Five Years

In 2013, USEPA selected Northern Arizona University for an Environmental Workforce Development and Job Training grant for \$215,000. Through its Institute for Tribal Environmental Professionals, Northern Arizona University plans to train students and place 35 graduates in environmental jobs, and track graduates for one year. The core training program includes 142 hours of instruction in 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER), radiological technician training, construction safety, hazardous materials safe handling, and orientation to environmental cleanup. A total of three federal certifications will be offered. The university is targeting unemployed residents of the Navajo Nation, particularly those living in communities impacted by uranium mining and cleanup activities. Key partners include Navajo Nation Department of Workforce Development, NNEPA, Navajo Nation Office of Economic Development-Church Rock and Shiprock Chapters, and Navajo Nation Council Delegates.

Training Schedule

| Year | Task |
|-------------|--|
| Year 1 | <ul style="list-style-type: none">▪ Orientation to Environmental Cleanup, April 2014▪ Hazardous Materials Safe Handling, April 2014▪ 40-Hour HAZWOPER, April 2014▪ Radiological Technician, May 2014▪ Occupational Safety and Health Administration (OSHA) Construction Safety, May 2014 |
| Year 2 | <ul style="list-style-type: none">▪ Orientation to Environmental Cleanup, April 2015▪ Hazardous Materials Safe Handling, April 2015▪ 40-Hour HAZWOPER, April 2015▪ Radiological Technician, May 2015▪ OSHA Construction Safety, May 2015 |

APPENDIX A:

This statement was provided by the Navajo Nation.

The Navajo people, or the Diné, have an obligation under the Diné Fundamental Law to respect, preserve and protect Mother Earth as stewards and guardians for the benefit of future generations. The Fundamental Law is codified in 1 Navajo Nation Code (N.N.C.) §206.

The Fundamental Law is comprised of Natural Law, Traditional Law, Customary Law, and Common Law. 1 N.N.C. §§201-206. There is a Diné world view and concept of and relationship between the environment and the natural elements of life. The Diné world view is strongly linked to the use of core ancient Diné principles and values which should guide environmental reclamation, restoration and related activities.

The Diné know that all things have within them the capability of both *hozhooji* (good or goodness) and *hashkeji* (bad or badness), and that both must be balanced to achieve beneficial results. This balance, known by the Navajo word *hózhó*, meaning harmony, is disrupted when natural laws are not observed. In Western science, this is known as a state of equilibrium, in which opposing forces balance each other out and stability is attained and maintained.

The Diné journey narratives speak of two Hero Twins that set about dealing with the Monsters. Confrontations with certain of these Monsters, such as hunger and poverty, led to accommodations to allow them to live for the benefit of the People.

Navajo elders have taught that uranium, or *leetsó* (literally, “the dirt that is yellow”), is one of these Monsters - a powerful element that can disrupt *hózhó* when it is misused or disrespected. Certain substances in Mother Earth are not to be disturbed from their resting places, and “the people now know that uranium is one such substance”. 18 N.N.C. §1301.D.

Since *leetsó* has been disturbed by past mining and processing activities, Navajo natural laws charge the Diné with seeking ways to return *leetsó* to its natural balance with Mother Earth so that it does not further harm the sacred elements or the sacred balance of life.

On May 7, 2012, Ben Shelly, President of the Navajo Nation, created a Uranium Task Force to coordinate activities relating to the economic, health and environmental impacts of past uranium mining and processing, and to “promote and achieve cleanups and remediation actions that are most protective of human health and the environment ...”

On November 4, 2013, the Navajo Nation Uranium Task Force unanimously adopted a resolution supporting the formation of a commission or advisory board which would be responsible for offering advisory opinions on appropriate remediation options at abandoned uranium mine sites and former uranium mill sites located in Navajo Indian Country. The Task Force recommended that the commission be guided by the principles of Diné Fundamental Law, 1 N.N.C. §§201-206. The commission also will give full consideration to the comments and opinions of the citizens of the Navajo Nation. The resolution has been submitted to the Navajo Nation President and the Navajo Nation Council for review and possible action.

The Navajo Nation supports the efforts of the United States Government to restore *hózhó* by addressing the impacts of past uranium mining and processing in Navajo Indian Country. Such efforts should continue in alignment with the Diné Fundamental Law and with full participation of the citizens of the Navajo Nation.