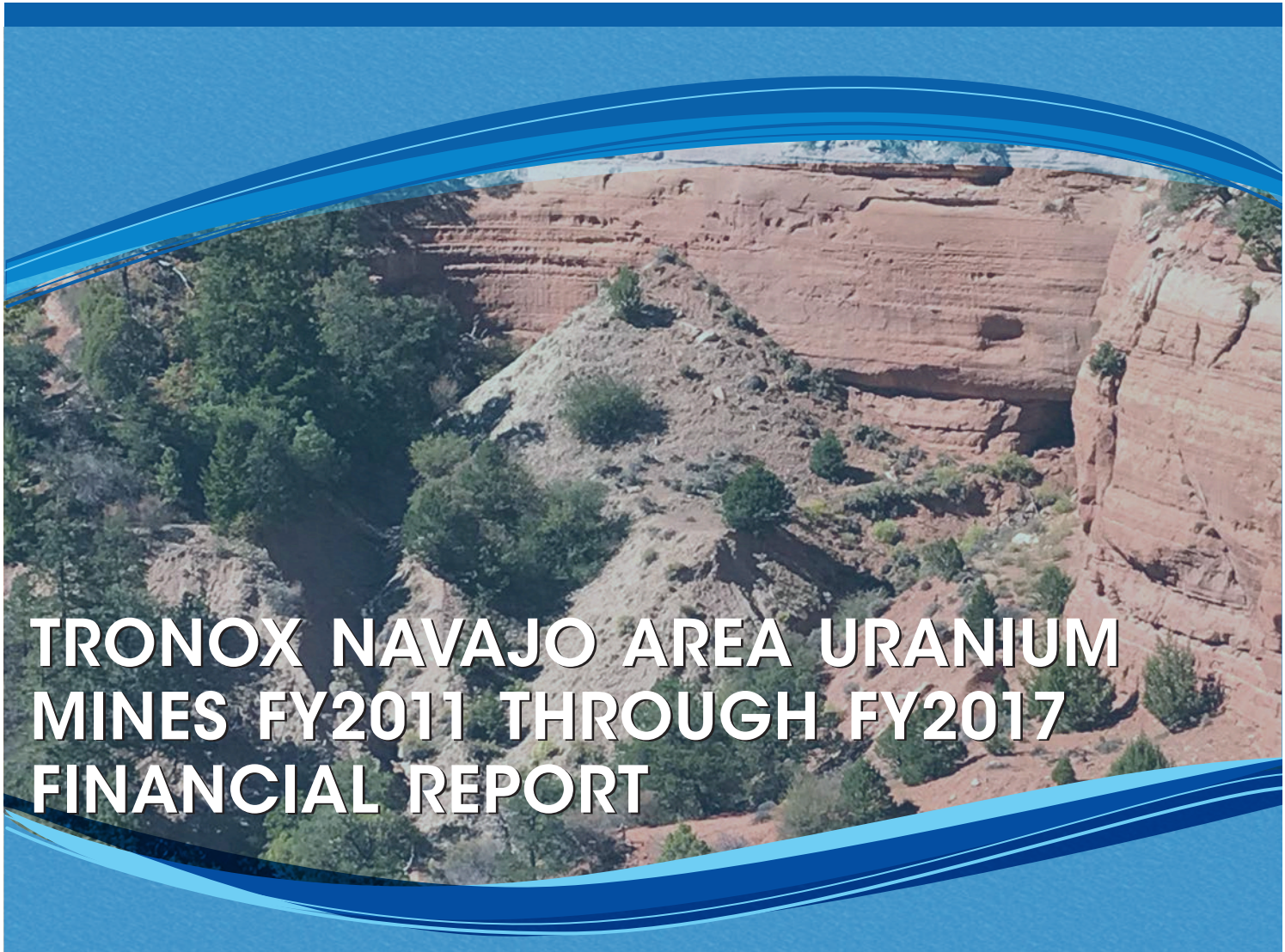

TRONOX NAVAJO AREA URANIUM MINES FY2011 THROUGH FY2017 FINANCIAL REPORT

United States Environmental Protection Agency

Tronox Navajo Area Uranium Mines
April 2019

Contents


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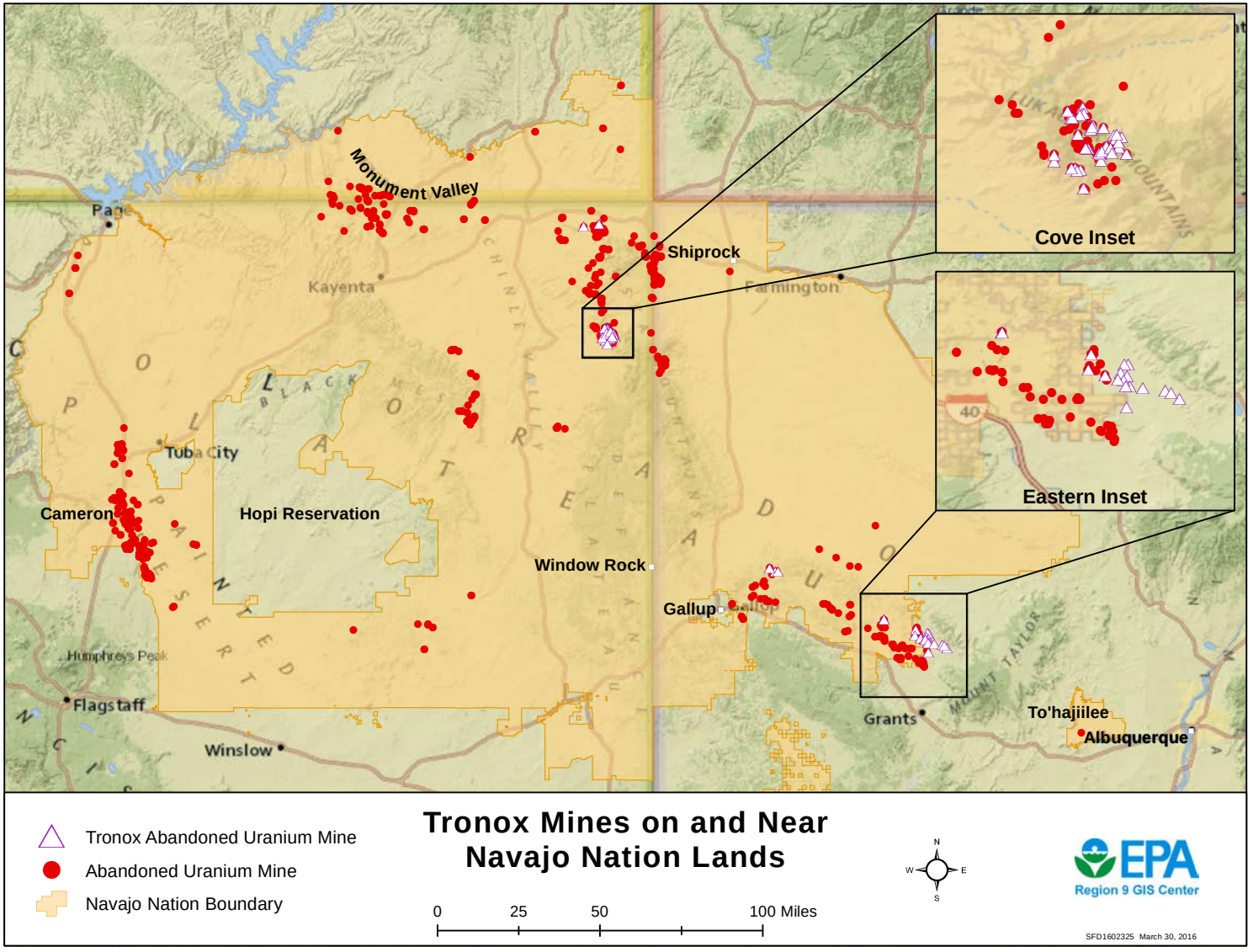
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1.0 Tronox Settlement Background

Background

On January 21, 2015, the Tronox Settlement agreement resolving fraudulent conveyance claims against Kerr-McGee Corporation and related subsidiaries of Anadarko Petroleum Corporation went into effect. Pursuant to the settlement agreement, Anadarko paid $5.15 billion plus interest to the litigation trust on January 23, 2015.

As a Result of the Tronox Settlement:

- USEPA received a distribution of 20% (~$917 million) for the cleanup of 54 uranium mines that were operated, and subsequently abandoned, by Kerr-McGee in and near the Navajo Nation territory;
- USEPA also received a distribution of 2% (~$92 million) for the cleanup of Northeast Church Rock Quivira Mine Site; and
- Navajo Nation also received a distribution of 1% (~$45 million) in connection with the Shiprock Uranium Mill Site.

From the late 1940s to the 1980s, Kerr-McGee Corporation mined more than seven million tons of uranium ore on or near the Navajo Nation. About 32 of these mines are located in the Cove and Lukachukai Chapters. Other mines are located in the Teec Nos Pos, Coyote Canyon, Casamero Lake, and Baca/Prewitt Chapters. There are 20 former Kerr-McGee former Kerr-McGee mines that are located in the Ambrosia Lake area that have impacted the Navajo Nation.

USEPA Tronox funds can be used to support activities related to the assessment and cleanup of the 54 Tronox Settlement mines and contamination caused by the mines. Examples of these activities include:

- Informing and involving the community
- Investigating radiation levels in water, soil, sediment, and air
- Putting up fences and signs to warn people about dangerous areas
- Protecting cultural and biological resources in the mine areas
- Constructing access roads to the mines for cleanup operations
- Closing mine openings and address other physical hazards

USEPA Tronox funds cannot be used for these activities:

- Paying people who worked at the mines or lived nearby (some compensation for mine workers is available through the Radiation Exposure Compensation Act of 1990)
- Projects not related to Tronox mine cleanup or mine impacts

2.0 USEPA Tronox Settlement Financial Expenditure Breakout FY2011 through FY2017

The approximately $1 billion in funds that USEPA received for the cleanups at 54 Tronox Navajo Area Uranium Mines has been deposited into a USEPA Superfund Special Account. In accordance with Section 122(b)(3) of CERCLA, the Agency may establish a special account when USEPA receives funds pursuant to an agreement with a Potentially Responsible Party (PRP). Special accounts are site-specific, interest-bearing sub-accounts housed within USEPA's Hazardous Substances Superfund (Superfund Trust Fund). Charges to a special account must be consistent with the terms of the settlement pursuant to which the funds are received.

The USEPA (Regions 6 and 9), the Navajo Nation, and the state New Mexico meet several times a year to discuss prioritizing response actions and the funding of projects at each Tronox NAUM site. Other agency stakeholders may also be invited to these meeting. The agencies strive to develop a coordinated prioritized project list along with estimated funding requirements for the following calendar year. Once information about individual project proposals have been presented and discussed in the USEPA, Navajo Nation, and New Mexico annual prioritization meeting, this project list is memorialized in an annual "Approval and Annual Funding Projections for Implementation of Tronox Settlement Memo." The memo is presented to the USEPA Region 6's Branch Chief, Technical and Enforcement Branch, Superfund Division, for concurrence and then to the approving official, USEPA Region 9's Assistant Director, Superfund Division, for signature. Once projects are approved, a special account name/number is created for that project to track expenditures. Table 2.1 summarizes approved Tronox projects by special account name, budget, expenditures, and balance.

These expenditures are further broken out into the following expenditure categories.

Labor: Labor cost associated with the assessment and cleanup of the mine/mine areas specified in the Tronox Settlement.

- **On Scene Coordinator** – directing cleanup contractors
- **Remedial Project Manager** – overseeing cleanup
- **Legal** – reviewing documents and attending meetings
- **Technical Enforcement** – PRP search activities
- **Community Involvement** – fact sheets; CIP; public meetings
- **Contracting** – issuing contracts and developing cost packages
- **Administrative Assistant** – site related travel; mailings; meetings coordination
- **Management** – conducting meetings with counsel, program, enforcement, community relations, contracts, and/or finance; reviewing site related documents; management briefings

Travel: Travel cost associated with the management, assessment, and cleanup of the mine/mine areas specified in the Tronox Settlement.

Contracts: Contracting costs associated with the assessment and cleanup of the mine/mine areas specified in the Tronox Settlement.

Expenses: Expense costs for equipment, property, supplies, and materials associated with the assessment and cleanup of the mine/mine areas specified in the Tronox Settlement.

Grants: Grants associated with the management assessment and cleanup of the mine/mine areas specified in the Tronox Settlement.

Figure 2.1 is a graphical representation of Tronox Expenditures by Category FY2011 through FY2017 and Table 2.2 that follows is a further breakdown of those expense categories by approved project.

Table 2.1: USEPA Tronox and Quivira Approved Projects, Budgets, and Expenditures FY2011 through FY2017

An overview of the approved projects and activities associated with these expenditures is located in Section 3.

Special Account Summary

Special Account Names	Total Budget	Total Expenditures	Remaining Balance
USEPA Region 6			
Tronox NAUM	$4,265,250.00	$2,473,421.00	$1,791,828.59
Tronox NAUM East GSA	$2,302,625.00	$1,947,801.11	$354,823.89
Tronox NAUM West GSA	$1,774,625.00	$1,445,594.49	$329,030.51
Tronox NAUM Central GSA	$2,124,800.00	$745,294.50	$1,379,505.50
Tronox NAUM S18 Mine Residential Removal	$100,000.00	$30,604.95	$69,395.05
Tronox NAUM Section 10	$167,000.00	$302.47	$166,697.53
Tronox NAUM Section 33	$50,000.00	$0.00	$50,000.00
USEPA Region 9			
Abandoned Uranium Mines on the Navajo Nation	$3,356,943.86	$3,356,943.86	$0.00
NE Churchrock Quivira Mines	$91,558,172.20	$7,004,619.85	$84,553,552.35
Cove Transfer Station - Tronox	$4,646,998.29	$3,730,533.08	$916,465.21
Mesa I Mines - Tronox	$9,413.59	$9,413.59	$0.00
Section 32 AUM Site - Tronox	$1,961,202.44	$1,463,939.47	$497,262.97
Section 33 AUM Site - Tronox	$569,782.38	$70,725.32	$499,057.06
Tronox NAUM Cove Wash Regional Assessment	$4,102,910.89	$3,633,640.94	$469,269.95
Tronox Navajo Area Uranium Mines	$890,703,214.90	$7,776,138.37	$882,927,076.53
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	$2,500,000.00	$662,872.95	$1,837,127.05
Sum	**$1,010,192,938.55**	**$34,351,846.36**	**$975,841,092.19**

Figure 2.1: Tronox Expenditures Breakout by Cost Category for February 2011 through September 2017

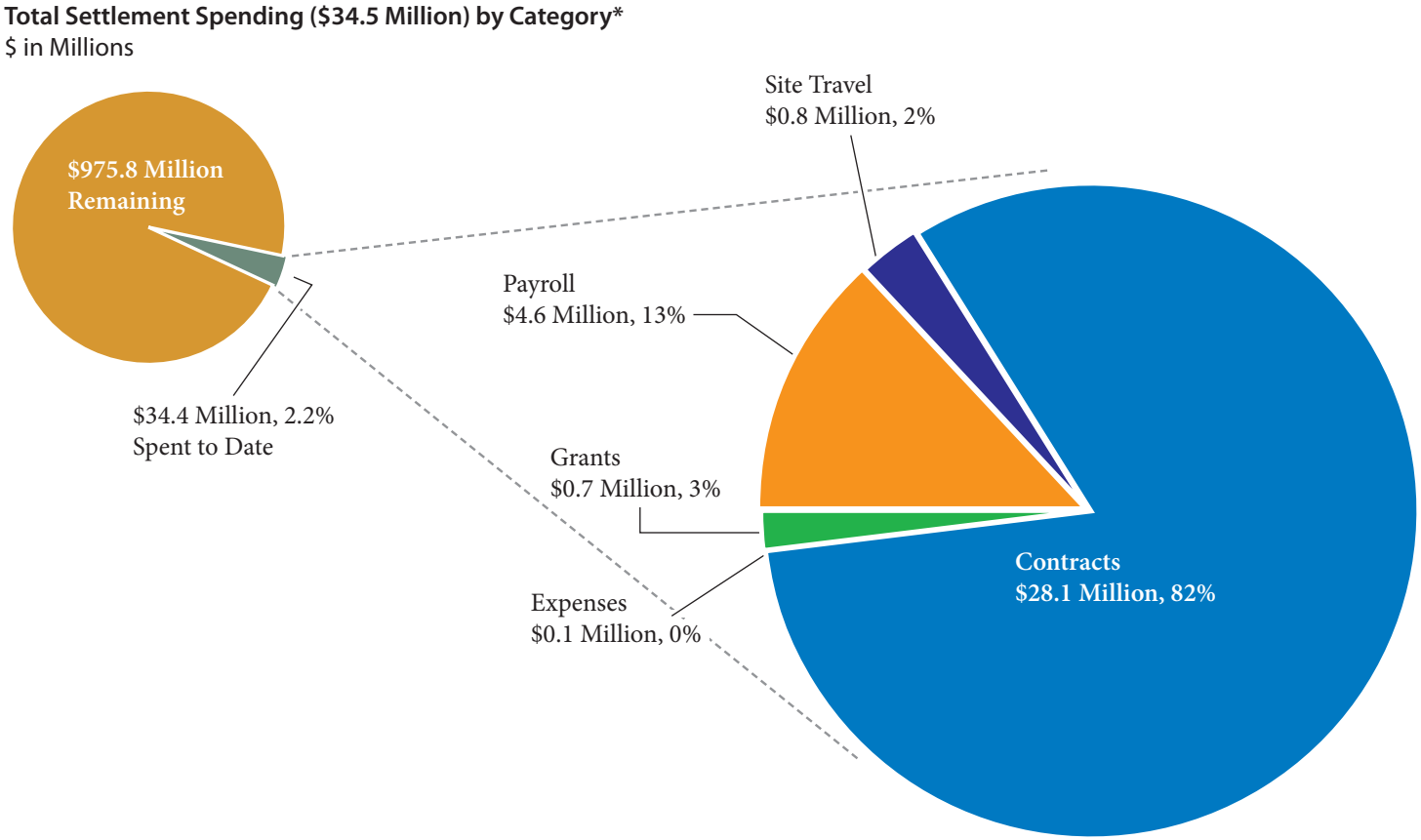


Table 2.2: Breakout of Tronox and Quivira Expenditures Categories for Approved Projects FY2011 through FY2017

Special Account Summary

Special Account Names	Contracts	Expenses	Grants	Payroll	Site Travel	Total Spent
USEPA Region 6						
Tronox NAUM	$1,874,840.99	$0.00	$221,811.00	$462,482.79	$100,704.63	$2,659,839.41
Tronox NAUM East GSA	$1,682,374.23	$0.00	$0.00	$213,838.59	$51,588.29	$1,947,801.11
Tronox NAUM West GSA	$1,296,445.56	$0.00	$0.00	$112,172.83	$36,976.10	$1,445,594.49
Tronox NAUM Central GSA	$700,000.00	$0.00	$0.00	$33,169.33	$12,125.17	$745,294.50
Tronox NAUM S18 Mine Residential Removal	$30,000.00	$0.00	$0.00	$604.95	$0.00	$30,604.95
Tronox NAUM Section 10	$0.00	$0.00	$0.00	$302.47	$0.00	$302.47
Tronox NAUM Section 32/33	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
USEPA Region 9						
Tronox AUM on the Navajo Nation (Bankruptcy)	$1,830,727.68	$5,995.46	$191,951.00	$1,213,404.09	$114,865.63	$3,356,943.86
Tronox Quivira Mines	$6,436,961.55	$3,197.12	$57,733.00	$436,442.36	$70,285.82	$7,004,619.85
Tronox Cove Transfer Station	$3,617,524.02	$69.66	$4,314.00	$74,890.13	$33,735.27	$3,730,533.08
Tronox Mesa I Mines	$0.00	$0.00	$0.00	$7,376.05	$2,037.54	$9,413.59
Tronox Section 32 AUM Site	$1,437,719.71	$167.69	$0.00	$20,294.23	$5,757.84	$1,463,939.47
Tronox Section 33 AUM Site	$69,068.13		$0.00	$560.57	$1,096.62	$70,725.32
Tronox NAUM Cove Wash Regional Assessment	$2,512,409.93	$3,309.53	$386,543.00	$609,585.62	$121,792.86	$3,633,640.94
Tronox Navajo Area Uranium Mines	$6,038,432.99	$76,456.47	$22,995.00	$1,392,440.46	$245,813.45	$7,776,138.37
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	$598,381.20	$0.00	$0.00	$52,629.08	$11,862.67	$662,872.95
Total	**$28,124,885.99**	**$89,195.93**	**$885,347.00**	**$4,630,193.55**	**$808,641.89**	**$34,538,264.36**

Spent amounts are the sum of commitments, unliquidated obligations, and expenditures.

Tronox and Quivira Contracting Expenditures (FY2011 through FY2017) ($28.1 Million) by USEPA Region, Approval Projects, and Contract Type

Since the Tronox settlement in 2011, USEPA has been utilizing existing contracts to conduct cleanup activities, which allowed the Agency to expeditiously achieve our goal of protecting human health and the environment on the Navajo Nation. These existing contracts include:

- **START Contract**: Superfund Technical Assessment and Response Team – provides scientific/technical support for chemical, biological, radiological and nuclear events as well as site assessment, Brownfields, and remedial support activities.
- **ERRS Contract:** Emergency and Rapid Response Services – provides management, field personnel, and equipment resources to execute decontamination and demolition, containment measures, and removal services.
- **RAC Contract**: Remedial Action Contracts – provides remedial response, enforcement oversight, non-time critical removal activities, engineering support, and assessment services.
- **TASC Contract**: Technical Assistance Services for Communities – provides independent assistance through an USEPA HQ contract to help communities better understand the science, regulations and policies of environmental issues and USEPA actions.
- **USEPA Records Services Contract**: provides technical management services for the management of project documents.
- **SERAS Contract**: Scientific, Engineering, Response & Analytical Services – provides technical assistance the U.S. Environmental Protection Agency's Environmental Response Team (ERT).
- **ASPECT**: Airborne Spectral Photometric Environmental Collection Technology – nation's only airborne real-time chemical and radiological detection, infrared and photographic imagery platform.
- **HQ Environmental Management Services Contract**: provides technical management services for the USEPA NAUM Program Management Plan.

Table 2.3 breaks out $16.2 million of the $28.1 million FY2011 through FY2017 contract expenditures by contract and approved projects. Since the final Tronox settlement in 2015, USEPA has been working to establish Tronox specific contracts, which will be used for all future, non-emergency, assessments and construction actions. These contracts will support the utilization and workforce development of Navajo owned business.

In addition to the contracts listed in Table 2.3, USEPA has entered into interagency technical services agreements with US Army Corps of Engineers (USACE) and US Geological Society (USGS), Navajo specific agreements, and miscellaneous field equipment contracts. Table 2.4 breaks out the $1 million of the $28.1 million FY2011 through FY2017 contract expenditures by agreement/miscellaneous contract by approved projects.

Table 2.3: Tronox and Quivira Contract Expenditures Breakout by Approved Projects for FY2011 through FY2017

Approved Projects / Special Account Names	Total Contracts	Start Contract	ERRS Contract	Arrow Contract	RAC Contract	TASC HQ Community Involvement Contract	USEPA Records Services Contract	SERAS Technical Services Contract*	USEPA ASPECT Asset	HQ EMS Sevices PMP Services Contract
USEPA Region 6										
Tronox NAUM	**$0.00**	$1,830,251.43	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM East GSA	**$0.00**	$1,538,524.66	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM West GSA	**$0.00**	$1,290,920.66	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Central GSA	**$0.00**	$383,010.43	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM S18 Mine Residential Removal	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Section 10	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Section 33	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal Region 6 NAUM Special Accounts:	**$0.00**	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
USEPA Region 9										
Abandoned Uranium Mines on the Navajo Nation	**$1,830,727.68**	$1,251,371.75	$0.00	$0.00	$0.00	$0.00	$358,511.21	$50,000.00	$164,347.72	$0.00
Cove Transfer Station Tronox	**$3,571,775.68**	$585,057.73	$2,786,577.95	$0.00	$0.00	$0.00	$0.00	$95,240	$0.00	$0.00
Mesa I Mines - Tronox	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Section 32 AUM Site - Tronox	**$1,437,619.24**	$1,437,619.24	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Section 33 AUM Site - Tronox	**$69,065.64**	$69,065.64	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Cove Wash Regional Assessment	**$2,104,946.38**	$1,940,777.98	$0.00	$0.00	$0.00	$164,168.40	$0.00	$0.00	$0.00	$0.00
Tronox Navajo Area Uranium Mines	**$5,083,432**	$744,566.40	$0.00	$0.00	$3,670,283.70	$100,000	$0.00	$50,000	$0.00	$518,581.95
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	**$121,381.20**	$0.00	$0.00	$0.00	$0.00	$121,381.20	$0.00	$0.00	$0.00	$0.00
Quivira Mines	**$6,101,032.66**	$1,381,747.9	$0.00	$4,122,524.66	$451,801.05	$118,434	$0.00	$0.00	$0.00	$0.00
Subtotal Region 9 NAUM Special Accounts:	**$11,349,922.49**	**$6,522,939.58**	**$2,836,799.48**	**$4,122,524.66**	**$742,041.05**	**$278,602.40**	**$358,511.21**	**$99,700.00**	**$164,347.72**	**$346,981.00**
Total	**$16,151,197.62**	**$11,324,214.76**	**$2,836,799.48**	**$4,122,524.66**	**$742,041.05**	**$278,602.40**	**$358,511.21**	**$99,700.00**	**$164,347.72**	**$346,981.00**

Table 2.4: Tronox and Quivira Interagency Agreements and Other Contracts Expenditures by Approved Projects for FY2011 through FY2017

Approved Projects / Special Account Names	Total Interagency Agreements / Other Contracts	USACE Interagency Agreement	USGS Interagency Agreement	Misc. Navajo Service[1]	Navajo Nation Red Water Pond	Misc. USEPA Field Equipment Contracts
USEPA Region 6						
Tronox NAUM	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM East GSA	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM West GSA	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Central GSA	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM S18 Mine Residential Removal	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Section 10	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Section 33	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Subtotal Region 6 NAUM Special Accounts:	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
USEPA Region 9						
Abandoned Uranium Mines on the Navajo Nation	**$6,497.00**	$0.00	$0.00	$0.00	$0.00	$6,497.00
Cove Transfer Station - Tronox	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Mesa I Mines - Tronox	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Section 32 AUM Site - Tronox	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Section 33 AUM Site - Tronox	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00
Tronox NAUM Cove Wash Regional Assessment	**$400,000**	$375,000	$25,000	$0.00	$0.00	$0.00
Tronox Navajo Area Uranium Mines	**$955,000**	$930,000	$25,000	$0.00	$0.00	$0.00
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	**$477,000.00**	$477,000	$0.00	$0.00	$0.00	$0.00
Quivira Mines	**$169,585.25**	$144,061	$0.00	$0.00	$25,524.25	$0.00
Subtotal Region 9 NAUM Special Accounts:	**$1,051,994.44**	**$743,023.19**	**$284,692.00**	**$6,308.00**	**$11,474.25**	**$6,497.00**
Total	**$1,051,994.44**	**$743,023.19**	**$284,692.00**	**$6,308.00**	**$11,474.25**	**$6,497.00**

Tronox and Quivira Grant Expenditures for FY2011 through FY2017 by USEPA Region, Approved Projects and Grant

USEPA provides grants associated with the assessment and cleanup of the mine/mine areas specified in the Tronox Settlement. The following is a breakout of the grant funding from FY2011 through FY2017:

Approved Projects / Special Account Names	State of NM	Navajo Nation Superfund / AML	Dine College	Total Grants
USEPA Region 6				
Tronox NAUM	$35,393	$0.00	$0.00	**$35,393**
Tronox NAUM East GSA	$0.00	$0.00	$0.00	**$0.00**
Tronox NAUM West GSA	$0.00	$0.00	$0.00	**$0.00**
Tronox NAUM Central GSA	$0.00	$0.00	$0.00	**$0.00**
Tronox NAUM S18 Mine Residential Removal	$0.00	$0.00	$0.00	**$0.00**
Tronox NAUM Section 10	$0.00	$0.00	$0.00	**$0.00**
Tronox NAUM Section 32/33	$0.00	$0.00	$0.00	**$0.00**
Subtotal Region 6 NAUM Special Accounts	**$35,393**	$0.00	$0.00	**$35,393**
USEPA Region 9				
Tronox AUM on the Navajo Nation (Bankruptcy)	NA	$191,951	$0.00	**$191,951**
Tronox Quivira Mines	NA	$57,733	$0.00	**$57,733**
Cove Transfer Station - Tronox	NA	$4,314	$0.00	**$4,314**
Tronox Mesa I Mines	NA	$0.00	$0.00	**$0.00**
Tronox Section 32 AUM Site	NA	$0.00	$0.00	**$0.00**
Tronox Section 33 AUM Site	NA	$0.00	$0.00	**$0.00**
Tronox NAUM Cove Wash Regional Assessment	NA	$0.00	$0.00	**$0.00**
Tronox Navajo Area Uranium Mines	NA	$6,529	$380,014	**$386,543**
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	NA	$22,995	$0.00	**$22,995**
Subtotal Region 9 NAUM Special Accounts	NA	**$283,522**	$380,014	**$663,536**
Total	**$35,393**	**$283,522**	**$698,929**	**$698,929**

3.0 Tronox and Quivira NAUM Approved Projects Descriptions for FY2011 through FY2017

This section describes USEPA Region 6 approved projects activities in New Mexico that may impact the Navajo Nation and USEPA Region 9 approved project activities on the Navajo Nation. The following table provides a brief project description for each accounting line.

Names	Descriptions
Tronox NAUM (Region 6)	Overall planning and logistical support for Removal activities and settlement implementation, including salary and travel, and the ground water study.
Tronox NAUM East GSA	Assessment of Tronox mines in the eastern area of Ambrosia Lake to complete an RSE and EE/CA. Includes contracting, salary, and travel specific to this project.
Tronox NAUM West GSA	Assessment of Tronox mines in the western area of Ambrosia Lake to complete an RSE and EE/CA. Includes contracting, salary, and travel specific to this project.
Tronox NAUM Central GSA	Assessment of Tronox mines in the central area of Ambrosia Lake to complete an RSE and EE/CA. Includes contracting, salary, and travel specific to this project.
Tronox NAUM S18 Mine Residential Removal	A time critical radon abatement project for a residential structure adjacent to the Section 18 Tronox Mine in Ambrosia Lake. Includes contracting, salary, and travel specific to this project. Project was completed in FY18 Quarter 1.
Tronox NAUM Section 10	Assessment of the Section 10 Tronox mine in Ambrosia Lake to complete an RSE and EE/CA. Includes contracting, salary, and travel specific to this project.
Tronox NAUM Section 32 and 33	A joint project with Region 9 to assess the Section 32/33 Tronox mines in the Smith Lake sub-district in the Casamero Lake area to complete an RSE and EE/CA. Includes Region 6 salary, and Region 6 travel specific to this project.
Tronox Abandoned Uranium Mines on the Navajo Nation (bankruptcy settlement)	Tronox NAUM activities (2011 – 2015) prior to the 2015 settlement that included quarterly meetings with Navajo Nation EPA; settlement implementation planning; accounting and contracting strategy ; community involvement; Tronox portal development, Northern Agency ACPECT data collection, and grants.
Tronox NAUM Cove Transfer Station	Construction activities to mitigate surface erosion at the former transfer area located in the Cove Chapter of the Navajo Nation, in eastern Arizona.
Tronox NAUM Mesa I Mine	Mesa Mine I Preliminary Site Assessment has been conducted to determine risk to human health and the environment. A RSE will be conducted in FY 2018.
Tronox NAUM Cove Wash Regional Assessment	Assessment of potential areas of concern and sources of contamination, as well as determine the baseline contaminant levels in the Cove Wash.
Tronox NAUM (Region 9)	Activities included quarterly meetings with Navajo Nation; settlement records review; settlement implementation planning; Navajo Nation Mines Portal Database; Northern Agency ASPECT Gamma survey; Annual Quarterly reports; Tronox Northern Agency RSEs; Tronox Northern Agency EE/CAs; Cove Mesa V Main Access Road Improvement/Design; Cove Mine Access Assessment; Northern Agency Cultural Resources Survey; community involvement; and Navajo Nation grants.
Tronox NAUM Cove Sitewide Conceptual Model and Data Gaps	Assimilate information from previous studies and actions of the site; research, gather and analyze other existing data and documents that could be used to develop the conceptual site model; break the site out into investigation areas based on known information; provide pictorial representations of the site; depict exposure pathways and receptors; provide recommendations for paths forward for each of the investigation areas; and, suggest general areas for data gap investigations.
Tronox NAUM Quivira Mines	Activities at the Northeast Church Rock Quivira Mines include: Repair roads and bridges to allow access to removal sites; vent hole removal action; the Engineering Evaluation/Cost Analysis; and discuss the removal options with Navajo Nation, community members, and other stakeholders.

3.1 USEPA Region 6

TRONOX NAUM WEST GEOGRAPHIC SUB-AREA

In FY2017 Region 6 focused on continuation of field activities to support the drafting of a Removal Site Evaluation (RSE) Report on the West Geographic Sub-Area (GSA), which consists of surface expressions from the Sections 10, 22, 24, and 30 West mines. The objective of the RSE is to investigate surface soil radioactive contamination and determine the exposure risk to human health and the environment. Mining activities began in the West GSA in 1959 and ceased in 1970, with approximately 3.9 million tons of uranium ore produced. In addition to conventional underground mining, solution or leachate mining occurred on Sections 22 and 24.

Approximately 1,895 acres in the West GSA show impacts from uranium mining, some of which are over 100 times site specific background levels. Three of the mines in the West GSA, Section 22, 24, and 30 West, are known to have discharged millions of gallons of contaminated ground water from the mine shafts to access the ore body. Data from the RSE shows this discharge to arroyos and streams caused surface contamination beyond the mine shafts.

A portion of the West GSA includes the Navajo allotment land on Section 27. In order to conduct the RSE in this allotment area, Region 6 coordinated closely with Navajo Nation EPA and the allotees as appropriate. This contamination appears to be due to migration of contaminated materials from the Section 22 mining operations, since there is no visible or historic evidence of uranium mining on these allotments.

The RSE is expected to be released in FY2019, followed by a draft alternatives analysis to help inform stakeholders of potential clean-up methodologies.

TRONOX NAUM CENTRAL GEOGRAPHIC SUB-AREA

In FY2017 Region 6 focused on continuation of field activities to support the drafting of a RSE Report on the Central GSA, which consists of the surface expression of Sections 17, 19, 30 and 33 mines. The objective of the RSE is to investigate surface soil radioactive contamination and determine the exposure risk to human health and the environment. Mining activities began in the Central GSA in 1959 and ceased in 1970, with approximately 4.1 million tons of uranium ore produced.

USEPA Conducting Soil and Groundwater Sampling Activities.

Sonic Drill Rig used for the Ambrosia Lake Groundwater Investigation.

Approximately 1,842 acres in the Central GSA show impacts from uranium mining, some of which are over 100 times site specific background levels. The three mines in the Central GSA are known to have discharged millions of gallons of contaminated ground water from the mine shafts to access the ore body. Data from the RSE shows this discharge to arroyos and streams caused surface contamination beyond the mine shafts.

The RSE is expected to be released in FY2019, followed by a draft alternatives analysis to help inform stakeholders of potential cleanup methodologies.

TRONOX NAUM SECTION 10 MINE

Removal Site Evaluation (RSE) field activities continued in FY2017 for Tronox NAUM Section 10 Mine. The Section 10 Mine was originally included in the West GSA site. RSE data for the West GSA showed Section 10 Mine was not part of the contiguous area of contamination and a determination was made to evaluate the mine separately.

USEPA Region 6 RSE work included conducting a gamma survey and collecting soil samples. Soil samples were prepared and analyzed by gamma spectroscopy in a field laboratory, with some samples sent off-site to a commercial laboratory for confirmation analysis. Additional investigations have been conducted at the site in preparation for the development of an EE/CA, including a Cultural Survey, an Ecological Survey, and a re-vegetation plan.

Pending future funding, the RSE is expected to be released in FY2019, followed by a draft alternatives analysis to help inform stakeholders of potential cleanup methodologies.

SECTION 18 RESIDENTIAL REMOVAL

USEPA Region 6 began a time-critical removal during FY2017 to install a Radon Mitigation System in a residential structure located in Section 18. As part of a Removal Site Evaluation (RSE) conducted and funded by the USEPA Region 6 Superfund Program, elevated Radon 222 levels were measured inside the residence. Results from the 90 day test locations were 7.0 and 10.6 pico curies per liter (pCi/L), exceeding the maximum acceptable indoor air standard of 4 pCi/L. It was determined that the elevated levels were primarily due to the underground uranium mining activities conducted in Section 18 through the historic Kerr McGee Section 17 Mine central shaft. As a result, abatement activities taken at the site are eligible for cost recovery under the Tronox settlement. The Radon Mitigation System will be completed in FY2018.

Region 6 undertook extensive research to confirm the Radon 222 levels were not naturally occurring and instead anthropogenic and subject to a CERCLA removal action. Documentation from multiple scientific sources shows that mine shafts, tunnels, and boreholes associated with uranium mines collect and artificially concentrate Radon 222. This concentration becomes exacerbated when the mines are closed due to the limited or no

fresh air circulation, and the Radon 222 levels reaching the surface are also higher. Region 6 sampling of a partially open vent shaft and an open adit in adjacent areas of the Ambrosia Lake Sub-district demonstrated this effect with high concentrations of Radon 222.

AMBROSIA LAKE / SAN MATEO BASIN GROUND WATER STUDY

USEPA Region 6 continues work on the multi-phased ground water investigation for the San Mateo Creek Basin, including the Tronox NAUM Ambrosia Lake Impact Area. Efforts in FY2017 focused on interpretation of the data collected during FY2016 field work and drafting the Phase 2 report. These efforts will continue into FY2018.

The ground water investigation work completed in 2016 is helping USEPA delineate the extent of the impacts from the Tronox NAUM Ambrosia Lake mines discharge operations to ground water that could present a current or future health threat to the Navajo as well as other local communities that use the ground water as a water supply for drinking and other domestic or agricultural purposes. Understanding and predicting the future flow path of this impacted ground water as it continues to move through the shallow alluvium and underlying bedrock formations will be critical to protecting the Navajo Nation and other users from legacy ground water contamination in the Tronox NAUM Ambrosia Lake area for generations to come. Data gathered and analyzed under Phase 1 and Phase 2 work will be useful to the Navajo and other stakeholders that rely on this vital water resource.

Region 6 on scene coordinators at a community event.

The first phase of the investigation (Phase 1), which focused on the alluvial ground water, was completed in September 2016 with the release of a ground water report documenting the findings of Phase 1. Copies of the report were provided to the Navajo and the results presented to the Navajo Nation at the Tronox Quarterly Meeting in Albuquerque in October 2016. The results were also presented to other stakeholders in November 2016 via community meetings held in Grants and at the Cross Roads Area (near the intersection of State Highways 509 and 605) and with the Bluewater Valley Downstream Alliance (BVDA) and the Acoma Pueblo Council. A webinar session was held for Laguna Pueblo Environmental and Natural Resources Department.

3.2 USEPA Region 9

TRONOX NAUM COVE WASH WATERSHED ASSESSMENT

In April and May of 2017, the USEPA, in coordination with Navajo Nation EPA (NNEPA) and the Diné College Environmental Institute, conducted the last of four soil, sediment and water sampling events across the Cove Wash watershed. The goal was to identify potential areas of concern and sources of contamination, as well as determine the baseline contaminant levels in the Cove Wash. These areas are locations of historical uranium mining activities and have elevated uranium concentrations in surface water and ground

USEPA Region 9's ecological risk assessor, Ned Black, showing Dine College interns the proper methodology for the stream ecosystem health study, June 2017.

Dine College intern collecting a macroinvertebrate sample, June 2017.

Testing the soil pH to see if this area is a wetland, June 2017.

water. The Cove Wash watershed is approximately 47 square miles, and includes 50 of the 70 AUMs within the Lukachukai Mountains. Year-round water is found in peaks and canyons above 7000-foot elevation, where springs and seeps emerge. Developed springs and wells are also part of the watershed assessment.

As part of the overall watershed assessment, USEPA had sampled Cove residents' crops, field soils, and irrigation features' soils and water. In 2017, we drafted a results letter for each family whose farm was sampled, and, with NNEPA, we hand delivered the results letters to the families. USEPA conducted its second year of wetland delineation within the watershed, which completed the overall wetland delineation. USEPA also continued evaluating the exact locations of Mexican spotted owls through another year of surveys. Under the leadership of our in-house USEPA ecological risk assessor, Dine College interns conducted a stream ecosystem health survey of the Cove Wash, including taking physical measurements and pebble counts, as well as collecting macroinvertebrates to send to the lab for counts and taxonomic identification. In 2017, field activities gave the Remedial Project Manager team a good amount of information about the overall status of the health and contamination within the Cove Watershed.

Excavating contaminated soil near a ventilation shaft during the 2017 Quivira Removal Acton. The cement cap on the ventilation shaft is in the foreground.

COVE CHAPTER AREA TRONOX MINES CONCEPTUAL SITE MODEL ACTIVITIES

In late June of 2016, the USEPA entered into an interagency agreement (IA) with the Albuquerque District of the U.S. Army Corps of Engineers (Corps) to develop a conceptual site model (CSM) and conduct a data gaps assessment for the Cove Chapter AUMs. In FY17, the Cove CSM team, which includes NNEPA, Navajo AML, a representative from OP/VP, the USEPA RPM, and various technical experts, continued to meet on a regular basis to ensure a solid CSM was developed. The project resulted in the development of a full geospatial model of the reclamation work done at the 33 Tronox mines in the Northern Abandoned Uranium Mine Region, as well as pictorials and wire diagrams representing exposure scenarios for the Cove community. The work also divided the site into investigation areas and suggests general areas for data gap investigations. The draft document was delivered to the agencies in December 2017.

Scanning for radiation to check if the excavation is complete in this spot during the 2017 Quivira Removal Action.

TRONOX QUIVIRA MINES

In 2017, USEPA awarded a $3.85 million contract to a Navajo owned business to excavate and remove contaminated soils located around five mine ventilation shafts and repair roads and a bridge in the community. The contractor completed the excavation of contaminated soils and placed them on top of the main mine waste pile under a clean soil cover. The contractor also completed the road repairs and began work on the bridge. The bridge repair was completed in May of 2018. During the Removal Action, USEPA also temporarily re-located two residences while contaminated soils were being transported near their homes.

USEPA continued to meet monthly with the community. USEPA also continued working on the Engineering Evaluation/Cost Analysis, which is a document that compares possible cleanup options for the mine sites.

TRONOX - SECTION 32/SECTION 33

USEPA Region 9 is working to protect residents of Casamero Lake Chapter by cleaning up waste from past uranium mining operations. Uranium mining operations occurred throughout the Navajo Nation from the 1940s to the 1980s.

Over time, the contaminated soils in the Section 32 mine area have migrated due to wind and rain. USEPA also found that areas outside the Section 32 mine area contain contaminated soils. Because of the health risks, USEPA Region 9 removed the contaminated soil from the area around the Section 32 Mine site, including the former transfer area to the south of the Section 32 mine area, and built temporary stockpile on top of the Section 32 Mine.

The stockpile has been temporarily established and sealed using soil tackifier to stabilize and prevent the contaminated soil from moving. After the soil was sealed at Section 32 Mine to prevent exposure to people and livestock, a fence was placed around the pile with signs warning people to keep out.

This removal action is a temporary measure to stabilize the contaminated soil. USEPA and Navajo Nation Environmental Protection Agency (NNEPA) will discuss the final disposal options and timeframe with the community before making any decisions about permanent disposal.

Mine Category Assessment Protocol Reconnaissance (MCAP)

The objective of Mine Category Assessment Protocol Reconnaissance (MCAP) was to develop and implement a systematic method for assessing and surveying 32 Tronox mines and mines within a half mile radius of the Tronox mines located within the Northern Agency of the Navajo Nation. This systematic approach included ranking each mine claim area based on a historical review as well as creating a Target List, made up of the Tronox mine sites and other nearby mines sites. MCAP next steps include: take interim action at Mesa II and Mesa V; conduct road assessments and improvements necessary to access mine areas; and perform Removal Site Evaluations and Engineering Evaluation/Cost Analysis to determine waste volumes and evaluate cleanup options.

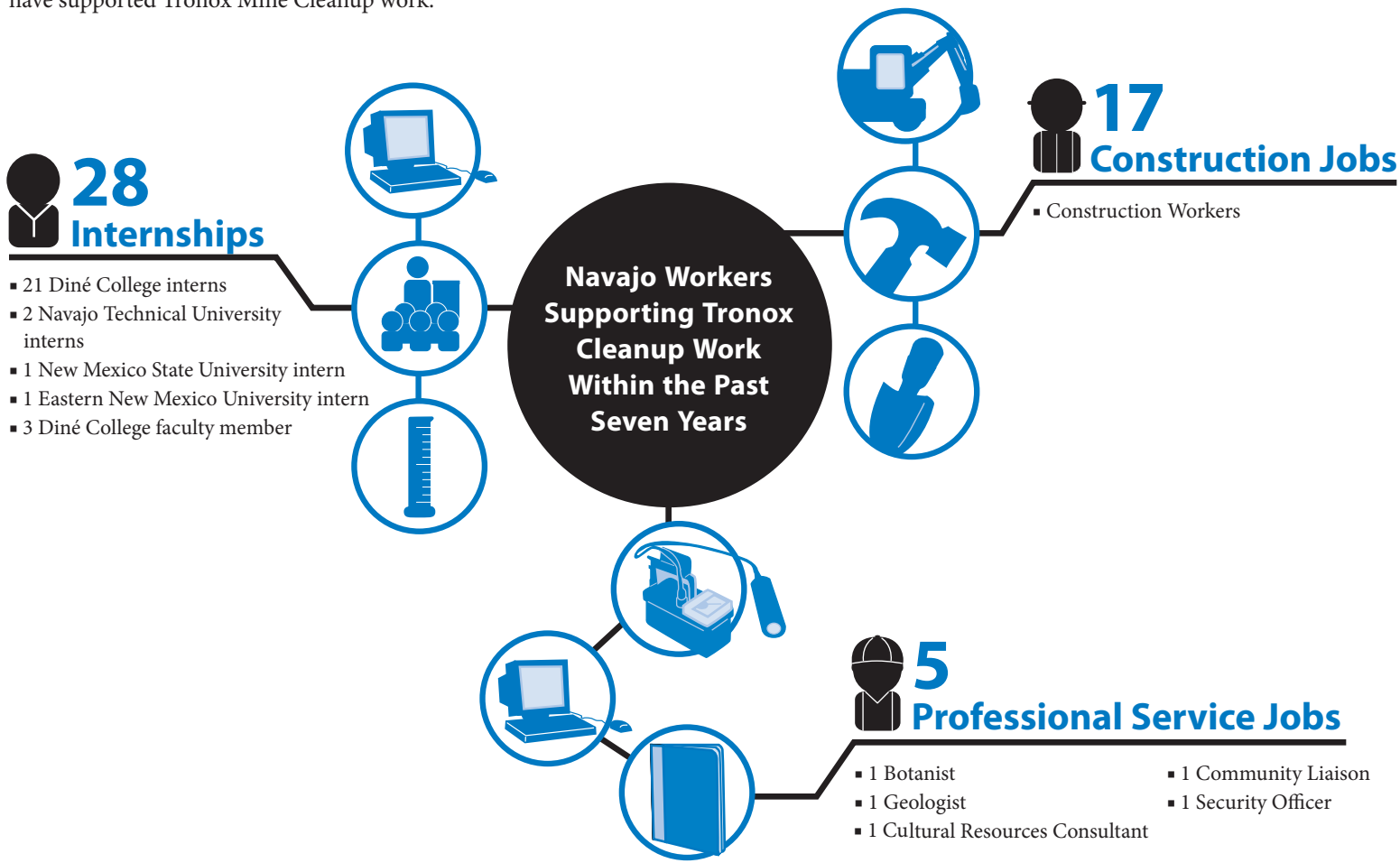
Future activities at the Quivira Mines include:

- Work with NTUA to re-route power lines off of the mine site;
- USEPA plans to release the Engineering Evaluation/Cost Analysis which presents an analysis of all the removal options in 2018; and
- Discuss the removal options with Navajo Nation, community members, and other stakeholders.

Beginning the bridge repairs at Quivira. The mine site is in the upper right background.

4.0 Tronox and Quivira NAUM – Workforce Development Opportunities

Cleaning up abandoned uranium mines on the Navajo Nation creates jobs for Navajo workers and provides opportunities for Navajo businesses. These opportunities will increase as cleanup work at the mines accelerates. The following provides a summary of Navajo workers that have supported Tronox Mine Cleanup work:



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EPA United States Environmental Protection Agency

Tronox Navajo Area Uranium Mines
FY2011 through FY2017
Financial Summary

April 2019