TRONOX PROPOSED PROJECTS FY 2019

United States Environmental Protection Agency

90029460

Navajo Area Uranium Mines
July 2018

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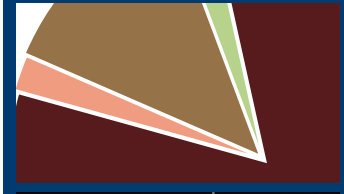

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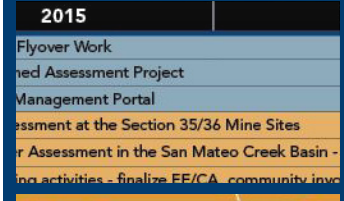

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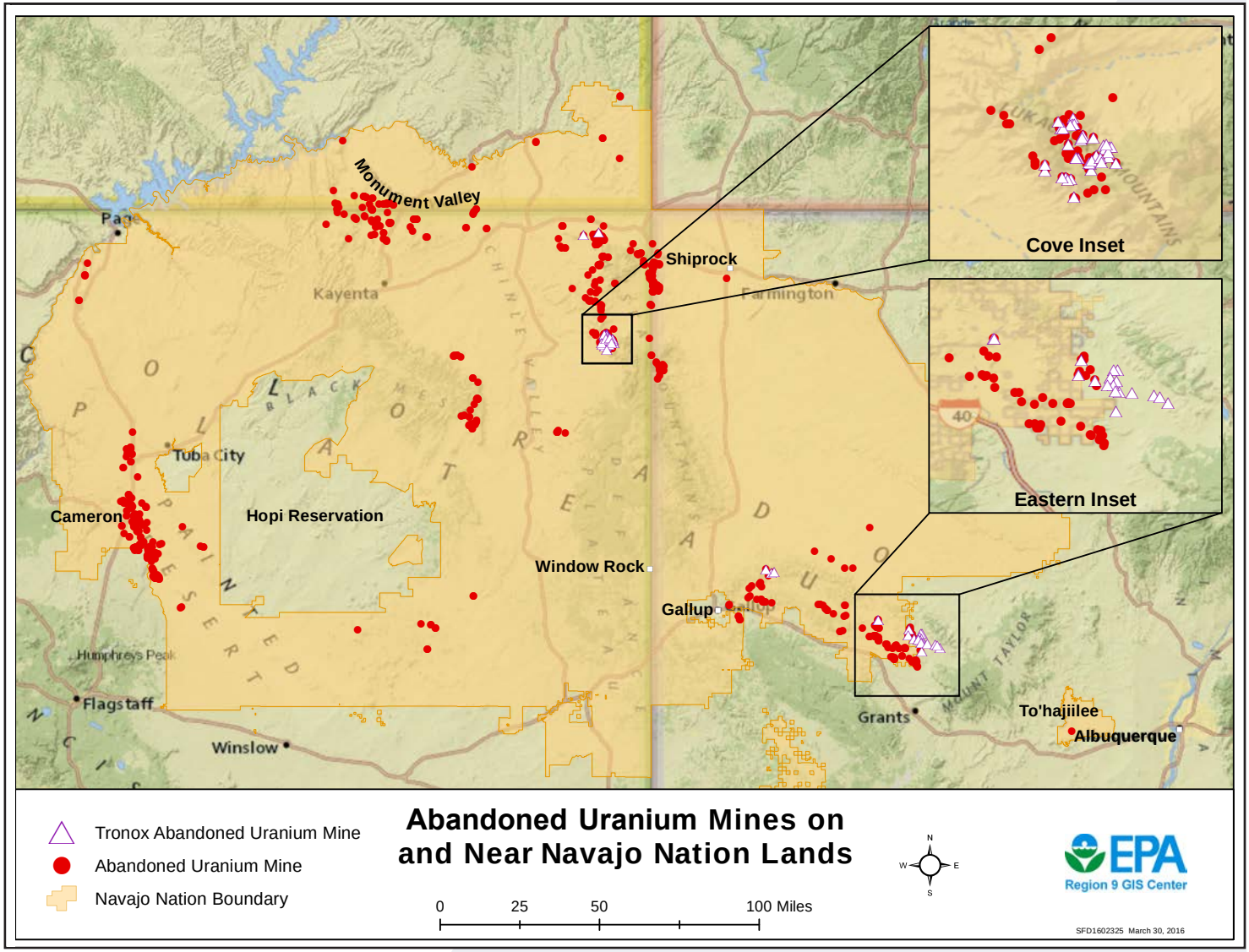
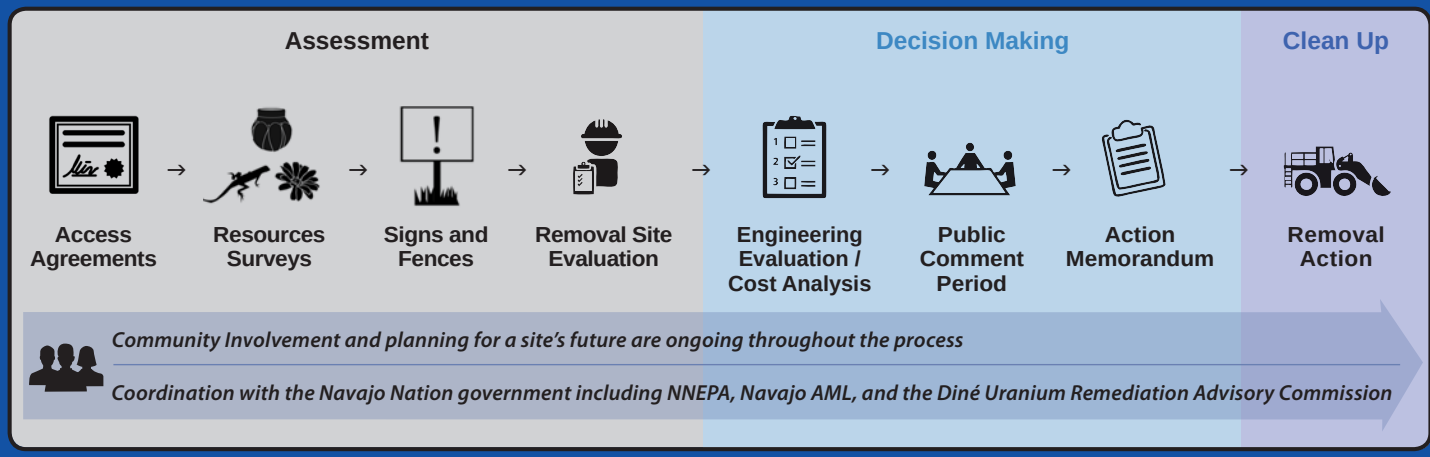
Abandoned Uranium Mines on and Near Navajo Nation Lands



Superfund Process

Superfund Process on the Navajo Nation

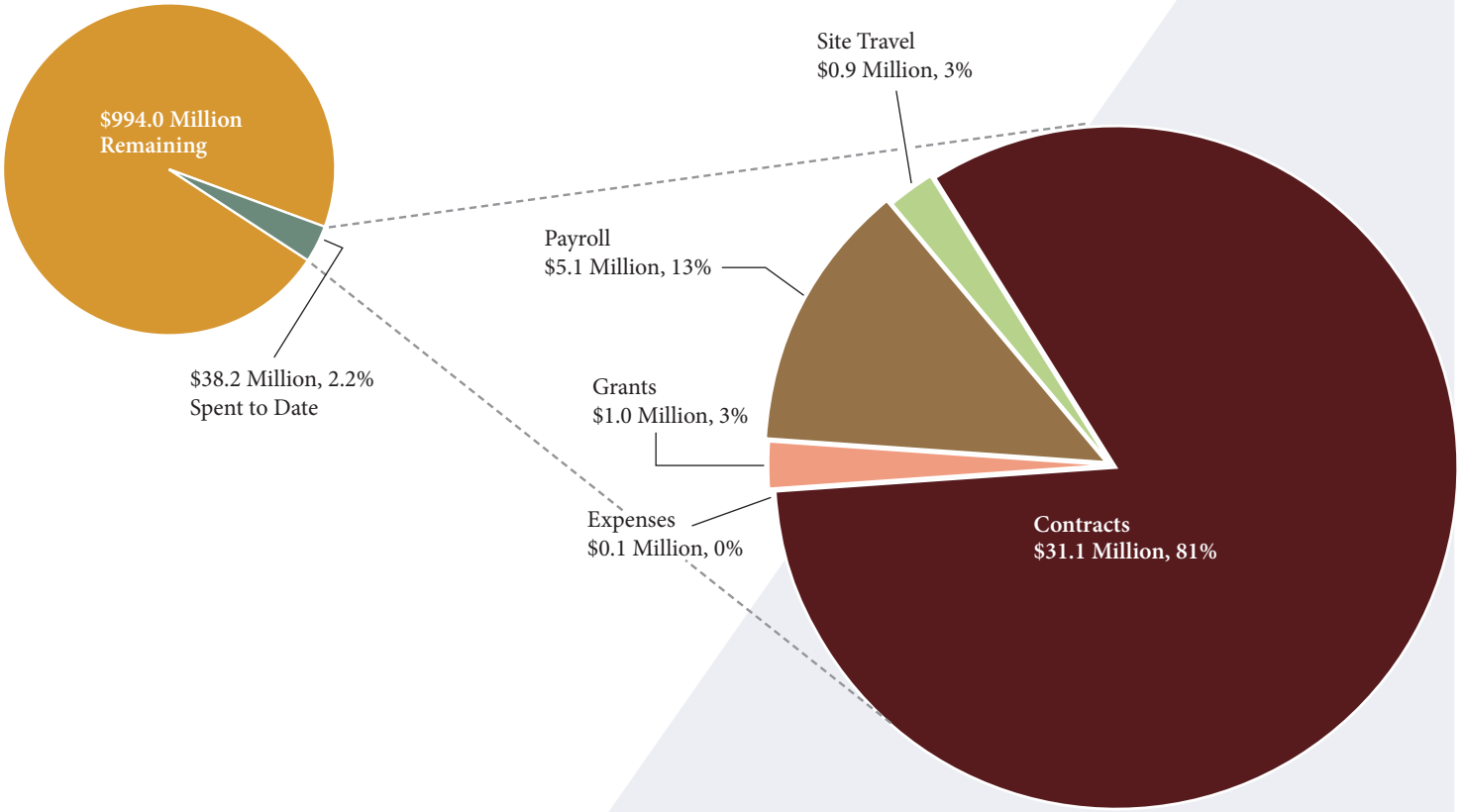


Tronox Navajo Northern Agency Mines (34 Mine Areas Navajo Nation)	X Access Agreement	X Resources Surveys	X Signs & Fences	ongoing Removal Site Evaluation	Proposed FY 2019 Engineering Evaluation/ Cost Analysis
Tronox Eastern AUM (20 Mine Areas New Mexico)	X Access Agreement	X Resources Surveys	X Signs & Fences	ongoing Removal Site Evaluation	ongoing Engineering Evaluation/ Cost Analysis

Tronox Expenditures

Tronox Expenditures Breakout by Cost Category for February 2011 through March 2018

Totals represent dollars that are committed, obligated or disbursed ($38.2 Million) by Category



** Interest earned through January 31, 2018 = ~$17.8 million*

** There have been two separate Tronox Settlements that provided funds for NAUM: (collectively known as Tronox Settlement)*

- FY 2011 Tronox Incorporated = ~$13.2 million

- FY 2015 Anadarko Petroleum Corporation = ~$980 million

Approved Projects Timeline

2015	2016	2017
[1]Aspect Cove Flyover Work		
Cove Watershed Assessment Project		
Tronox Data Management Portal		
Removal Assessment at the Section 35/36 Mine Sites		
Ground Water Assessment in the San Mateo Creek Basin - Watershed		
Quivira ongoing activities - finalize EE/CA, community involvement, interim removal, and structural testing of the RWPR bridge		
Ambrosia Lake Mines (Sections 10, 22 complex, 24, 30) Removal Assessment and EE\CA		
EE/CA Section 32/33 Mines		
	Mine Category Assessment Protocol Reconnaissance	
	Ambrosia Lake Mines (Sections 10, 22 complex, 24, 30) Removal Assessment and	
	Cove Chapter Area Tronox Mines Remedial Investigation/Feasibility Study Activities	
	Cove Transfer Station Slope Stabilization and Cover Repair	
	Northern Agency Removal Site Evaluations for 34 Tronox Mines	
	Navajo Area Uranium Mines Program Management Plan	
		Time Critical Residential Removal Action for Section 18
		Non-Time Critical Removal Site Evaluation
		Quivira Mines Removal Pre-Design Activities
		Quivira Mines Utilities Rerouting
		Quivira Groundwater Assessment
		Cove Livestock Sampling Study
		Cove Air Quality Sampling

Legend

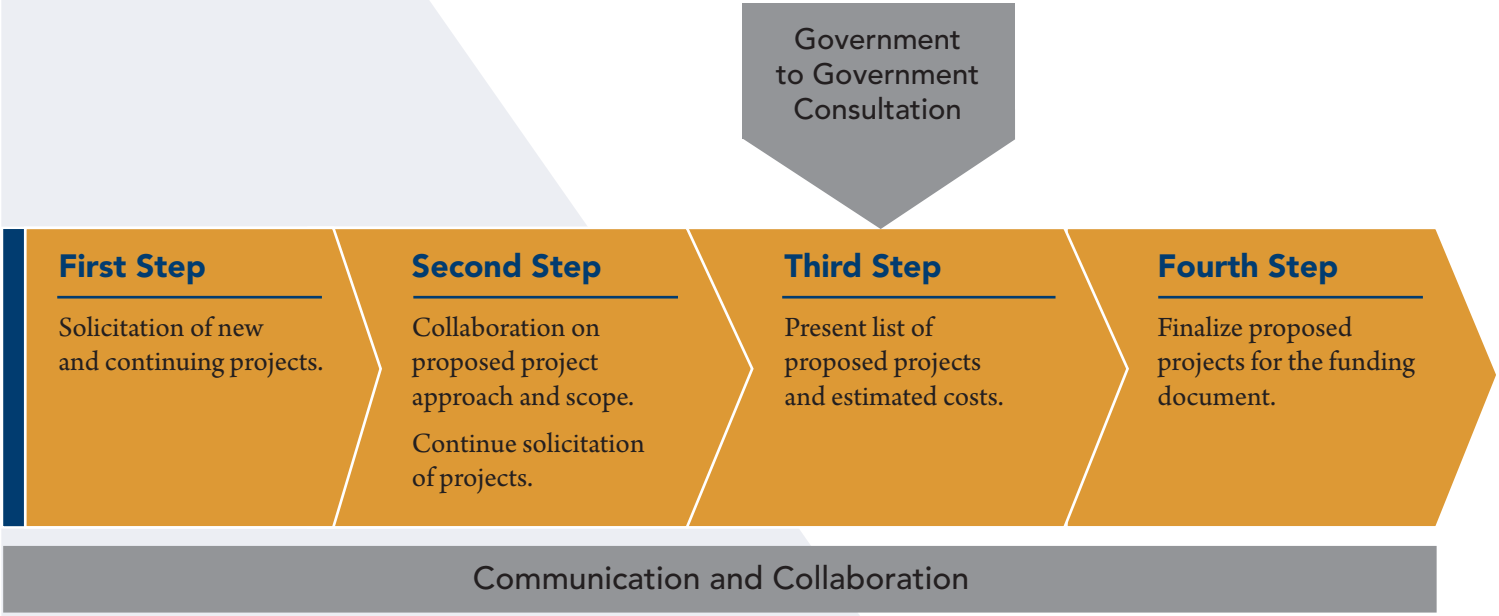
- Eastern AUM
- Northern AUM

[1]ASPECT - Airborne Spectrial Photometric Environmental Collection Technology

2018
2019
2020
EE\CA
(CSM)
and EE\CA on the Central GSA
Cove Mesa V Adit Closure
Interim Action at Mesa II Reclamation Cell
Waste Reduction Investigation at Existing Mines
EE/CA for the Quivira Mine Site in the Coyote Canyon and Standing Rock Chapters of the Navajo Nation and McKinley County, NM

Project Approval Process

The USEPA Regions 6 and 9 Navajo Nation and New Mexico (Tronox Joint Agencies), meet at least three times annually to continue their ongoing process of prioritizing response actions, determine lead responsibility, and discuss joint priorities. The Tronox Joint Agencies strive to develop a coordinated prioritized project list along with estimated funding requirements for the following calendar year. In the event that the Tronox Joint Agencies cannot reach consensus on a proposed project(s), the project will be brought before a executive level group (USEPA, Navajo Nation, and New Mexico) for resolution. The project approval process is illustrated below:



Tronox Project Proposal for FY 2019

LIST OF TRONOX PROPOSED PROJECTS:

1. Risk Assessments and Engineering Evaluation/Cost Analysis (EE/CAs) for 34 Tronox Mines

2. Evapotranspirative Cap Evaluation

3. Cove Lithology Mapping

4. Tronox Cove NAUM Treatability Study

Removal Site Evaluation at Cove Mesa V Haul Shaft.

1. Risk Assessments and Engineering Evaluation/ Cost Analysis (EE/CAs) for 34 Tronox Mines

PROJECT OBJECTIVES

The objective of this project is to use the 2018 Removal Site Evaluation information (providing extent and nature of contamination) to complete risk assessments and EE/CAs for 34 mines in the Northern AUM Region of the Navajo Nation. The EE/CA will develop the response options at these mines site to abate the threats to the public health and the environment to the benefit of the Navajo Nation. USEPA is currently developing a prioritization methodology for cleanup of the Tronox AUM site on or near Navajo Nation. Once the EE/CA are complete, prioritization will be determined using the results of the EE/CA and the Methodology.

PROJECT SNAPSHOT

Project Duration

Begin: Spring 2019 End: Fall 2020

Contracting Budget*

$7,000,000

Outcome

Have a risk assessment and EE/CA report for 34 abandoned uranium mines

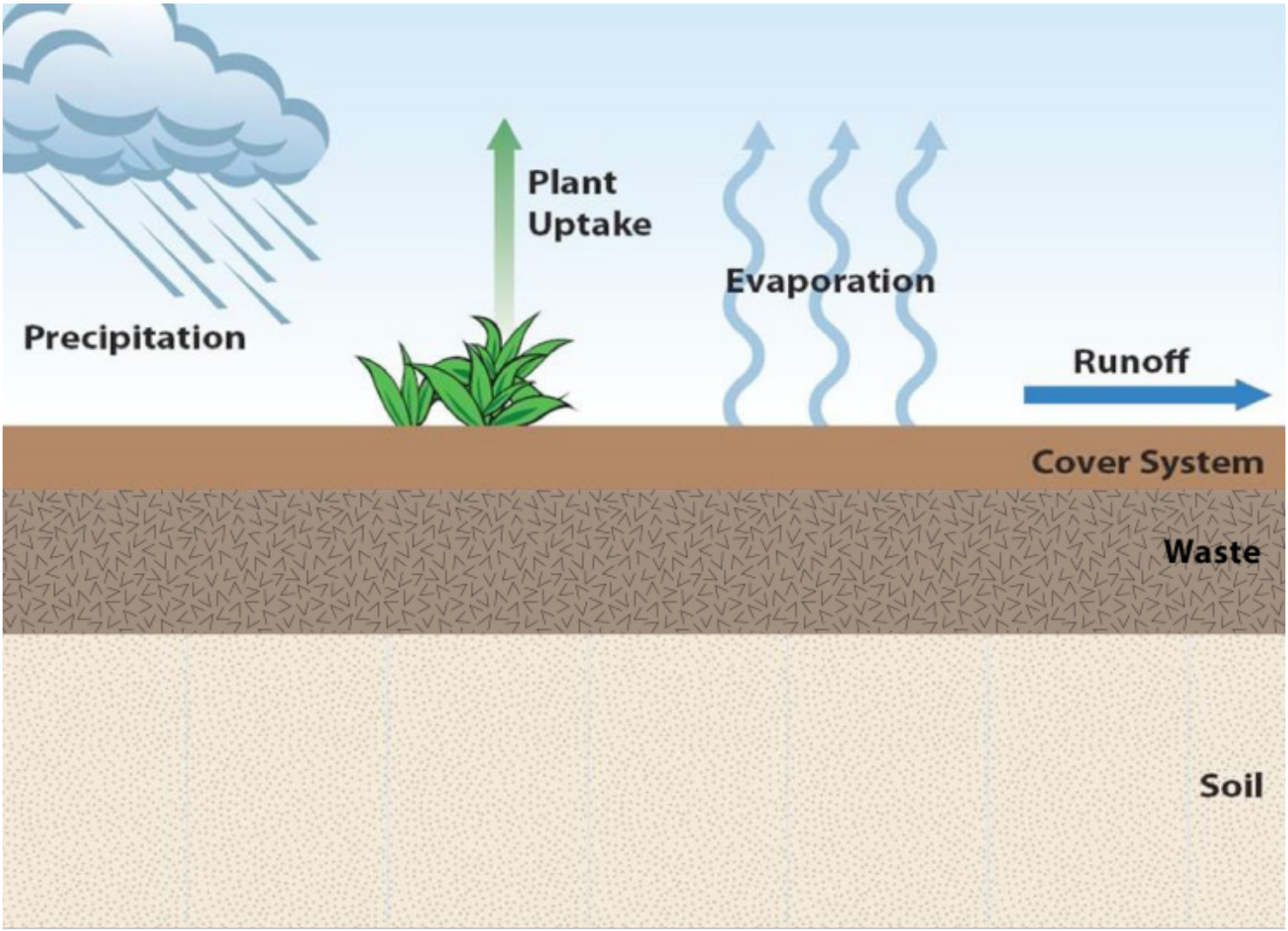
Project Next Steps

Develop and implement methodology to prioritize mines for removal actions based on risk and other factors

**Proposed Contracting Budget doesn't include USEPA and NNEPA payroll, site travel, expenses, or grants. These expenditures are tracked by project and reporting Quarterly as actual costs and as a percentage of the overall costs.*

PROJECT TIMELINE

2016	2017	2018	2019	2020
Removal Site Evaluations		Removal Site Evaluation Complete		
			• Prioritize EE/CAs • Initiate the EE/CA Process • Public Comment	
				Complete the EE/CAs (Action Memos)



Evapotranspirative caps are used to ensure water does not percolate down through buried waste and into the groundwater table.

2. Evapotranspirative Cap Evaluation

PROJECT OBJECTIVES

The objective of this project is to evaluate the effectiveness of evapotranspirative caps as an option for future cleanups. One objective is to evaluate if evapotranspirative caps, combined with longterm operation and maintenance, can offer a permanent cleanup solution. It is possible that in some cases, it might be best to leave remediation cells in place and upkeep them in perpetuity. However, choosing this option would require knowing that water was not percolating down past the remediation cell and into the groundwater table below. The same goes for new removal actions that would be using an through evapotranspirative cap. The concern is transporting waste out of cell. In order to evaluate this possibility, an evapotranspiration evaluation is needed to see if water is percolating past the plants that are growing on a representative remediation cap, or not.

PROJECT SNAPSHOT

Project Duration

Begin: Spring 2019 End: Spring 2020

Contracting Budget*

$200,000

Outcome

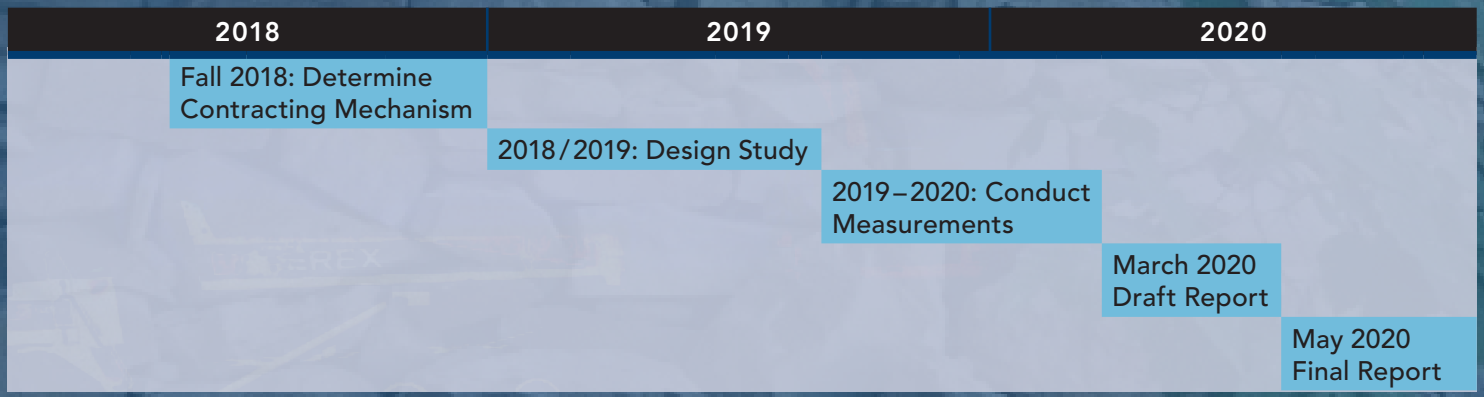
Determine if evapotranspirative caps work in the NAUM cleanup scenario

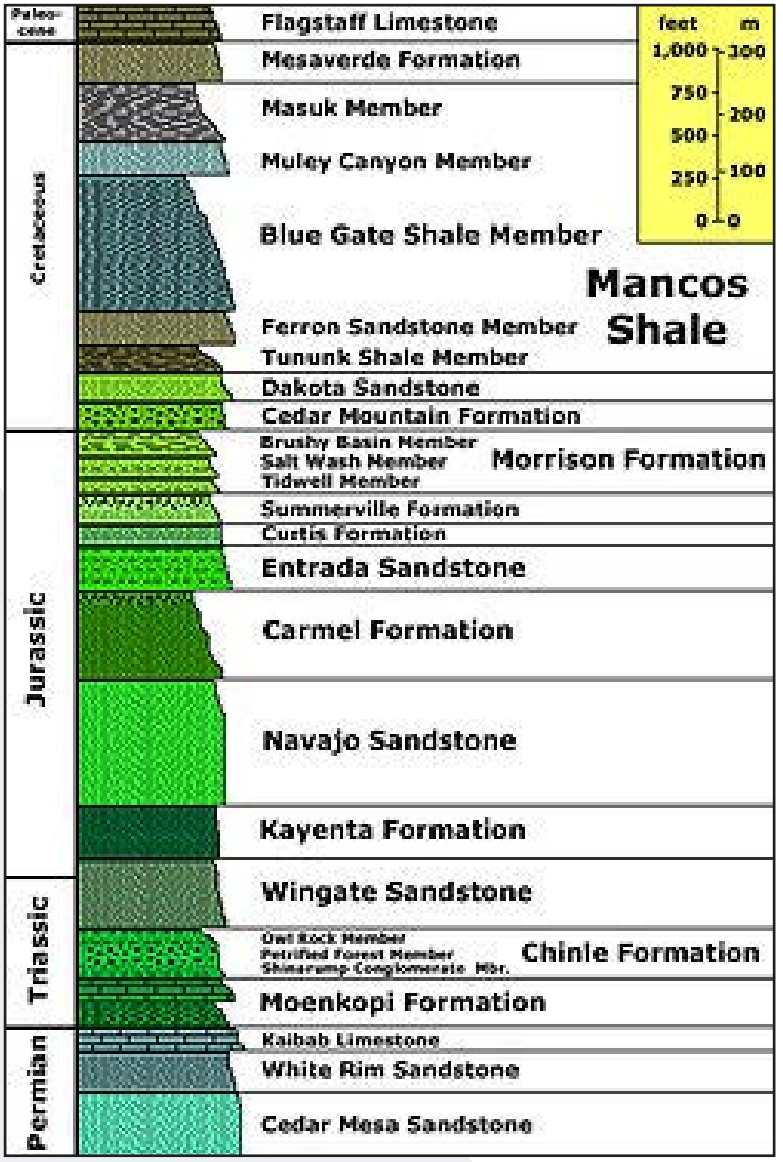
Project Next Steps

Determine contracting mechanism and pick a location for the study

**Proposed Contracting Budget doesn't include USEPA, NNEPA and AML payroll, site travel, expenses, or grants. These expenditures are tracked by project and reporting Quarterly as actual costs and as a percentage of the overall costs.*

PROJECT TIMELINE





Geological layer of Capitol Reef Nation Park in Utah, that includes similar formations as Cove, Ariz. Mapping geological layers helps determine whether to use on-site repositories or other on-site solutions, and where to place them.

3. Cove Lithology Mapping

PROJECT OBJECTIVES

The objective of this project is to contract with an experienced stratigrapher to develop a map of the underground lithology in Cove for the purposes of helping to evaluate different waste removal/reduction options in the EE/CAs. The stratigrapher will use existing boring logs to develop the map.

PROJECT SNAPSHOT

Project Duration

Begin: Fall 2019 End: Fall 2020

Contracting Budget*

$300,000

Outcome

A lithological map of different parts of Cove where a remedy might be implemented.

Project Next Steps

Evaluate information from RSEs and the start of EE/CAs to determine which areas to map.

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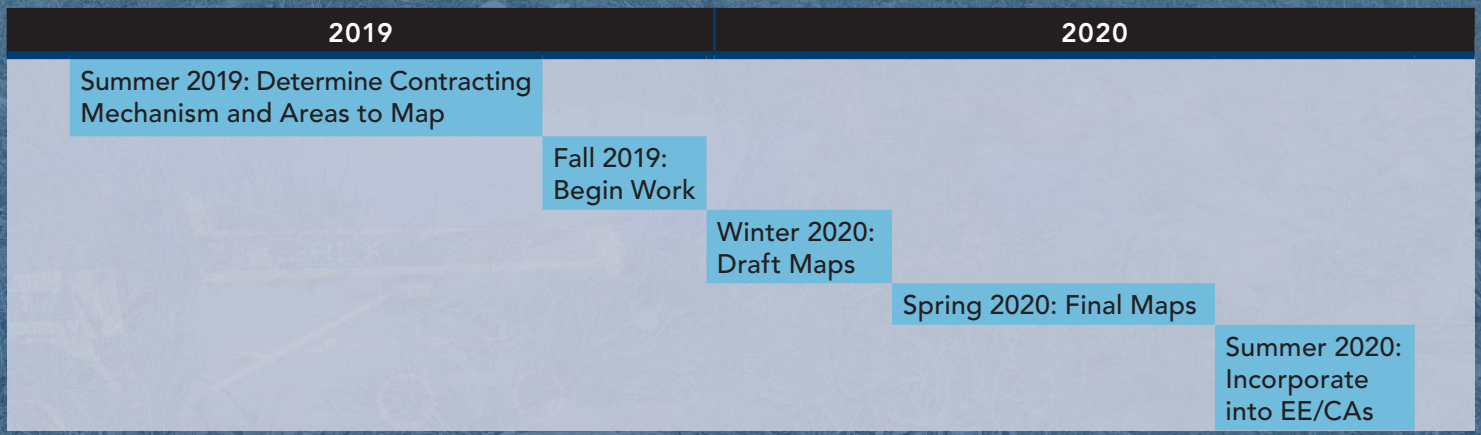
PROJECT TIMELINE



Stabilizer used to bind waste to prevent migration from a site repository.

4. Tronox Cove NAUM Treatability Study

PROJECT OBJECTIVES

The objective of this project is to test technologies that could be viable cleanup options for the Cove mine sites. Treatability Studies test technologies at a small scale to verify if they are effective in field scenario. The technology tested in this project will be decided later, once the removal options technical memorandum is finalized in Summer 2018 and the Removal Site Evaluations for Cove are received in December 2018. This project will provide information for Alternatives being evolved in the EE/CA.

PROJECT SNAPSHOT

Project Duration

Begin: Spring 2019 End: Summer 2020

Contracting Budget*

$500,000

Outcome

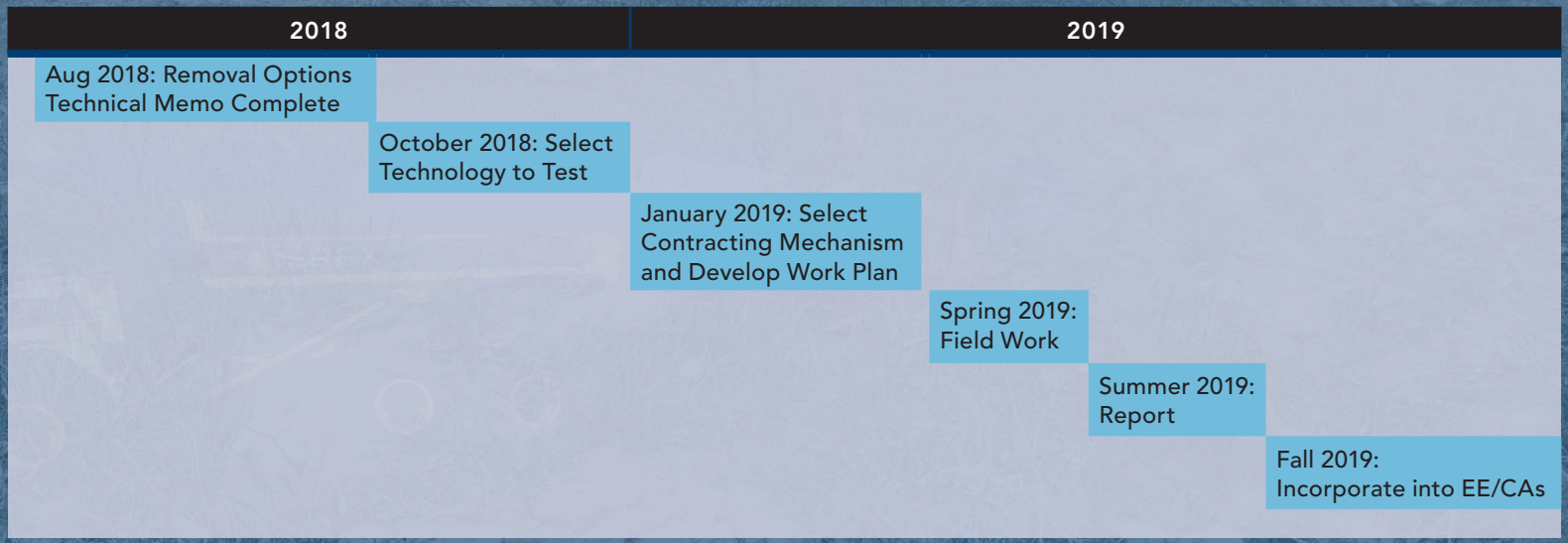
Make a determination about whether this technology is feasible to implement on a large scale.

Project Next Steps

In the EE/CAs, evaluate the technology tested in this treatability study for larger scale application.

**Proposed Contracting Budget doesn't include USEPA and NNEPA payroll, site travel, expenses, or grants. These expenditures are tracked by project and reporting Quarterly as actual costs and as a percentage of the overall costs.*

PROJECT TIMELINE



Tronox Proposed Projects for FY 2019

Project I:
Risk Assessments and Engineering Evaluation/Cost Analysis (EE/CAs) for 34 Tronox Mines ~$7,000,000

Project II:
Evapotranspirative Cap Evaluation ~$200,000

Project III:
Cove Lithology Mapping ~$300,000

Project IV:
Tronox Cove NAUM Treatability Study ~$500,000

Total Proposed Projects FY2018 = $8,000,000

Tronox Northern Agency RSE Team Assessing Cove Chapter Mines

Proposed Contracting Budget doesn't include USEPA and NNEPA payroll, site travel, expenses, or grants. These expenditures are tracked by project and reporting Quarterly as actual costs and as a percentage of the overall costs.

Cove Mesa V Main Mine Access Road Improvement

Cove Chapter Mesa V Main Mine Access Road (Before Improvements)

Cove Chapter Mesa V Main Mine Access Road (After Improvements)

FOR MORE INFORMATION (USEPA CONTACTS)

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