UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
LAND AND EMERGENCY
MANAGEMENT

MEMORANDUM

SUBJECT: Final Update to Responses to Office of Inspector General June 15, 2018, Report Recommendations and August 22, 2018 (No. 18-P-0233) Report entitled "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands."

FROM: Shahid Mahmud, Director *Shahid Mahmud*
Office of Mountains, Deserts and Plains

TO: Katherine Trimble
Assistant Inspector General
Office of Audit
Office of the Inspector General

I. Introduction

The United States Environmental Protection Agency (EPA) is providing this final update to the Office of Inspector General (OIG) on its progress with the corrective actions identified in the report titled, "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands" (Report No. 18-P-0233). The Report focused on the 54 Tronox Navajo Area Uranium Mines (NAUMs) on the Navajo Reservation or on private land within the State of New Mexico.

As reported in the December 20, 2021, update to the OIG, EPA has completed Engineering Evaluations/Cost Analyses (EE/CAs) that cover the 54 Tronox NAUMs where additional work is anticipated.[1] As also reported in that update, EPA has completed a prioritization list for funding, and established a funding allocation strategy for the prioritized NAUM sites. For your reference, a copy of that OIG update is included as Attachment 1.

[1] The Navajo Nation has requested to comment on draft final EE/CAs without a recommended alternative prior to EPA selection of such an alternative.

This final update reflects completion of the remaining action: implementation of the Tronox resource allocation strategy. An updated table summarizing completed activities can be found at the end of this memorandum.

Corrective Action 2.4 – Complete Final Resource Allocations by May 31, 2022

As mentioned, EPA developed an Allocation Strategy for distributing the Tronox NAUM special account funds. Region 6 and Region 9 have been accessing Tronox NAUM special account funds to conduct interim actions, address imminent threats to human health and the environment, and to complete the EE/CAs. The regions have agreed to the transfer of funds from Region 9 special accounts to Region 6 special accounts through a funding memorandum documenting the transfer. The funding memo documents the basis for Region 6 to request Tronox NAUM funds from the Region 9 Tronox NAUM special account, consistent with the Allocation Strategy. The funding memo was approved by Region 9 and $305 million has been transferred to Region 6 with Region 9 retaining about $605 million. With these actions, EPA has completed implementation of the resource allocation and allows the regions to move forward to initiate settlement negotiations with liable and viable parties to secure additional funding for response actions at these sites. A copy of that funding memo is included as Attachment 2.

This memorandum documents EPA's completion of all actions from the OIG report "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for the Abandoned Uranium Mines on or Near Navajo Nation Lands." OMDP appreciates the opportunity to provide this final update and is closing out that report.

Original Corrective Actions and Status			
No.	**Recommendation**	**High-level Intended Corrective Actions**	**Estimated Completion / Region 6 and 9 Completion Status**
1	Complete the necessary removal site evaluations and engineering evaluations/cost analyses.	1.1 Complete removal site evaluations (RSEs).	COMPLETED May 31, 2019
		1.2 Complete engineering evaluations/cost analyses (EE/CAs).	COMPLETED – December 31, 2020 Region 6 EE/CAs completed Draft Final EE/CAs for 20 NAUMs COMPLETED – December 31, 2021 Region 6 and Region 9 completed draft final EE/CAs for 53 Tronox NAUMs. Region 9- Five draft final EE/CAs for NAUMs were completed September 30, 2021, consistent with the December 2020 OIG response.

2	Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.	2.1 Complete development of prioritization methodology.	COMPLETED - May 31, 2019
		2.2 Refine prioritization methodology.	COMPLETED - Draft Final July 2020
		2.3 Conduct mine cleanup prioritization.	COMPLETED - Region 6 and Region 9 have completed –Relative prioritizations for Tronox Mines Region 6 completed October 30, 2020 Region 9 completed Relative prioritizations for the 34 Tronox Mines December 31, 2020 COMPLETED - Share relative prioritization methodology results with Navajo Superfund Program (NSP) and State of New Mexico on January 15, 2021
		2.4 Complete development and implementation of resource allocation methodology following the cost analysis of the preferred remedies	COMPLETED - Complete prioritization list for funding by December 31, 2021 COMPLETED - Establish a funding allocation strategy for the prioritized NAUM sites on December 20, 2021 COMPLETED - final resource allocations on March 14th, 2022

ATTACHMENT 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
LAND AND EMERGENCY
MANAGEMENT

MEMORANDUM

SUBJECT: Update to Responses to Office of Inspector General June 15, 2018, Report Recommendations and August 22, 2018 (No. 18-P-0233) Report entitled "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands."

FROM: Shahid Mahmud, Director
Office of Mountains, Deserts and Plains

SHAHID MAHMUD
Digitally signed by SHAHID MAHMUD
Date: 2021.12.20 11:24:12 -05'00'

TO: Katherine Trimble
Assistant Inspector General
Office of Audit
Office of Inspector General

The United States Environmental Protection Agency (EPA) is providing this update to the Office of Inspector General (OIG) on its progress with the corrective actions identified in the report titled, "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands" (Report No. 18-P-0233). The Report focused on the 54 Tronox Navajo Area Uranium Mines (NAUMs) on the Navajo Reservation or on private land within the State of New Mexico. Corrective actions include completion of Engineering Evaluation and Cost Analysis (EE/CAs) for these sites and refining and finalizing a prioritization methodology and resource allocation strategy for the Tronox settlement NAUM mine site cleanups. As reported in the December 29, 2020, update to the OIG, EPA Region 6 is the lead on 18 mines and EPA Region 9 is the lead on 35 mines. The 54th mine, Spencer Mine, was reclaimed by the State of New Mexico with funding by the Bureau of Land Management, and no further EPA action is planned for that site. Corrective actions include completion of Engineering Evaluation and Cost Analysis (EE/CAs) for these sites and refining and finalizing a prioritization methodology and resource allocation strategy for the Tronox settlement NAUM mine site cleanups. The prior update to OIG also explained that the Office of Mountains, Deserts and Plains (OMDP) would provide future responses to the OIG. An updated table summarizing completed activities and activities that remain outstanding can be found at the end of this memorandum. The table has been updated to reflect actions completed since December 2020. A memo describing the recently completed Tronox Allocation Strategy is provided as an attachment to this document.

Corrective Action 1.2 - Complete Engineering Evaluations/Cost Analyses

EPA has completed draft final Engineering Evaluations/Cost Analyses (EE/CAs) that cover the 54 Tronox NAUMs where additional work is anticipated.[1] The Navajo Nation has requested to comment on draft final EE/CAs without a recommended alternative prior to EPA selection of such an alternative. Section 33 Mine is located on private land in New Mexico and is commingled with Section 32 Mine on Navajo Nation. Section 32 and Section 33 will be addressed jointly with Region 9 as the lead region with Region 6 support. One of the 54 Tronox NAUMs, Spencer Mine, was reclaimed by the State of New Mexico with funding by the

[1] EE/CAs are complete for 25 sites (20 in Region 6 and 5 in Region 9). Region 9 is drafting EE/CAs for the remaining 29 sites, which plan to be complete by December 31, 2021.

Bureau of Land Management, and no further EPA action is planned for that site. This results in Region 6 having 18 remaining Tronox NAUMs to address.

Corrective Action 2.4 - Complete Prioritization List for Funding

During 2021, EPA completed its prioritization methodology, including scoring sheets that provide a relative ranking of the 54 NAUMs under the Tronox settlement. EPA has shared this prioritization methodology and relative ranking with both OIG and its regulatory stakeholders in the State of New Mexico and Navajo Nation. Prioritization was necessary to determine the sequence of response actions among the 54 NAUMs, a process distinct from allocation, discussed below, dividing the settlement proceeds among the NAUMs for CERCLA response. No further EPA action is planned for the prioritization methodology or the relative ranking prioritization list. EPA anticipates that allocated funds will be made available to initiate negotiations and/or response actions at the time such actions are selected for each mine or mine grouping to be addressed as a separate site. EPA Region 6 will work with New Mexico and EPA Region 9 with Navajo Nation on selecting response actions within their respective jurisdictions.

Corrective Action 2.4 - Establish a Funding Allocation Strategy for the Prioritized NAUM Sites

During 2021, EPA completed its Tronox Allocation Strategy (Attachment).[2] Settlement funds will be distributed among EPA special accounts established for the Tronox NAUM mines or mine groupings consistent with the allocation strategy. This Strategy will inform the final resource allocation to be completed by May 31, 2022. In September 2021, EPA initiated discussions with its regulatory stakeholders concerning the proposed allocation strategy. EPA met jointly with representatives of the Navajo Nation and the State of New Mexico on October 13, 2021, to present the draft strategy and request written comments on the strategy. EPA met again with Navajo Nation and the State of New Mexico on November 9, 2021, to answer written comments and gather additional input from these external partners on the proposed strategy. Correspondence concerning the Tronox Allocation Strategy was received on November 5, 2021, from New Mexico and November 9, 2021, from Navajo Nation. EPA responded to comments received on November 16, 2021. On November 18, 2021, EPA Regions 6 and 9 held government to government consultation with Navajo Nation. EPA Region 9 provided a follow-up response to consultation. On November 30, 2021, Navajo Nation President Nez and Vice President Lizer provided a letter to EPA summarizing their position following the consultation. On December 17, Region 9 send a letter to Navajo Nation responding to that November 30, 2021 correspondence and describing the conclusion of the consultation process.

Summary of Next Steps:

OMDP, and EPA Regions 6 and 9, will complete its final resource allocation by May 2022.

OMDP appreciates the opportunity to report the progress made in addressing the Tronox NAUM mine sites in Regions 6 and 9.

cc:

Attachment: Tronox Allocation Strategy Memo

Original Corrective Actions and Status			
No.	**Recommendation**	**High-level Intended Corrective Actions**	**Estimated Completion / Region 6 and 9 Completion Status**

[2] The December 2020 OIG response from EPA indicated that a "short, medium, and long-term funding allocation strategy" would be developed by December 31, 2021. EPA has since determined that it is more appropriate to follow policy and guidance for disbursing Special Account funds and is not reporting a short, medium, and long-term strategy.

1	Complete the necessary removal site evaluations and engineering evaluations/cost analyses.	1.1 Complete removal site evaluations (RSEs).	COMPLETED May 31, 2019
		1.2 Complete engineering evaluations/cost analyses (EE/CAs).	COMPLETED – December 31, 2020 Region 6 EE/CAs completed Draft Final EE/CAs for 20 NAUMs COMPLETED – December 31, 2021 Region 6 and Region 9 completed draft final EE/CAs for 53 Tronox NAUMs. Region 9- Five draft final EE/CAs for NAUMs were completed September 30, 2021, consistent with the December 2020 OIG response.
2	Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.	2.1 Complete development of prioritization methodology.	COMPLETED - May 31, 2019
		2.2 Refine prioritization methodology.	COMPLETED - Draft Final July 2020
		2.3 Conduct mine cleanup prioritization.	COMPLETED - Region 6 and Region 9 have completed –Relative prioritizations for Tronox Mines Region 6 completed October 30, 2020 Region 9 completed Relative prioritizations for the 34 Tronox Mines December 31, 2020. COMPLETED - Share relative prioritization methodology results with Navajo Superfund Program (NSP) and State of New Mexico by January 15, 2021
		2.4 Complete development and implementation of resource allocation methodology following the cost analysis of the preferred remedies	COMPLETED - Complete prioritization list for funding by December 31, 2021 COMPLETED - Establish a funding allocation strategy for the prioritized NAUM sites by December 31, 2021 Complete final resource allocations by May 31, 2022

Tronox Navajo Area Uranium Mines
Draft Settlement Funding Allocation Strategy
USEPA Tronox Allocation Workgroup[1]
November 5, 2021

I. Introduction

Two settlements ("2011 and 2015 Consent Decrees" or "Tronox Settlements") in the Tronox Inc. Bankruptcy in the Southern District of New York and related litigation, provided USEPA with approximately $900 million to address 54 Tronox Navajo Area Uranium Mines (Tronox NAUMs). Twenty of the mines are located in USEPA Region 6 (on private land in New Mexico outside of the Navajo Nation) and 34 in USEPA Region 9 (on tribal land within the Navajo Nation) (*see* map provided as Attachment 1). When USEPA first received this funding, the costs of investigation and cleanup of the mines were unknown. This resulted in uncertainty concerning whether the settlement funds would be sufficient to complete all tasks required under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601 *et seq*., to address the contamination at the 54 Tronox NAUMs. While final remedies have not been selected, USEPA investigations, analyses of alternatives and development of cost estimates have made it clear that the Tronox settlement funds will be insufficient to perform the required work. Consistent with the Tronox Settlements, USEPA has developed a draft funding allocation strategy with the goal of creating appropriate incentives for full funding by the remaining non-Tronox potentially responsible parties (PRPs), so that cleanup work can begin as soon as possible after response actions are selected. This memorandum describes the assumptions and considerations the USEPA Tronox Allocation Workgroup has utilized, as well as the resulting strategy and planned next steps. The memo is intended for distribution to regulatory stakeholders for their input. After regulatory stakeholder's input has been considered, a final version of the allocation strategy will be provided to the USEPA Office of Inspector General, which initiated an audit in 2017 (see Attachments 2 and 3).

II. Background

The 54 Tronox NAUMs are located in the Grants Mineral Belt, which runs through both steep mesas in Arizona as well as flatter lands to the east in New Mexico. Mining occurred primarily in the 1940s through the 1970s. While Tronox's predecessor Kerr McGee Corporation was the primary operator of the mines, USEPA has issued notice of potential liability to other parties, including other mining companies that operated the Sites and federal agencies that participated in leasing and incentivizing production of uranium ore. The non-Tronox PRPs include parties that are familiar with the issues presented because these parties have participated in discussions, settlements and in some cases litigation, regarding the responsibility for cleanup of other uranium mine sites in the Grants Mineral Belt.

[1] USEPA's Tronox Allocation Workgroup includes members of USEPA's Office of Mountains, Deserts and Plains (OMDP), Office of Superfund Remediation and Technological Innovation (OSRTI), Office of Emergency Management (OEM), Office of Site Remediation Enforcement (OSRE) and Regions 6 and 9.

III. Assumptions, Considerations and Funding Allocation Strategy

A. Assumptions

Insufficiency: A key assumption, based on investigations and cost analyses to date, is that the funds currently available in the Tronox Special Accounts ($924 million with interest) will be insufficient to cover the full costs of cleanup for the 54 Tronox NAUMs. USEPA's work to date has shown that even if the least expensive options that might be protective were implemented, Tronox funding alone would be insufficient. Based on current estimates, USEPA expects the insufficiency of funds to be substantial. *See* Attachments 4 and 6.

Remedy/Cost Uncertainty: USEPA investigations of site conditions and the development response action options and associated cost estimates are ongoing for the 54 Tronox NAUMs. The total funding required for full cleanup of the 54 Tronox NAUMs will not be known with certainty for a relatively long period, most likely a decade or more.

Other Financially Viable non-Tronox PRPs: As detailed below, there are financially viable non-Tronox PRPs for all but three of the Tronox NAUMs that require additional response actions but federal agencies may also be liable at those three sites.

Maximize Non-Tronox PRP Incentives to Settle: Allocation of the Tronox settlement proceeds is needed to begin negotiations with the non-Tronox PRPs and to secure full funding for cleanup at all 54 Tronox NAUMs.

Avoid Pre-Decisional Actions: The Workgroup sought to avoid pre-decision assumptions and considered the range of alternatives that could potentially be selected to address the 54 sites. Given that there is an implementable protective regional waste repository option for Region 6, the Workgroup did not use the more expensive option of disposal of off-site licensed facilities for the R6 Tronox NAUMs. For Region 9, however, the option of licensed off-site facilities is still among options that the Workgroup found is likely to receive further consideration, even though regional repositories remain a possibility. While the use of this most expensive option in Region 9 remains the strong preference of the Navajo Nation, a decision has not yet been made. USEPA will make the final response action selections consistent with CERCLA, the NCP and other program guidance.

Impact on Non-Tronox PRPs: The Workgroup considered the need to ensure that the chosen strategy would be fair to both PRPs whose sites were addressed sooner, as well to those whose sites would be addressed later.

Fair, Reasonable, in the Public Interest and Consistent with the CERCLA/NCP: The allocation strategy needs to result in settlements with or orders to private parties that would be readily approvable and enforceable by federal courts.

B. Considerations

Expedite Cleanup: A key consideration for selecting the Allocation Strategy was expediting cleanup. While some sites had significant reclamation, impacted environmental justice communities have waited decades for final protective cleanups. Interim actions have reduced exposure, but uncertainty about the nature and timing of final cleanup has been disruptive for the affected communities. Finalizing a resource allocation as a basis for engaging the non-Tronox PRPs will allow USEPA to move promptly to fully fund and begin cleanups at the Tronox NAUM sites.

Minimize Funding Shortfall, including for Cleanup and Post-Removal Site Control: A second consideration, consistent with USEPA policy, is to ensure that PRPs fully fund the costs of cleanup.

C. Enforcement:

Based on prior litigation and settlements, the Workgroup is confident that enforcement against the known, viable non-Tronox PRPs will be successful. As noted above, the non-Tronox financially viable PRPs include former mine operators and federal agencies. An April 2019 federal district court decision (El Paso Natural Gas v. U.S.), regarding a group of 19 non-Tronox uranium mines in Western Navajo Nation, established that neither the mining company operators nor the federal agencies in that very similar case had successful defenses to CERCLA liability. None of the parties to that litigation appealed. *See* Attachment 5. In addition, in three settlements for other similar mine sites, between 2011 and 2018, the U.S. agencies and the mining companies agreed to contribution claims against the United States for roughly 25% - 50% of total response costs. These settlements provide additional assurance that enforcement against the non-Tronox PRPs will be successful.

IV. Funding Allocation Strategy

Proportional Funding/Bankruptcy Claims Model: The proportional allocation strategy the Workgroup developed is similar to a bankruptcy court approach and is appropriate given that the Tronox assets are insufficient to pay all claims. The Workgroup selected this approach because it met the criteria described above.

Equal Percentage of Capital Costs: For sites with viable PRPs, the Workgroup selected having the Tronox Settlement fund an equal percentage of capital costs at each mine or mine grouping. Non-Tronox PRPs would pay 100% of all costs exceeding their share of the allocated Tronox settlement funds (*see* Attachment 6).

V. Conclusions

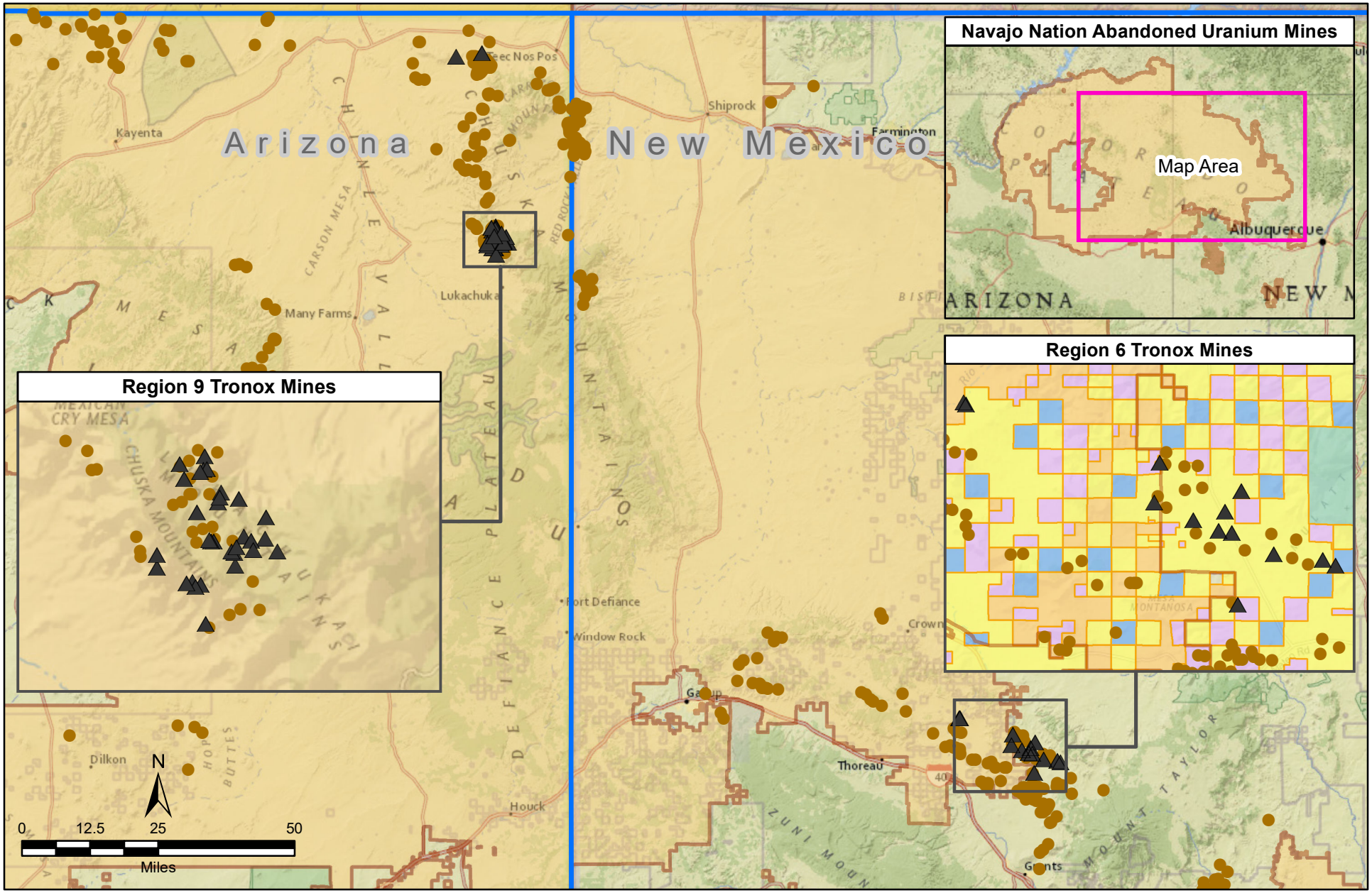
Based on the factors discussed above, the Tronox Allocation Workgroup has proposed the draft Tronox Settlement Funding Allocation Strategy for regulatory stakeholder review and input. At an October 13, 2021 virtual meeting, USEPA met with representatives of Navajo Nation EPA and State of New Mexico agencies and requested their input. A follow-up meeting with regulatory stakeholders is scheduled for November 9, 2021. The OIG deadline for USEPA to complete the funding allocation strategy is December 31, 2021. The OIG deadline for USEPA to complete the final resource allocation is May 31, 2022 (*see* Attachment 3 at p. 5).

VI. Attachments

1. Map showing location of Tronox NAUMs
2. OIG Audit Report 2018
3. Regions 6 and 9 Report to OIG, dated December 29, 2020
4. Tronox NAUM Cost Estimate Table
5. *El Paso Natural Gas v. United States*, No. CV14-8165-PCT-DGC, (D. Ariz. April 16, 2019) (https://casetext.com/case/el-paso-natural-gas-co-v-united-states-9)
6. Tronox Allocation Strategy PowerPoint shared with Navajo Nation and New Mexico, October 13, 2021

Source: The source of the image is ESRI, used by the EPA with ESRI's permission.

Date: August 25, 2021



Legend

- Abandoned Uranium Mine
- Tronox Abandoned Uranium Mine
- EPA Region Boundary
- Navajo Nation Boundary
- Bureau of Land Management
- Forest Service
- Private Land
- State Land
- Tribal Land

Abandoned Uranium Mines

Tronox Mines - EPA Regions 6 and 9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

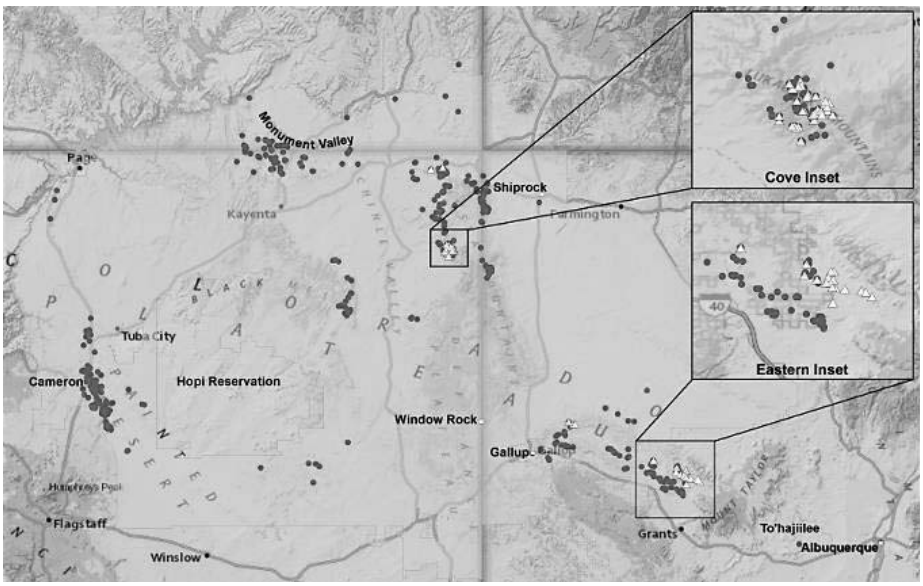
U.S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF INSPECTOR GENERAL

Cleaning up and revitalizing land

EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Lands

Report No. 18-P-0233 **August 22, 2018**



Report Contributors:

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Abbreviations

ASPECT	Airborne Spectral Photometric Environmental Collection Technology
AUM	Abandoned uranium mine
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	U.S. Environmental Protection Agency
GAO	U.S. Government Accountability Office

Cover Image: The map represents the Tronox Mines on or near Navajo Nation lands. (EPA-generated map)

U.S. Environmental Protection Agency
Office of Inspector General

18-P-0233
August 22, 2018

At a Glance

Why We Did This Review

We conducted this review to determine whether the U.S. Environmental Protection Agency (EPA) had a method for prioritizing cleanup of the approximately 50 abandoned uranium mine (AUM) sites on or near Navajo Nation lands covered under a special account established in 2015 totaling approximately $1 billion; and whether the EPA has a resource allocation methodology for the special account funds that accounts for estimated cleanup cost, timeframe for cleanup, and scope of cleanup for the 50 sites.

Health effects from uranium exposure can include impacts to autoimmune and reproductive functions, high blood pressure, kidney or lung damage, and bone cancer.

This report addresses the following:

- *Cleaning up and revitalizing land.*

Send all inquiries to our public affairs office at (202) 566-2391 or visit www.epa.gov/oig.

Listing of OIG reports.

EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Lands

What We Found

Site prioritization will aid EPA-initiated actions where there is imminent danger at numerous sites in the same area.

The EPA has taken steps to develop a prioritization methodology for cleaning up AUM sites on or near Navajo Nation lands that are part of a 2015 settlement with a chemical company, Tronox Incorporated. In conjunction with Tronox AUM cleanup stakeholders, the EPA has developed a system for identifying immediate risks and, where necessary, has taken the removal actions needed. The EPA has been following the National Contingency Plan for assigning risk to the sites and is gathering the data needed to complete prioritization for all Tronox AUM sites covered by the settlement. The EPA is tracking the estimated cleanup costs, timeframe for cleanup, and scope of cleanup for some of the Tronox AUM sites where work has already been conducted. After the prioritization methodology is developed, the EPA will be able to develop a resource allocation methodology for the Tronox AUM sites based on estimated cleanup costs, timeframe for cleanup and scope of cleanup.

Regions 6 and 9 have agreed on a timeline to complete the key activities necessary to finalize their prioritization methodology. It is critical that the EPA meet its milestones, including by the end of calendar year 2020, that EPA finalize the prioritization of Tronox AUM sites. Also, by the end of calendar year 2021, the EPA has agreed to complete development and implementation of the resource allocation methodology following the cost analysis of the preferred remedies. The regions' efforts will help result in the effective use of the Tronox special account and will help provide continued protection of human health and the environment.

Recommendations and Planned Agency Corrective Actions

We recommend that the Region 6 and 9 Regional Administrators complete the necessary removal site evaluations and engineering evaluations/cost analyses; and fully develop and implement prioritization and resource allocation methodologies for the Tronox AUM sites on or near Navajo Nation lands. The agency agreed with the recommendations and corrective actions are pending.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

August 22, 2018

MEMORANDUM

SUBJECT: EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Lands
Report No. 18-P-0233

FROM: Arthur A. Elkins Jr.

TO: Anne L. Idsal, Regional Administrator
Region 6

Mike Stoker, Regional Administrator
Region 9

This is our report on the subject audit conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency. The project number for this audit was OPE-FY17-0023. This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established audit resolution procedures.

Action Required

In accordance with EPA Manual 2750, your office provided acceptable corrective actions and milestone dates in response to OIG recommendations. All recommendations are resolved and no final response to this report is required. However, if you submit a response, it will be posted on the OIG's website, along with our memorandum commenting on your response. Your response should be provided as an Adobe PDF file that complies with the accessibility requirements of Section 508 of the Rehabilitation Act of 1973, as amended. The final response should not contain data that you do not want to be released to the public; if your response contains such data, you should identify the data for redaction or removal along with corresponding justification.

We will post this report to our website at www.epa.gov/oig.

Table of Contents

Appendices

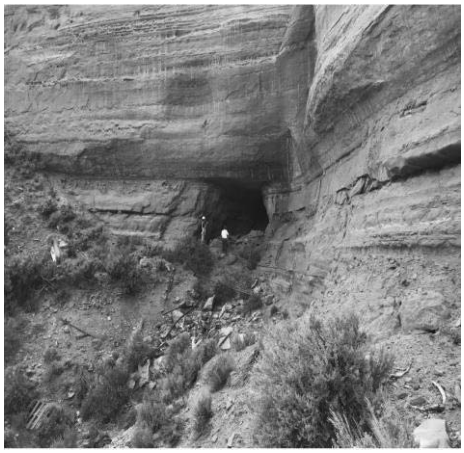
Purpose

The purpose of this audit was to determine whether the U.S. Environmental Protection Agency (EPA) has a method for prioritizing cleanup of the 50 abandoned uranium mine (AUM) sites[1] on or near Navajo Nation lands covered under a special account established in 2015 totaling approximately $1 billion; and whether the EPA has a resource allocation methodology for the special account funds that accounts for estimated cleanup costs, timeframe for cleanup, and scope of cleanup for the 50 sites.

Background

The Navajo Nation covers over 27,000 square miles in portions of three states: Arizona, New Mexico and Utah. There has been widespread uranium mining on Navajo Nation lands, beginning in the early 1900s. Peak uranium mining occurred between the 1940s and 1960s in support of the U.S. government's defense programs. Substantial amounts of land throughout the Navajo Nation were disturbed by surface and underground mining. Most uranium mining activities on Navajo Nation lands ended in 1968. According to the EPA, mines were operational until the 1980s but the legacy of contamination from the AUMs continues.

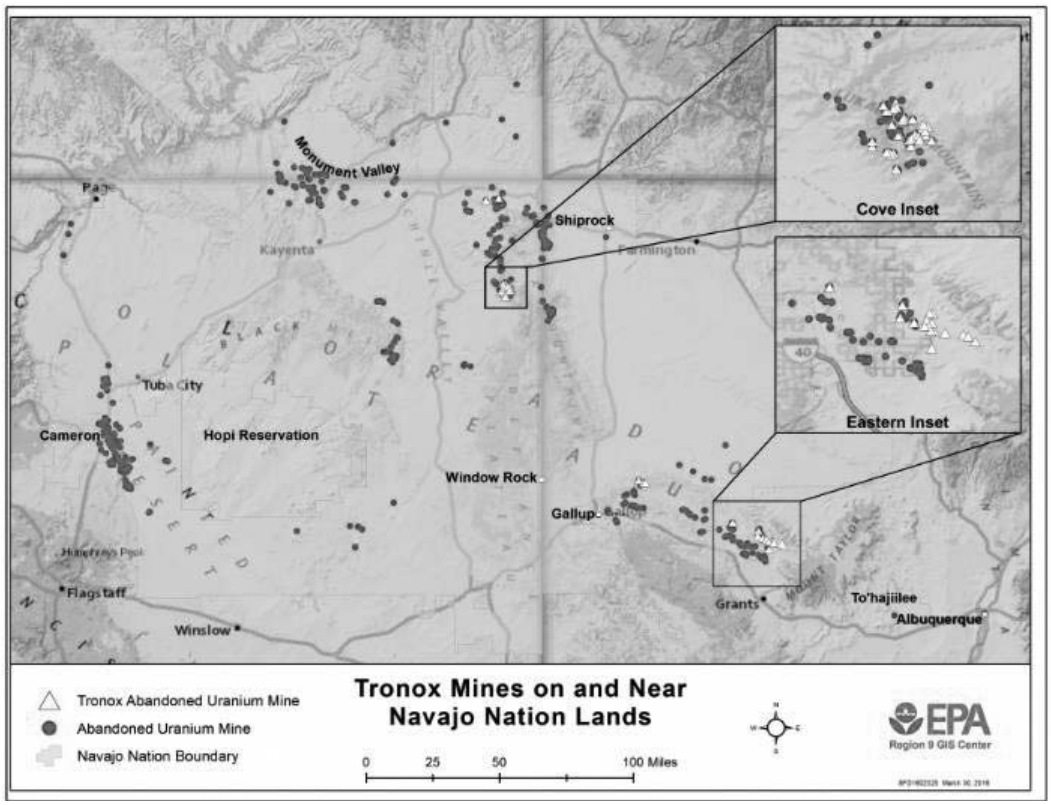
Tronox Settlement Agreement



Tronox Mesa V Shaft in Arizona. (EPA photo)

On January 21, 2015, the EPA recovered approximately $1 billion from a chemical company, Tronox Incorporated, in a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) settlement to address its liability for the activity of a predecessor company, Kerr McGee Corporation, which operated approximately 50 mines on or near Navajo Nation lands. The approximately $1 billion in funds the EPA received for the cleanup at the about 50 Navajo area uranium mines has been deposited into an EPA Superfund special account. In accordance with CERCLA Section 122(b)(3), special accounts are site-specific, interest-bearing sub-accounts housed within the EPA's Hazardous Substance Superfund Trust Fund. Charges to a special account must be consistent with the terms of the settlement pursuant to which the funds are received. Special account funds may be used for a wide range of site-specific CERCLA response actions.

[1] Subsequent to our issuance of the notification memorandum, we found that there were over 50 mines included in the settlement.



Source: EPA Region 9.

Tronox special account funds, designated for specified uranium mine sites in or near Navajo Nation territory, can be used to support activities related to the assessment and cleanup at the approximately 50 mines and contamination caused by the mines. Examples of these activities include:

- Inform and involve the community in the CERCLA response.
- Investigate the nature and extent of the contamination in water, soil, sediment and air.
- Install fences to control access and display signs to warn people about dangerous areas.
- Protect cultural and biological resources in the mine areas.
- Construct access roads to the mines for cleanup operations.
- Close mine openings and address other physical hazards.
- Conduct removal and cleanup activities.

Impacts on Human Health and Environment from Uranium Contamination

Contact with uranium or radiation from AUMs can come from living in a home built with material from a mine or mill site, or from drinking contaminated water. Health effects from uranium exposure can include impacts to autoimmune and reproductive functions, high blood pressure, kidney or lung damage, and bone

cancer. For example, at high concentrations, uranium has a toxic, chemical effect, and people have developed kidney disease drinking highly contaminated water for long periods. In 2001, the Navajo Nation issued a health advisory recommending that people drink water from regulated safe drinking water sources that are tested routinely to ensure their safety.

Uranium contamination can also impact the environment. Mining practices at AUMs often disturbed the soils, thus making them less stable and more susceptible to erosion. Soils disturbed by mining are also likely to support less vegetation, or may support a new species mix due to changes in soil composition. In the air, uranium exists as dust. Very small dust-like particles of uranium fall onto surface water, plant surfaces and soil either by themselves or during rainfall.

Initial Work to Assess Abandoned Uranium Mines

In 2002, the EPA used its Hazard Ranking System[2] to initially assess the AUM sites based on a limited subset of the locational-distance criteria in the Hazard Ranking System. It does not include the complete set of criteria and factors built into the full Hazard Ranking System model. The scoring is not intended to identify actual risks, but rather to identify and prioritize areas for future investigation and response decisions. The EPA conducted its work using the National Contingency Plan as its criteria. The National Contingency Plan provides the framework for the EPA to address cleanup at the AUM sites, take actions at sites where there is imminent danger, and gather the data needed to complete prioritization of all Tronox sites.

An EPA contractor and college interns collecting water and sediment samples in the Arizona Cove Wash in April 2017. (EPA photo)

In June 2005, the Navajo AUM Project[3] initiated a series of reports to document preliminary scoring results for AUMs in the six AUM regions in the Navajo Nation. For the first 5 years, the agencies involved 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. A second 5-year plan, completed in 2013, outlined a multi-agency and multidisciplinary approach to assessing the sites to aid in the coordination of addressing cleanup activities at the sites.

[2] The Hazard Ranking System is the principal mechanism that the EPA uses to place uncontrolled waste sites on the National Priorities List. It is a numerically based screening system that uses information from initial, limited investigations to assess the relative potential of sites to pose a threat to human health or the environment.
[3] The primary purpose of the Navajo AUM Project is to identify AUMs, potential exposures, and recommend methods to reduce exposure from AUMs on the Navajo Nation. The agencies involved are the EPA, Bureau of Indian Affairs, Nuclear Regulatory Commission, Department of Energy, and Indian Health Service.

Prior Report

In May 2014, the U.S. Government Accountability Office (GAO) issued a report titled *Uranium Contamination: Overall Scope, Time Frame, and Cost Information Is Needed for Contamination Cleanup on the Navajo Reservation* (GAO-14-323). The report focused on findings related to the 2008 5-year plan. The report indicated that six of the plan's eight objectives were met. The GAO concluded that federal agencies had not identified the full scope of remaining work, timeframes or costs to fully address uranium contamination on or near Navajo lands. The GAO made four recommendations, including that the EPA Administrator; Secretaries of Energy, Interior, and Health and Human Services; and Chairman of the Nuclear Regulatory Commission develop a coordinated outreach strategy to include in the 2014 5-year plan and take action to incorporate key practices in their collaborative effort (including defining and agreeing on the agencies' respective roles and responsibilities). The federal agencies agreed with the recommendation and incorporated key practices in the 2014 5-year plan.

Responsible Offices

EPA Region 6 (which covers New Mexico) and Region 9 (which covers Arizona) are responsible for addressing actions related to the cleanup of the Tronox Settlement-funded abandoned uranium mine sites, with Region 9 acting as the lead regional contact to Navajo Nation. None of the sites in our review were in Utah, so we did not include Region 8 in our review. At headquarters, the Office of Land and Emergency Management, Office of Enforcement and Compliance Assurance, Office of the Chief Financial Officer, and Office of International and Tribal Affairs have roles in the oversight of the AUM mines and EPA special account funds.

Scope and Methodology

We conducted our audit from December 2017 to June 2018. We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We analyzed documentation on AUMs and special accounts from EPA websites and those provided by Regions 6 and 9, such as the 5-year plans, Tronox AUM Proposed Mine Evaluation Risk Factors, Tronox Settlement Agreement, Tronox financial reports, and funding memos. We interviewed Regions 6 and 9 management and staff to understand the EPA's process for prioritizing Tronox Settlement-funded AUM sites and to determine the resource allocation methodology used for these sites. We interviewed members of the Navajo Nation to gain a stakeholder perspective.

Results

The EPA does not yet have a prioritization methodology for cleaning up the Tronox AUM sites on or near Navajo Nation lands, but is developing one. In conjunction with stakeholders[4] involved in AUM cleanups, the EPA has developed a system for identifying immediate risks and, where necessary, has taken the removal actions needed. The EPA has been following the National Contingency Plan for assigning risk to the sites and is gathering the data needed to complete prioritization for all Tronox sites. The EPA is tracking the estimated cleanup costs, timeframe for cleanup, and scope of cleanup for the Tronox AUM sites where cleanup work has already been conducted. After the prioritization methodology is developed, the EPA will be able to develop a resource allocation methodology for the Tronox AUM sites based on estimated cleanup costs, timeframe for cleanup and scope of cleanup.

EPA Is Developing a Prioritization Methodology for Tronox AUM Sites

The EPA does not have a formal prioritization methodology for the cleanup of the Tronox AUM sites. According to EPA officials, they have been gathering the necessary data and following the steps outlined in the National Contingency Plan to assess and eventually prioritize the Tronox sites. The EPA has implemented a "worst first" approach while proceeding through the development of the cleanup process. Prior to the Tronox settlement, the EPA used Airborne Spectral Photometric Environmental Collection Technology (ASPECT)[5] to gather information about contamination of the large affected area. The EPA was able to identify sites that were of higher risk to human health and the environment. The EPA initiated actions at sites where there was imminent danger.

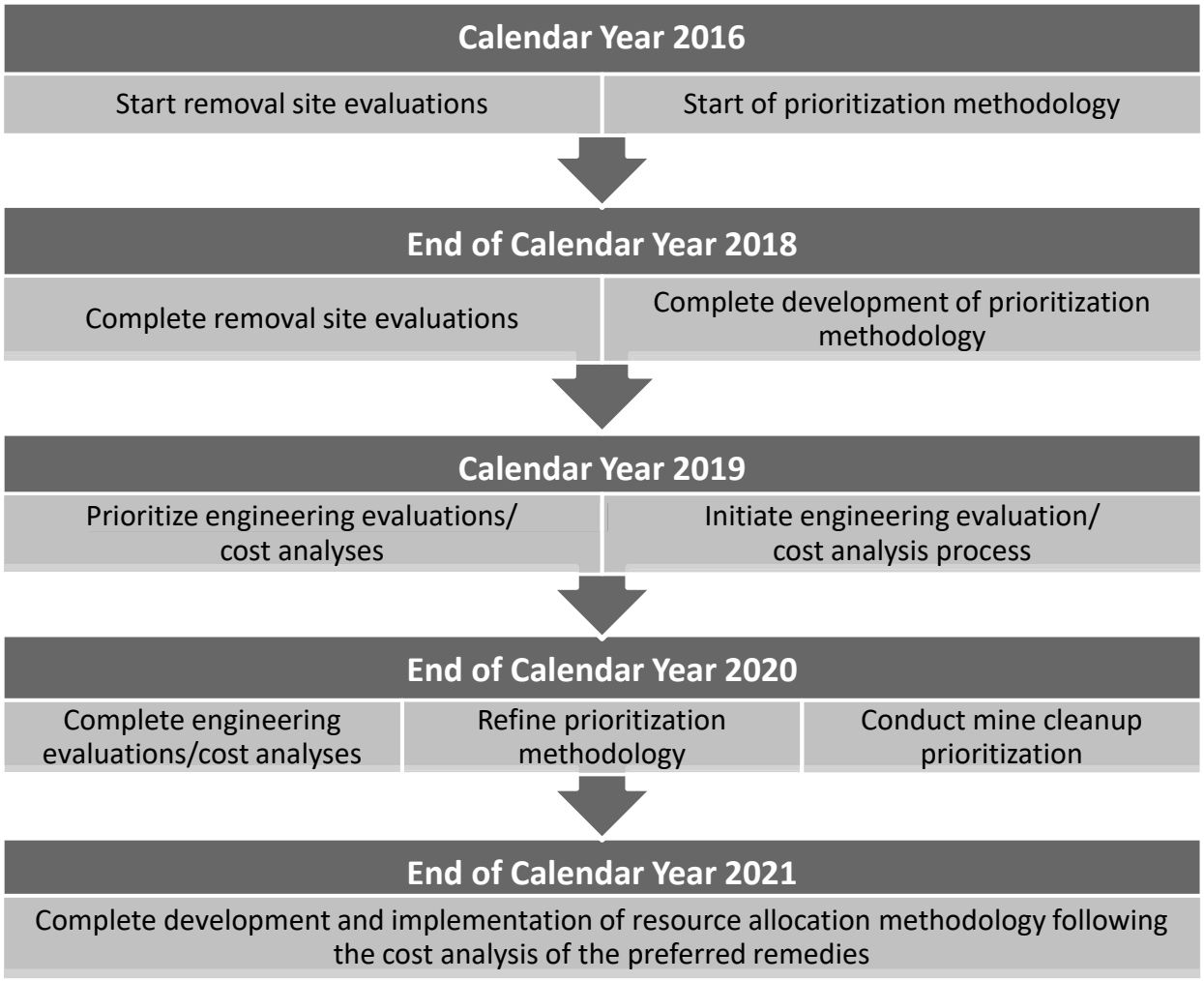
EPA Region 9 staff in Arizona Cove and Red Valley areas in August 2017 working to determine most accessible roads to conduct removal site evaluations. (EPA photo)

In an effort to aide in prioritization prior to the Tronox settlement agreement, the EPA has been identifying site risk factors and grouping mines to create a site ranking. The first procedure the agency used for prioritizing the Tronox mines was the Mine Category Assessment Protocol,[6] which according to the EPA, integrated information from prior scans by EPA and its contractors as well as the ASPECT over-flights and included criteria such as proximity, potential

[4] Stakeholders include the Navajo Nation; states of Arizona and New Mexico; other federal agencies that are part of a national federal abandoned uranium mines cleanup group, such as the EPA, Department of the Interior and Department of Energy; and the public.
[5] ASPECT gamma survey collected data on uranium radioactivity levels in survey areas surrounding the AUMs.
[6] The Mine Category Assessment Protocol is used to develop a ranking system for prioritizing Removal Site Evaluations (see next footnote for definition).

human exposure and other risk factors. Following the protocol, the EPA is currently conducting the removal site evaluation[7] at the Tronox sites, after which the engineering evaluation/cost analysis[8] will be developed. Figure 1 provides a timeline of key activities during the next 4 years.

Figure 1: Timeline for completion of prioritization and resource allocation methodologies



Source: OIG image derived from EPA Region 9 data.

The prioritization methodology in development is being created with input from the Tronox stakeholders[9] and the Federal AUM Workgroup. Throughout its efforts in assessing the AUM sites and developing its plan for cleaning up the sites, the EPA has consulted with the Navajo Nation, consistent with EPA's 2011

[7] Removal site evaluations identify the source and nature of the release, evaluate the magnitude of the threat, and determine necessity of removal actions.
[8] Engineering evaluation/cost analyses analyze the ability to implement, and the cost and effectiveness, of various cleanup actions based on removal site evaluation data.
[9] Stakeholders include the Navajo Nation; state of New Mexico; and other federal agencies that are part of a national federal abandoned uranium mines cleanup group, such as the Department of the Interior and Department of Energy.

Policy on Consultation and Coordination with Indian Tribes. The EPA indicated it does not envision the final prioritization methodology being a list of sites in a numerical order but rather groupings of sites prioritized by highest to lowest risk.

EPA Will Not Have a Resource Allocation Methodology for All Tronox Special Account Funds Until Prioritization Methodology Is Complete

The EPA has not completed a resource allocation methodology for all of the Tronox AUM sites that accounts for estimated cleanup costs, timeframe for cleanup, and scope of cleanup. EPA officials said that they will not be able to fully develop this resource allocation methodology until the site prioritization is complete. However, the EPA is currently tracking the estimated cleanup costs, timeframe for cleanup, and scope of cleanup for the Tronox AUM sites where cleanup work has already been completed.

Regions 6 and 9 established a series of sub-accounts for individual sites/projects within the overall umbrella account that will be used to address the Navajo Area Uranium Mines. In April 2017, the EPA developed a "Tronox Navajo Area Uranium Mines Project Implementation Plan, Accounting Strategy" to manage, track, plan and communicate the use of the funds. EPA Region 6 uses a special account structure similar to EPA Region 9 to address the Tronox Navajo AUM sites in New Mexico. The accounts are tracked in the regions and headquarters through the Compass database and the Superfund Cost Recovery Package Imaging and On-Line System (known as "SCORPIOS"). The data obtained in those systems is presented in the EPA's quarterly and annual reports.

The EPA (Regions 6 and 9), Navajo Nation, and New Mexico meet several times a year to discuss prioritizing response actions and the funding of projects at each Tronox AUM site. The parties develop a coordinated prioritized project list along with estimated funding requirements for the following calendar year. Individual project lists are tracked in an annual "Approval and Annual Funding Projections for Implementation of Tronox Settlement Memo." Once projects are approved, a special account name/number is created for that project to track expenditures. Special account funds have been and will continue to be used for future cleanup actions needed to address sites that pose an imminent and substantial endangerment.

According to the EPA, the prioritization methodology is being developed to address all of the Tronox AUM sites. The EPA believes that prioritizations will be determined when the engineering evaluations/cost analyses are complete. The goals of the engineering evaluations/cost analyses are to identify the objectives of the cleanup and analyze the various alternatives that may be used to satisfy the objectives for cost effectiveness, and their ability to be implemented. Therefore, the EPA cannot provide a complete resource allocation methodology for all of the Tronox sites until completion of removal site evaluation and engineering evaluations/cost analyses.

Conclusion

The agency has taken appropriate steps to assess sites, take removal actions when needed, and gather the data necessary to complete its assessments and develop its prioritization methodology. Regions 6 and 9 have agreed on a timeline to complete the key activities necessary to finalize their prioritization methodology. It is critical that the EPA meet its milestones and finalize the prioritization of Tronox AUM sites to use the Tronox special account effectively and provide continued protection of human health and the environment.

Recommendations

We recommend that the EPA Regional Administrators, Regions 6 and 9:

1. Complete the necessary removal site evaluations and engineering evaluations/cost analyses.

2. Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.

Agency Response and OIG Evaluation

EPA Regions 6 and 9 agreed with the report's recommendations and offered technical comments in a response dated July 16, 2018. On July 30, 2018, the agency provided a revised email response to further address Recommendation 2. We revised the report as appropriate, based on the technical comments. In response to the recommendations, the regions provided acceptable corrective actions and planned completion dates, with corrective actions pending. Appendix A contains the agency's response to the discussion document, including the revised response.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS

Rec. No.	Page No.	Subject	Status[1]	Action Official	Planned Completion Date	Potential Monetary Benefits (in $000s)
1	8	Complete the necessary removal site evaluations and engineering evaluations/cost analyses.	R	Regional Administrators, Regions 6 and 9	12/31/20	
2	8	Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.	R	Regional Administrators, Regions 6 and 9	12/31/21	

[1] C = Corrective action completed.
R = Recommendation resolved with corrective action pending.
U = Recommendation unresolved with resolution efforts in progress.

Agency Response to Discussion Document

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

REGION IX
75 HAWTHORNE STREET
SAN FRANCISCO, CA 94105

JUL 16 2018

MEMORANDUM

SUBJECT: Response to Office of Inspector General Discussion Document, "EPA Is Developing a Methodology to Prioritize Cleaning Up Abandoned Uranium Mine Sites on or Near Navajo Nation Lands," (Assignment # OPE-FY17-0023) dated June 15, 2018

FROM: Anne Idsal
Regional Administrator
Region 6

Michael Stoker 7/13/18
Regional Administrator
Region 9

TO: Kevin Christensen
Assistant Inspector General
Office of Audit and Evaluation
Office of Inspector General

Thank you for the opportunity to respond to the issues and recommendations in the subject audit report. Following is a summary of the United States Environmental Protection Agency, Region 6 and 9's overall position, along with our position on the two report recommendations. For the report recommendations, we provide corrective actions and estimated completion dates to the extent possible. We also provide Region 6 and 9's detailed comments with respect to certain factual matters covered in the discussion document and a copy of comments from EPA's Office of Site Remediation Enforcement.

I. AGENCY'S OVERALL POSITION

The U.S. Environmental Protection Agency, Regions 6 and 9, agree with the recommendations in the report.

II. AGENCY'S RESPONSE TO REPORT RECOMMENDATIONS

Agreements

No.	Recommendation	High-level Intended Corrective Actions	Estimated Completion
1.	Complete the necessary removal site evaluations and engineering evaluations/cost analyses.	1.1 Complete removal site evaluations (RSEs).	December 31, 2018
		1.2 Complete engineering evaluations/cost analyses.	December 31, 2020
2.	Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.	1.1 Complete development of prioritization methodology.	December 31, 2018
		1.2 Refine prioritization methodology.	December 31, 2020
		1.3 Conduct mine cleanup prioritization.	December 31, 2020
		1.4 Complete development and implementation of resource allocation methodology following the cost analysis of the preferred remedies.	December 31, 2021

OIG Note: On July 30, 2018, action officials for Regions 6 and 9 provided a revised response to report Recommendation 2 by providing the above milestone highlighted in blue text and annotated as corrective action 1.4 with the corresponding estimated completion date.

Note: Regions 6 and 9 intend to follow through with our commitments and timeline (as we detailed above). However, completion dates are subject to available resources (staffing). As the OIG found (see https://www.epa.gov/office-inspector-general/report-epas-distribution-superfund-human-resources-does-not-support-current), both Regions 6 and 9 are operating at a structural deficit with regard to FTE. This lack of adequate resources could affect the actual completion dates.

Disagreements

The U.S. Environmental Protection Agency, Regions 6 and 9, have no disagreements.

III. DETAILED COMMENTS FROM REGIONS 6 AND 9

1. On Page 1, first paragraph, the draft indicates "On January 21, 2015, the EPA recovered almost $1 billion from Tronox Incorporated." To clarify the settlement history, there have been two separate settlements in the Tronox Bankruptcy that provided funding for the "Navajo Area Uranium Mines" ("NAUM") (collectively "the Settlements"). The first settlement was with Tronox, Incorporated and provided approximately $12 million. The second settlement was with Anadarko Petroleum Corporation, resolved fraudulent conveyance claims against Kerr-Mc-Gee Corporation and provided approximately $890 million. Each of the Settlements also provided separate funding for the Quivira Mine Site, the largest of the Tronox uranium mines on the Navajo Nation (approximately $1.2 million and $89 million respectively). In total, the two settlements provided approximately $990 million to address uranium mine sites formerly operated by Kerr McGee Corporation on and near the Navajo Nation.

2. On Page 1, Charles Huskon No. 7 Mine (EPA photo). This is not a Tronox mine. Attached please find a photo of the Tronox Mesa V Shaft and waste pile for possible use in the report.

3. On Page 1, first paragraph, the draft indicates "50 abandoned uranium mine sites." There are currently 54 NAUMs funded by the Settlements. As noted above, funding for the Quivira Mine Site is completely separate and cannot be prioritized *vis a vis* the other NAUM sites.

4. On page 1, the second paragraph should reflect that the mines were operational until the 1980s.

5. On page 2, the second sentence should clarify that "Tronox Special Account funds *[designated for specified uranium mine sites in or near Navajo Nation territory]* can be used to support activities related to the assessment and cleanup at the approximately 54 mines and contamination caused by the mines."

6. On Page 2, Tronox Settlement Agreements bullet #2, because contaminants other than radiation will be evaluated, we recommend the following change to bullet #2:

   - *Investigate the nature and extent of the contamination in water, soil, sediment and air.*

7. On Page 2, second paragraph, it should be noted that of the 54 NAUM sites covered by the funding in the Tronox Settlements, 20 are near the Navajo Nation on private land within New Mexico.

8. On Page 2, Impacts on Human Health and Environment from Uranium Contamination, the Regions recommend changing "unregulated water" to "contaminated water" for clarification.

9. On Page 5, first paragraph, the draft indicates "In conjunction with AUM cleanup stakeholders, the EPA has developed a system for identifying immediate risks and, where necessary, has taken the removal actions needed." For clarification, it should read "In conjunction with stakeholders involved in AUM cleanups nationwide, the EPA has developed a system for identifying immediate risks and, where necessary, has taken the removal actions needed."

10. On Page 5, EPA photo caption states "EPA Region 9 staff assessing Tronox mines in the Cove and Red Valley areas in August 2017 to determine most assessable roads to conduct removal site evaluations". The caption should read "The EPA Region 9 staff is assessing Tronox mine roads in the Cove and Red Valley areas in August 2017 to determine most accessible roads to conduct removal site evaluations".…….

11. On Page 5, third paragraph – first sentence should include that ASPECT was used for prioritization:

    In an effort to aide in prioritization prior to the Tronox settlement agreement, the EPA has been identifying site risk factors and grouping mines to create a site ranking. The first procedure the agency used for prioritizing the Tronox mines was the Mine Category Assessment Protocol,[5] *which integrated information from prior scans by EPA and its contractors as well as the ASPECT over-flights and included criteria such as……..*

12. On Page 6, second paragraph, Federal Uranium Mines Commission should be replaced with Federal AUM Workgroup.

13. On Page 7, third paragraph – the first sentence should include acknowledge that the prioritization methodology is being developed through collaboration and outreach to Navajo Nation and the State of New Mexico.

14. General Footnote Comment – stakeholders should include the public.

Appendix B

Distribution

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Audit Follow-Up Coordinator, Region 6
Audit Follow-Up Coordinator, Region 9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

December 29, 2020

MEMORANDUM

SUBJECT: Update to Responses to Office of Inspector General June 15, 2018, Report Recommendations and August 22, 2018 (No. 18-P-0233) Report entitled "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands."

FROM: Ken McQueen
Regional Administrator, Region 6

KENLEY MCQUEEN
Digitally signed by KENLEY MCQUEEN
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=KENLEY MCQUEEN, 0.9.2342.19200300.100.1.1=68001003780283
Date: 2020.12.29 08:49:27 -06'00'

John W. Busterud
Regional Administrator, Region 9

JOHN BUSTERUD
Digitally signed by JOHN BUSTERUD
Date: 2020.12.29 08:13:54 -08'00'

TO: Kathlene Butler
Acting Assistant Inspector General
Office of Audit and Evaluation
Office of Inspector General

The United States Environmental Protection Agency (EPA) is providing an update on its progress with the corrective actions identified in the report titled, "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands" and proposing a revised corrective action. The report focused on the 54 Tronox Navajo Area Uranium Mines (NAUMs) on the Navajo Reservation or on private land within the State of New Mexico which included 20 mine sites in Region 6 and 34 sites in Region 9. Corrective actions include completion of Engineering Evaluation and Cost Analysis (EE/CAs) for these sites and refining and finalizing a prioritization methodology for the Tronox settlement NAUM mine site cleanups. An updated table summarizing completed activities and activities that remain outstanding can be found in Attachment 1 at the end of this letter.

On September 2, 2020, EPA established a new office within the Office of Land and Emergency Management (OLEM) to improve efficient and effective cleanups at western hardrock mining sites. This office, called the Office of Mountains, Deserts and Plains, will serve as the coordinating body for cleanup efforts at western hardrock mine sites with EPA Regions 6, 7, 8, 9 and 10, OLEM and other headquarters offices. A special priority area for OMDP is to improve response actions and expedite the effective cleanup of abandoned uranium mines on the Navajo Nation. EPA recommends that further OIG inquiries be directed to EPA's OMDP. This office will serve as the EPA lead office for reporting progress and completion of EPA commitments to this report (No. 18-P-0233).

EPA has addressed thirty-five percent of the 54 sites by completing four draft final EE/CAs that cover the 18 mines on private land in Ambrosia Lake, New Mexico. An additional mine, Spencer Mine, was reclaimed by the State of New Mexico with funding by the Bureau of Land Management, and no further EPA action is planned for this site. EPA completed a draft EE/CA

for the Section 32 and 33 mine sites, which have commingled mine waste contamination and are located on Navajo allotment land. Region 9 will be the lead region for both Section 32 and Section 33, with Region 6 as the support region.

EPA also refined the prioritization methodology and completed scoring sheets to provide an initial relative ranking of the 54 sites under the Tronox settlement. EPA is sharing the draft final prioritization methodology with its stakeholders to include the State of New Mexico (NM Environment Department and NM Mining and Minerals Division) and the Navajo Nation (Navajo Nation EPA [NNEPA], Navajo AML, Navajo DOJ, and Navajo Office of the President and Vice President). No further EPA action is planned for the prioritization methodology beyond what is described below and in Table 1.

EPA will proceed with robust discussions with the Navajo Nation and the State of New Mexico to finalize EE/CAs for all remaining sites concurrently. The EE/CAs will provide critical information such as draft remedy options with associated scope and cost, practical engineering logistics considerations, and public review and comment processes associated with individual draft EE/CAs.

Of the 34 mines in Region 9, EPA did not complete the draft EE/CAs as planned this year due to a convergence of factors. The most significant of these factors was the ongoing COVID-19 pandemic, resulting in travel restrictions for EPA staff [1] and repeated closures of Navajo Nation government offices, making it impossible to conduct the fieldwork necessary to complete the draft EE/CAs.

To summarize completed actions and next steps:

- EPA refined the draft prioritization methodology and developed an initial prioritization of all 54 sites.
- EPA completed draft final EE/CAs for 18 NAUMs under the Tronox Settlement.
- By September 30, 2021, EPA Region 9 will complete draft EE/CAs for four sites closest to residents, and by December 31, 2021, Region 9 will complete draft EE/CAs for the remaining 30 sites.
- By December 31, 2021, EPA will finalize its prioritized list of 54 sites. EPA will continue to meet with the Navajo Nation and the State of New Mexico during this process.
- By December 31, 2021, OMDP, in partnership with the Navajo Nation, State of New Mexico, and Regions 6 and 9, will establish a short, medium and long term funding allocation strategy for the prioritized NAUM sites. The allocation strategy and funding will be reviewed annually.

[1] As an update, Region 9 has recently posted three staff in the Navajo Nation and added four new Remedial Project Managers for NAUM cleanups.

The EPA appreciates the opportunity to report the progress made in addressing contaminated mines identified in the Tronox Settlement. OMDP looks forward to working with the OIG to clean up the Tronox NAUM mine sites in Regions 6 and 9.

cc: Deb Thomas, Acting Administrator, Region 8
Shahid Mahmud, Acting Director, Office Mountains Deserts and Plains

Attachment

Attachment 1
OIG Original Corrective Actions and Status

In 2018, Regions 6 and Region 9 committed to completing several corrective actions in order to finish prioritization and resource allocation for the Tronox NAUMs. Region 6 divided the 18 Tronox NAUMs on private land in Ambrosia Lake into 4 study areas to more efficiently manage the investigations. Region 9 identified 34 Tronox NAUM Mines. All dates below are subject to change if COVID-19 restrictions and/or if weather conditions delay the start of field work. OLEM's Office of Mountains, Deserts and Plains will play an active role in the corrective actions below in accordance with its mandate.

Original Corrective Actions and Status			
No.	**Recommendation**	**High-level Intended Corrective Actions**	**Estimated Completion / Region 6 and 9 Completion Status**
1.	Complete the necessary removal site evaluations and engineering evaluations/cost analyses.	1.1 Complete removal site evaluations (RSEs).	Region 6 and Region 9 – COMPLETED May 31, 2019
		1.2 Complete engineering evaluations/cost analyses (EE/CAs).	December 31, 2020 Region 6 --COMPLETED 4 Draft Final EECAs for 18 Tronox NAUMs Region 9 – Draft 4 EE/CAs by September 30, 2021 at mines that are closest to residents, where exposure is higher, and human health risk is therefore potentially higher. Draft remaining EE/CAs by December 31, 2021
2.	Fully develop and implement prioritization and resource allocation methodologies for the Tronox abandoned uranium mine sites on or near Navajo Nation lands.	2.1 Complete development of prioritization methodology.	May 31, 2019 (COMPLETED)
		2.2 Refine prioritization methodology.	December 31, 2020 COMPLETED Draft Final July 2020
		2.3 Conduct mine cleanup prioritization.	December 31, 2020 Region 6 – COMPLETED Relative prioritizations for its 18 Tronox Mines October 30, 2020 Region 9 – COMPLETED Relative prioritizations for the 34 Tronox Mines December 31, 2020. Share relative prioritization methodology results with Navajo Superfund Program (NSP) and

			State of New Mexico by January 15, 2021. Complete prioritization list for funding by December 31, 2021
		2.4 Complete development and implementation of resource allocation methodology following the cost analysis of the preferred remedies	Establish a funding allocation strategy for the prioritized NAUM sites by December 31, 2021 Complete final resource allocations by May 31, 2022

Attachment 4

Tronox NAUM Cost Estimate Table

Category	Description			Cost
EPA Intramural	Federal Salary and Travel			$98,000,000
EPA Extramural	Grants & Cooperative Agreements to Navajo Nation and New Mexico, Contractor Oversight Support, Post Removal Site Control			$121,000,000
Region 6 Non-Time Critical Removal Actions	Non-Time Critical Removal Construction Costs	East GSA	$213,000,000	$669,000,000
		Central GSA	$229,000,000	
		West GSA	$209,000,000	
		Section 10	$18,000,000	
Region 9 Interim & Non-Time Critical Removal Actions	Non-Time Critical Removal Construction Costs	Section 32/33	$61,000,000	$1,034,000,000
		Lukachukai	$128,000,000	
		Tse Tah\Cove	$845,000,000	
Total Estimated Funding Needs				$1.922,000,000

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ARIZONA

El Paso Natural Gas Company, LLC, Plaintiff, v. United States of America, et al., Defendants.	No. CV14-8165-PCT-DGC **ORDER**

This case concerns environmental liability under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") for 19 uranium mines located near Cameron, Arizona, on the Navajo Nation Reservation (the "Mine Sites"). Plaintiff El Paso Natural Gas Company, LLC, whose predecessors operated the mines in the 1950s and 1960s, brings claims against Defendants United States of America, the Department of the Interior ("DOI"), the Bureau of Indian Affairs ("BIA"), the United States Geological Survey ("USGS"), and the Department of Energy ("DOE") (collectively, the "United States") for cost recovery and contribution. Doc. 55 ¶¶ 1-2.[1] The United States asserts a CERCLA counterclaim against El Paso for contribution. Docs. 53, 66.[2]

[1] The Nuclear Regulatory Commission was dismissed on May 5, 2016. *See* Doc. 72.

[2] The 19 Mine Sites consist of sites 1-12, 14, and 17, originally permitted by Charles and Evan Huskon, and sites 20-22 and 24, originally permitted by Rare Metals Corporation. The Court will refer to the sites generally as "Mine Sites" and specifically as "Huskon" followed by the site number or "Ramco" (for Rare Metals) followed by the site number.

El Paso stipulates that it was an operator of the Mine Sites for purposes of CERCLA liability (Doc. 108), and the Court previously held that the United States is liable as an owner of the land where the mines are located (Doc. 135). The parties assert additional grounds for CERCLA liability against each other and ask the Court to make an equitable allocation of past and future response costs under CERCLA § 113.

The Court held an eight-day bench trial in February and March, 2019. Each side presented many witnesses, live or by deposition, and hundreds of exhibits. The parties also submitted extensive proposed findings of fact and conclusions of law, as well as post-trial briefing on specific issues addressed in this order. For reasons set forth below, the Court will allocate 65% of past and future response costs to El Paso and 35% of such costs to the United States.

I. Findings of Fact.

This order sets forth the Court's findings of fact and conclusions of law under Rule 52 of the Federal Rules of Civil Procedure. The Court provides some citations to the record, but the citations should not be regarded as the sole basis for the Court's ruling. The Court's findings and conclusions are based on all of the testimony and exhibits admitted in evidence.

A. The Parties.

El Paso is the corporate successor of Arrowhead Uranium Company ("Arrowhead"), Rare Metals Corporation of America ("Rare Metals"), and El Paso Natural Gas Company. Doc. 159 at 8.[3] Arrowhead and Rare Metals mined uranium at the Mine Sites. Arrowhead was one of the original uranium mining companies in the Cameron region of Northern Arizona, operating from 1952 to 1954. Ex. 28 at 7-8. Rare Metals was formed in 1954 to prospect, explore, and acquire properties containing uranium deposits and other valuable minerals. Rare Metals acquired Arrowhead in December 1954 and took over its uranium mining operations. *See* Exs. 1040-44. Rare Metals also engaged in uranium exploration

[3] Throughout this order, the Court will refer to Arrowhead, Rare Metals, and El Paso collectively as "El Paso" unless the context requires identification of a specific entity.

and development in Utah, New Mexico, California, and other locations. Exs. 1041 at 7; 1042 at 6, 8; 1043 at 5-7, 9. Rare Metals merged with El Paso in 1962. Ex. 1056. El Paso also takes responsibility for the mining activities of Cameron Mining Company at several of the Mine Sites. Doc. 159 at 8.

The land where the Mine Sites are located is owned by the United States in trust for the Navajo Nation. *See* 25 U.S.C. § 640d-9(a); Doc. 159 at 7. The DOI and the BIA, as part of their tribal trust responsibilities, oversaw some aspects of the mining permits and leases for the Nation. Doc. 159 at 8; Ex. 12 at 2. The USGS, which is part of the DOI, collects, analyzes, monitors, and provides information about natural resources. Docs. 1 ¶ 19; 23 ¶ 19. DOE is the successor agency to the former Atomic Energy Commission ("AEC"). Doc. 23 ¶ 20. After World War II, the AEC was responsible for creating and managing a program to procure uranium for nuclear weapons, known as the Domestic Uranium Procurement Program ("DUPP"). Ex. 74 at 6.

B. The Cold War and the Domestic Uranium Industry.

The United States' use of atomic bombs in Japan both hastened the end of World War II and sparked the Cold War with the Soviet Union. Both nations aggressively developed nuclear weapons. Obtaining uranium, a naturally occurring metal that was an indispensable component of such weapons, became a driving objective of the United States' national defense effort. Doc. 158 ¶ 12.

In 1946, Congress passed the Atomic Energy Act, which formed the AEC. *See* 60 Stat. 755. The Act also established the DUPP, a program for "the production, ownership, and use of fissionable material to assure the common defense and security and to insure the broadest possible mining of the fields." Ex. 74 at 6. Viewing foreign sources of uranium as unreliable, the United States sought, through the DUPP, to locate and develop domestic sources using a combination of government-led exploration and private enterprise incentives. Tr. at 94-95. At the time, the federal government was the only authorized purchaser of uranium in the United States. Atomic Energy Act of 1946 § 5(2); Ex. 74 at 14.

Between 1948 and 1956, the AEC published nine circulars offering guaranteed minimum prices and bonus payments for uranium ore (the "Circulars"). *See* Ex. 41. Circulars 3, 4, 5, and 6 applied to uranium mining on the Colorado Plateau, a geographic area encompassing some 140,000 square miles in Arizona, Utah, Colorado, and New Mexico. Ex. 1002; Doc. 159 at 7. Circular 3 guaranteed, for three years, a minimum price and "development allowance" of fifty cents per pound for uranium ore of .15% grade or more. Ex. 41 at 3-4; *see also id*. at 8-9 (Circular 5 Revised). Circular 4 established a haulage allowance of six cents per mile for the first 100 miles. *Id*. at 5. Circular 5 also guaranteed a minimum price and expanded the development allowance to ore with uranium concentrations as low as .10%. *Id*. at 6. Circular 6 created an additional bonus for the production of uranium ore from new domestic mines. *Id*. at 13-14.

The AEC assisted the young domestic uranium industry by conducting geologic surveys, furnishing free testing and assaying services, and agreeing to purchase uranium ore. Ex. 25 at 13. The AEC established ore-buying stations in uranium-producing areas. *Id*. The AEC's assistance programs included research and development that led to improvement in milling processes and other mining-related innovations. *Id*.; *see also* Chenoweth Depo. Jan. 15, 2014, at 85.[4]

Beginning in 1948, the AEC, assisted by the USGS, operated a program of uranium exploration on the Colorado Plateau and several other western states. Ex. 25 at 14. The program involved temporary withdrawal of some 700 square miles of public domain land for exploration, geologic studies, drilling, examination of samples, and airborne reconnaissance. *Id*. The AEC employed a contractor, Walker Lybarger, to use a bulldozer to uncover any uranium outcrops that were discovered. Chenoweth Depo. Jan. 15, 2014, at 103.[5] Ore found on AEC land was leased to private parties directly through the AEC in return for a royalty on ore production. Ex. 25 at 14; *see also* Chenoweth Depo. Jan. 15,

[4] The relevancy and Rule 403 objections to this deposition testimony are overruled. When the Court relies on any other deposition testimony submitted by the parties to which an objection has been made, the Court will state its ruling in this order.

[5] The Rule 403, 602, and 802 objections to this deposition testimony are overruled.

2014, at 79-82. The AEC also undertook an access road program under which the AEC, the Bureau of Public Roads, and various state agencies improved over 1,200 miles of roads in Arizona and other states to facilitate uranium exploration and mine development. Ex. 25 at 15.

In July 1952, Charles Steen, an independent prospector, found uranium on the Colorado Plateau south of Moab, Utah. *See* Tr. at 56-57, 1600. Steen made over a million dollars on the ore deposit, and his success motivated many others to pursue uranium mining, launching a gold-rush-like interest in prospecting for uranium. Tr. at 57.

C. Uranium Mining on the Navajo Reservation.

Because the 19 Mine Sites are all located on the Navajo Reservation, both the Navajo Nation and the federal government were involved in transactions affecting the sites. Generally, four permits or leases are required for uranium mining: (1) prospecting permits, (2) drilling and exploration permits, (3) mining permits, and (4) mining leases. *See* Ex. 31 at 10. As of 1951, the Navajo Nation did not require a separate drilling and exploration permit (Ex. 1075) and required only non-Navajos to apply for prospecting permits (Ex. 31 at 10). In 1953, the Nation's mining regulations were updated to require drilling and exploration permits. Ex. 1078. The new regulations also required any prospector, Navajo or non-Navajo, to apply for a prospecting permit. *Id*. at 2. A non-Navajo permit holder could negotiate a mining lease with a tribal advisory committee. *Id*.

Permits were approved by the Navajo Tribal Council and the area director of the BIA. *See* Tr. at 160-61; *see, e.g.*, Ex. 294A. All rents and royalties were paid to the United States Treasury for deposit exclusively in Navajo tribal funds. *See* Tr. at 203, 523. The permits contained provisions related to the trust oversight responsibilities of the DOI and required permittees to (1) "conform to any and all regulations of the Secretary of the Interior"; (2) receive approval from the Tribal Council and the Secretary of the Interior before assigning the permit; and (3) allow inspection of permitted premises and operations by BIA personnel. Ex. 294A at 3-4. These provisions and the DOI oversight of the leases were consistent with the DOI's trust duties over all reservation mining. *See* Tr. at 162-63,

90 (the lease authorization requirement is consistent with all mining contracts on the Navajo reservation); Ex. 75 (example of a lease rejected by the BIA consistent with its tribal trust duty); Ex. 13 (delegating approval of leases to the Secretary of the Interior because it was in a better position to make profitable lease arrangements for tribes); *see also Navajo Tribe of Indians v. United States*, 9 Ct. Cl. 227, 232 (1985) (noting that the United States has a responsibility to supervise the affairs of Indian tribes). The Navajo Nation exercised independent decision-making authority and had a strong interest in developing uranium resources on tribal lands, and that the United States supported the Nation's efforts consistent with its role as tribal trustee. Tr. at 893-95, 899-904, 941-42, 988-89.

D. The Mine Sites.

In 1952, Charles Huskon, a Navajo prospector who worked for AEC contractor Walker Lybarger, discovered a natural uranium outcrop that would later become Huskon 1. Ex. 28 at 6. In July 1952, Huskon and his son left the contractor to work for Arrowhead. *Id*. In August and September, 1952, Huskon received mining permits for Huskon 1, 2, 3, 4, 5, 6, 7, and 8, and assigned them to Arrowhead. Ex. 294D. In Apr. 1953, the BIA approved a mining permit for Huskon 9, 10, and 11, which Huskon also assigned to Arrowhead. Ex. 24 at 53. Huskon 12, 14, and 17 were surveyed and located in December 1953 and January 1954 (Tr. at 525-27; Ex. 1023), but permits were not obtained until March 1954 (Ex. 294D).

Rare Metals acquired Arrowhead in December 1954 and took over all of its uranium mining operations. *See* Exs. 1040-44. In 1955, mining permits for Ramco 20, 21, and 22 were issued to Navajo prospectors and assigned to Rare Metals. Ex. 294D. These sites were converted to mining leases in 1959. *Id*. Ramco 24 was permitted by a Navajo prospector in 1957 and assigned to Rare Metals. *Id*.

In 1959, Rare Metals allowed Cameron Mining Company, an independent contractor, to perform mining operations at sites where Rare Metals had ceased operations. Doc. 159 at 8; Tr. at 499-500. These included Huskon 1, 2, 3, 6, 10, 11, 12, and 17, and

Ramco 20, 21, and 22. Exs. 28 at 13; 1165; 1166; Prince Depo. Oct. 9, 1996, at 88-89. Rare Metals relinquished its rights to Ramco 24 in 1958, and its rights to the remaining Mine Sites during the first half of the 1960s. *See* Ex. 294D.

E. Three Mining Phases.

At trial and in their briefs, the parties focused on three phases of mine operations: exploration, mining, and reclamation. The Court makes the following findings of fact with respect to each phase.

1. Exploration.

During exploration, an ore deposit is located through prospecting, confirmed, and uncovered to determine its "dimension, grade, and continuity." Tr. at 216. Common exploration methods in the 1950s included drilling and rim stripping. Tr. at 282. El Paso concedes that there is no evidence the United States ever conducted exploration activities at the Ramco sites (Tr. at 62), and El Paso does not seek contribution for exploratory drilling that occurred at any of the Huskon mines (Tr. at 17). During trial, El Paso also stated that it would assume responsibility for all exploration activities at Huskon 5, 6, and 9. Tr. at 348-49. This order, therefore, focuses on exploration at Huskon 1, 2, 3, 4, 7, 8, 10, 11, 12, 14, and 17. El Paso claims that the United States engaged in rim stripping at each of these sites. The United States disagrees.

Rim stripping occurs when a bulldozer excavates soil, referred to as "overburden," from the top of an ore deposit to expose the mineralized zone. *See* Tr. at 350. During a 45-day period between December 19, 1953 and February 3, 1954, the AEC conducted rim stripping in the Cameron area. Exs. 58; 91 at 2; 129 at 20; 1258. According to a report prepared in 1955 by David Hinckley, an AEC geologist (the "Hinckley Report"), the AEC stripped approximately 45,000 linear feet of soil in the Cameron area during this 45-day window, exposing portions of 15 uranium outcrops. Ex. 129 at 20.

Exploratory trenches made during rim stripping can still be seen at many of the Mine Sites today. Some of the trenches are visible in aerial photographs of the sites taken in

1954, and even more are apparent in aerial photographs taken in 1992. The question is who made the trenches.

AEC and its contractors used a Caterpillar D7 bulldozer for rim stripping – an 11-ton machine that cut a 29-foot-wide swath with its front blade. *See* Tr. at 330-31; Ex. 129 at 20. Arrowhead did not own a machine of this size, but instead used a much smaller Allis Chalmers HD5 front-end loader for work at the Mine Sites. *See* Tr. at 320-22, 441; *see also* Maloney Depo. at 117. After it purchased Arrowhead in December 1954, Rare Metals also used D7 bulldozers, as well as larger D8s, for work at the Huskon Mine Sites. *See* Tr. at 542, 551 (Mr. Beahm testifying that there is no dispute that Rare Metals bulldozers were used at the Huskon mines), 1306 (1992 aerial photos suggest that more rim stripping occurred after 1954); Exs. 130 at 6; 1160 (1957 contract with Rare Metals for contractor stripping of overburden); *see also* Chenoweth Depo. Apr. 24, 2014, at 26 (more exploration by private parties after 1956 than by the AEC before 1956).

El Paso's mining expert, Douglas Beahm, reviewed historical documents regarding the DUPP and historical aerial photographs. Tr. at 311. He visited the Mine Sites six times. *Id*. On the basis of his investigation, Mr. Beahm testified that the AEC performed rim stripping at Huskon 1-12, 14, and 17. Tr. at 349.[6] He testified to measuring a total of 30.2 acres (or 45,362 linear feet) of exploration disturbance at these Huskon sites. Tr. at 358-59. He noted that trenches he observed generally were 29-feet wide, corresponding to the size of a D7 blade, and that his estimated 45,362 linear feet of trenching aligns with the 45,000 linear feet of AEC rim stripping described in the 1955 Hinckley Report – rim stripping performed by the AEC during the 45-day window in 1953 and 1954. Tr. at 358; *see also* Ex. 129 at 20. Mr. Beahm concludes that all of the AEC's rim stripping in the Cameron area was performed at the Huskon Mine Sites, and constitutes the only rim stripping that occurred at those sites. El Paso also presented an undated internal corporate

[6] Mr. Beahm also noted a disturbance at Huskon 26, but he combined Huskon 26 with Huskon 11. *See* Tr. at 349. Thus, Mr. Beahm's numbers are applicable to all 15 Huskon sites.

memorandum which stated that the AEC bulldozed trenches on Huskon 1-11, 12, 14, and 17, and that the company did "[l]ittle bulldozer work . . . except to strip off overburden." Ex. 119; *see also* Tr. at 366-67.[7]

If Mr. Beahm is correct in his conclusion that some 45,000 feet of trenching was done by the AEC at the Mines Sites during the 45-day period described by Hinkley, the trenching would have occurred before the 1954 aerial photos were taken in February 1954 and presumably would be visible in those photos. But the government's aerial photography expert, Mary Sitton, testified that only 13,589 linear feet of rim stripping can be seen within the Mine Sites' boundaries in the 1954 aerial photographs, with approximately 3,000 linear feet outside of the boundaries. *See* Tr. at 1116.[8] She identified many trenches visible at the sites today that cannot be seen in the 1954 aerial photographs. She also noted that the 1955 Hinckley Report attributes the 45,000 linear feet of rim stripping not to the Mine Sites specifically, but to the general Cameron area, which includes scores of mine sites, and that Rare Metals had heavy bulldozers at the Mine Sites in early 1955 and thereafter – machines capable of creating the trenches observed on the ground today. This evidence persuasively suggests that the trenches at Huskon 1-12, 14, and 17 were not all made by the AEC during a single 45-day period in late 1953 and early 1954.

The Court finds Ms. Sitton's testimony about the aerial photographs to be more credible than Mr. Beahm's. She has significantly more aerial photography training and expertise than he does, and she obtained aerial photographs from the National Archives and Records Administration, the USGS, and the University of Arizona. Tr. at 1075. Unlike Mr. Beahm, she reviewed the historical aerial photos through a stereoscope, which allowed her to examine them in 3D. Tr. at 1076. The Court does not find credible Mr. Beahm's

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[7] El Paso presented evidence of some AEC involvement and reconnaissance in the Cameron area that predates Arrowhead's mining permits, but it does not specifically refer to rim stripping. *See* Ex. 179 (sampling at Huskon 1 on September 9, 1952, three weeks before Arrowhead received its permit).

[8] Mr. Beahm's exploration numbers included several areas outside of the mine boundaries. *See* Tr. at 617-18. According to El Paso, the EPA specifically requested that it examine these locations, but El Paso has not agreed to do any further remediation there. Tr. 438-41.

assertion that virtually all of the trenches seen on the ground today were present in 1954 but do not appear in the 1954 aerial photographs because they were obscured by shadows or lack of contrast.

The evidence also shows that Arrowhead conducted rim stripping. Mr. Beahm testified that Arrowhead was unable to rim strip by bulldozer because it owned only the HD5 front-end loader, which was incapable of creating the wide trenches observed at the 19 Mine Sites. *See* Tr. at 320-22, 441; *see also* Maloney Depo. at 117. And records do indicate that Arrowhead was primarily a hand-digging operation before it was acquired by Rare Metals. *See* Tr. at 323. Further, Dozing with an HD5 front-end loader would require multiple passes to create a trench as wide as a D7's, would create several separate waste piles, and would not create uniform windrows as observed on the side of trenches at the Mine Sites.[9] But the United States presented evidence that Arrowhead did conduct rim stripping with its HD5 at some of the Mine Sites. Arrowhead cofounder George Morehouse stated that he would "strip down with the dozer, actually [he would use] the front end loader as a dozer." *See* Ex. 69 at 9; *see also* Tr. at 1196-97. Expense and production reports for the Huskon sites, before the 45-day AEC exploration window, also indicate that rim stripping was performed by Arrowhead at the Huskon sites. *See* Ex. 1139 (report for Huskon 1 for October 24, 1952 to March 31, 1953, stating cubic yards for stripping); 1106 at 6 (indicating that overburden was stripped by an ACD5, which is the Allis Chalmers HD5 dozer); *see also* Tr. at 1199.

Based on all the evidence, the Court makes several findings regarding the parties' involvement in the exploration phase.

First, El Paso was directly involved in exploration. It has assumed responsibility for all exploration activities at the Ramco sites and Huskon 5, 6, and 9, as well as all exploratory drilling. The evidence described above shows that Arrowhead engaged in rim

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[9] A windrow is waste material left on either side of a trench dug by a bulldozer, or on one side if the bulldozer's blade is angled. Tr. 332.

stripping, and Arrowhead had mining permits at Huskon 1-11 before February 1954. *See* Ex. 294D. The parties agree that Arrowhead had the authority to mine or explore as a result of those permits. *See* Tr. at 1623. In fact, Arrowhead delivered its first uranium ore shipment from Huskon 1 in October 1952, well before the 45-day window when the United States conducted rim stripping activities in the Cameron area. *See* Ex. 28 at 7-8. The Court finds it likely that the rim stripping at Huskon 1-11 was conducted by Arrowhead in conjunction with its mining activities. *See* Tr. at 1099 (noting that exploration and mining occurred at the same time), 1228 (stripping is done at the mines after mining started).[10]

Second, the Court finds by a preponderance of the evidence that the United States engaged in exploration activities at Huskon 12, 14, and 17. Arrowhead did not receive a permit to mine these sites until March 1954, and yet Ms. Sitton and Mr. Beahm each found disturbances on these sites in the 1954 aerial photos that predate the permits. *See* Ex. 294D. For Huskon 14 and 17, Ms. Sitton noted several linear excavations on the 1954 aerials. *See* Exs. 1354; 1356.

El Paso asserts that Arrowhead could not have created these disturbances without a mining permit. *See* Tr. at 1623. Prior to approval of the survey of the mining claims, Arrowhead had no privileges at Huskon 12, 14, and 17. *See* Tr. at 369. El Paso argues that the United States did have permission from the Navajo Nation to prospect and explore on the lands in question before the February 1954 aerials were taken. Tr. at 341-43; Exs. 58; 1258. The United States appears to argue that because Arrowhead had a prospecting permit, and because it surveyed and plotted Huskon 12, 14, and 17 in December of 1953

[10] It is also possible that some exploration activities at Huskon 1-11 were conducted by the United States. The AEC certainly conducted rim stripping in the Cameron area, at least in the vicinity of the Mine Sites. *See* Exs. 91; 129 at 20. But the Court is not certain how much, if any, occurred on Huskon 1-11. El Paso's only historical document linking AEC exploration to Huskon 1-11 is the undated internal memo that does not identify the source of its information. *See* Ex. 119. And even if the United States conducted additional rim stripping at these sites, it would not affect the Court's allocation. The exploration phase of this case is small compared to the mining phase, and El Paso would, in any event, have welcomed and encouraged AEC rim stripping for more ore at its Mine Sites.

and January 1954, Arrowhead had authority to conduct exploration activities on those Sites. *See* Tr. at 1621. The United States asserts that because the Navajo Nation did not utilize exploration and drilling permits at the time, the prospecting permit gave Arrowhead authority to conduct these exploration activities. *See* Tr. at 1623. Further, the United States argues that the minimal level of activity identified by Ms. Sitton would be consistent with staking a mine claim. Tr. at 1622.

As already noted, the Navajo Nation initially did not require exploration or drilling permits. Tr. at 896, 1255; Exs. 1075; 1078. Miners applied for a prospecting permit and then for a mining permit. Ex. 1075. In December 1953, the Nation updated its regulations, requiring miners to seek first a prospecting permit, then an exploration permit, and then a mining permit. Tr. at 896; Ex. 1078. Mr. Beahm testified that the mining permit was necessary for miners to conduct exploration activities like those seen clearly at Huskon 14 and 17, and that likely occurred at Huskon 12 (Tr. at 117), and the United States failed to present any testimony that supports its theory that a prospecting permit prior to 1953 would allow Arrowhead to conduct exploration.[11] Moreover, the fact that the disturbances in question were labeled as linear excavations or seemed to be made by heavy equipment indicates that these disturbances were not made in the normal course of staking a claim. *See* Trial Tr at 1176 (only use a simple compass and steel chain for staking claims). Because the trenches and disturbances at Huskon 12, 14, and 17 were made at a time when Arrowhead likely did not have authority to do the work, and were made by heavy equipment of the kind operated by the AEC contractor, the Court finds by a preponderance of the evidence that the United States conducted rim stripping at these sites.

Third, the Court does not find, as El Paso suggests, that the AEC conducted most of the exploration activities at the Mine Sites. Mr. Beahm relied heavily on current site visits where he assumed that bulldozer-sized trenches visible on the ground were made by the

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[11] United States witness Jay Brigham testified that an individual with a prospecting permit would have an interest in the particular area. *See* Tr. at 944. But that does not mean that the individual would have had the authority to conduct exploration activities or to exclude the United States from conducting exploration activities.

AEC during the 45-day window in late 1953 and early 1954. But this view disregards the fact that the disturbances could have been made at any time during the years of mining by El Paso, including after 1954 when Rare Metals brought its own D7 and D8 bulldozers to the Mine Sites. *See* Tr. at 390; Ex. 1158. Mr. Beahm also relied on historical documents noting that the AEC conducted rim stripping in the Cameron area, but these documents refer to the entire Cameron area, which contained approximately 100 mines. Tr. at 1147 (Ms. Sitton testifying that she noted other activity in the Cameron area), 1112-14 (discussing mapping anomalies that included linear excavations in the Cameron area outside the Mine Sites), 1114-15 (Ms. Sitton testifying that the 45,000 linear feet does not cover just the 19 Mine Sites); *see also* Ex. 1363. And Mr. Beahm's assertion that he measured approximately 45,000 linear feet of trenching, which matched the Hinckley Report on AEC activity, is less credible than Ms. Sitton's testimony that most of this trenching does not appear in the 1954 aerial photographs.

In summary, although the Court finds that both El Paso and the United States engaged in exploration activities at the Mine Sites, the Court does not find that all or even a majority of it was performed by the United States. The evidence does not enable the Court to precisely determine the parties' respective exploration activities at the sites, but this is not an impediment to an overall allocation because the exploration phase is a relatively minor portion of the relevant activity in this case.

2. Mining.

All of the Mine Sites were open pit mines. Tr. at 1611. They were mined either by El Paso or one of the orphan companies. The United States never mined or supervised mining operations at any of the sites. *See* Tr. at 908, 1580; Ex. 69 at 4-5; Chenoweth Depo. Jan. 16, 2014, at 409; Chenoweth Depo. Apr. 24, 2014, at 23, 57.[12]

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[12] An orphan under CERCLA is a "party otherwise qualifying as a responsible party [but who] may be defunct, bankrupt, uninsured, or otherwise lack the resources to bear its ideal measure of responsibility in monetary terms." *United States v Kramer*, 953 F. Supp. 592, 595 (D.N.J. 1997). There were five entities that operated the Mine Sites and eventually went bankrupt: Utco Uranium, Cameron Mining, B.C. Associates, Domino Company, and H.R. Rodgers. *See* Tr. at 743.

The Navajo Nation managed uranium mining on the reservation. Tr. at 941-42; Chenoweth Depo. Jan. 16, 2014, at 408-09. The Nation wrote its own regulations, established a department of mining, conducted mining inspections, and hired a mining engineer. Tr. 893-95; Exs. 31 at 8; 62; 1074; 1080. The United States did conduct inspections through the DOI and the Bureau of Mines ("BOM") to promote mine safety and identify hazards. *See, e.g.*, Exs. 1189-1202; 1207-08; Chenoweth Depo. Jan. 16, 2014, at 409.

Initially, Arrowhead mined with picks, shovels, wheel barrows, the HD5 loader, and a crew of about twelve workers. *See* Ex. 69 at 10. El Paso's proposed findings of fact admit that Arrowhead produced almost 4,000 tons of ore in 1953 and more than 8,000 tons in 1954. *See* Doc. 158 ¶ 167. When Rare Metals acquired Arrowhead in December 1954, production at the mines increased significantly. *See* Doc. 158 ¶ 167; Ex. 1334. In 1956, Rare Metals Mines produced nearly 30,000 tons of ore. *See* Doc. 158 ¶ 167. In 1957, the Mines Sites produced over 40,000 tons. Doc. 158 ¶ 167. As of March 1956, an internal company memo stated that Rare Metals had stripped 291,169 tons of native material at the Huskon sites and another 273,857 tons of overburden at the Ramco sites. Ex. 1135.

Open pit mines are created by stripping away large amounts of overburden and then removing the ore to an onsite stockpile. *See* Exs. 1190-1210 (safety inspection reports documenting mining methods). El Paso's excavations at the Mine Sites ranged in size from shallow trenches to large pits up to 2,400 feet long. Exs. 28 at 5; 1190-1210; *see also* Tr. at 1202. Mine development also included roadbuilding. *See* Exs. 1336 (summarizing miles of road built at each site based on El Paso expense and production reports); 1389 ¶ 17. A majority of the Cameron area waste-generating activity occurred between 1954 and 1961. *See* Exs. 28 at 19; 1334.

El Paso disposed of hazardous substances at each of the Mine Sites. *See* Doc. 117 ¶ 3. The United States did not direct waste handling or waste disposal. *See* Tr. at 907, 921, 1204; Chenoweth Depo. Jan. 16, 2014, at 410. During mining, workers used a Geiger counter to asses wheelbarrow loads of ore and, if a load did not "measure so much on the

Geiger counter, they'd dump it over the hill [] someplace." Chenoweth Depo. Jan. 16, 2014, at 410-11. Waste rock was dumped out of the way so it would not interfere with mining. Chenoweth Depo. Jan. 16, 2014, at 411; *see also* Ex. 69 at 10 (Arrowhead put waste wherever it was convenient).

The AEC bought uranium at the prices and bonuses set by the Circulars. Because miners could grade their uranium on an average monthly basis, they had an incentive to stockpile lower-grade ore and blend it with higher-grade ore to sell to the AEC. Chenoweth Depo. Apr. 24, 2014, at 36. This was a common practice. *See* Tr. at 1610; Ex. 15 at 3; Chenoweth Depo. Apr. 24, 2014, at 36-37.

When El Paso opened the Tuba City mill in 1956, it set an ore grade cut-off of .20% because that was more efficient for the mill's operation. Ex. 280; Chenoweth Depo. Apr. 24, 2014, at 163-64 (the ore grade cut-off was up to the mill, if the mill did not want to take the lower grade the AEC did not force them); *see also* Exs. 1231-32 (mining companies complaining that El Paso was not purchasing lower grade ore as permitted by the Circulars). Even before the mill changed the cut-off, miners were more focused on higher-grade uranium because it sold for a higher price. Chenoweth Depo. Apr. 24, 2014, at 37 (most miners could not make money at the .10% cut-off, so during the uranium boom the average grade was about .23%).

By late 1957, dramatic increases in reported uranium ore reserves and in milling capacity prompted the AEC to announce that "it no longer [was] in the interest of the Government to expand production of uranium concentrate." Ex. 25 at 12. The AEC announced that it would buy "only appropriate quantities of concentrate derived from ore reserves developed prior to November 24, 1958." *Id.* In 1958, the AEC announced that "domestic producers of uranium ores and concentrate" could start making private sales for the peaceful use of atomic energy, but no such sales were actually made until 1966. *Id.*

In 1962, the AEC implemented a "stretch-out" program which allowed mining companies to defer delivery of a portion of their contract commitments until 1967 and 1968, in return for an AEC commitment to purchase the ore in 1969 and 1970. *Id.*

Operations at the Mine Sites phased down as incentives decreased, but there is also evidence that ore reserves at the Mine Sites were exhausted by this time and no longer held enough economically viable uranium. Chenoweth Depo. Jan. 16, 2014, at 410-14 (describing the process of using the Geiger counter to measure uranium from a mine; once it was very low, mining would stop); *see also* Ex. 31 at 7 ("[A]s the known orebodies were depleted, ore production declined sharply after 1958.").

At the end of a mining lease, there was an inspection to ensure that sites were free from physical hazards. *See* Tr. at 154; Ex. 1214; *see also* Chenoweth Depo. Apr. 24, 2014, at 182. Open pits were left unfilled. *See* Prince Depo. Oct. 9, 1996, at 131. Language in the leases and the customs of the day were to leave mines "timbered," which meant leaving the ore body accessible and, in the case of open pit mines, leaving the pit open. *See* Tr. at 154, 1613 (timbered means the structural integrity of the pit walls).[13]

Language in the mine leases also stated that mines were to be surrendered and returned in good condition except for ordinary wear and tear. *See* Tr. at 1576. El Paso's expert, Mr. Dempsey, testified that this provision did not affect the expectation that mine pits would be left open. *See* Tr. at 1577; *see also* Prince Depo. Oct. 9, 1996, at 114. By 1962, El Paso and its subcontractors stopped all mining at the 19 Mine Sites. Prince Depo. Oct. 9, 1996, at 68-69.

3. Reclamation.

For almost three decades, the Mine Sites remained largely in the same condition as when mining ceased, with open pits and waste piles on the properties. In the 1980s, the Navajo Nation became concerned about possible health impacts of abandoned uranium mines on the Reservation. Ex. 1275; Prince Depo. Oct. 30, 1996, at 220-21. People were frequenting the pits for recreational purposes, and livestock was watering at the pits. Prince Depo. Oct. 30, 1996, at 221-22. As a result, in the early 1990s the Navajo Nation undertook

[13] There is evidence that the Navajo Nation wanted mines closed after 1959 (Ex. 1274), but also some suggestion that this applied only to underground mines (Tr. 156).

reclamation of 17 of the 19 Mine Sites. Reclamation was not deemed necessary at Huskon 5 and 14. Doc. 159 at 9.

Funding for the reclamation was provided through grants from the federal government's Office of Surface Mining ("OSM") under the Surface Mining Control and Reclamation Act ("SMCRA"). Doc. 159 at 9. The Nation's office of Navajo Abandoned Mine Lands ("NAML") developed the plans for reclaiming the mines and submitted grant applications to the OSM. Martinez Depo. at 20-21. The OSM reviewed the applications prior to approving funding. *See id.* The OSM was deferential to the Nation in its review and oversight of the reclamation because of the Nation's status as a sovereign nation. Sassaman Depo. at 126-31. The OSM's role was to oversee the sites for compliance with the NAML plans and to offer advice when necessary. Martinez Depo. 34-36, 40-43; Sassaman Depo. 33-35, 106. All reclamation standards were established by the NAML. Martinez Depo. at 34-35; Sassaman Depo. at 29-30, 35, 56, 74-76.

Through five reclamation projects, the NAML (1) restored hundreds of acres of land, (2) backfilled and graded seventeen uranium mine pits formerly operated by El Paso, (3) removed or reduced the slopes of thousands of feet of dangerous highwalls and embankments, (4) contained mining waste underground to prevent erosion and reduce surface exposure, (5) built drainages structures to divert runoff from the pits and waste piles, (6) removed ponds of polluted water that were sometimes used for recreational and agricultural purposes, and (7) provided replacement ponds for livestock and wildlife. *See* Exs. 1279-85 (NAML technical specifications); 1310 (Project three update report); Prince Depo. Oct. 30, 1996, at 261-62. The United States provided the Nation with $2.4 million in funding for this work. *See* Exs. 1294-1308 (total costs by each site).

F. The Tuba City Mill.

The Tuba City uranium mill was built and operated by El Paso, and purchased ore from Cameron-area mines, including the Mine Sites. The mill is not part of the EPA's current CERCLA directive to El Paso, and the parties disagree on whether its remediation is relevant to the Court's equitable allocation for the 19 Mine Sites at issue in this case.

Originally, Arrowhead and Rare Metals shipped ore to the AEC's Bluewater mill in New Mexico. Exs. 1222; 1162; 1163; 1243. In 1954, Rare Metals contacted the AEC about establishing a mill in the vicinity of the Mine Sites, which would significantly reduce haulage costs. Tr. at 1008; Ex. 107. Rare Metals and the AEC agreed that the AEC would operate an ore-buying station in Tuba City until Rare Metals could finish building the mill, and Rare Metals would then take over the ore-buying function. Exs. 1030 at 5; 1222; 1224. In July 1956, Rare Metals completed construction of the mill and began purchasing ore from mines in the area. Exs. 1241; 1235. The mill operated from 1956 to 1966 and produced 80,000 tons of yellow cake uranium for the United States. Ex. 1072 at 25.

In the Circulars, the AEC offered to purchase uranium ore above a .10% grade. The Tuba City mill adopted a stricter standard, requiring a grade of .20% on a monthly average basis. Exs. 131; 280; 1040; 1226 at 2.

The Tuba City mill generated its own waste pile in the form of "tailings," which consisted of low-level radioactive sand generated from processing uranium ore. Ex. 1317 at 8; Prince Depo. Dec. 1, 2016, at 43-44. El Paso also disposed of liquid wastes from ore processing in an impoundment pond constructed near the mill. Exs. 1317 at 101; 1319 at 5. These operations contaminated groundwater at the site. Tr. at 1262.

El Paso stopped operation of the Tuba City mill in 1966 because uranium sources in the area were exhausted. *See* Ex. 1240 at 2. The Arizona Atomic Energy Commission ("Arizona AEC") oversaw the termination of El Paso's mill license. El Paso was required to stabilize the tailings pile (Ex. 1242), and consulted with the federal BOM to develop a stabilization plan (Ex. 176; Caulkins Depo. at 20-22).[14] El Paso's plan was submitted to and approved by the Arizona AEC, the United States Public Health Service, and the Navajo Minerals Resource Office. *See* Ex. 173. El Paso implemented the plan, and the Arizona AEC terminated El Paso's license, acknowledging that El Paso "effectively decontaminated the mill building," "stabilized the tailings pile against wind erosion," and "fenced and posted the tailings pile." Ex. 177; *see also* Tr. at 1252; Ex. 176.

[14] The Rule 401 and 403 objections to this testimony are overruled.

Eventually, the United States remediated the mill site under the Uranium Mill Tailings Radiation Control Act ("UMTRCA"). Ex. 1317 at 5, 18-20; 42 U.S.C. § 7901(a). In UMTRCA, Congress acknowledged that uranium tailings at active and inactive mill sites may pose a significant radiation health hazard to the public. *See* § 7901(a). UMTRCA was designed to "stabilize and control [mill] tailings in a safe and environmentally sound manner and to minimize or eliminate radiation hazards to the public." § 7901(b). In effect, the federal government assumed responsibility for the clean-up of uranium-producing mills for the good of the country. Tr. at 1243. Where clean-up occurs on Indian lands, as at the Tuba City mill, the government pays all costs. Ex. 1317 at 9.

The Tuba City mill remediation occurred in two phases from January 1985 to Apr. 1990. Ex. 1317 at 19. Through the end of 2018, the United States has spent $34,143,000 in surface remedial action costs and $59,426, 656 in groundwater remedial action costs, for a total of more than $93,500,000. *See* Ex. 1321. The monitoring process will continue into perpetuity (Ex. 1320 at 7), with the United States' future response costs projected to reach $37,288,757 (Ex. 1321).

G. The EPA and Remediation of the 19 Mine Sites.

When the EPA identifies an abandoned uranium mine that contains a hazardous substance, it requests that a potentially responsible party ("PRP") conduct a Remedial Site Evaluation ("RSE"). *See* 42 U.S.C. §§ 9606, 9607; 40 C.F.R. § 400.15. The RSE investigates the nature and extent of contamination and associated risks. *See* 40 C.F.R. § 400.20. It includes determining the background levels of radiation due to naturally occurring uranium. Stavinoha Depo. at 64-65. In Cameron, background levels vary dramatically from place to place and even within a particular site. *Id*. at 97. After an RSE, the PRP prepares an Engineering Evaluation/Cost Analysis ("EE/CA"), which evaluates potential response actions. Doc. 159 at 10; Tr. at 641.

In May 2012, the EPA sent El Paso a "general notice" letter identifying El Paso as a PRP for the Mine Sites. Doc. 159 at 8; Stavinoha Depo. at 29. In 2013, El Paso signed an administrative order of consent ("AOC") to perform a "limited" investigation. Ex. 263;

Stavinoha Depo. at 53-54. El Paso agreed to conduct gamma screening to determine the lateral extent of disturbed areas within a portion of the 19 Mine Sites. *See* Ex. 263 at 33-34. El Paso submitted a number of work plans related to background levels and gamma scanning (Tr. at 610), and has not missed a deadline with the EPA (Tr. at 610-11).

In 2017, El Paso agreed to conduct RSEs at Huskon 12 and 14, modifying the original AOC. *See* Tr. at 613. In 2018, El Paso entered a second AOC amendment to perform EE/CAs at Huskon 12 and 14. *See* Tr. at 613-14. El Paso also submitted a draft for a third modification to perform RSEs for the remaining 17 Mine Sites. Tr. at 614. To date, El Paso has performed draft RSEs for Huskon 12 and 14. *See* Ex. 1325. El Paso has also prepared a draft EE/CA for both sites. *See* Ex. 285. The EPA has not yet provided comments on these drafts. *See* Tr. at 630. The EPA has not selected a final remedy for Huskon 12 and 14, and El Paso has not agreed to perform a remedy. Tr. at 666.

H. Costs at Issue in this Order.

For purposes of the actual response costs to be allocated in this order, the parties have agreed to a cut-off date of August 1, 2016. El Paso alleges that it has incurred recoverable response costs at the Mine Sites totaling $1,393,448 through August 2016, and has paid another $502,500 to the United States to reimburse certain EPA response costs. *See* Doc. 159 at 13. The United States does not dispute these amounts and stipulates that they are necessary, recoverable, and consistent with the National Contingency Plan. *Id*. 12-13.[15]

The parties made clear at the final pretrial conference on February 13, 2019, that they are asking the Court not only to allocate these existing response costs, but also to enter a declaratory judgment establishing the allocation between them for purposes of all response costs related to the Mine Sites, including amounts to be incurred in the future. The parties agree that the Court need not address interest amounts due under CERCLA,

[15] The United States originally sought to recover response costs under § 107 in its counterclaim, but this claim was resolved in a consent decree between the parties. *See* Doc. 66. The consent decree did not resolve the United States' contribution claim under § 113. *Id.*

stating that they can agree on such amounts once the Court sets its allocation. The parties further stipulate that the Court should declare their allocated shares of liability as if all response costs incurred by each party were allocated under § 113(f). Doc. 159 at 13.

II. Liability.

A contribution claim under § 113(f) includes four elements: (1) a release or threatened release of hazardous substances; (2) from a facility as defined by CERCLA § 9601(9); (3) which has caused the plaintiff to incur response costs that are necessary and consistent with the National Contingency Plan; and (4) that the defendant is a PRP under CERCLA § 107(a). 42 U.S.C. § 9607(a); *see also* Doc. 159 at 10-11*; City of Colton v. Am. Promotional Events, Inc.*, 614 F.3d 998, 1002-03 (9th Cir. 2010); *Carson Harbor Village, Ltd. v. Unocal Corp.*, 270 F.3d 863, 870-71 (9th Cir. 2001). The parties do not dispute that the first three elements of § 113(f) liability are satisfied in this case, so the liability question focuses on PRP status. Doc. 159 at 10-13.

There are four types of PRP liability: owners, operators, arrangers, and transporters. 42 U.S.C. § 9607(a). As noted above, El Paso stipulates that it was an operator of the Mine Sites and the Court previously held that the United States is liable as an owner. Docs. 108, 135. El Paso argues that the United States is liable as an operator and arranger during all of the mining phases (Doc. 187 at 1-13), and the United States asserts that El Paso is liable as an arranger (Doc.186 at 2-6).[16]

A. United States' Operator Liability.

CERCLA imposes liability on "any person who at the time of disposal of any hazardous substance . . . operated any facility at which such hazardous substances were disposed of." 42 U.S.C. § 9607(a)(2). The word "operated" suggests that the liable party

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[16] The United States further argues that El Paso is liable as an owner because it owned equipment at the Mines Sites and disposed of mining waste with that equipment. *See* Doc. 157 ¶ 71. CERCLA broadly defines "owner" to include an owner of a "facility," and defines "facility" to include "equipment." 42 U.S.C. §§ 9601(9), 9601(20)(A)(ii). But case law is sparse on whether CERCLA liability can be premised on ownership of equipment at a superfund site. The Court need not wrestle with this question, however, because El Paso already is liable as an operator and, in the Court's view of the equities, adding equipment-owner liability would not change El Paso's equitable allocation.

actually took some action with respect to the facility. The Supreme Court has agreed, holding that "an operator must *manage*, *direct* or *conduct* operations specifically related to pollution[.]" *United States v. Bestfoods*, 524 U.S. 51, 66-67 (1998) (emphasis added). The Ninth Circuit similarly has held that an operator must play an "active role in running the facility, typically involving hands-on, day to day participation in the facility's management." *Long Beach Unified Sch. Dist. v. Dorothy B. Godwin Cal. Living Tr.*, 32 F.3d 1364, 1367 (9th Cir. 1994).

El Paso suggests that operator liability can be imposed on the basis of mere "authority to control" operations at a site, even if that authority is not exercised. Doc. 187 at 2. The Ninth Circuit did state in *Kaiser Aluminum & Chemical Co. v. Catellus Development Corp.*, 976 F.2d 1338 (9th Cir. 1992), that operator liability applies to a party that "had the authority to control the cause of the contamination at the time the hazardous substances were released into the environment." *Id.* at 1341. But *Kaiser* did not hold that unexercised authority is sufficient for operator liability. Rather, it imposed operator liability on a party that actually excavated and graded the contaminated property, spreading hazardous waste. *Id.* at 1339-40. *Kaiser*'s holding that such an actor is liable as an operator comports with the Supreme Court's instruction that operator liability "must be read to contemplate 'operation' as including the *exercise* of direction over the facility's activities." *Bestfoods*, 524 U.S. at 71 (emphasis added). It also squares with the Ninth Circuit's teaching that a party cannot be liable as an operator for merely "stand[ing] by and fail[ing] to prevent the contamination." *Long Beach*, 32 F.3d at 1367.[17]

1. Exploration.

El Paso asserts that the United States directed, managed, or conducted rim stripping at several of the Huskon Mine Sites. *Id*. at 4. As explained above, the Court finds by a preponderance of the evidence that the United States engaged in rim stripping at Huskon

[17] Judge Winmill harmonized the Ninth Circuit's language in *Kaiser* and *Long Beach* with this definition: "CERCLA operator liability attaches if the defendant had authority to control the cause of the contamination at the time the hazardous substances were released into the environment and actually exercised such control." *Nu-W. Min. Inc. v. United States*, 768 F. Supp. 2d 1082, 1089 (D. Idaho 2011) (citation omitted).

12, 14, and 17. These exploration activities released hazardous substances. *See* Tr. at 316-17, 372, 669, 1186-87. As a result, the United States controlled the "cause of the contamination at the time the hazardous wastes were released into the environment." *Kaiser*, 976 F.3d at 1341. The United States is liable as a CERCLA operator for its role in rim stripping at these three Mine Sites.

2. Mining.

El Paso argues that the United States was an operator during the mining phase because it exercised control over mining operations through its authority over El Paso's permits and leases. The evidence cited by El Paso in support of this proposed liability shows that the United States, through the BIA, approved mining permits and leases, possessed the authority to terminate permits and leases, rejected a lease at least once, retained authority to inspect the Mine Sites, required El Paso to comply with relevant regulations, and retained authority to hear disputes between El Paso and the Navajo Nation. *See* Doc. 187 at 5 (citing testimony and exhibits). But this evidence merely establishes that the United States had some "authority to control" what happened at the Mine Sites, not that the United States actually exercised that authority as required for operator liability, as explained above.

Several historical witnesses who worked at the Mine Sites testified that the United States did not have direct involvement in the mining operations. James Maloney testified that he never saw anyone from the federal government at the Mine Sites. Maloney Depo. at 28. George Morehouse reported that there was no federal oversight of the mining operations. Ex. 69 at 4-5. William Chenoweth testified that the AEC did not review or approve mining plans or supervise mining operations. Chenoweth Depo. Jan. 16, 2014, at 409; Chenoweth Depo. Apr. 24, 2014, at 23, 57.

The Court finds that the United States did not "manage, direct, or conduct operations specifically related to pollution," *Bestfoods*, 524 U.S. at 66-67, and that mere possession of such authority is not enough for operator liability, *Long Beach*, 32 F.3d at 1367. Other cases have reached comparable conclusions. *See Cour D'Alene Tribe v. Asarco Inc.*, 280

F. Supp. 2d 1094, 1128-30 (D. Idaho, 2003) (finding no United States operator liability even where compliance with the government's wartime directives was mandatory); *see also Miami-Dade County v. United States*, 345 F. Supp. 2d 1319, 1344-46 (S.D. Fla. 2004) (holding that the manual detailing contractors' inspection and quality control responsibilities did not amount to direction of waste disposal practices).

El Paso argues that the United States exercised control of the Mine Sites through the AEC and the DUPP by (1) creating the domestic market for uranium ore; (2) exercising authority over the possession, transport, and delivery of the ore; (3) acting as the sole purchaser of the ore; (4) controlling El Paso's profits by controlling ore prices, bonuses, and allowances; and (5) setting the ore-grade cut-off, which determined what level of uranium-bearing materials necessarily would be left at the Mine Sites. Doc. 187 at 6. The Court agrees that the United States influenced the operations of El Paso and other uranium mining companies in the 1950s and 1960s. The DUPP was created to foster development of domestic uranium mines, the AEC actively promoted mining on the Colorado Plateau and in the Cameron area, the government regulated the acquisition and handling of uranium ore and was the sole purchaser of the ore for many years, and the AEC exercised some financial control over the uranium market through the Circulars. But El Paso was not conscripted into the uranium business, and the government did not tell it how to operate its mines or dispose of its waste. El Paso stayed in the business and expanded its operations as long as they were profitable and left the business when they were not. El Paso decided who to hire, how much to pay them, what equipment to use, how much money to invest, where to mine, how to mine, how to dispose of waste, and how long to operate. El Paso excavated the ore, created waste piles, and built the mill that had the effects of increasing the profitability of mining in the Cameron area and promoting the development and expansion of the Mine Sites and other mines. El Paso continued to mine and process uranium at the mill after the United States allowed private party purchases of uranium and announced its stretch-out program, and continued to process ore until the supply was exhausted. *See* Ex. 1240 at 2. Given these facts, the Court cannot conclude that the

influence exercised by the United States over uranium mining and markets rose to the level of "manag[ing], direct[ing], or conduct[ing] operations specifically related to pollution," as required for CERCLA operator liability. *Bestfoods*, 524 U.S. at 66-67.

This is true even when the Court considers the most direct influence the government exerted on contamination-creating activities – the Circular's establishment of a .10% grade cut-off. While it is true that this cut-off resulted in less concentrated uranium-bearing materials being left as waste at the sites, some cut-off level was required. El Paso cannot plausibly argue that no cut-off level should have been established – that even the most minute concentrations of uranium in soil or rock should have been purchased and milled on behalf of the government. This fact is best demonstrated by El Paso's own .20% cut-off at the Tuba City mill. This level resulted not only in ore below .10% being left at the Mine Sites, but also in ore below .20% being left there. El Paso's cut-off produced the same on-site contamination as the Circular, and more. The Court cannot conclude that the Circular's cut-off level constituted sufficient managing, directing, or conducting of pollution-creating operations to give rise to operator liability.

Other cases which have considered comparable levels of government influence have reached the same conclusion. *See United States v. Iron Mountain Mines*, 987 F. Supp. 1277, 1285 (E.D. Cal. 1997) ("Despite its creation of various incentives and programs to assist mining companies, the government did not compel Mountain Copper to do any mining at Iron Mountain; it did not require Mountain Copper to extract a certain amount of any substance from Iron Mountain; and it did not issue commands to Mountain Copper as to how, where, or when to mine."); *see also Cour D'Alene Tribe*, 280 F. Supp. 2d at 1129 (finding no operator status where the government lacked managerial control over the mines, the mines and mills were not forced to produce but elected to aid the war effort and participate in the government's premium price plan, the mining companies owned the equipment used in the mines and mills, the government set the price for the metals but did not control who could purchase them, and the mining companies controlled the mechanisms creating the tailings and disposal of the tailings).

The facts of this case are also distinguishable from cases where the United States has been held liable as an operator. For example, in *FMC Corp. v United States Department of Commerce*, 29 F. 3d 833 (3d Cir. 1994), the Third Circuit found the government liable as an operator because it (1) required the facility to manufacture a certain product, (2) controlled the supply and price of the raw materials, (3) supplied equipment for use in the manufacturing process, (4) acted to ensure the facility retained an adequate labor force, (5) participated in the management and supervision of the labor force, (6) had authority to remove workers, and (7) controlled the price of the product and who could purchase the product. *Id*. at 843. In this case, the United States had no oversight of mining or labor activities at the Mine Sites, other than generic safety responsibilities, and did not compel El Paso to mine for uranium. *See* Tr. at 1580; *Coeur D'Alene Tribe*, 280 F. Supp. 2d at 1130 (distinguishing *FMC* where the mining companies maintained actual control over the mines and mills, hired and fired its owner employees, and voluntarily decided to mine for metals and participate in the government's premium plan).

In *Cadillac Fairview/California, Inc. v. Dow Chemical Co.*, 299 F. 3d 1019 (9th Cir. 2002), the government owned the site, the pits, the plant, and all materials, including the wastes, had unfettered control over Dow Chemical's waste producing actions, and made an express agreement to indemnify Dow Chemical. The United States in this case did not exercise similar control and did not indemnify El Paso.

El Paso cites *MRP Properties, LLC v. United States*, 308 F. Supp. 3d 916 (E.D. Mich. 2018), to argue that even the government's passive or unintentional control of the Mine Sites' operations gives rise to operator liability. But *MRP Properties* involved a motion to dismiss for failure to state a claim. The trial court assumed all facts alleged in the complaint to be true and construed them in the plaintiff's favor. *Id*. at 928. Those allegations included an assertion that the United States "controlled day-to-day operations at each refinery." *Id*. The complaint also alleged that the government "oversaw" or "dictated" the "amount and type of wastes generated and released at each refinery and tracked these production loss statistics." *Id*. at 929. In denying the motion to dismiss, the

MRP court noted that further factual development might disprove these allegations, stating that "[a] key factual question in this case is whether and to what extent the Government's alleged control of inputs, outputs, conversion of facility operations, and constructions projects, was specifically brought to bear on operations having to do with leakage or disposal of hazardous waste." *Id.* at 934. This case is different. The Court is making factual findings on a full evidentiary record, not deciding a motion to dismiss. The Court finds that the government did not manage, direct, or conduct disposal of hazardous waste at the Mine Sites, and that El Paso freely chose to enter the uranium mining business and contract with the United States. To the extent language in *MRP* can be read to suggest that the passive possession of authority gives rise to operator liability, the Court finds it inconsistent with the Supreme Court's instruction that such liability "must be read to contemplate 'operation' as including the *exercise* of direction over the facility's activities." *Bestfoods*, 524 U.S. at 71 (emphasis added).

3. Reclamation.

El Paso argues that the United States is liable as an operator during the reclamation phase at the Mine Sites. Doc. 187 at 11. El Paso asserts that federal agencies worked with the Nation to plan and determine a "joint strategy" for reclaiming the sites. *Id*. Further, the United States paid for the reclamation through funding under the SMCRA grant. Once the reclamation strategy was in place, the OSM reviewed and approved the Nation's plans and oversaw the work. *Id*. Specifically, El Paso asserts that the United States approved and oversaw the importation of off-site uranium-bearing material as cover on the reclamation sites. *Id*. at 11-12.

The Court does not agree with El Paso's factual assertions. As discussed above, a division of the Navajo Nation – the NAML – created the reclamation's guiding specifications. *See* Ex. 198; Sassaman Depo. at 29-30, 35, 56, 74-76; Martinez Depo. at 34-35. Once the plans were submitted for the SMCRA grant, the OSM provided oversight to ensure that the plans were being performed pursuant to the grant. *See* Martinez Depo. at 20-21. But management of the day-to-day reclamation activities and handling of

all reclamation subcontracts was performed by the Nation. *See* Tr. at 517-18. The OSM employees responsible for overseeing the reclamation testified that their job was to make sure the site existed, ensure that the work followed the Nation's reclamations standards, and give suggestions where appropriate. *See* Martinez Depo. 34-36, 40, 41-43; Sassaman Depo. 33-35, 106. The OSM employees were conscious of the fact that the Navajo Nation was an independent sovereign that should be granted special deference. Sassaman Depo. at 126-31.

El Paso's own expert, Mr. Beahm, acknowledged that the Navajo Nation took the lead on reclamation. The Nation conducted an inventory of the Mine Sites in the 1980s and decided in the early 1990s to reclaim 17 of the 19 sites (Tr. at 511); performed the assessments for the reclamation projects (*id.* at 516); developed the technical specifications for the projects (*id.*); selected the contractors who would do the work (*id.*); and performed the day-to-day management of the projects (*id.* at 517-18).

El Paso argues that various federal government agencies participated in planning the reclamation project. *See* Tr. at 516-17. But this was due to the overlap between the EPA's authority to prioritize hazardous waste sites and the NAML's authority to reclaim sites that present public health hazards. El Paso points to a letter from the EPA to the DOI regarding a meeting among several federal agencies. *See* Ex. 198. But the letter indicates that the NAML should continue to reclaim sites under SMCRA and develop reclamation standards in conjunction with the Navajo Superfund Program ("NSP"). *Id.* Meanwhile, the NSP should continue working with the EPA to identify sites that are not eligible for SMCRA funding. *Id.*; *see also* Ex. 201 (letter stating that the NAML should continue reclamation and SMCRA clean-up will be the most appropriate funding source). Thus, the cooperation identified by El Paso resulted in substantial deference to tribal environmental agencies and does not indicate that the federal government exercised control over reclamation at the Mine Sites. The Court finds that the United States was not a CERCLA operator with respect to reclamation.[18]

[18] El Paso's citation to *California Department of Toxic Substances Control v. Jim*

B. Arranger Liability.

El Paso argues that the United States was an arranger during all three phases of mining. An arranger is "any person who by contract, agreement, or otherwise arranged for disposal or treatment" of hazardous substances. 42 U.S.C. § 9607(a)(3). The Supreme Court has held that, "[i]n common parlance, the word 'arrange' implies action directed to a specific purpose." *Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599, 611 (2009). "Consequently, under the plain language of the statute, an entity may qualify as an arranger . . . when it takes intentional steps to dispose of a hazardous substance." *Id*. Mere knowledge of possible disposal is not enough: "knowledge alone is insufficient to prove that an entity 'planned for' the disposal[.]" *Id.* at 612. A party must act "with the intention" that hazardous waste be disposed in the transaction in which the party is participating. *Id.*

El Paso's argument regarding the government's arranger liability largely overlaps its argument on operator liability. Both are based on essentially the same government activity. As a result, although the two forms of CERCLA liability differ, the Court's ruling on arranger liability largely tracks its ruling on operator liability.

1. Exploration Phase.

El Paso argues that the AEC arranged for its primary contractor to perform rim stripping at the mine sites. Doc. 187 at 5. The Court has already held that the United States is an operator for purposes of the exploration activities at Huskon 12, 14, and 17. The Court concludes that government arranger liability has not been proved for the other Mine Sites, for reasons explained above, and that imposing arranger liability for Huskon 12, 14,

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Dobbas, Inc., No. 2:14-595 WBS EFB, 2014 WL 4627248 (E.D. Cal. Sept. 16, 2014), is not helpful. That case recognized, as this Court does, that whether a government is liable as a CERCLA operator of a facility "depends on whether it managed, directed, or conducted operations there." *Id*. at *3. The district court addressed a motion to dismiss, accepted all allegations as true, construed the allegations in the light most favorable to the claiming party, and held only that a State's issuance of several remedial action plans over a period of years "could plausibly constitute management or direction of operations there." *Id*. The case did not attempt to specify what level of involvement is necessary to trigger CERCLA liability and provides no guidance in this case.

and 17 would not change the Court's equitable allocation in this case. As a result, the Court need not decide whether United States is an arranger for these three sites.

2. Mining Phase.

El Paso argues that the United States was an arranger during the mining phase because of the Circulars' ore grade cut-off level. Doc. 187 at 7. El Paso asserts that this level shows the United States intended mine operators to separate and leave behind low-grade uranium-bearing materials. *Id*. at 8.

The Court agrees that the United States knew low-grade uranium-bearing material would be left at the Mine Sites, although, as noted above, such a result was likely an inevitable result of any mining process. But as the Supreme Court has made clear, knowledge is not enough. The party must "take[] intentional steps to dispose of a hazardous substance." *Burlington*, 556 U.S. at 611.

The evidence does not show that the United States took intentional steps to dispose of waste at the Mine Sites during the mining phase. As already discussed, El Paso decided what equipment to use, where to mine, how to mine, how to dispose of waste, and how long to operate the mines. El Paso excavated the ore at the Mine Sites and created the waste piles. The government's cut-off levels may have influenced what waste was left behind, just as El Paso's higher mill cut-off level did, but such influence does not amount to intentional action to dispose of hazardous materials.

3. Reclamation Phase.

El Paso asserts that federal agencies took a leading role in establishing the reclamation strategy and approving grant applications, reclamation plans, and the comingling of waste from mines operated by third parties. Doc. 187 at 13. According to El Paso, these actions were intentional steps to arrange for the disposal of hazardous substances that resulted from dispersal of waste piles, disturbance of native uranium-bearing material, and the import of uranium-bearing material to the Mine Sites. *Id*.

As explained above, however, the Court does not find that the United States controlled the reclamation work or set the reclamation standards. Its role in reclamation

was primarily as the source of reclamation funds. The Court cannot conclude that the United States' general oversight and funding responsibilities amounted to "intentional steps to dispose of a hazardous substance." *Burlington*, 556 U.S. at 611.

4. Broader Arranger Liability.

In *United States v. Shell Oil Co.*, 294 F.3d 1045 (9th Cir. 2002), which predated the Supreme Court's decision in *Burlington*, the Ninth Circuit discussed what it characterized as "broader arranger liability." *Id.* at 1055. The court addressed whether the United States was subject to arranger liability for its actions in the production of aviation gas ("avgas") during World War II.

"Because avgas was critical to the war effort, the United States government exercised significant control over the means of its production during World War II." *Id.* at 1049. The government established several agencies to oversee war-time production; established a nationwide priority ranking system to identify scarce goods, prioritize their use, and facilitate their production; made policy determinations regarding the construction of new facilities and allocation of raw materials; had authority to issue production orders to refineries; entered contracts to ensure avgas production; offered low-cost loans to refineries to help finance the construction of avgas-producing plants; assisted refineries in exchanging and blending various avgas components in order to maximize production; directed that specific component exchanges be made; provided detailed instructions for blending; directed refiners to blend avgas in a way that would allow increased overall production; but did not exercise direct actual control over the production of avgas components. *Id.* at 1049-50. The government knew avgas production generated acid wastes and that increased avgas production increased acid waste generation, but it never specifically ordered or approved the dumping of the spent acid that caused contamination. *Id.* at 1051. In addressing the United States' arranger liability in light of these facts, the Ninth Circuit considered four circuit court decisions.

One of the cases found arranger liability where the party owned hazardous chemicals, arranged for their blending by another company, and knew that the blending

process generated and disposed of hazardous waste. *See United States v. Aceto Agric. Chems. Corp.*, 872 F.2d 1373, 1381 (8th Cir.1989). The Ninth Circuit in *Shell Oil* found that *Aceto* was not persuasive because, in the avgas case before it, the United States was the end purchaser of avgas, never owned any of the raw materials or intervening products, and did not contract out a crucial and waste-producing intermediate step in a manufacturing process. 294 F.3d at 1056.

The second case imposed arranger liability on a company whose vice president agreed with a third party to bury drums of chemical waste on a farm several miles from the plant. *See United States v. Ne. Pharm. & Chem. Co.*, 810 F.2d 726 (8th Cir.1986). The Ninth Circuit found the case inapplicable because the United States in its avgas operations "did not exercise any actual control over the Oil Companies' disposal of spent acid and acid sludge[.]" 294 F.3d at 1057.

In the third case, the en banc Eighth Circuit split evenly on the question of whether the United States was an arranger for its World War II involvement in rayon manufacturing. The government vigorously sought to increase production of rayon during the war, installed government-owned rayon-manufacturing equipment at a plant, ensured an adequate supply of sulfuric acid for the plant, built and retained ownership of a new acid plant next door, obtained draft deferments for workers at the plant, directly controlled the process by which the rayon was manufactured, directly controlled the supply of the raw materials, and directly controlled the price of the rayon produced. *See FMC Corp.*, 29 F.3d at 833. The Ninth Circuit observed that "[i]f it was a close question on the facts of *FMC* whether the United States was an arranger, it cannot possibly be a close question on the facts in the case before us." 294 F.3d at 1058.

Finally, *Shell Oil* considered another case where the Eighth Circuit held that the United States was not an arranger in connection with the production of Agent Orange during the Vietnam War. *See United States v. Vertac Chem. Corp.*, 46 F.3d 803 (8th Cir. 1995). The Ninth Circuit found the facts in *Vertac* comparable to the avgas facts before it

and concluded that the United States was not an arranger. The court provided this comparison between the avgas and Agent Orange facts:

> In both cases, products were manufactured for purchase by the United States in war-time; in both cases, the manufacturing was carried out under government contracts and pursuant to government programs that gave it priority over other manufacturing; in both cases, the companies voluntarily entered into the contracts and profited from the sale; and in both cases, the United States was aware that waste was being produced, but did not direct the manner in which the companies disposed of it.

294 F.3d at 1059.

These facts – recited from *Shell Oil* and *Vertac* – closely parallel the facts in this case. Uranium ore was mined for purchase by the United States in war-time; the mining was carried out under government-approved permits and leases and pursuant to a government program that sought to encourage domestic uranium production; El Paso voluntarily entered into the mining and profited from both mining and milling; and "the United States was aware that waste was being produced, but did not direct the manner in which the [El Paso] disposed of it." *Id.* The Ninth Circuit held in *Shell Oil* that the United States was not an arranger, a holding which makes clear that the government is not an arranger in this case, even under the "broader arranger theory." *See Coeur D'Alene Tribe*, 280 F. Supp. 2d at 1132 ("The *Shell* [*Oil*] court determined that mere 'authority to control' was insufficient without some actual exercise of control.").[19]

5. El Paso Arranger Liability.

The United States argues that El Paso should be liable as an arranger because it exercised actual control over all aspects of the mining operations, including disposal of

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[19] As part of its argument for arranger liability of the United States, El Paso cites an Arizona case from 1914 and a Ninth Circuit case from 1908 for the proposition that waste rock at the Mine Sites always belonged to the United States because, although it was moved, there was never an intent to sever it from the realty. Doc. 187 at 10. But El Paso does not explain why these cases apply to land on the Navajo Nation Reservation, and the Court notes that at least one more recent case has rejected this legal principle for federal lands. *See Chevron Mining Inc. v. United States*, 863 F.3d 1261, 1283 (10th Cir. 2017) ("The United States neither owned nor possessed the waste rock and tailings extracted from Chevron's molybdenum mining activities."). El Paso's argument does not alter the Court's conclusion that the United States was not a CERCLA arranger during the mining phase.

mining waste at the Mine Sites. *See* Docs. 186 at 3; 157 at 80-82 ¶¶ 62. El Paso has already conceded its operator liability, which encompasses control over waste-generating activities. The Court concludes that imposing arranger liability for the same actions would not change the Court's equitable allocation in this case. As a result, the Court need not decide whether El Paso is an arranger

III. Equitable Allocation.

The Court may allocate response costs among liable parties using such equitable factors as the Court determines are appropriate. 42 U.S.C. § 9613(f)(1). The liability of a responsible person under § 113(f) corresponds to that party's equitable share of the total liability. *Fireman's Funds Ins. v. City of Lodi, Cal.*, 302 F.3d 928, 945 (9th Cir. 2002).

A. El Paso's Proposed Allocation.

El Paso suggests that the Court allocate responsibility for all past and future response costs by (1) creating three categories or buckets, one for exploration, one for mining, and one for reclamation; (2) assigning a percentage of overall site responsibility to each of these three buckets based on the volume of soil moved during each phase; (3) allocating the portion within each bucket between El Paso and the United States; and (4) adding the percentage allocated to each party in each of the three buckets to arrive at the overall allocation. Using this model, El Paso's proposed allocation assigns 86.77% of the liability for the Mine Sites to the United States, and 13.23% to El Paso. The Court disagrees both with the percentage of site responsibility El Paso assigns to each of its proposed buckets and with its suggested allocation within each bucket.

1. El Paso's Percentage Division Among Buckets.

El Paso's three-bucket approach was developed by its allocation expert, David Batson. He allocated a percentage of overall site responsibility to each bucket by adopting Mr. Beahm's estimates of the amount of soil moved during each of the three phases of mining. Tr. at 735-36. The Court finds this approach seriously flawed.

During the exploration phase, Mr. Beahm estimated that 132,000 cubic yards of soil was moved, amounting to about 7% of all soil moved during the exploration, mining, and

reclamation phases. Mr. Batson therefore assigned 7% of the overall responsibility for response costs to the exploration bucket. Mr. Beahm reached this 7% calculation by relying on the 45,000 linear feet of trenching he attributes to the 45-day AEC exploration window. As explained above, however, the Court cannot accept Mr. Beahm's conclusion that 45,000 feet of trenching was done at the Mine Sites in late 1953 and early 1954 when it is not shown on the 1954 aerial photographs, nor that all of it was done by the AEC. The Court has little confidence in Mr. Beahm's conclusion about the amount of soil moved during the exploration phase, and therefore in Mr. Batson's assignment of 7% of the overall site responsibility to the first bucket.

The size of the second bucket – 59% of overall site responsibility – is based on Mr. Beahm's calculation of the amount of soil moved and left at the site during the mining phase. He calculated that amount by estimating the volume of the mine pit at each site, subtracting from that volume the amount of ore sold from the site, and increasing the result by 20% to reflect the fact that soil expands after it is removed from the ground. Tr. at 418-19. But this calculation assumes that the only soil El Paso moved at the Mine Sites was the soil that came from within the walls of the pits as they appeared when Mr. Beahm visited the site decades later or in aerial photographs taken before reclamation by the Navajo Nation. The calculation fails to account for soil moved by El Paso at the Mine Sites to excavate overburden down to where the pit mining actually started; to clear ground for mine structures, ore piles, ore blending, and waste piles; to build ramps into and out of mine pits; and to build roads around and into the Mine Sites. *See* Tr. at 1500-01.

The amount assigned by El Paso to the third bucket – 34% – is based on Mr. Beahm's estimate of the amount of new soil moved during reclamation. Mr. Beahm noted that the volume of soil moved during reclamation was higher than his calculated volume for mining. Tr. at 413-17. He subtracted his mining volume from the reclamation volume and arrived at 643,308 cubic yards of soil that he claims was moved for the first time during reclamation. Tr. at 1396. He explains this additional soil movement by assuming that the Nation's reclamation contractors moved more soil than necessary when reclaiming waste

piles. Tr. at 420. He asserts that they likely dug into the soft undisturbed dirt when moving the waste piles. Tr. at 477-78. He also notes that soil was brought from off-site to complete the reclamation. Tr. at 479-80. The Court views this reclamation calculation as unreliable because it relies on Mr. Beahm's mining volume, which the Court finds unreliable for reasons stated above. The Court also has difficulty with the implicit assumption that the movement of additional soil in reclamation was unnecessary – that reclamation could have been accomplished by moving no more soil than was originally disturbed during mining. No evidence was presented to support this assumption, and yet it is the basis for the third bucket, which is a percentage of site costs independent of mining and exploration activities that El Paso claims should be assigned to somebody. If the movement of additional soil was a necessary part of reclaiming the Mine Sites, then it could be considered a product of mining and allocated in accordance with the mining allocation. The Court cannot agree that it should be treated as a separate percentage of the overall site costs to be allocated without regard to mining activities, as El Paso proposes.

2. El Paso's Allocation Within Each Bucket.

The Court also disagrees with how El Paso's allocates responsibility within each bucket. The first bucket represents 7% of the overall response cost liability, and El Paso allocates 70% of it to the United States and 30% to itself. This allocation assumes that the AEC did all of the exploration at the 12 Huskon Mine Sites accounted for in this bucket and during the 45-day window. Tr. at 735.[20] As noted above, the Court does not find this position credible. The Court finds that the United States engaged in exploration activities at Huskon 12, 14, and 17, considerably less than all of the exploration activities that occurred at the 12 Huskon Mine Sites in El Paso's proposed first bucket.

For the second bucket – the mining phase – Mr. Batson starts with an allocation of two-thirds liability to the United States as landlord, active owner of the land, and arranger for the disposal of the hazardous substances, and one-third to El Paso as an operator that

[20] Initially, Mr. Batson noted 15 Huskon sites, but he scaled this back to 12 sites, omitting Huskon 5, 6 and 9, the three sites where El Paso decided not to seek contribution for the exploration phase. *See* Tr. at 752.

conducted mining activities. Tr. at 738. From this largely unexplained baseline, Mr. Batson considers the impact of four equitable factors: (1) the benefits received by each party, (2) the degree of knowledge regarding the risks of the contamination, (3) the degree of cooperation by the parties, and (4) the degree of control and care exercised by each party in relation to knowledge. Tr. at 739. Based on these factors, Mr. Batson recommends increasing the United States' share by ten percent (Tr. at 741), although he does not explain how he arrived at this specific amount. He also assigns the United States the orphan shares for Huskon 4, 5, 8, and 9. Tr. at 745. When all of his second-bucket allocation is completed, Mr. Batson assigns 81% of the second bucket to the United States and 19% to El Paso. Tr. at 746.

The Court disagrees with Mr. Batson's baseline. The period represented by the second bucket was the primary waste-generating phase at the Mine Sites – years when the mines were in operation and creating waste piles. El Paso was the key actor in these operations. As will be clearer from the Court's allocation discussion below, the Court can see no justification for assigning the United States a supermajority of liability for mining operations El Paso performed.

In the third bucket, Mr. Batson assigns 100% of the liability to the United States as the only operator during the reclamation phase. Tr. at 746. His assessment is based on El Paso's view that the Nation's reclamation created additional waste by moving too much soil and by moving in radioactive material from off-site. *See* Tr. at 860-61.

The Court's first disagreement is that the United States is not an operator during this phase, as explained above. The Court also finds that the reclamation projects most likely will decrease, rather than increase, the ultimate clean-up costs at the Mine Sites. El Paso has evaluated possible remedies in draft RSEs and EE/CAs for Huskon 12 and 14. *See* Tr. at 677. These represent two of the most contaminated Mine Sites, and yet three of the four remedies proposed by El Paso involve no excavation of the mine pits where wastes were placed during reclamation. Nor does El Paso propose that entirely new caps be placed on the mounds now found where the mine pits once were located. Instead, El Paso proposes

that it enhance and maintain the reclamation work performed by the NAML. *See* Ex. 285 at 11-13.

Although the EPA has not responded to El Paso's proposal, it appears likely that El Paso will not be required to excavate the mine pits and move contaminated soil off-site to other locations, particularly given the arid and still-remote positions of the Mine Sites.[21] The Court finds it more likely that El Paso will be required to upgrade caps on the waste piles and improve storm-water run-off and erosion protection systems. It may also be required to address contamination in drainages and other areas that were not addressed in the reclamation work. If this is true, the excavation of waste piles and filling of mine pits performed by the Navajo Nation during reclamation most likely will have reduced, not increased, the response costs at the Mine Sites.

Mr. Werth, El Paso's remediation project manager, testified that the reclamation work will increase remediation costs, but the Court did not find this testimony credible. He suggested that areas on the Mine Sites with the highest gamma readings were in locations that have not been reclaimed, suggesting that reclamation lowered radiation levels. Tr. at 624-25. He testified that erosion of the reclamation mounds will increase remediation costs (*see* Tr. at 621), but there is evidence that the mine sites were eroding prior to the reclamation work (Ex. 189). The Court cannot find that erosion of the capped waste mounds created during reclamation has caused more contamination than would have been caused by erosion of uncovered waste piles left at the sites by El Paso.

Nor did El Paso persuasively show that reclamation made the sites worse by bringing in radioactive fill material from other sites. Mr. Beahm did testify that soil was brought from other locations to provide cover at the Mine Sites, and that some of these locations were other uranium mines. Tr. at 460-63, 516-17. But he did not testify that the material brought to the Mine Sites was contaminated. He noted that the radiation level used by the Nation in reclamation was 25 picocuries per gram, implying that materials near

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[21] El Paso itself asserts that excavation of the filled mine pits today would not allow it to segregate the mixed waste for separate remediation treatment. Tr. at 474.

this level could have been imported for cover, but he did not testify that this actually occurred. *Id.* El Paso provides a long string cite of various exhibits and deposition pages to support its position (Doc. 187 at 11-12), but none of the cited evidence shows that contaminated material was brought onto the Mine Sites during reclamation. To the contrary, at least one historical document states that the imported material was "clean." Ex. 224. The Court accordingly does not find that reclamation made the sites more contaminated as El Paso asserts.

To summarize, the Court finds El Paso's proposed allocation to be quite unreliable – contrived to assign maximum responsibility to the United States.

B. The United States' Proposed Allocation.

The government's allocation expert, Mr. Low, did not present a framework similar to Mr. Batson's. He instead opined that the United States' trust ownership of the land should reduce the costs allocated to it. Tr. at 1298. And he emphasized involvement of the parties, benefits to the parties, and cooperation as the three main factors for the Court to consider. Tr. at 1302-08. Mr. Low opined that the equitable share for the United States in this case should not exceed 25%, but he did not fully explain how he applied his equitable factors to reach this proposed limit. The Court does not find his allocation analysis helpful.

C. The Court's Allocation.

In apportioning response costs among responsible parties, CERCLA requires only that the Court use "such equitable factors as the court determines are appropriate." 42 U.S.C. 9613(f)(1). Courts often start allocation analysis with the Gore factors originally contained in a bill proposed by then-Congressman Al Gore. *See Burlington*, 520 F.3d at 940 n.26. These include (1) the ability of the parties to demonstrate that their contribution to a discharge, release or disposal of a hazardous waste can be distinguished; (2) the amount of the hazardous waste involved; (3) the degree of toxicity of the hazardous waste; (4) the degree of involvement by the parties in the generation, transportation, treatment, storage, or disposal of the hazardous waste; (5) the degree of care exercised by the parties with respect to the hazardous waste, taking into account the characteristics of

such hazardous waste; and (6) the degree of cooperation by the parties with federal, state, or local officials to prevent any harm to the public health or the environment. *See TDY Holdings, LLC v. United States*, 885 F.3d 1142, 1146 (9th Cir. 2018). Courts also consider (1) the extent to which the clean-up costs are attributable to wastes for which a party is responsible; (2) the party's level of culpability; (3) the degree to which the party benefitted from disposal of the waste; and (4) the party's ability to pay its share of the costs. *United States v. Davis*, 31 F. Supp. 2d 45, 63 (D.R.I 1998). The Court will consider all of these factors.

1. Gore Factors.

a. Distinguishability of Each Party's Waste.

There is only one type of waste at issue in this case – radioactive remnants of uranium mining. Both parties claim the other is partially responsible for this single form of waste. The Court cannot accept El Paso's three-bucket approach for reasons explained above, and finds no other reasonable basis for distinguishing one party's waste from the other's.

b. Amount of Hazardous Waste.

The Court cannot identify a volume of hazardous waste that can be neatly attributed to one party and not the other. The fight is over waste that has not been quantified. As noted, the Court does not agree with El Paso's attempt to estimate a soil volume attributable to each of the parties.

c. Degree of Toxicity.

With only one type of contaminant blended in the soil throughout the Mine Sites, this factor is not relevant. *See Gavora, Inc. v. City of Fairbanks*, No. 4:15-cv-00015-SLG, 2017 WL 3161626, at *8 (D. Alaska July 25, 2017) (noting that this factor is most relevant when there are two types of discharges by two distinct actors, and one is more toxic).

d. The Degree of Involvement.

This is the most important factor in this case. El Paso, as the Mine Sites' operator, was the primary party responsible for the generation and disposal of waste at the sites. El

Paso excavated uranium ore in open pit mines, stockpiled ore on the property, and stockpiled waste on the property. El Paso also built and operated the Tuba City mill, which purchased uranium from its own mines and others in the area.

The United States did not directly oversee El Paso's mining operations or instruct it on where or how to dispose of waste. But the United States did own the land in trust for the Navajo Nation and was obligated to hold it for the best interests of the Nation. In this capacity, the United States reviewed and approved permits and leases, included various oversight powers in the permits and leases, advised the Nation on its uranium regulation activities, and collected rents and royalties for the Nation's benefit. The Court concludes that the United States should be assessed a 5% share for these ownership activities.

But this assessment does not fully account for the government's substantial involvement in this case. The United States did much more than simply act in its trust capacity for the Nation's benefit. It created the DUPP to obtain uranium and further the national defense. It created the market for uranium by publishing the Circulars and establishing buying stations. It encouraged uranium mining throughout the United States and in the Cameron area by researching best exploration and mining practices and engaging in exploration and road-building. It was the only purchaser of uranium ore, and it reviewed and approved El Paso's construction and operation of the Tuba City mill. Charlie's Steen's million-dollar discovery may have sparked the uranium "gold rush" in the minds of the public (Tr. at 1600), but the United States played a primary role in the creation and growth of uranium mining in the 1950s, including at the Mine Sites.

How, then, does the Court balance the parties' respective roles – El Paso's for-profit, on-the-ground, excavation and disposal of the uranium waste that must now be remediated, together with its operation of the mill that created a local uranium purchaser for its mines and others, versus the government's role in promoting, facilitating, and assisting in uranium mine development generally and its exploration of some of the Mine Sites?

The Court begins by noting that El Paso was directly involved in every step of waste generation. With the exception of the relatively small orphan shares that will be assigned

below, El Paso moved every cubic foot of radioactive soil that has created an environmental hazard at the sites. It opened the mines, hired the workers, acquired the machinery, excavated the soil, created the waste and ore piles, loaded the trucks, and blended the ore. It decided how long to operate each mine, how much soil to disturb, and, within the limits of the mines' capacities, how much ore to produce. It built and operated the mill that made the Cameron area mines, including its own mines, more profitable. It set the ore grade cut-off at the mill that determined what levels of waste would be left at mines. In short, El Paso was the principal actor, the primarily responsible party for generating the waste at issue in this case. El Paso was not dragooned by the United States into this activity. Like many others drawn to uranium mining in the 1950s and 1960s, it sought to make a profit and dutifully reported its mining profits to management and shareholders each year.

The United States, by contrast, was not an on-site actor in the waste generating or disposal activities. With the exception of some exploration work at Huskon 12, 14, and 17 in the early years, it had no direct involvement in the mining or waste generation. It did, to be sure, exert influence over those operations. It created financial incentives, promoted uranium mining on the Colorado Plateau, approved construction of the mill, and purchased uranium ore and concentrate.

Comparing these two parties, the Court concludes that El Paso was the primary actor but that the United States should bear some meaningful share of the responsibility. Therefore, in addition to the 5% that the Court has assigned the United States for its trust ownership of the land and the actions it took to oversee and approve permits and leases, the Court assigns 25% to the United States for creating the conditions and market that led to mining at the Mine Sites, and for its limited exploration at three sites. The Court assigns 70% to El Paso for its role as the primary generator of the contamination – an amount that will be adjusted slightly when the Court considers the relative benefits to the parties.

e. Degree of Cooperation.

This factor does not tip the balance either way. Both parties have been appropriately responsive to their environmental responsibilities.

El Paso left the Mine Sites exactly how the Navajo Nation and the United States requested. The government approved termination of the leases and returned El Paso's bonds. *See* Tr. at 383; Ex. 172. Leases required El Paso to leave the Mine Sites timbered, which for pit mining meant leaving the pits open. In the years that followed, El Paso had no interest in or responsibility for the Mine Sites, nor has the United States produced evidence that El Paso was asked to participate in the reclamation. Since El Paso received a PRP notice from the EPA, it has been compliant. *See* Tr. at 610-11. El Paso appears to have done everything the EPA has asked, on schedules agreed to by the EPA.[22]

El Paso asserts that the United States and the Navajo Nation left the Mine Sites unattended from 1962 to the 1990s, allowing erosion and other health hazards to continue and increase. *See* Tr. at 746-47. But in response to concerns about public health and the state of the Mine Sites, the United States funded the Navajo Nation's reclamation through a SMCRA grant of $2.4 million. The reclamation significantly mitigated immediate health hazards and likely reduced not only the continuing spread of radioactive material through erosion, but also the ultimate remediation costs as noted above.

f. The Degree of Care.

There is no evidence El Paso mined inappropriately or disposed of waste outside of its lease provisions or the customs of the 1950s and 1960s. Similarly, there is no evidence that the United States acted irresponsibly in operating the DUPP or in its involvement with uranium mines. This factor does not affect the Court's allocation.

2. Other Factors.

a. The Relative Benefits to the Parties.

Courts may consider both financial and non-monetary benefits when considering the degree to which parties benefited. *See*, *e.g.*, *Cadillac Fairveiw*, 299 F.3d at 1026 (World War II rubber production); *Shell Oil Co.*, 294 F.3d at 1060 (aviation gasoline as

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[22] The Court cannot accept the United States' argument that El Paso should have done more after the *Neztsosie* tort litigation. *See* Tr. at 1474. The parties presented no evidence of the litigation's outcome or of any right El Paso had to access or control the Mine Sites at the time.

part of the war effort). The clear benefit to El Paso was the profits it received from the mining activities. Tr. at 1056-58; Exs. 1032-1056.

For the United States, the benefit was of a different kind. The threat of nuclear war was real when the government started the DUPP. Uranium ore from the Colorado Plateau was considered vital to the Country's national security, and the federal government needed private companies with experience in mining. The Cold War effort ultimately succeeded; the United States obtained enough uranium and produced enough weapons to maintain security during the Cold War.

In assessing the benefit to the United States from domestic uranium production, however, the Court cannot ignore the relatively small portion of government uranium needs that was filled by the Cameron area mines. In 1961, all of Arizona provided only 3.2% of the uranium ore produced in the United States (Ex. 1331), a percentage comparable to other years (Tr. at 918-19). Mr. Beahm testified that production from the Cameron mines was a "tiny" portion of domestic output. Tr. at 498; *see also* Exs. 1072 at 8; 1330; 1331. Indeed, he testified that a single mine in Wyoming produced more uranium ore in one year than all of the mines in the Cameron area produced during their entire lives. Tr. at 497.

Thus, although the benefit to the United States from overall uranium procurement was substantial, the Mine Sites contributed only a small portion of that benefit. The Court will assign an additional 5% to the United States for this factor, raising its total allocation to 35%, with 65% for El Paso.

b. Tuba City Mill Remediation.

The United States asserts that it should be credited for money spent on the Tuba City mill remediation. The Court does not agree. As discussed above, when El Paso closed the mill it followed the procedures of the Arizona AEC and instructions from the BOM. When it enacted UMCTRA, Congress opted not to impose liability on mill operators and instead assumed responsibility for mills used in the uranium procurement program. Given this conscious choice by Congress, it would be improper to use CERCLA to shift mill clean-up costs to El Paso.

c. Degree of Knowledge and Risk.

Both parties knew of and understood the risks associated with uranium mining in the 1950s and 1960s. Both employed geologists and mining experts. The Court cannot conclude that one party had more knowledge than the other.

d. Orphan Share.

The orphan shares in this case arise from the operations of defunct mining companies – Utco Uranium, Cameron Mining, B.C. Associates, Domino Company, and H.R. Rodgers. El Paso proposes that the Court assign nine sites to Rare Metals, where Rare Metals ceased operations prior to the ultimate closure of those sites, and the remaining sites to the United States because it owned the land and had more connections with the other orphan companies. Tr. at 744-45. But El Paso's proposed assignment of 100% of the remainder to the United States ignores El Paso's continued relationship with the mines through its operation of the Tuba City mill, which facilitated their mining and profited from their ore production. *See* Tr. at 1335-36, 1478. The Court concludes that a pro rata allocation of the orphan shares is more equitable.

3. Supporting Case Law.

The Court arrives at the 35%–65% allocation based on the factors considered above. The Court has also considered a number of other cases that have engaged in CERCLA allocations and finds that they support this division of responsibility.

a. Newmont USA Ltd.

The most relevant case is *United States v. Newmont USA Ltd.*, No. CV-05-020-JLQ, 2008 WL 4621566 (E.D. Wash. Oct. 17, 2008), which concerned the relative CERCLA liabilities of the United States and two mining companies for an open pit uranium mine operated during the 1950s, 1960s, and 1970s on land held in trust by the United States for the Spokane Indian Tribe. *Id.* at *1. The involvement of the United States in *Newmont* was even greater than its involvement in this case.

Leases for the Newmont mine site were executed and approved by DOI, as were later assignments of the leases. *Id.* at *4. The AEC engaged in exploratory drilling at the

mine site, executed a series of small ore procurement contracts with the mining companies, performed geologic surveying, provided free testing and assaying, guaranteed minimum ore prices through the Circulars, and was the only purchaser of uranium when the mine was opened. *Id.* at *8-9. As here, the companies elected to construct a mill for the uranium ore, and the AEC executed a contract for the production and sale of uranium concentrate. *Id.* at *10. Once the mill was operational, the AEC inspected it regularly, and the USGS inspected the mine. *Id.* at *13. The AEC entered into additional contracts with the mining companies, and DOI prepared and entered into renewed leases. *Id.* at *13-14. The leases included obligations to the United States, not to the Spokane Tribe, allowed DOI to audit the mining companies' records, empowered DOI to suspend operations, and provided for payment of rents and royalties to the BIA for the benefit of the Tribe. *Id.* at *14. Following a short closure of the mine while prices would not support a profitable operation, mining resumed and uranium was sold to various private electric utilities. *Id.* at *16. Various federal agencies, including the BIA and USGS, resumed their inspections of the mine. *Id.* The DOI approved revised royalty agreements between the mining companies and the Tribe, and the USGS was extensively involved in various reclamation and mitigation activities at the mine. *Id.* at *17-21.

In addition to this direct involvement with the mine and the mill, the *Newmont* court found that the mine's "uranium production provided the United States with a significant, material benefit by supplying uranium for the nation's nuclear weapon and energy needs during the Cold War." *Id.* at *43. The *Newmont* court also found that "[w]ithout the encouragement and direct involvement of the United States, the Mine would not and could not have been developed in the 1950s and 60s." *Id.* at *44.

Newmont assigned one-third of the CERCLA liability to the United States and two-thirds to the mining companies. The district court found that the government knew of the inherent environmental problems associated with open pit mining and that uranium production provided the United States with a vital national benefit for the Cold War and commercial nuclear power. Additionally, the United States had authority to inspect the

mining operations, monitor water quality, control rents and royalties, conduct audits, and set the amount of the reclamation bond. *Id*. at *60-61. *Newmont* assigned two-thirds of the CERCLA liability to the mining companies because they "conducted the mining activities that have caused the environmental problems that are now being addressed by EPA." *Id.* at *61. The companies also "sought to profit financially and did profit from the operation," and "demonstrated [a] lack of care and recalcitrance in reclaiming the mine site." *Id.*

The Court finds that *Newmont* corroborates the 35% allocation to the government in this case. On very similar facts, the United States was assigned one-third of the CERCLA responsibility. Although it is true that the mining companies in *Newmont* were recalcitrant in their environmental responsibilities and El Paso is not, the United States also had greater involvement with the mine than here. *See* Tr. at 1312 (Mr. Low testifying that there was much more government oversight at the Newmont mine).[23]

b. Lockheed Martin Corp.

Lockheed Martin filed suit against the United States seeking contribution under CERCLA for clean-up of three solid propellant rocket production facilities. *See Lockheed Martin Corp. v. United States*, 35 F. Supp. 3d 92, 96 (D.D.C. 2014). Both parties admitted PRP status, and the court held a bench trial. *Id*. The Court allocated the costs across three facilities, giving 19 to 29% to the United States and 71 to 81% to Lockheed Martin. *Id*.

Lockheed Martin researched, developed, and operated the sites in support of military and scientific programs critical to the Cold War. *Id*. at 98. The United States, as the only purchaser of the solid propellant rockets, controlled the solid propellant industry. *Id* at 99. The government set the specifications for the propellant rocket motors, but otherwise had limited involvement in Lockheed's technical development process. *Id*.

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[23] El Paso argues that the United States' share was reduced in *Newmont* because the mine produced only 11% of the AEC's total uranium input, while here the AEC purchased 100% of the Mine Sites' uranium. These two numbers are not comparable. One represents input to the AEC's program and the other represents what AEC purchased from particular mines. If the Court were to compare input to the AEC, all Arizona mines provided only 3.2%, with the Mine Sites providing even less. *See* Ex. 1331.

at 102. Because Lockheed Martin was the sole operator of the sites, the court found that it should shoulder a larger portion or the liability for response costs. *Id*. at 150.

c. TDY Holdings.

TDY Holdings, LLC and its predecessor, Ryan Aeronautical Company (collectively "TDY"), filed a claim against the United States for equitable allocation of the costs TDY incurred cleaning up hazardous wastes at an aeronautical manufacturing plant. *See TDY Holdings, LLC v. United States*, No. 07-CV-787-CAB-BGS, 2019 WL 1012001, at *1 (S.D. Cal., Mar. 1, 2019). Contamination at the site was caused by the sole operator, TDY, and there was no evidence that operational or disposal decisions were made by the government. *Id*. at *5. The government required that chromium be used in the manufacturing process, and the court accordingly allocated 5% of the soil remediation costs to it. *Id*. The court also allocated 10% of the ground clean-up costs to the government because it recommended that chlorinated solvents be discharged to a sewer line. *Id*.

d. Cadillac Fairview.

Cadillac Fairview involved allocation of clean-up costs associated with a synthetic rubber facility operated by Dow Chemical during World War II. 299 F.3d at 1022. At the time, the need for synthetic rubber was so urgent that the government had Dow Chemical build the plant and operate it as "an agent" of the government at the "expense and risk" of the government. *Id*. The government was found liable as an owner, operator, and arranger. *Id*. at 1025. Because of its agency relationship and express agreement to hold Dow Chemical harmless, the district court allocated 100% of the response costs to the government. *Id*. at 1026.

e. Shell Oil Co.

As noted above, *Shell Oil* involved the clean-up of a site contaminated with waste from the production of aviation fuel during World War II. 294 F.3d at 1048. The district court allocated 100% of the liability for remediation of the benzol waste to the United States. *Id*. at 1059. The district court found that the clean-up costs for such wastes were part of the war effort for which the American public should pay. *Id*. at 1060. Additionally,

the United States refused to make tank cars available for transporting the waste and refused to allocate resources to build reprocessing plants, resulting in the contamination. *Id*.

f. Other Cases Conclusion.

This case is most similar to *Newmont*, which involved uranium mining, tribal-land ownership, the DUPP, and benefits to the United States. The government exercised more day-to-day oversight of the mines in *Newmont* than here, but the companies were less cooperative in the environmental clean-up. *See* 2008 WL 4621566, at *44. The Court's allocation in this case seems appropriately similar to *Newmont*'s.

Lockheed Martin also presents a similar situation, where the government was not an operator despite setting requirements for the final products. Assigning El Paso the majority of the allocation due to its primary operator status aligns with *Lockheed Martin*.

This case is distinguishable from *Cadillac Fairview* and *TDY*. In *Cadillac Fairview*, the private operator was an agent of and held harmless by the government. *TDY* involved the discharge of multiple substances, only some of which could be attributed to the government's products or requests.

The allocation in *Shell Oil* clearly differs from the allocation here. After a full trial, the district court found that "had the future CERCLA regime been foreseen by the parties, the Government would have agreed to pay for the costs of the cleanup of the McColl Site (or any other unforeseen cost) in the blink of an eye[.]" 294 F.3d at 1060. The district court also found that government decisions about tank cars and reprocessing plants resulted in disposal of the waste and the present contamination. *Id.* The Court does not make the same findings here, and therefore finds the allocation in *Shell Oil* distinguishable.

IV. Application of § 107(n).

CERCLA provides that "[t]he liability of a fiduciary under any provision of this chapter for the release or threatened release of a hazardous substance at, from, or in connection with a vessel or facility held in a fiduciary capacity shall not exceed the assets held in the fiduciary capacity." 42 U.S.C. § 9607(n)(1). The United States argues that this provision limits its liability because it owns the Mine Sites in trust for the Navajo Nation.

El Paso does not dispute that the government acted as a fiduciary with respect to the Nation and the land ownership.

Section 107(n) does not eliminate CERCLA liability. Rather, it states that if a fiduciary becomes liable under one of CERCLA's four categories, the assets from which that liability can be satisfied are limited. "The liability of a fiduciary under any provision of this chapter . . . shall not exceed the assets held in the fiduciary capacity." *Id.* Consequently, when a party faces CERCLA liability for actions taken as a fiduciary – usually land ownership – the party is not personally liable and the CERCLA recovery may come only from assets held in the fiduciary capacity. *Canadyne-Georgia Corp. v. NationsBank, N.A. (South)*, 183 F.3d 1269, 1274 (11th Cir. 1999).

In this case, the United States' owner liability arises from its ownership of land as a trustee, and CERCLA states that a fiduciary includes a trustee. 42. U.S.C. § 9607(n)(5)(i). Such owner liability, therefore, may be satisfied only out of assets held in trust by the United States and not from the general U.S. Treasury. As noted above, the Court assigns 5% of the liability to the United States based solely on its role as owner of the land and the actions it took in that role – approving permits and leases, including various oversight powers in the permits and leases, advising on regulations, and collecting rents and royalties for the benefit of the Nation.

The United States' operator liability arises from exploration actions of the AEC at the Mine Sites, not from its fiduciary land ownership, and therefore is not limited to trust assets by § 107(n). *See* 42 U.S.C. § 9607(n)(2) (Section 107(n) "does not apply to the extent that a person is liable under this chapter independently of the person's ownership of a vessel or facility as a fiduciary or actions taken in a fiduciary capacity."). The Court concludes that the 25% share allocated to the United States for its purposeful promotion of uranium mining in the 1950s, and the additional 5% allocated to it because of the benefits it received from uranium production during the Cold War, should be assigned to its operator liability, not its owner liability. The government's creation of the DUPP was not a result of its land ownership for the Navajo Nation. Rather, it was undertaken by the AEC

for a very different purpose – enhancing national defense during the Cold War. It was motivated by the same forces that led the AEC to engage in the exploration activities that give rise to its operator liability in this case. Because the Court allocates this 30% share to the United States' operator liability, it is not subject to the limitation of § 107(n). *Id.*

The United States suggests that there are no assets available in trust to satisfy the portion allocated for owner liability. It cites the Indian Non-Intercourse Act as holding that all assets held in trust are inalienable. But the Act is limited to land: "[n]o purchase, grant, lease, or other conveyance *of lands, or of any title or claim thereto*, from any Indian nation or tribe of Indians, shall be of any validity in law or equity, unless the same be made by treaty or convention entered into pursuant to the Constitution." 25 U.S.C. § 177 (emphasis added). The trust assets include more than land. Relevant regulations state that "[t]rust assets mean trust lands, natural resources, *trust funds, or other assets* held by the federal government in trust for Indian tribes and individual Indians." 25 C.F.R. § 115.002 (emphasis added); *see also id.* ("Trust funds means money derived from the sale or use of trust lands, restricted fee lands, or trust resources and any other money that the Secretary must accept into trust."). The government conceded in its proposed findings and conclusions that "[t]he assets held in the fiduciary capacity include the trust lands, natural resources, *and other assets such as revenues*, all of which are held for the benefit of the Navajo Nation and individual Navajo tribal members." Doc. 157 ¶ 82 (emphasis added). The United States has presented no evidence to show that non-land trust assets are insufficient to satisfy the 5% owner liability allocated above.

El Paso cites § 107(n)(7)(A) to suggest that the limitation in § 107(n)(1) does not apply at all in this case. Doc. 187 at 14. El Paso asserts that "the AEC acted in a capacity other than [as] a fiduciary during its mining activities at the Mine Sites[.]" *Id.* But § 107(n)(7)(A) has other requirements that El Paso does not address. *See* § 107(n)(7)(A)(ii), (B)(ii).

El Paso also argues that § 107(n) does not apply because the United States does not fall within the "safe harbor" provision in § 107(n)(4)(H). Doc. 187 at 15. This argument

conflates § 107(n)(1) and § 107(n)(4), which are clearly different provisions with different purposes. El Paso cites no authority to suggest that a party which does not satisfy the safe harbor provision in § 107(n)(4)(H) cannot receive the benefits of § 107(n)(1), and the statute certainly does not say so.

In summary, § 107(n) has the following effect in this case: the 5% allocated to the United States for its ownership in trust of the Mine Sites, and for actions it took as the land owner and trustee, is recoverable only from trust assets. The 30% allocated to the United States as a CERCLA operator is not subject to this limitation and may be recovered from the United States Treasury.

V. Declaratory Relief.

As noted above, the parties agree that the Court may enter declaratory relief on the allocation of response costs other than the specific amounts sought by El Paso. CERCLA provides for declaratory relief in an action under § 107, but is silent on the availability of such relief for contribution claims under § 113(f). *See* 42 U.S.C. § 9613(g)(2). Courts have held, nonetheless, that declaratory relief may be entered in CERCLA contribution actions. *See Newmont*, 2008 WL 4621566, at *62; *Boeing Co. v. Cascade Corp.*, 920 F.Supp. 1121, 1140 (D. Or. 1996); *cf. Cadillac Fairview*, 840 F.2d at 696 (establishing prerequisites for declaratory judgments in CERCLA cases).

IT IS ORDERED:

1. With respect to El Paso's claim for response costs of $1,393,448 through August 2016, and $502,500 paid to the United States, 65% of the liability for these costs is allocated to El Paso and 35% to the United States. The United States shall reimburse El Paso for 35% of these costs, but the 5% allocated to the United States on the basis of owner liability may be satisfied only out of trust assets.

2. With respect to other response costs incurred to date and future response costs, the Court enters this declaratory relief: 65% of the liability for these costs is allocated to El Paso and 35% to the United States, but the 5% allocated to the United States on the basis of owner liability may be satisfied only out of trust assets.

3. The Clerk is directed to enter judgment consistent with this order and terminate this action.

Dated this 16th day of April, 2019.

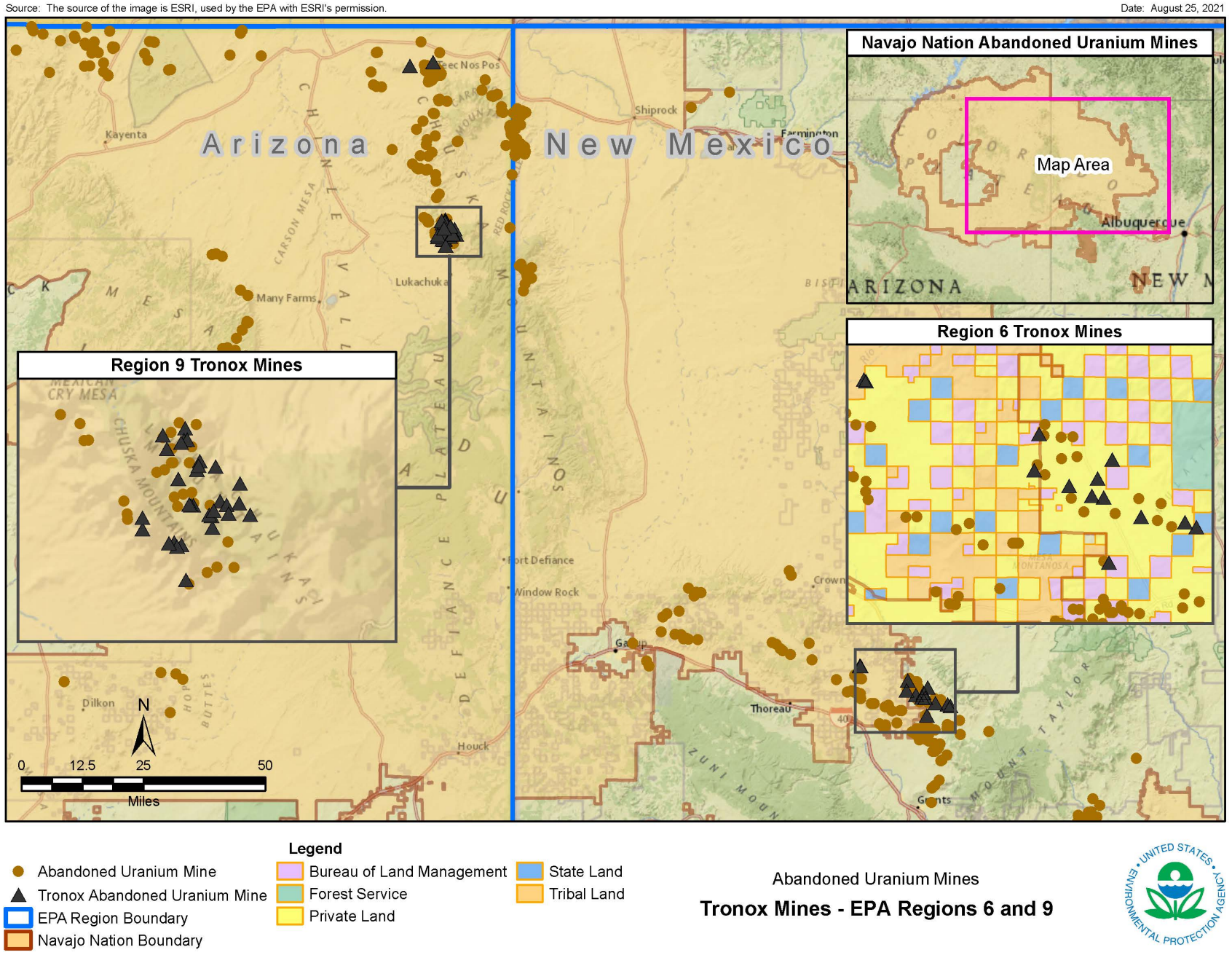
David G. Campbell
Senior United States District Judge

Tronox Navajo Area Uranium Mines & Settlement Fund Allocation Strategy

October 13, 2021

Welcome and Opening Remarks

Navajo Nation: Valinda Shirley, Executive Director Navajo EPA
New Mexico: Jerry Schoeppner, Director, Mining and Mineral Division
John Rhoderick, Acting Director, Water Protection Division
Region 6: Susan Webster, Branch Chief, SEMD
Region 9: Will Duncan, Assistant Director, SEMD
EPA HQ: Shahid Mahmud, OMDP
Presenters: Kevin Shade (Region 6) Pam Travis (Region 6)
Krista Brown (Region 9) Laurie Williams (Region 9)
Facilitator: Pam Avery



Information Overview

- Office of Inspector General (OIG) Audit Background
- Proposed Allocation Strategy and Enforcement
- Process for gathering input/Next Steps

Office of Inspector General Audit

- **2017 –** OIG initiates audit of EPA's use of the almost $1 billion Tronox Funds ($900 million for NAUMS; and an additional $90 million for largest Tronox mine – the Quivira Mine Site)

- **2018 –** OIG report with deadlines based on EPA timing estimates

- **2020 –** Regions 6, 9 and OMDP update to OIG on progress

Office of Inspector General Audit

- **Completed**
  - 2019 R6 and R9 Removal Site Evaluations
  - 2020 R6 Draft EE/CAs
  - January 2021 Prioritization List submitted to OIG, NM, and NN
  - September 2021 R9 Draft EE/CAs without preferred alternatives
- **Remaining Commitment Deadlines**
  - December 31, 2021 – EPA to complete Funding Allocation Strategy
  - December 31, 2021 – Region 9 to complete draft EE/CAs (without a recommended alternative).
  - May 2022 – EPA to complete Final Resource Allocation.

Assumptions for Proposed Allocation Strategy

- Insufficiency of Tronox Funds: $924 million available vs $1.9 billion estimate for 54 sites and EPA's costs.
- Remedy/Cost Uncertainty: Will be resolved as investigation and cleanup moves forward over a relatively long period of time (a decade or more).
- Other Financially Viable PRPs Exist: Appropriate allocation of Tronox funds is important for successful negotiations with these parties to secure full funding for all 54 sites.
- Allocation: The goal of proportional allocation is to achieve full funding at all sites and rough justice for all remaining PRPs.

(Continued on next page)

Assumptions for Proposed Allocation Strategy

- Fair, Reasonable, in the Public Interest and Consistent with the CERCLA/NCP: Allocation criteria should lead to PRP settlements that can be readily approved by a federal court.

- Proportional Funding/Bankruptcy Claims Model: The proportional allocation strategy is similar to a bankruptcy court approach, appropriate when assets are insufficient to pay all claims.

Allocation Strategy

- Tronox Settlement will fund an equal percentage of capital costs at each mine or mine grouping where viable PRPs exist
- Remaining funding or work will be sought from viable PRPs
- Current calculations indicate proportional allocation may allow approximately 39% of capital costs to be funded by Tronox Settlement

Basis for Response Cost Estimates

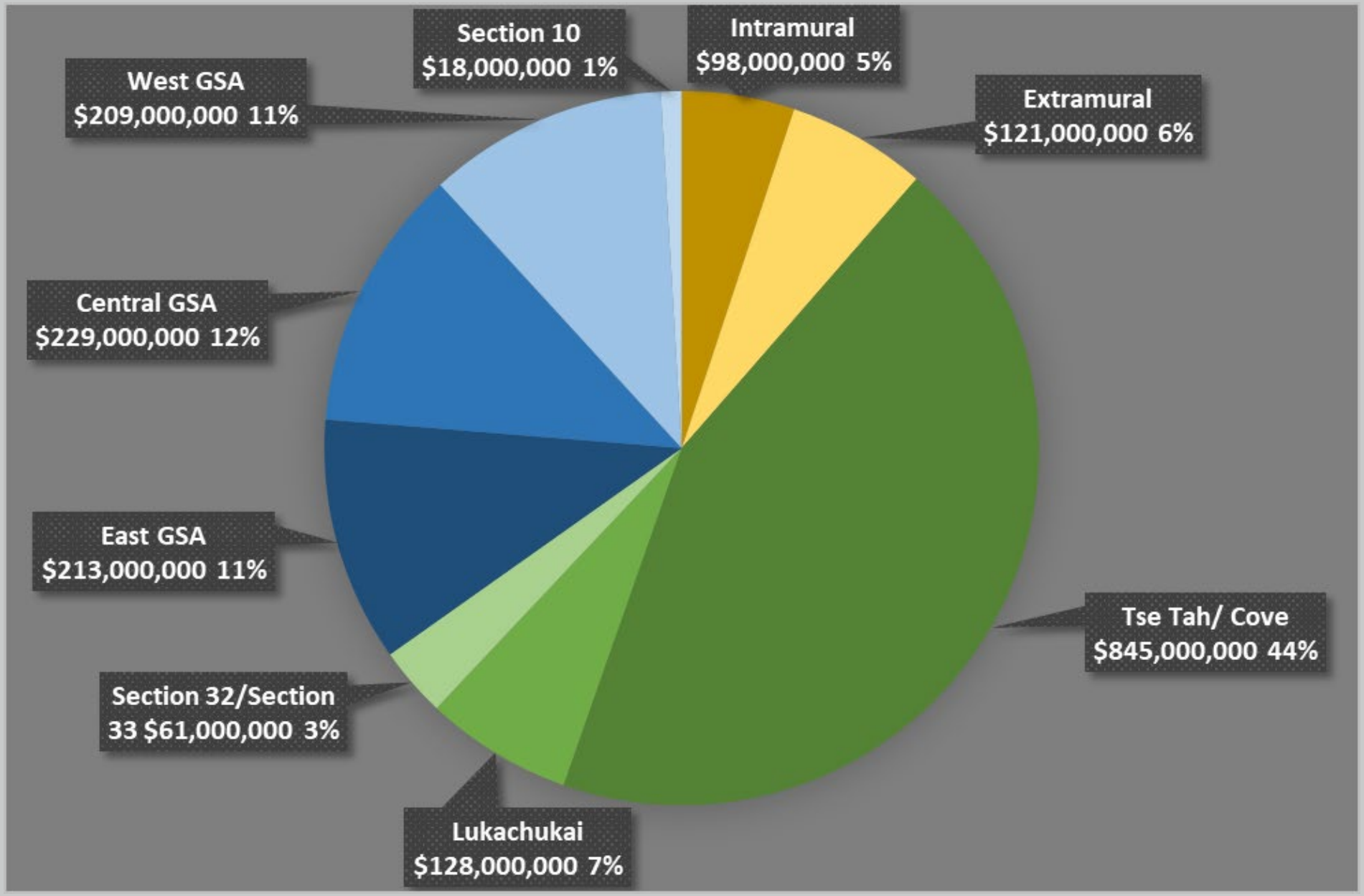
Current Estimates are prior to decision documents – final decisions/estimates will be made in Action Memos

Options used for Estimates:

R6/New Mexico: Regional Repositories

R9/Navajo Nation: Off-Navajo Nation option for estimates

$1,922,000,000 estimated for total response costs



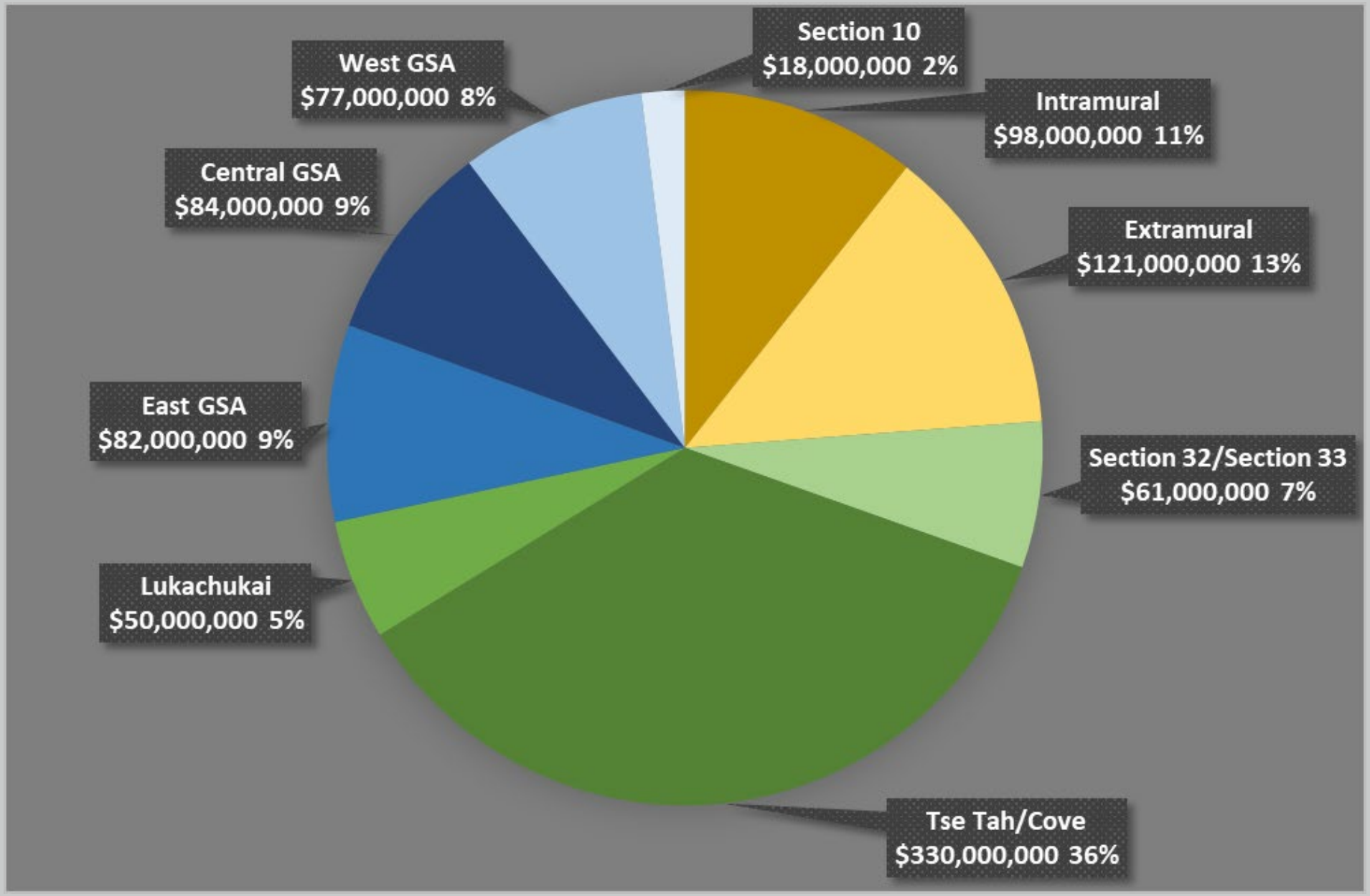
Tronox/Non-Tronox Share of Future Costs

- **Current Tronox Balance: approx. $924,000,000**
- Scenario and amounts are for illustrative purposes only
- Result: Non-Tronox PRP share may be approximately 61%
- Under this scenario, after ensuring funds are retained for oversight, interim actions and future maintenance ($219M), Tronox Funds may only cover approximately 39% of total capital costs.
- Uncertainties on Cost Estimates for Mine Site cleanup are substantial.

Mine Grouping	Capital Costs Tronox Share	Capital Costs Non-Tronox Share
Section 32/Section 33	$61,000,000	$0
East GSA	$82,000,000	$128,000,000
Central GSA	$84,000,000	$131,000,000
West GSA	$77,000,000	$121,000,000
Section 10	$18,000,000	$0
Tse Tah/Cove	$330,000,000	$516,000,000
Lukachukai	$50,000,000	$78,000,000
TOTALS	$702,000,000	$974,000,000
Capital Costs Grand Total		$1,676,000,000

Special Account Planning of Remaining Funds

$921,000,000



Enforcement

- **Additional Financially-Viable PRPs**
  - Former Operators - Mining Companies (Cyprus Amax,Rio Algom Mining and others)
  - Department of Energy, Successor to Atomic Energy Commission
  - Department of Interior, Bureau of Indian Affairs (BIA)

- **Region 6 issued CERCLA General Notice to PRPs and Federal Agencies 2018 - 2020**
- **Region 9 issued CERCLA General Notice to PRPs and Federal Agencies in September 2021**

- **2019 Court Decision in El Paso Natural Gas v. United States:** re Non-Tronox AUMs on Navajo - Allocated 65% liability to private operator and 35% to United States (decision was not appealed).
- **Settlements of US liability at Uranium Mines Sites:** In three settlements between 2011 and 2018, the US agreed to settle mining company contribution claims for roughly 25% - 50% of total Site response costs.

- **Allocation is needed to begin negotiations with PRPs so cleanup can begin.**

Key Takeaways

- Cleanups: USEPA intends to address all of the Tronox NAUM Sites.
- Tronox Insufficiency & Viable PRPs: While Tronox Settlement Funds are insufficient, financially viable PRPs are available to address shortfall.
- Regulatory Stakeholder Input: EPA will work with Navajo Nation and New Mexico to address their concerns regarding the proposed strategy and cleanup issues.
- Allocation decisions are needed to get to cleanup.

Next Steps

- Process for Input: USEPA is seeking input from Navajo Nation and New Mexico to inform our December 31, 2021 Allocation Strategy submittal to the Inspector General.

- Schedule next meeting in 3-4 weeks (November 8 week). Consultation needs to be scheduled (target November 15 week?)

- OIG - USEPA next update to OIG December 31, 2021

Q and A

ATTACHMENT 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA REGION 6 and REGION 9

Via Electronic Transmission

MEMORANDUM

DATE: March 1, 2022

SUBJECT: Implementation of Tronox Allocation Strategy - Approval of Special Account Transfer

FROM: Kevin Shade, Grants Mining District Coordinator, Region 6

Digitally signed by KEVIN SHADE
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=KEVIN SHADE, 0.9.2342.19200300.100.1.1=68001003695651
Date: 2022.03.01 11:57:58 -06'00'

Krista Brown, Tronox NAUM Remedial Project Manager, Region 9

Krista Brown
Digitally signed by Krista Brown
Date: 2022.03.02 14:56:41 -05'00'

THRU: Susan Webster, Branch Chief, Assessment and Enforcement Branch, Region 6

Webster, Susan
Digitally signed by Webster, Susan
DN: cn=Webster, Susan, email=webster.susan@epa.gov
Date: 2022.03.01 12:04:42 -06'00'

TO: Will Duncan, Assistant Director, Superfund Division, Region 9

CC: Shahid Mahmud, Director, Office of Mountains, Deserts, and Plains

I. Introduction

The purpose of this memorandum is to request and document approval to transfer $305,000,000 of the Tronox settlement funds (*In re: Tronox Incorporated, et al,* Case No. 09-10156 (Bankruptcy, S.D.N.Y)) to implement the Tronox Allocation Strategy in response to the August 22, 2018, EPA Office of Inspector General (OIG) Report entitled "EPA Needs to Finish Prioritization and Resource Allocation Methodologies for Abandoned Uranium Mine Sites on or Near Navajo Nation Lands" (No. 18-P-0233). This memo follows the process set forth in the "Tronox Navajo Area Uranium Mines Project Implementation Plan – Accounting Strategy" (September 2020).

II. Background

The Tronox Navajo Area Uranium Mines (Tronox NAUM) are located primarily in the Grants Mining District in New Mexico and in the Northern and Eastern Regions of the Navajo Nation. The Tronox Settlement provided over $900 million to assess and clean up 54 Tronox NAUMs.[1] In response to the EPA OIG Report, Region 6 and Region 9 identified several corrective measures to complete prioritization and resource allocation for the Tronox NAUMs, one of

[1] The Spencer Mine was reclaimed using non-Tronox funding by a Bureau of Land Management funded project implemented by the New Mexico Mining and Minerals Division. No further EPA action is expected.

which was the development of an allocation strategy. To support meeting the EPA OIG commitments, the Office of Mountains, Deserts, and Plains (OMDP) formed a workgroup consisting of representatives of Region 6, Region 9, the Office of Land and Emergency Management (OLEM), and the Office of Enforcement and Compliance Assurance (OECA). This workgroup developed the Tronox Allocation Strategy that identifies an approach on how to utilize the remaining special account funds to implement cleanups of the Tronox NAUMs. The strategy was presented to senior EPA management, and EPA met several times with stakeholder representatives (Navajo Nation EPA, Navajo Nation DOJ, New Mexico Environment Department, and New Mexico Mining and Minerals Department) for discussion and input, followed by a comment period in which EPA provided responses. EPA also initiated Government-to-Government Consultation with the Navajo Nation Office of President and Vice President. The Allocation Strategy was submitted in a memo to the EPA OIG on December 20, 2021 (Attachment 1).

III. Anticipated Costs and Accounting

Region 6 and Region 9 utilized information from the Removal Site Evaluations, draft Engineering Evaluation/Cost Analyses, and other information to develop cost estimates for intramural and extramural funding needs to clean up the Tronox NAUMs. These cost estimates were then used to develop the Tronox Allocation Strategy. Attachment 2 includes the Tronox NAUM Cost Estimate Table. Attachment 3 identifies the anticipated intramural and extramural use of the available special account funds as of December 20, 2021.

IV. Approval for Transfer of Special Account Funds

The U.S. EPA Tronox NAUM Coordinators recommend $305,000,000 be transferred from the Region 9 A982 Tronox NAUM Account to the Region 6 A6KZ Tronox NAUM Special Account as set forth in the Tronox Allocation Strategy. Upon completion of the transfer, OMDP will be informed of the transfer in order to update the EPA OIG of the commitment of implementing an allocation strategy being completed.

Please indicate your approval or disapproval on the signature lines provided below. We look forward to responding to any questions or concerns.

APPROVED:

WILL DUNCAN Digitally signed by WILL DUNCAN
Date: 2022.03.02 15:59:59 -08'00'

Will Duncan, Acting Assistant Director, Superfund Division, Region 9 Date

NOT APPROVED:

Will Duncan, Acting Assistant Director**,** Superfund Division, Region 9 Date

Tronox NAUM Allocation Strategy - Special Account Cost Estimates

This table reflects the cost estimates as of December 2021 used to support the Tronox NAUM Allocation Strategy. It does not reflect potential disbursements to performing parties or place obligations on EPA.

Category	Description	Breakout		Total Cost
EPA Intramural	Federal Salary and Travel	Region 6	$15,000,000	$98,000,000
		Region 9	$83,000,000	
EPA Extramural	Grants & Cooperative Agreements for Navajo Nation and New Mexico, Contractor Oversight Support, and Post Removal Site Control	Region 6	$29,000,000	$121,000,000
		Region 9	$92,000,000	
Region 6 Non-Time Critical Removal Actions	Non-Time Critical Removal Construction Costs	East GSA	$82,000,000	$261,000,000
		Central GSA	$84,000,000	
		West GSA	$77,000,000	
		Section 10	$18,000,000	
Region 9 Interim & Non-Time Critical Removal Actions	Non-Time Critical Removal Construction Costs	Section 32/33	$61,000,000	$441,000,000
		Lukachukai	$50,000,000	
		Tse Tah\Cove	$330,000,000	
Total Region 6 Funding Needs				$305,000,000
Total Region 9 Funding Needs				$616, 000,000