



REGION 9

SAN FRANCISCO, CA 94105

MEMORANDUM

DATE: March 25, 2025

SUBJECT: Approval, Funding, and Exemption from the \$2M and 12-Month Statutory Limits for a Time-Critical Removal Action at the Mesa V Complex, Operable Unit 3, Lukachukai Mountains Mining District Superfund Site, Located on the Navajo Nation Indian Reservation, Cove, Arizona

FROM: Krista Brown, Remedial Project Manager
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THROUGH: Jacob Phipps, Acting Assistant Director and Section Manager
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TO: Michael Montgomery, Director
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I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the selected Time-Critical Removal Action ("TCRA") described herein for the Mesa V Complex (or "Site"), Operable Unit 3 of the Lukachukai Mountains Mining District ("LMMD") Superfund Site, located on the Navajo Nation Indian Reservation, Cove, Arizona, for funding and an exemption from the \$2 million and 12-month statutory limits. The TCRA will require the expenditure of an estimated \$18,686,861 in direct extramural costs and an exemption from the \$2 million and 12-month statutory limits to mitigate threats to human health and the environment posed by contamination at the Site. The Site was added to the National Priorities List ("NPL") as part of the LMMD Superfund Site listing on March 5, 2024, and the requested waiver is based on the consistency exemption provided in Section 104(c)(1)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9604(c)(1)(C). The TCRA will be funded by the Tronox Navajo Area Uranium Mines Special Account (A982).

Consistent and in accordance with the Superfund Removal Guidance for Preparing Action Memoranda ("AM Guidance") (OSWER September 2009), *Timing and Procedures for Review of Certain Time-Critical Removal Actions by EPA Headquarters Offices* (OSRE & OEM February 2013), and the

United States Environmental Protection Agency (“USEPA”) delegations 14-2 together with Region 9 redelegation R9 14-2 (July 18, 2023), the Director of the Region 9 Superfund and Emergency Management Division is authorized to approve the consistency exemption from the \$2 million statutory limits for action memorandums at proposed and final NPL sites, and action memorandums for removals exceeding 12 months.

II. SITE CONDITIONS AND BACKGROUND

Site Status: Listed on NPL on March 5, 2024, part of the Lukachukai Mountains Mining District Superfund Site

Category of Removal: Time-Critical

SEMS ID: NND983466814

SITE ID: A982

Operable Unit (“OU”) Number: 3

A. Site Description

1. Physical Location

The Mesa V Complex consists of three former mines – Mesa V Incline, Mesa V Adit, and Mesa V Mine – 103 – and is located in the Lukachukai Mountains on the Navajo Nation Indian Reservation, Cove, Arizona. The areas of contamination at the Mesa V Complex include surface soil areas, burial cells, and waste piles from past mining activities. The main source of potential exposure on the Mesa V Complex is from surface disturbance of the geological Salt Wash Member and waste piles that are experiencing ongoing erosion from stormwater, snow melt, and wind. Contamination generally originates from the waste piles at Mesa V Mine – 103 and Mesa V Adit. These waste piles are continuously eroding into the drainage areas below the Mesa V Complex, potentially impacting the Navajo community of Cove and the greater Cove watershed. See Attachment III, Map 5, for the location of various surveyed drainages. The mine waste at the Site is a very fine sediment that easily mobilizes with both wind and water erosion. See Attachment III, Map 1 for an overview of the Mesa V Complex.

Carnotite (uranium-vanadium ore) was discovered around 1918 north of the Lukachukai Mountains in the nearby Carrizo Mountains, which are approximately 20 miles northwest of the Cove Chapter of the Navajo Nation. Many mining claims were filed within this region over the next several years, although little mining occurred until 1942, when wartime need for vanadium increased. Uranium mining in the region began at former vanadium mines in the Carrizo Mountains in 1948. By 1949, uranium-vanadium had been discovered and mined in the Lukachukai Mountains.

All economic deposits within the Lukachukai Mountains are within a well-defined belt of the Salt Wash Member of the Jurassic Morrison Formation. The Salt Wash sandstone is the lowest member of the Morrison Formation and is the ore-bearing horizon in the Lukachukai Mountains. Tyuyamunite, the calcium uranium vanadate, is the most common ore mineral. The ore-bearing Salt Wash Member is approximately 100 to 180 feet thick, with most deposits confined to a nearly north-south trending belt across the southeastern end of the Lukachukai Mountains. Most of the ore bodies occur 30 to 80 feet

above the base of the Salt Wash Member, and most ore deposits are within a north-south trending belt southeast of the Lukachukai Mountains.

Mining of uranium deposits in the Lukachukai Mountains commenced in the spring of 1950 and continued until early 1968. During this period, 53 individual mines produced 724,754 tons of ore that averaged 0.24 percent uranium oxide and 1.01 percent vanadium oxide, and additionally, contained 3,483,231 pounds of uranium oxide and 14,729,693 pounds of vanadium oxide. Approximately 666,850 tons of uranium ore was mined in the Cove Chapter and was transported to transfer stations in the Cove Wash valley on a series of unpaved mining roads. Kerr-McGee Corporation (“Kerr-McGee”) acquired properties in the Lukachukai Mountains in 1952 and was the leading producer of ore until 1963. Climax Uranium Company, a subsidiary of American Metals Climax Inc., began mining activities in the Lukachukai Mountains around 1963.

2. Site Characteristics

Portions of the Navajo Nation are on geologic formations rich in radioactive uranium ores. Beginning in the 1940s, widespread mining and milling of uranium ore for national defense and energy purposes on Navajo tribal lands led to a legacy of Abandoned Uranium Mines (“AUMs”). The mines that comprise the Mesa V Complex – Mesa V Incline, Mesa V Adit, and Mesa V Mine – 103 – are three of approximately 523 AUMs located on or near the Navajo Nation. Nearby residents have expressed concern to the Navajo Nation Environmental Protection Agency (“NNEPA”) regarding the potential for wind-blown and water-borne radioactive particles to migrate from these mines and impact their health as well as the health of their livestock and the environment.

Mesa V Incline, Mesa V Adit, and Mesa V Mine – 103 (see Attachment II for various pictures of the areas of concern) are all located on steeply sloping terrain with vertical bands of cliffs bisecting these mines. Above and below Mesa V Incline, mine waste is located on steep, sloped surfaces on both sides of the east fork of the Cove Wash Middle 1A drainage. See Attachment III, Map 6. Mine waste at Mesa V Adit is located on steep slopes bisected by an east-west running cliff and the north-south running east fork of the Cove Wash Middle 1A drainage. Mine waste at Mesa V Mine – 103 is located below a cliff and bisected by the west fork of the Cove Wash Middle 1A drainage. The bands of cliffs and locations of mine waste in the drainages at all three mines make accessing the waste difficult. However, the actions described herein, including the establishment of roads to access these difficult to reach areas, will mitigate the threat to public health, welfare, and the environment.

During mining activities, waste rock from all three mines was deposited downhill of the portals and adjacent to the east and west forks of the Cove Wash Middle 1A drainage. A mine portal is the structure that surrounds the entrance to a mine, or the mouth of a tunnel or adit. Portals are critical access points to underground mines and are often built within an open pit or box cut. Waste remains on the steep canyon walls, within the Cove Wash Middle 1A drainage, and is subject to mass erosion during precipitation and snowmelt events. Waste has eroded into the Cove Wash Middle 1A drainage and extends downstream 0.5 mile to the confluence with the Cove Wash Middle 1 drainage.

3. Removal Site Evaluation and Site Investigation Data

In 2018, USEPA performed a Removal Site Evaluation (“RSE”) for mines (and related areas) that were historically operated by or associated with Kerr-McGee and its successor, Tronox, Inc., in the Northern Agency Region of the Navajo Nation. This effort included the performance of individual RSEs at each of the Mesa V Complex mines – Mesa V Incline, Mesa V Adit, and Mesa V Mine – 103. The findings and results of the 2018 Northern Agency Tronox RSE were summarized in a final report dated October 10, 2019, which included as appendices, the individual RSE reports for each of the Mesa V Complex mines. See Attachment IV. The 2018 RSE work and findings, as well as subsequent investigations for the Site are described below.

At the Mesa V Complex, field mobilizations for the Baseline Study and Site Characterization Study and a comprehensive gamma radiation survey were performed as part of the 2018 RSE. See Attachment III, Map 2 for the measured gamma readings.

At Mesa V Incline, as part of the RSE, soil samples were collected from both the surface and subsurface and analyzed for metals, radionuclides, and geochemical parameters. The total mine waste volume at the Mesa V Incline is estimated to be 13,037 Cubic Yards (“CY”). The total waste volume in the two newly identified un-reclaimed waste piles at Mesa V Incline – Waste Pile M15A and Waste Pile M15B – is 8,811 CY, which accounts for 66 percent of the total waste volume at this mine. The lateral extent of radiological contamination at the Mesa V Incline was well documented through gamma radiation surveys and the extent of surficial contamination above the applied Background Threshold Values (“BTV”) levels has been characterized. Elevated gamma measurements extend into the Mesa V Adit survey area, which is adjacent to the western boundary of Mesa V Incline. A total of 28 Contaminants of Potential Concern (“COPCs”) were identified at Mesa V Incline. Of these COPCs, 26 were found to be above background in both the surface and subsurface environments.

For Mesa V Adit (also known as (M16)), the 2018 RSE identified radionuclides and chemicals above background in Waste Piles M16A and M16B located at the mine. The volume of waste within the waste piles is estimated to be 21,926 CY. A cliff that runs approximately east-west separates the waste piles; Waste Pile M16B is located above the cliff, while Waste Pile M16A is below the cliff. Waste Pile M16B is actively eroding via mass wasting over the cliff edge. Material covering Burial Cells 91, 92, and 93 at Mesa V Adit contain radionuclide and chemical concentrations above background, and the volume within the burial cells is estimated to be 10,166 CY. No drainages were mapped within the burial cells, and the material appeared to be stable. There is potential for off-site migration of contaminated material from the burial cells via aeolian transport or from sheet flow during monsoon events. A total of 23 analytes were identified as COPCs at Mesa V Adit. Of these 23 analytes, all were identified as occurring within the surface environment and 19 were identified as occurring within the subsurface environment. 19 of the analytes were found to be above background concentration levels in both the surface and subsurface environments.

For Mesa V Mine – 103 (also known as (M17)), as part of the RSE, it was confirmed that the potential for off-site migration is through the surface water pathway. At the mine the greatest potential source of off-site contaminant migration to the canyon below is Waste Pile M17, which feeds directly into the Middle 1A drainage. There are several smaller drainages connected to Waste Pile M17 that are contributing to the migration of waste material. The footprint of Waste Pile M17 (formerly referred to as “Waste Pile 88a”) was expanded by using multiple lines of evidence from 0.55 acres to 1.44 acres. An estimated removal depth of 20 feet was assumed for all survey units that intersected

this pile. A total removal volume of 57,708 CY was estimated for this waste pile (including waste from within the Haul Shaft) that accounts for 96 percent of the total waste volume of 60,259 CY for the Site.

The waste volume to be addressed by this TCRA is estimated in Table 1 below. The estimated waste volume incorporates the data from the 2018 RSE (described above) and a data gaps investigation that was performed by USEPA for the Site in 2022. The estimated waste volume also reflects the current USEPA Navajo Abandoned Uranium Mine program methodologies. Since the actions for this TCRA are focused on source control, the TCRA waste volume does not include the total waste volume within the Technologically Enhanced Naturally Occurring Radioactive Material (“TENORM”) boundary of the Site.

The 2018 RSE waste volumes were calculated based on multiple lines of evidence: historical records and polygons, field observations, estimated depths and limited subsurface sampling. It should be noted that the historical records have certain limitations. Mapped waste volumes were recorded by the Navajo Abandoned Mine Lands Reclamation Program (“AML”), but volumes did not always include existing waste that was buried by AML. Additionally, cap material used by AML commonly exceeded cleanup levels and were not included in historical records of waste volumes. Many of the polygons used for the RSE were developed through the mapping performed in 2007 and included historical polygons from AML records which were later updated. Initial field observations and subsurface sampling provided some data on waste volumes but are insufficient to determine underlying topography or deeper subsurface volumes. Due to the inaccessible location of many waste piles, subsurface investigations to find the contact between waste and the original surface could not be performed. The 2018 RSE estimates were designed to be conservative, and overestimates of volume occurred as a result of assuming a set depth to estimate an entire polygon in the absence of bedrock contact or expected natural topography information.

After completing the 2018 RSE investigation, the removal action goals (“RAGs”) for Mesa V Complex changed based on their respective BTVs, altering the TENORM boundary and the waste volume at the Site. Furthermore, the engineering assessments conducted during the 2022 data gaps investigation for the Site refined the waste pile boundaries and the volume estimates. Table 1 below shows the results from the 2018 RSE reports and the volumes from the 2022 data gaps investigation.

The TCRA waste volume is calculated with a cut and fill analysis and field verification. Surface topography mapped through Light Detection and Ranging (“Lidar”) technology, and expected bedrock contact elevation or natural contour underneath the waste piles were inputted into Computer Aided Design (“CAD”) Software to generate a three-dimensional model to determine the waste volume.

The actions under this TCRA will eliminate much of the source control releases at the Site and will be considered in any Engineering Evaluation and Cost Analysis (“EE/CA”) for the Mesa V Complex.

Table 1: RSE and TCRA Volumes

Mesa V Incline (Waste Piles M15A and 15B)			Mesa V Adit (Waste Pile 16)			Mesa V Mine 103 (Waste Pile 17)		
Removal Activity Basis	Removal Depth (ft)	Soil Volume (yd3)	Removal Activity Basis	Removal Depth (ft)	Soil Volume (yd3)	Removal Activity Basis	Removal Depth (ft)	Soil Volume (yd3)
Waste Pile M15A	7	7,256	Burial Cell	7.5	10,166	Waste Pile	20	57,408
Waste Pile M15	3	1,555	Waste Pile	5	21,926	Mean Gamma >2 x BTV	15	239
Mean Gamma >2 x BTV	2	1,276	Mean Gamma >2 x BTV	1	917	Mean Gamma 1-2 x BTV	1	2,312
Mean Gamma 1-2 x BTV	1	2,751	Mean Gamma 1-2 x BTV	1	3,588	Haul Shaft Waste Pile	NA	300
COPC Exceedance	1	199	COPC Exceedance	1	279			
TOTAL RSE VOLUME		13,037	TOTAL RSE VOLUME		36,877	TOTAL RSE VOLUME		60,259
ESTIMATED TOTAL TCRA VOLUME		3,000	ESTIMATED TOTAL TCRA VOLUME		2,500	ESTIMATED TOTAL TCRA VOLUME		6,500

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

In the area of the Mesa V Complex proposed for excavation as part of this TCRA, the risk assessment identified 5 candidate Contaminants of Concern (“COCs”) and 11 candidate Contaminants of Emerging Concern (“COECs”) for surface and/or subsurface soil. Of the candidate COCs, 3 are recommended for this removal action: radium-226, arsenic (subsurface soil only), and manganese. Of the candidate COECs, 1 contaminant is recommended for this removal action: vanadium (surface soil only). See Attachment III, Map 3 for a topographic map of the areas of concern. Radium-226, arsenic, manganese, and vanadium are hazardous substances as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

USEPA distinguished COCs and COECs that were naturally occurring (“Naturally Occurring Radiological Material” or “NORM”) from those that were occurring due to mining related activities, TENORM. NORM is generally found in the Salt Wash Member of the Morrison geologic formation and is present in the area. TENORM is NORM that has been manipulated through mining related activities, which occurred in the area starting in the 1950s. Response actions may address TENORM where BTVs

are exceeded. The goal of removal actions taken at the LMMD Superfund Site is to address TENORM, where there is a threat or potential threat to the public health or welfare or the environment.

Off-site migration of waste material from Mesa V Incline into the Middle 1A drainage via surface water has been confirmed. Waste Pile M15A and Waste Pile M15B are the greatest sources of contamination from Mesa V Incline. At Mesa V Adit, Waste Pile M16A and Waste Pile M16B contain radionuclides and chemicals above BTVs. A cliff runs approximately from east to west between these waste piles. Waste Pile M16B is located above the cliff while Waste Pile M16A is below the cliff. Waste Pile M16B is actively eroding via mass wasting over the cliff edge. Waste Pile M17 located at Mesa V – 103 is the greatest potential source of off-site migration of contamination to the drainages below the Mesa V Complex, which feeds directly into the Middle 1A drainage. There are several smaller drainages coming off Waste Pile M17 that are contributing to the migration of waste material.

5. NPL Status

The Mesa V Complex was placed on the NPL on March 5, 2024, as part of the LMMD Superfund Site. A Remedial Investigation/Feasibility Study (“RI/FS”) is in progress but has not been completed for the LMMD Superfund Site, including the Mesa V Complex. No other remedial activities have been performed or are in progress at the Mesa V Complex or larger LMMD Superfund Site. As stated in more detail below, the TCRA described herein is appropriate to abate the threats posed at the Mesa V Complex and will be consistent with and contribute to any anticipated remedial action and/or non-time-critical removal action at the Site.

6. Maps, pictures, and other graphic representations

See Attachment II and Attachment III to this Action Memorandum.

B. Other Actions to Date

In 2024, a response action was initiated and completed to address road repairs and manage stormwater more efficiently within the LMMD Superfund Site. This action included construction and implementation of a storm water control system at the top of the Mesa V Complex. This storm water control system consists of three rock retaining walls that are designed to slow and divert storm water to reduce further erosion and transport of contaminants downgradient. See the table under Section VI.B. (Estimated Extramural Costs) below for past extramural construction costs.

Additionally, in 2023, as part of the time-critical removal action at Cove Transfer Station (“CTS”), a soil sorter was used to segregate materials and determine whether some material would be suitable for reuse at the Mesa V Complex. The material that did not meet the criteria for reuse at the mesas was required to be transported and disposed off-site. The material that was considered suitable for reuse on the mesas was transferred to the top of the Mesa V Complex. The time-critical removal action at CTS, including the transportation of material considered suitable for reuse to Mesa V Complex, was taken to address actual or threatened releases of hazardous substances at CTS that may have otherwise continued to present an imminent and substantial endangerment to public health or welfare or the environment. The material from CTS will be used to reclaim and cover mine-scarred areas on the Mesa V Complex under this TCRA, unless such material exceeds mesa standards for reuse (in which case, the material will be placed in the Site’s on-bench repository). Installing this cover for the mine-scarred

areas will involve construction of retention walls to prevent the cover from eroding. This is further described under Section VI.A. (Proposed Actions and Estimated Costs).

The following historical reclamation actions were completed by AML at the Mesa V Complex.

At Mesa V Mine – 103:

- An access road and bench were excavated to access Mesa V Mine – 103. After the project was completed, the access road and bench were backfilled with cover material.
- Rim Strip 90 was revegetated.
- Highwalls 88 and 90, Prospect 90a, and Portals 88c, 89, and 90 were backfilled with cover material.
- Vertical Opening 88 (12 feet by 15 feet by 60 feet) was excavated and stabilized. The entrance to the opening was covered with a concrete slab and reinforced with steel beams.
- Prospect 88b was excavated, stabilized, and closed with polyurethane foam. Prospect 88b and the associated highwall (Highwall 88b) were backfilled with cover material.

At Mesa V Adit:

- Four portals (91 through 94) were excavated, stabilized and closed with polyurethane foam.
- Waste Pile 91 (250 bulk cubic yards (“bcy”)) was excavated, transported and used as exterior backfill against Portal 91 and its associated highwall, forming burial cell 91.
- Waste Pile 92 (425 bcy) was excavated, transported, and used as the exterior and backfill against Portal 92 and its associated highwall, forming burial cell 92.
- Waste Pile 93a (900 bcy) was excavated by cut and fill and used as exterior backfill within burial cell 93.
- Waste Pile 95 (7,15 bcy) and Waste Pile 96 (175 bcy) were transported to burial cell 93.

C. State and Local Authorities’ Roles

The Site is located on the Navajo Nation Indian Reservation. USEPA is currently working closely with the Navajo Nation on all matters regarding the LMMD Superfund Site. This has included regular (weekly) calls and updates with NNEPA on LMMD Superfund Site topics, including work performed at CTS and current and anticipated actions at the Mesa V Complex. On November the 14th the Cove Chapter adopted a resolution in favor of the actions outlined in this Action Mem

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Current Site conditions pose ongoing releases and threat of future releases of hazardous substances, including arsenic, manganese, vanadium, and uranium and its progeny (*i.e.*, radium-226) and ionizing gamma and alpha radiation associated with that progeny. The likelihood of human exposure, via ingestion and/or inhalation of hazardous substances, as well the actual or potential contamination to a sensitive ecosystem, and the threat of future releases and migration of those

substances, pose an imminent and substantial endangerment to the public health or welfare or the environment based on the factors set forth in the NCP, 40 C.F.R. § 300.415(b)(2).

The NCP, 40 C.F.R. § 300.415(b)(2), lists the factors to be considered in determining the appropriateness of a removal action. At this time, subparagraphs (i), (ii), (iv), (v) and (vii) of § 300.415(b)(2) apply as follows to the conditions at the Site.

1. “Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants”

The RSE in 2018 revealed TENORM waste piles that are located on the Mesa V Complex resting on steep inclines that are subject to stormwater, snowmelt, and wind erosion. Specifically, of the candidate COCs, 3 are recommended for this removal action: radium-226, arsenic and manganese. Of the candidate COECs, 1 contaminant is recommended for this removal action: vanadium. Persons nearby or traversing the Site may be exposed to contaminated dust by inhalation or ingestion of contamination sorbed to particulate matter. The mesas located within and near the Site are culturally significant. The Navajo population utilizes these mesas for various cultural and sustainable activities such as the grazing of animals, cultural ceremonies, and occupancy. Structures located on the mesas, such as hogans, are regularly used. Navajo activities on the Mesa V Complex place the population at risk due to the potential proximity to TENORM waste piles, as well as animals that may be contaminated through contact, which may have food chain implications.

2. “Actual or potential contamination of drinking water supplies or sensitive ecosystems”

USEPA completed a desktop review of biological surveys of AUM sites within the Cove Chapter. Biological assessment reports received by both the United States Fish and Wildlife Service (“USFWS”) and the Navajo Nation Department of Fish and Wildlife (“NNDFW”) listed possible sensitive species in the Cove Wash area based on information from the Environmental Conservation Online System and Arizona Game and Fish Department (USEPA 2017). The following federally or Navajo Nation threatened and endangered (“T&E”) species were considered for potential adverse effects related to RSE field work:

- Zuni fleabane (*Erigeron rhizomatus*)
- Navajo sedge (*Carex specuicola*)
- Mexican spotted owl (*Strix occidentalis lucida*)¹
- American dipper (*Cinclus mexicanus*)

The Site’s ecosystem is subject to degradation due to stormwater, snowmelt, and wind erosion. The ecosystem’s exposure to radiological contaminants may be exacerbated by the fate and transport of contaminated media to sensitive areas. Additionally, the Mesa V Complex is home to various livestock that may be exposed to radiological contaminants. As part of Navajo cultural practices, livestock is substantially used for grazing at the Mesa V Complex. Fate and transport of radiological contaminants to areas where livestock graze may create exposure to livestock. See Attachment III, Map 6 for location of the Middle 1A drainage that is substantially affected by the continued erosion from the waste piles at the Mesa V Complex and is the focus of this TCRA.

¹ See Attachment III, Map 4 for the location of the Mexican spotted owl (“MSO”) throughout the mesas.

3. “High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate”

Waste piles with elevated levels of contaminants (radium-226, arsenic, manganese and vanadium) are located on the Mesa V Complex. Based on the risk assessment performed, it was determined that these contaminants exceeded RAGs, which is their respective BTVs. The waste piles are located on steep inclines and are subject to transport through a complex network of drainages in the area. The migration of contaminants from the waste piles to downstream soils, sediments, and surface water in and near the community of Cove may present unacceptable health risks given the higher potential for exposure in residential areas.

4. “Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released”

Waste piles located on steep slopes and drainages at the Site are extremely susceptible to migration. The monsoon season, with heavy and frequent rain, exacerbates potential migration of contaminants. Additionally, snow melt on the Mesa V Complex also contributes to the migration of contaminants.

5. “The availability of other appropriate federal or state response mechanisms to respond to the release”

This TCRA is being performed by USEPA with potentially responsible party (“PRP”) funds from a bankruptcy settlement. The Site is located on the Navajo Nation, but it neither has the financial resources nor the staff to perform the TCRA at the Mesa V Complex. See Attachment VIII for the Cove Chapter Resolution that supports the TCRA at the Mesa V Complex.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

The consistency exemption is proposed for this TCRA from the \$2,000,000 million and 12-month statutory limits under Section 104(c) of CERCLA, 42 U.S.C. § 9604(c). The proposed removal action at the Site meets the exemption criteria for consistency with the remedial action to be taken. The exemption criteria are that the proposed removal action is both appropriate to abate the threat posed from the Site and consistent with the anticipated remedial action. See Section 104(c)(1)(C) of CERCLA, 42 U.S.C. § 104(c)(1)(C); NCP, 40 C.F.R. § 300.415(b)(5)(ii).

The proposed removal action is necessary and will address the threat caused by existing exposure to ionizing radiation, radium-226, arsenic, manganese, and vanadium contamination in soils at the Site. In particular, the proposed removal action will take waste piles from the three mine sites to a Mesa V Complex on-bench repository to prevent further migration of contaminants. This action is expected to be consistent with the anticipated remedial actions at the Site to address exposure to any remaining and potential contamination, including in groundwater, at the Mesa V Complex and

throughout the LMMD Superfund Site. While the RI/FS has not been completed for the LMMD Superfund Site, including the Mesa V Complex, any future RI/FS and Record of Decision (“ROD”) (as well as any EE/CA for a future non-time critical removal action), will be required to address the remaining contamination so the TCRA for the Site is appropriate and consistent with the expected requirements of a ROD (and/or potential EE/CA).

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Action

1. Proposed action description

USEPA proposes to prevent the release or threat of release of hazardous substances into the environment that is causing a threat to the public health or welfare or the environment at the Site by excavating and stabilizing the contaminated soil. This Action Memorandum proposes to initiate the activities outlined below and would constitute the scope of the Mesa V Complex TCRA.

List of tasks associated with project scope:

- a. Stabilize waste at Mesa V Complex.
- b. Develop planning documents for work, health and safety, and environmental sampling.
- c. Construct Mesa V Soil Cap Final Engineered Retaining Wall for Cove Transfer Station (“CTS”) soils. If contaminant level lab results exceed mesa standards for reuse, then soils will be placed in the on-bench repository. (See Attachment VII, Sheet 1)
- d. Construct and improve access to the Lower Mesa V haul road route to provide access to the mine waste. New and/or improved Lower Mesa V haul road shall be suitable to meet safety requirements (Mine Safety and Health Administration). (See Attachment VII, Sheet 3)
- e. Implement and maintain stormwater control measures before, during and after the TCRA action. (See Attachment VII, Sheet 6)
- f. Construct the Lower Mesa V haul road to provide access to the lower Mesa V Adit. (See Attachment VII, Sheet 3)
- g. Construct an on-bench repository with a capacity of approximately 17,500 cubic yards. (See Attachment VII, Sheet 2)
- h. Remove and stockpile material from the on-bench repository area suitable for cover and topsoil. Contractors shall consider any necessary borrow material in the form of rock and soil.

- i. Excavate and haul mine waste from the Mesa V Complex including Mesa V Adit, Mesa V Incline, and Mesa V Mine – 103 to the Mesa V on-bench repository. (See Attachment VII, Sheet 4)
- j. Remove loose material from the bottom of the Mesa V Incline area that was deposited from mining. Loose material and rocks will be pushed over the edge of the cliff and onto the prepared landing below in the Waste Pile M16A area. Contaminated material will be hauled to the on-bench repository.
- k. Base preparation and other construction of the on-bench repository parallel to the Lower Mesa V haul road. The on-bench repository shall have an evapotranspiration (“ET”) final cover to increase the hydrologic performance. Hydrologic data collection instruments will monitor the hydrologic performance of the on-bench repository. Surface water will be managed up-gradient of the on-bench repository with surface water controls, diverted, and released without causing erosion on the natural terrain. Geomorphic features shall be implemented into the side slopes of the on-bench repository, allowing the on-bench repository to fit into surrounding natural terrain and match the natural topographic.
- l. Regrade the waste removal areas at lower Mesa V Adit and Mesa V Mine – 103. Cap these areas with clean soil from the on-site stockpile. (See Attachment VII, Sheet 5)
- m. Restore and stabilize all disturbed areas.
- n. Optional: After removing the mine waste, transplant trees in the path of the proposed Lower Mesa V haul route within the entrada bench.
- o. Optional: Conduct excavation controls at areas of the Mesa V Complex where remediation has to determine the degree of any additional excavations.
- p. Optional: Selective handling of rock and soil to determine the appropriateness of reuse at the Mesa V Complex or deposition on the on-bench repository.

All hazardous substances addressed through the actions listed above will be stabilized in the on-bench repository or used as soil cover for mined-scarred lands. There will be no off-site disposal of any mine waste.

2. Contribution to the Remedial Performance

The successful completion of the Mesa V Complex TCRA will be consistent with and contribute to the efficient performance of any long-term remedial action later implemented as part of the clean-up of the LMMMD Superfund Site. USEPA has identified imminent threats posed by exposure to ionizing radiation, radium-226, arsenic, manganese, and vanadium contamination in soils at the Site. This removal action will address the immediate threats posed by uncontrolled hazardous substances in soils

at the Site by stabilizing and capping such contamination. Abating the threats at the Site through this TCRA is necessary to protect public health, welfare, and the environment.

The long-term cleanup plan for the Site:

USEPA's removal activities described in this Action Memorandum will stabilize soil contamination at the Mesa V Complex and will be the first removal action to address contamination at the LMMD Superfund Site. As stated above, the Mesa V Complex was added to the NPL on March 5, 2024, as part of the LMMD Superfund Site. This TCRA will address the uncontrolled hazardous substances in soil at the Site and will require future maintenance to ensure the on-bench repository and ET cover are functioning properly. Any remaining and potential contamination at the Site, including in groundwater, will be addressed through the anticipated remediation of the LMMD Superfund Site.

Threats that will require attention prior to the start of a long-term cleanup:

It is expected that this removal action will eliminate any threat of direct or indirect contact with or inhalation of hazardous substances at the areas addressed at the Site.

The extent to which the removal will ensure that threats are adequately abated:

The actions planned for the Site will eliminate the threat of additional exposures to and releases of contamination.

Consistency with the long-term remedy:

USEPA expects this TCRA will address the immediate threats posed by soil contamination at the Site by stabilizing and capping the identified COCs, and is consistent with any long-term response actions implemented at the Site. As stated above, this removal action will be consistent with the anticipated remedial actions at the Site to address exposure to any remaining and potential contamination, including in groundwater, at the Mesa V Complex and throughout the LMMD Superfund Site.

Post-Removal Site Control:

After this TCRA is completed, USEPA expects to perform maintenance to revegetate and stabilize areas with clean backfill. USEPA and its contractor will perform post restoration site inspections to assess potential maintenance actions starting in FY26. USEPA will work with NNEPA and/or AML) to determine the appropriate maintenance activities and responsibility for conducting ongoing maintenance work at the Site following future inspections.

3. Applicable or relevant and appropriate requirements (ARARs)

A complete list of ARARs for the TCRA are provided in Attachment VI to this Action Memorandum.

Pursuant to the NCP, 40 C.F.R. § 300.415(j), removal actions must, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (“ARARs”) under federal environmental or state environmental or facility siting laws. The Site is on the Navajo Nation Indian Reservation. No state environmental or facility siting laws have been identified as ARARs for the removal action. As defined in 40 C.F.R. § 300.5, the term “state” includes Indian tribes. Therefore, for purposes of selecting the ARARs for the removal action, tribal requirements were treated the same as state requirements; that is, the tribal requirement must be a promulgated environmental standard and must be more stringent than the corresponding federal standard. A full and complete evaluation of ARARs was completed for the TCRA. Upon completion of the TCRA, all ARARs listed in Attachment VI will be attained. No ARARs were removed based on the exigencies of the situation and no ARAR waivers are being sought.

Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a CERCLA site.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

Pursuant to CERCLA section 121(e), CERCLA on-site response actions do not require permitting; only substantive requirements are considered ARARs. Administrative requirements such as approval of, or consultation with administrative bodies, issuance of permits, documentation, reporting, record keeping, and enforcement are not ARARs for the CERCLA actions occurring on the site.

4. Project Schedule

It is estimated that it will take approximately 7-10 months in the field to perform the full scope of this TCRA including: excavating and hauling mine waste, constructing an on-bench repository with an ET cover, constructing retention walls, implementing erosion control measures, and capping mine scarred lands with cover soils. Due to weather conditions and resources, field activities for this TCRA will likely span over two field seasons. It will take an additional 2 months to perform and confirm a Final Status Survey (“FSS”) and restore and stabilize all disturbed areas.

B. Estimated Extramural Costs

Extramural Costs	MESA V COMPLEX TCRA
Previous Extramural Construction Costs (FY24)	\$189,500

Future Construction Removal Allowance ²	\$13,322,384
Future Technical Support Allowance ³	\$2,250,000
Future Subtotal, Extramural Costs	\$15,572,384
Future Extramural Cost Contingency (20% of Subtotal)	\$3,114,477
Future Total Extramural Cost	\$18,686,861
Total Removal Project Ceiling	\$18,876,361

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delay or disapproval of the proposed action will allow hazardous substances, pollutants, or contaminants, to continue to be present at the Site and potentially migrate through a complex set of drainages at the Mesa V Complex, impacting sensitive Navajo cultural practices around the Mesa V Complex and downgradient where a Navajo community resides creating threat to public health or welfare, or the environment.

VIII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues at the Site.

IX. ENFORCEMENT

This removal action will be funded by the Tronox Navajo Area Uranium Mines Special Account (A982). See the Confidential Enforcement Addendum (Attachment V) for further discussion on enforcement.

Estimated USEPA costs for this Removal Action

Direct Intramural	\$528,000
USEPA Indirect Costs: (Direct Future Extramural Costs ⁴ x 0.8517)	\$15,915,599.50
Total Intramural Costs	\$16,443,599.50

² These are AMRCS costs associated with completing the scope of work identified in Section VI.A.1.

³ These are RAES II costs associated with technical support and oversight to be provided during the TCRA.

⁴ Direct costs = Direct FTE Intramural costs (4 FTE=\$528,000) + Direct Future Extramural costs (\$18,686,861). Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only, and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recover.

The total USEPA costs (intramural \$16,443,599.50 plus extramural \$18,686,861) for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be **\$35.1 million**.

X. RECOMMENDATION

This decision document represents the selected removal action for the Mesa V Complex on the Navajo Nation, Cove, Arizona, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site. The index to the Site’s administrative record is included as Attachment I.

Conditions at the Site meet the criteria for a removal action under the NCP, 40 C.F.R. § 300.415(b)(2), and the consistency exemption under Section 104(c)(1)(C) of CERCLA, 42 U.S.C. §9604(c)(1)(C). Therefore, I recommend your approval of the proposed removal action. The Total Removal Project Ceiling, if approved, will be \$18,876,361.

APPROVED: /s/ Michael Montgomery **DATE:** 3/25/2025

DISAPPROVED: _____ **DATE:** _____

Attachments:

- I. Index to the Administrative Record
- II. Pictures Of Mesa V Complex
- III. Maps
- IV. Removal Site Evaluation
- V. Confidential Enforcement Addendum
- VI. Applicable or Relevant and Appropriate Requirements (“ARARs”) and To Be Considered (“TBC”) Materials
- VII. Design Specifications
- VIII. Chapter Supporting Resolution