



United States Department of the Interior
NATIONAL PARK SERVICE
Joshua Tree National Park
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IN REPLY REFER TO:

December 6, 2018

ACTION MEMORANDUM

To: Stanley J. Austin, Director, Pacific West Region

From: David Smith, Superintendent, Joshua Tree National Park

Through: Stephen J. Mitchell, PE, Operations/Environmental Programs Branch Chief,
Pacific West Region

Subject: Approval for CERCLA Time-Critical Removal Action at the Gray Eagle Mill,
Joshua Tree National Park, California

OVERVIEW

The purpose of this Action Memorandum (AM) is to request and document approval of and the basis for, the proposed time-critical removal action (TCRA) described herein for the Gray Eagle Mill Site (Site), located within Joshua Tree National Park, California, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, (CERCLA), 42 U.S.C. §§ 9601 *et seq.* The Site is the location of an inactive gold mill. This TCRA is necessary to reduce or eliminate unacceptable risks to human health and the environment at the Site due to the ongoing release and threatened release of hazardous substances (including arsenic, cadmium, copper, lead, mercury, and vanadium) from the toxic mill tailings at the Site. The National Park Service (NPS) has determined that a TCRA is appropriate because Site conditions have deteriorated, making the response time sensitive. High-intensity flash floods at the Site have caused ongoing, exacerbated erosion and active transport of toxic mill tailings towards the downstream wash. NPS has determined there is a need to take prompt action that begins on-Site within six (6) months of the NPS decision to proceed with the action. As there are no potentially responsible parties, NPS will fund the action, with anticipated costs under \$300,000 but certainly under \$500,000. If this action is approved, on-Site work is anticipated to begin by May 2019. The NPS Pacific West Regional Director has the delegated CERCLA Section 104(a) response action authority for authorizing and undertaking a TCRA at the Site.

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1.0 PURPOSE

The purpose of this Action Memorandum (AM) is to request and document approval of and the basis for, the proposed time-critical removal action (TCRA) described herein for the Gray Eagle Mill Site (Site), located within Joshua Tree National Park, California, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, (CERCLA), 42 U.S.C. §§ 9601 *et seq.* The Site is the location of an inactive gold mill. High-intensity flash floods are contributing to the ongoing, exacerbated erosion and active transport of the toxic mill tailings towards the downstream wash. Risks to public health, safety, and the environment, as a result of recent deterioration of Site conditions, dictate that the response action commence expeditiously. This AM documents the NPS determination that a removal action is necessary to address unacceptable risks to human health and the environment due to the ongoing release and threatened release of hazardous substances from the toxic mill tailings at the Site and that a TCRA is appropriate because the on-Site response work should begin within six (6) months of NPS's decision to proceed with the action.

2.0 STATUTORY AND REGULATORY FRAMEWORK FOR NPS CERCLA RESPONSE

CERCLA Section 104(a) provides Presidential authority to respond to the release or threatened release of hazardous substances into the environment by arranging for the removal of such substances and taking any other response measure consistent with the national contingency plan (NCP) the President deems necessary to protect the public health or welfare or the environment. CERCLA Section 104(a) authority to undertake non-emergency removal actions has been delegated to NPS to address the release or substantial threat of release of hazardous substances on or from land under the jurisdiction, custody, or control of NPS. The NPS Pacific West Regional Director has the delegated CERCLA Section 104(a) response action authority for undertaking a TCRA at the Site.¹

Response actions conducted by NPS pursuant to CERCLA are governed by the requirements of the NCP, codified at 40 C.F.R. Part 300. Several NCP provisions guide the determination as to whether a removal action is the appropriate course under CERCLA. Section 300.415(b)(1) establishes the foundation on which such a determination must be made:

[W]here the lead agency makes the determination, based on the factors in paragraph (b)(2)² of this section, that there is a threat to public health or welfare of the United States or the environment, the lead agency may take any appropriate removal action to abate,

¹ The President's CERCLA Section 104(a) non-emergency response action authority to address the release or threat of release of hazardous substances on or from land under the jurisdiction, custody, or control of NPS was delegated by the President to the Secretary of the United States Department of the Interior (DOI) by Executive Order 12580, 52 Fed. Reg. 2923 (Jan. 29, 1987), as amended by Executive Order 13016, 61 Fed. Reg. 45871 (Aug. 30, 1996), and further delegated to the Director of NPS via 207 Departmental Manual 7. NPS general delegations further re-delegate CERCLA authorities within the NPS.

prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release.

Section 300.415(b)(2) states that the “following factors shall be considered in determining the appropriateness of a removal action pursuant to this section:

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- (iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;
- (iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;
- (v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;
- (vi) Threat of fire or explosion;
- (vii) The availability of other appropriate federal or state response mechanisms to respond to the release; and
- (viii) Other situations or factors that may pose threats to public health or welfare of the United States or the environment.

When a removal action is under consideration, NCP Section 300.410(a) provides that a removal site evaluation be undertaken that includes a removal preliminary assessment and, if warranted, a removal site inspection. NCP Section 300.410(c)(1) directs that the removal preliminary assessment should be based, as appropriate, on readily available information and may include, but is not limited to, such information as: identification of the source and nature of the release or threat of release; evaluation of the threat to public health; evaluation of the magnitude of the threat; evaluation of factors necessary to make the determination of whether a removal is necessary; and determination of whether a nonfederal party is undertaking proper response. NCP Section 300.415(d) adds that removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned.

Upon consideration of the above factors, the NCP directs that if the lead agency determines that a removal action is appropriate, "actions shall, as appropriate, begin as soon as possible to abate, prevent, minimize, stabilize, mitigate, or eliminate the threat to public health or welfare of the United States or the environment." Section 300.415(b)(3). The NCP provides a modified administrative process for time-critical CERCLA actions, where, based on the site evaluation, the lead agency determines “that a removal is appropriate, and that less than six months exists before on-site removal activity must begin.”

As described in the following sections, the Gray Eagle Site meets factors (i), (iv), (v), and (vii) in Section 300.415(b)(2) listed above.

3.0 SITE CONDITIONS AND BACKGROUND

The following section discusses the Site's history and current characteristics, the nature and extent of Site contamination, and previous Site evaluations and other activities.

3.1 Site Description, Location, and Characteristics

The Gray Eagle Mill Site is located within Joshua Tree National Park (Park), in Riverside County, California. It is located downgradient of Cottonwood Spring, in the southern part of the Park, approximately 1 mile southeast of the Cottonwood Visitor Center and nearly adjacent to a segment of the Lost Palms Oasis/Mastodon Peak Loop Trail. The Site consists of three small tailings piles, occupying a surface area of approximately 196 square feet and a volume of approximately 80 cubic yards (as estimated by ECM's 2013 EE/CA). Remnants of the historic mill, including the three tailings piles, are located on the northwest and southeast banks of the Cottonwood Spring drainage, ranging from 15-40 feet downgradient of the drainage, which is within 50 feet of the trail. The trail typically remains open year-round and is one of the most popular destinations in the southern portion of the Park. Access to the Site is exclusively by foot, and it is only 225-250 feet from the Lost Palms Oasis/Mastodon Peak Loop trailhead, which has a dedicated parking lot.

Gray Eagle Mill was constructed and operated as a custom mill to refine ore from various, relatively small, nearby claims thanks to the presence of Cottonwood Spring, which historically supplied up to 20 gallons per minute of potable water. Though much of this was pumped to Iron Chief Mine some 18 miles away, there was enough water left over to supply the ore refining operation, the people who worked the mill, people who homesteaded at the spring, livestock, and the local flora and fauna³.

Historically, the Gray Eagle Mill was originally composed of a pump house, at least one (possibly several) arrastra, and a few small, associated historic features (some fencing, and possibly a corral at one point, etc.). At its peak, the mill reportedly included a variety of equipment including a 40-ton per day mill, a 20-ton coarse-ore bin, a belt feeder, a 9 in x 8 in Fulton jaw crusher, a 20-ton fine-ore bin, and a 4 ft x 4 ½ ft ball mill with amalgamation plates. Eventually, it reverted to a small homestead occupied into the 1940s.

After the land was acquired by the National Park Service with the creation of Joshua Tree National Monument in 1936, the homestead was eventually torn down before a popular campground was built in 1949, though at least the chimney was still present until 1953. The campground was eventually moved to its current location, about 0.5 miles northwest of the spring, in 1964. All that remains of the mill today are the arrastra, several scattered drag stones (indicating the possible existence of several other arrastras), portions of historic retaining walls,

³ See Newland's "An Archaeological Study of CA-RIV-2049/H: Cottonwood Oasis, Joshua Tree National Park" (2014), Greene's "Historic Resource Study: A History of Land Use in Joshua Tree National Monument" (1983), the NRHP District Nomination for the Cottonwood Archeological District, and the CA-RIV-2049/H site record for further details regarding the cultural background and history of Gray Eagle Mill and Cottonwood Spring.

the rough outline of a building foundation, and mill tailings. The mill tailings contain elevated concentrations of hazardous substances, including antimony, arsenic, cadmium, chromium, copper, lead, and mercury, that continue to be released into periodically flooded downgradient washes.

There is a rich Native American site beneath and around the mill site. The Cottonwood Spring/Mastodon Mine Loop Trail has post and cable fencing separating the footpath from the surrounding archeological site (which includes the hazardous mill tailings in question), with the intention of restricting visitor access to the trail only. The archeological site has individually been evaluated as eligible for the National Register of Historic Places (NRHP), as well as evaluated as part of a proposed Cottonwood Archeological District, which is planned for submission later in 2018. It appears to contain the richest deposits of Native American material culture of any of the spring sites within the proposed Cottonwood Archeological District, and its depositional integrity holds potential to illuminate our understanding of prehistory in the area around Cottonwood Spring.

Although the site has been determined eligible for inclusion in the NRHP, the proposed TCRA does not require SHPO or THPO consultation. The proposed action is considered a health and safety activity⁴ that will not adversely affect any of the historic components within the Site, and, therefore, this TCRA qualifies for streamlined review within the Park.

Cottonwood Spring is a key resource for flora⁵ and fauna⁶ within the Park; it is an essential water source for an ecosystem that is deceptively rich in its biodiversity. The Park is home to 240 species of birds, 712 plant species, 40 reptile species, and 41 mammal species (NPS, 2012c and

⁴ Defined by Section III C (4)(e) in the “Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers for Compliance Within Section 106 of the National Historic Preservation Act” of 2008

⁵ The main vegetation groups are: the Sonoran-Mojave creosotebush-white bursage desert scrub, the Mojave mid-elevation mixed desert scrub, Sonoran-Coloradan Semi-Desert Wash Woodland/Scrub, Southwestern North American Warm Desert Riparian Group, Warm Semi-Desert Shrub and Herb Wash-Arroyo, and disturbed soils (also known as North American warm desert dunes and sand flats, or Rock outcrops). Spring sites such as this also attract clusters of less common plant communities, and are the only locations in the area where native California fan palms can be found. (See the NRHP District Nomination for the Cottonwood Archeological District, (interim report on file at Joshua Tree National Park), Section 8, pp. 5-6.)

⁶ The faunal community around Cottonwood Spring contains few large game animals—only Bighorn Sheep (*Ovis Canadensis nelson*) and occasionally Mule Deer (*Odocoileus hemionus fuliginatus*). Dominant predators include coyotes (*Canis latrans mearnsi*), bobcats (*Lynx rufus baileyi*), and mountain lions (*Felis concolor californica*), but the majority of animals are small game: desert rodents, lagomorphs, Western Spotted Skunk (*Spilogale gracilis gracilis*), Desert Badger (*Taxidea taxus berlandieri*), and Desert Grey Fox (*Urocyon cinereogenteus scottii*). Many reptiles are common the area as well, including more than 17 species of snakes and 12 lizard species. (See the NRHP District Nomination for the Cottonwood Archeological District, (interim report on file at Joshua Tree National Park), Section 8, pg. 6.)

USFW, 2000) The following six species found in the Park are federally threatened or endangered (NPS, 2011): desert tortoise (*Gopherus agassizii*), least bell's vireo (*Vireo bellii pusillus*), Southwestern willow flycatcher (*Empidonax traillii extimus*), parish's daisy (*Erigeron parishii*), triple-ribbed milk-vetch (*Astragalus tricarinatus*), and the Coachella valley milk-vetch (*Astragalus lentiginosus coachellae*) (Tetra Tech 2013, p. 9). In addition to the threatened and endangered species, the California Department of Fish and Wildlife identifies numerous plant and animal Species of Special Concern (SSC) in the Park (Tetra Tech 2013, p. 10-11).

Situated within the Colorado Desert, the area around Cottonwood Spring is a typically arid part of the Park, receiving an average of 1-7 in of rain per year, most of which occurs during the monsoon season, generally July through September. Annual high temperatures in the Park can exceed 115° in the summertime, and high elevations can drop below freezing in the winter, occasionally receiving snowfall. Monsoon season is when the area around Cottonwood is most likely to experience high winds and flash flooding events.

The spring is located at the confluence of several small, but seasonally high-volume drainages, funneling together through eroding quartzitic monzogranite rock outcrops that ultimately feed into Cottonwood Canyon. The natural geological substructure of the Site channels water through the Site with a heightened volume and frequency. The tailings at Gray Eagle Mill Site are showing signs of increased erosion and migration. Recent high-intensity flash floods around Cottonwood Spring have resulted in ongoing, exacerbated erosion and active transport of toxic mill tailings and soils. The once gently sloping tailings pile has been subjected to multiple high-intensity flooding events most notably in 2011, 2013, and 2018. These events exposed buried deposits of cultural resources—both prehistoric and historic—as well as toxic mill tailings, and increased migration of the tailings towards the downstream wash.

3.2 Removal Site Evaluations

A removal site evaluation (RSE) for the Site was conducted in compliance with the NCP Section 300.410 for the purpose of determining whether hazardous substances released at the Site constitute a threat to public health, welfare, or the environment warranting a CERCLA removal action. The initial preliminary assessment of the Site was completed in 2001 as part of an assessment of 20 mine and mill sites within the Park (IT Corporation, October 2001).

Data collection for the assessment included Site visits and literature reviews. An inspection of the Site, including field sampling, was conducted in 2003 as part of an evaluation of 14 inactive mill sites within the Park (Tetra Tech, 2003).

An Engineering Evaluation/Cost Analysis (EE/CA) for the Site and 13 other mill sites at the Park was conducted in 2012-2013 (ECM 2013). The draft EE/CA report includes an evaluation of the nature and extent of contamination, an assessment of risk to human and ecological receptors, an evaluation of removal action alternatives, and a recommendation for further action at each mill site.

The draft EE/CA report concluded that hazardous substances released at the Site present unacceptable risks to human health and the environment and that a removal action is justified pursuant to the NCP Section 300.415(b) based on the presence of the following factors:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants.
- Actual or potential contamination of sensitive ecosystems.
- High levels of hazardous substances, pollutants, or contaminants in soils largely at, or near, the surface, that may migrate.
- Weather conditions that may cause hazardous substances, pollutants, or contaminants to migrate or be released.

After comparing available removal action alternatives, the draft EE/CA report recommended a removal action at the Site comprised of excavation, removal, and off-site disposal of the mill tailings and other contaminated material. More recently, NPS has determined that the recommended removal action must commence as expeditiously as possible to minimize further erosion and migration of the tailings into the downstream wash.

3.3 Release and Threatened Release into the Environment of Hazardous Substances

The NPS Pacific West Region (PWR) Environmental Programs Branch office, has determined remediation goals (RGs) that will effectively prevent remnant contaminants from affecting the health or safety of park visitors and the broader ecosystem around the site (see Table 1).

Table 1
Gray Eagle Site Proposed Remediation Goals (RGs)
(mg/kg)

Contaminant of Concern	EPA RSL Residential ¹	Ecological Toxicity Value			JOTR Background ⁵	Maximum Site Concentration	Location of Maximum Site Concentration ⁶	Proposed TCRA RG	Basis for RG
		NOAEL ²	Geomean ³	LOAEL ⁴					
Arsenic	0.7	660	-	6600	10.5	420	T-202	10.5	Background
Cadmium	78	0.51	1.6	5.1	2.1	8.1	T-002	2.1	Background
Cobalt	23	400	-	4000	14.7	95	T-202	23	Human Health
Copper	3100	64	80	100	89.8	2700	T-202	89.8	Background
Lead	400	120	166	230	58.1	4940	T-002	166	Eco (deer mouse)
Mercury	23	3	9.5	30	0.08	15	T-202	9.5	Eco (deer mouse)
Selenium	390	0.83	1.0	1.2	ND	4.7	T-003	1.0	Eco (deer mouse)
Vanadium	390	480	-	950	92	1290	T-002	390	Human Health

ND = not detected

1 = Cleanup goal based on full residential exposure (<https://semspub.epa.gov/work/HQ/197237.pdf>)

2 = No observed adverse effect level

3 = Geometric mean between the NOAEL and the LOAEL, “-“ = not needed, remediation goal driven by background or human health

4 = Lowest observed adverse effect level

5 = Upper threshold limit (UTL) value from 28 JOTR background samples (with outliers removed)

6 = (ECM, 2013, Figure D-10)

The following hazardous substances as defined by CERCLA Section 101(14) were identified in elevated concentrations in soil samples collected at the Site: antimony, arsenic, beryllium, cadmium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, vanadium, and zinc [EE/CA p. 26]. The same study indicated that the following hazardous substances are present in concentrations that exceed the aforementioned RGs: arsenic, cadmium, cobalt, copper, lead, mercury, selenium, and vanadium (see Table 2).

Table 2
Gray Eagle Site Sampling Locations and Results
(mg/kg)

Contaminant of Concern	Sample Locations							
	Western Bank Tailings				Eastern Bank Tailings		Arrastra Tailings	
	T-001	T-002	T-003	T-202	T-203	T-204	T-228	T-229
Arsenic	92.5	113	102	420	NA	30	NA	15
Cadmium	7.2	8.1	7.3	1.2	NA	0.48	NA	0.34
Cobalt	52.8	52.1	61.3	95	NA	23	NA	8.2
Copper	87.4	2460	90.1	2700	NA	440	NA	79
Lead	272	4940	248	640	NA	610	NA	160
Mercury	9.1	4.9	5	15	NA	6.4	NA	4.1
Selenium	4.1	3.1	4.7	2.3	NA	1.6	NA	0.38
Vanadium	304	1290	281	190	NA	70	NA	26

= concentrations exceeding the TCRA's established remediation goals

While the above contaminants may be found throughout the site in varying concentrations that exceed the TCRA's established remediation goals, the proposed removal action only concerns the Western Bank subset of mill tailings at the Site. The unique geomorphology at Site has been driving significantly increased erosion and migration of the mill tailings at the Site. The topography of prominent quartzitic monzogranite rock outcroppings surrounding the spring magnify the impact of seasonal rainfall and occasional flooding events on the stability of soils around the spring, accelerating the rate of erosion at the Site and undermining the stability of cut banks lining the drainage downstream of the trail. Our concern is that hazardous mill tailings are moving into the downstream wash. The other 13 mill sites considered in the draft EE/CA report do not share these features. The other 13 sites are generally in a stable condition and do not experience any significant active transport of sediments via precipitation or erosion.

That said, the different tailings deposits are affected differently by precipitation and flooding events. Sometime in the 2000s, two culverts were installed underneath the paved portion of the trail leading east from the trailhead parking lot. One of these culverts funnels water from one of these bedrock-defined high-volume drainages over the western bank of the wash, and directly over the Western Bank Tailings that contain the highest concentrations of contaminants at the Site (see Table 2).

Therefore, the proposed removal action will target only the Western Bank Tailings, consisting of an estimated 3 cubic yards. This number has been determined by reconciling different estimates of the total volume of possible tailings determined by testing and studies between 2002 and 2013. The 2002-2003 study performed by Tetra Tech identified just the tailings in the western bank, then estimated to contain roughly 2 cubic yards of material, whereas the 2012-2013 ECM study identified three tailings piles consisting of 80 cubic yards of material (50 cubic yards in the Western Bank tailings and a cumulative 30 cubic yards between the Eastern Bank tailings and the Arrastra tailings) for recommended removal (Tetra Tech 2013, p. 27, 100, and 101). The discrepancy between these two estimates is likely the result of surface estimations or a misinterpretation of the site's geomorphology. ECM could have interpreted the entirety or bulk of the soils present in the Site's western bank to be tailings, despite only a small section of the landform displaying discoloration characteristic of historic mill tailings in the Park. This TCRA will proceed with the visually identifiable tailings pile exposed in the western bank of the mill site, using a revised estimate of 3 cubic yards to account for any additional sediments that may not be currently visible in the cut bank, as well as a small buffer around the visually discolored mill tailings. However, as described in Section 5.1, the proposed removal action will excavate and dispose of all Western Bank Tailings and associated contaminated soils exceeding the RGs, thereby significantly mitigating this source of contamination.

The EE/CA made a collective determination that the threat of leaching at all 14 mill sites (including the Gray Eagle Mill Site) was negligible, given that the sites are located in the Colorado Desert, there is a scarcity of groundwater in the area, and local precipitation is infrequent enough that the total amount of exposure between water and residual heavy metals is too low to result in any extensive leaching.

3.4 National Priorities List (NPL) Status

This Site is not an NPL site, has not been proposed for the NPL, and is not expected to receive a Hazard Ranking System rating.

3.5 Maps, pictures, and other graphic representations

Please refer to attached figure for graphic representations of the Site.

3.6 Previous and Current Actions to Date

There have been no government or private actions undertaken to remediate hazardous mill tailings at the Site other than the investigative, erosion control, and historic preservation actions described above.

3.7 Other Federal, State, and Local Authorities' Roles

NPS is the lead agency for this Site. No other federal entities or State or local entities have been involved in or conducted any remediation activity at the Site to date. NPS does not anticipate any future involvement by any of these entities, except as NPS might initiate such involvement, for example, through consultation about State ARARs, endangered or threatened species, and preservation of cultural resources.

4.0 DETERMINATION OF THREATS TO PUBLIC HEALTH, WELFARE AND THE ENVIRONMENT

Documented Site conditions and associated risks and visual observation of Site conditions, coupled with evaluation of the relevant NCP factors, demonstrate that the Site poses substantial and unacceptable threats to public health, welfare, and the environment and that the removal action is time sensitive and should be undertaken as expeditiously as possible, making a TCRA the appropriate course of action.

The NCP Section 300.415(b)(2) sets forth eight factors the NPS shall consider to determine whether a removal action is appropriate. As discussed below, five of these factors are applicable to this Site and soundly support initiating a TCRA.

- *Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances.*
 - The tailings piles are located within 50 ft of the Cottonwood Spring/Mastodon Peak Loop trail, so the pathway to human exposure is considered potentially complete.
 - Sampling results identified eight metals as COCs for which tailings concentrations pose unacceptable risks to human health and ecological receptors (arsenic, cadmium, copper, cobalt, lead, mercury, and vanadium). Figure 1 illustrates the location of the tailings samples at the Gray Eagle Site and Table 1 shows the concentrations for each COC in the three areas with tailings.
 - Risks to human health could occur via incidental ingestion or inhalation of particulates in air. For ecological receptors, risks could occur via direct contact with or incidental ingestion of tailings.
 - The proposed TCRA remediation goals (RGs) are based on a human health unrestricted use exposure scenario and literature-based ecological toxicity values, as illustrated in Table 2.
 - The proposed TCRA RGs for arsenic, cadmium and copper are based on upper threshold limit (UTL) values calculated from 28 background samples collected throughout JOTR. For these three metals, the lowest toxicity value exceeded background, necessitating selection of the background value for cleanup.
 - For cobalt and vanadium, the proposed TCRA RGs are based on human residential exposure. As shown on Table 2, ecological toxicity values for cobalt and vanadium are higher.
 - The TCRA RGs for lead, mercury and selenium are based on exposure to a deer mouse. The deer mouse has a small home range (<1 acre), could experience full-time exposure, and is a reasonable ecological representative that would likely ensure protection of other terrestrial species.
 - The mill tailings are located on the northwestern and southeastern banks of the drainage. The concern is that hazardous mill tailings are moving into the downstream wash, further spreading the contamination and increasing the potential for exposure to both human and ecological receptors.

- *Actual or potential contamination of sensitive ecosystems.*
 - NPS considers natural resources within units of the National Park System to be sensitive ecosystems for purposes of determining the appropriateness of a removal action. See, e.g., National Park Service Organic Act, 54 U.S.C. § 100101 (National Park System units have superb environmental quality and shall be managed "to conserve the scenery, natural and historic objects, and the wild life . . . by such means as will leave them unimpaired for the enjoyment of future generations.").
 - Particularly sensitive ecosystems within the Park include the habitat of the Joshua tree and also that of the desert tortoise (*Gopherus agassizii*).
 - Springs such as Cottonwood Springs are considered particularly sensitive in a desert environment because these limited sources of water attract and support many types of plant and animal species.
- *High levels of hazardous substances in tailings at or near the surface that may migrate.*
 - Hazardous substances are largely concentrated in the toxic mill tailings. Tailings sample results indicate that concentrations of hazardous substances at the Site present significant and unacceptable risks to human health and other ecological receptors (Tables 1 and 2).
 - It is visually apparent that these materials have been migrating and are likely to continue to migrate. This is because the mill tailings are located on an eroding bank on the western side of an alluvial wash, surrounded by quartzitic monzogranite rock outcrops that funnel seasonal precipitation from the tailings to the drainage.
 - A popular hiking trail crosses through the Site, less than 50 ft upstream of the remaining tailings, and one can visually observe that the tailings are being transported via storm events closer to the trail and downgradient wash.
- *Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.*
 - Short, intense rainfall during the monsoon season is known to cause sudden and powerful flash flooding events at the Site. One can visually observe that these events periodically accelerate erosion of the mill tailings pile and contaminated soil in the path of the storm water. In the last decade, the area has experienced these flash flooding events in greater frequency. NPS has become increasingly concerned that action be taken as soon as possible to stop the migration of tailings before they get closer to the trail and downgradient wash.
- *The availability of other appropriate federal or state response mechanisms to respond to the release; and*
 - NPS CERCLA removal action authority is the sole mechanism currently available to respond to the release of hazardous substances at this Site.

Hazardous substances released at this Site already pose unacceptable risks to human health and the environment. NPS has sound justification for initiating this TCRA to address the Site contamination before the associated risks and response costs further increase as a result of contaminant migration.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

5.1 Description of Proposed Action

The TCRA will entail on-Site excavation of mill tailings and confirmation sampling that extends into surrounding soils to ensure a complete cleanup. Contaminated waste material would be packaged on-Site into bulk bags, transported off the Site by covered truck, and disposed in an appropriate, licensed, and off-Site disposal facility. Soil sampling will follow initial excavation to confirm that RGs are achieved, and excavation will continue until RG achievement is confirmed. The areas identified for excavation were delineated based on the tailings sampling results and visual observations, corresponding with the areas identified by both Tetra Tech and ECM. No Site sampling has occurred for 5 years and it appears the tailings have migrated since then, so confirmatory sampling will be critical to assuring that all contaminated material above risk levels is removed and disposed. We do not anticipate that more than 3 cubic yards of material will require removal.

All actions associated with this project, including management and disposal of removed material, will be conducted in accordance with all applicable federal, state, and local laws, regulations, and other requirements.

Following TCRA approval, detailed work plans will be prepared. On-site work is anticipated to begin in May 2019 and is estimated to take approximately two weeks. Replanting of native species, if needed, will occur in the fall of 2019.

The Site cannot accommodate mechanized equipment of any kind, so removal of mill tailings and other contaminated material will require hand tools and only light, wheeled equipment (i.e., wheel barrows) when necessary. This is due to the limited access to the Site via trail, restricted to foot traffic, as well as its nature as a culturally sensitive archeological site.

Work will be conducted in accordance with an NPS-approved Health and Safety Plan⁷ utilizing project-specific health and safety protocols for working with hazardous substances and for working in the environment of the Park (i.e. heat stress). A small increase in short-term risk to human health may be encountered during the excavation and transport phase of this work, however, these risks are short term and should not significantly impact human health. Additionally, fugitive dust will be controlled as necessary to mitigate any short-term air quality impacts to the immediate vicinity during removal of debris and contaminated soils. The Park will work with HAZWOPER-certified contractors to safely remove toxic mill tailings from the Site.

Excavation will be completed outside the season of heavy rains (July through September) to minimize the migration of disturbed, contaminated surface soils and prevent exposure to contractors working on the remediation.

⁷ This plan will be developed in concert with the Park's Safety Officer, Chuck Heard, to adhere to NPS safety standards and best practices.

5.2 Contribution to Remedial Performance

In evaluating the appropriateness of a removal action, the NPS must consider whether the removal action would contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned [NCP § 300.41 5(d)], as well as the availability of other appropriate federal or state response mechanisms to respond to the release of hazardous substances, [NCP § 300.415(b)(2)(vii)].

This removal action will entail excavation and off-site disposal of mill tailings and associated contaminated soils exceeding RGs at the Site, thereby significantly mitigating, if not eliminating, the source of the contamination and removing the material responsible for causing unacceptable risks to human health and the environment. This TCRA should obviate the need for any future response actions at the Site.

There are no other available federal or state response mechanisms to respond to the release of hazardous substances at this Site.

5.3 Applicable or Relevant and Appropriate Requirements (ARARs)

In the context of a TCRA, off-Site activities are subject to all applicable federal, state, and local laws and regulations, and all on-site project activities must attain the substantive provisions of “applicable or relevant and appropriate requirements” (ARARs) under federal and state environmental laws and facility siting laws that NPS determines to be practicable considering the exigencies of the situation (CERCLA Section 121(d); NCP Section 300.415(j)). In order to determine whether a particular ARAR is practicable under the exigencies of the situation, NPS has considered the scope of the response action to be conducted, the urgency of the situation, and other appropriate factors (40 C.F.R. § 300.415(j)).

NPS has determined that under the exigencies presented at this Site, it is practicable for NPS to achieve the substantive provisions of the following federal and state ARARs for this removal action. Additional federal and state ARARs may be identified and added to project requirements.

1. The NPS Organic Act of 1916 (codified at 54 U.S.C. § 100101) requires NPS management of units of the National Park System for public enjoyment so as to leave the natural resources “unimpaired” for future generations. *See* the NPS implementing regulations (36 CFR Parts 1-79), and in particular, *see* 36 CFR Part 2 regarding preservation of natural, cultural, and archeological resources. For example: the NPS 36 CFR § 2.1(a) prohibits “(1) Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state: (i) . . . wildlife or fish. . . (ii) Plants or the parts or products thereof. . . [or] (2) Introducing . . . plants . . . into a park area ecosystem.” Section 2.2(a)(2) prohibits “feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities.” Section 2.14(a) prohibits “(1) Disposing of refuse in other than refuse receptacles . . . (6) Polluting or contaminating

park area waters or water courses.” 36 CFR Section 5.13 prohibits the creation or maintenance of a nuisance upon lands within a park area.

2. The NPS-specific restrictions on solid waste disposal sites in National Parks codified at 36 CFR Part 6. The federal statute 16 USC 460l-22(c) prohibits operation of any new solid waste disposal site, except for sites used only for disposal of wastes generated within the park unit, and only so long as such site will not degrade any natural or cultural resources of the park unit. The NPS regulations implementing this statute are codified at 36 CFR Part 6. In short, contaminated debris, soil, rock, organic matter, and waste generated (or displaced) at the Site during on-Site project work must be collected and properly disposed outside the Park. Non-contaminated debris and waste generated (or displaced) during on-Site project work must be collected and properly disposed outside the Park. Non-contaminated soil, rock, and organic matter displaced during the project cannot be disposed or discarded in the Park; this material, however, may be put to beneficial use in the Park, at the Park's discretion, but otherwise may not remain within the Park.
3. Resource Conservation and Recovery Act and implementing regulations (42 U.S.C. §§ 7401-7642; 40 CFR §§ 264 and 265) regards all aspects of waste management, including transportation, storage, and disposal. Many are applicable or relevant and appropriate at the Site. For example 40 CFR 264.554 regulates use of staging piles at remediation site.
4. CERCLA Section 121(d)(3) (“off-site rule”) requires that hazardous substances, pollutants, and contaminants transferred off-site as a result of CERCLA response activities must be managed at a facility operating in compliance with federal and state laws. The NCP’s “off-site rule” implementing regulations (40 CFR § 300.440) define facility acceptability and create procedures for obtaining and reviewing acceptability determinations.
5. The Clean Water Act, 33 USC §1342 and its implementing regulations at 40 CFR § 122 and 125 regulate standards for discharge of pollutants from any point source into waters of the US as well as the discharge of stormwater from construction sites. See also 33 USC §§1251-1387 and implementing regulations at 40 CFR §§ 440.40-440.45, and Part 131.
6. The Endangered Species Act, 16. U.S.C. §§ 1531-1544 and its implementing regulations at 50 CFR Part 402 regulate the protection of threatened and endangered species.
7. Requirement to avoid, minimize, or mitigate impacts to historic sites or structures, National Historic Preservation Act (16 U.S.C. § 470f; 36 CFR Parts 60, 63, and 800), the Archeological Resources Protection Act (43 CFR Part 7), the American Indian Religious Freedom Act (42 U.S.C. § 1996), the Native American Graves Protection and Repatriation Act (43 CFR Part 10), and Executive Order 13007.

8. The Clean Air Act, 42 USC §§ 7409 and 7410 and implementing regulations at 40 CFR Parts 50 and 60 include air quality standards, including standards for particulates and fugitive dust emissions.
9. NPS requirements for reclamation of mine sites in national parks. 36 CFR § 9.11. While these regulations generally apply only to mine operators and not NPS, some of these provisions may be relevant and appropriate to guide response actions at former mine sites in park units.
10. The National Historic Preservation Act of 1966, *as amended*, 16 USC §§ 470, 470-1, 470a and its implementing regulations at 36 CFR Parts 63 and 800 establish requirements for the identification and preservation of historic and cultural resources. Also, Executive Order No. 11593 (1971); the Historic Sites, Buildings, and Antiquities Act of 1935, *as amended*, 16 USC §§ 461 and 462, and its implementing regulations at 36 CFR Part 65; the Archeological and Historic Preservation Act of 1974, *as amended*, 16 USC § 469 *et seq.* and 40 CFR § 6.301; and the Archeological Resources Protection Act of 1979, *as amended*, 16 USC §§ 470aa, 470cc, 470ee and implementing regulations at 36 CFR §§ 296.4, 296.5, 296.7, 296.18, 296.21 and 43 CFR §§ 7.4, 7.5, 7.7, 7.18, 7.21, and 7.35.
11. The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), 25 USC § 3001 *et seq.*, and its implementing regulations at 43 CFR §§ 10.3, 10.4, 10.5, and 10.6 regulates the disposition of Native American remains and cultural items encountered on federal or tribal lands for greater protection of Native American burial sites and cultural items encountered. Also, the American Indian Religious Freedom Act of 1978, *as amended*, 42 USC § 1996; and Indian Sacred Sites, Executive Order No. 13007, 61 Federal Register 26771.
12. Endangered Species Act of 1973, *as amended*, 16 USC § 1531 *et seq.*, particularly §§ 1536 and 1538, and its implementing regulations at 50 CFR §§ 17.21, 17.31-17.47, 17.61, 17.71, 17.94-17.96, and 402.10-402.16, establishing requirements for the protection of federally designated threatened or endangered species and their habitats, including consultation with the US Fish and Wildlife Service. See the Fish and Wildlife Coordination Act, *as amended*, 16 USC §§ 661, *et seq.*, and implementing regulation at 40 CFR § 6.302.

Additionally, the following are other factors “to be considered” (TBCs) that provide useful standards or policy direction for this response action.

1. Section 4.1.5 of the *2006 NPS Management Policies* provides: “The Service will reestablish natural functions and processes in parks unless otherwise directed by Congress Impacts on natural systems resulting from human disturbances include the introduction of exotic species; the contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the

best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of the landscape and biological community structure and function.” See also Section 4.4.1 for policies for managing wildlife and plant resources and Section 4.4.2.3 regarding policies for managing species of special concern.

2. Section 4.8.2.4 of the *2006 NPS Management Policies* allows importation of off-site soil or soil amendments to restore damaged sites. It provides that “off-site soil normally will be salvaged soil, not soil removed from pristine sites, unless the use of pristine site soil can be achieved without causing any overall ecosystem impairment. Before using any off-site materials, parks must develop a prescription and select the materials that will be needed to restore the physical, chemical, and biological characteristics of original native soils without introducing exotic species.”
3. Section 9.1.3.2 of the *2006 NPS Management Policies* requires that, to the maximum extent possible, plantings selected for revegetation will consist of species that are native to the park, and that low water use practices should be employed. This provision also addresses use of fertilizers and other soil amendments.
4. Section 5f of the *2006 NPS Management Policies* addresses management processes concerning cultural resources to ensure that they “integrate information about cultural resources and provide for consultation and collaboration with outside entities.”
5. NPS Reference Manual (RM) #77 offers comprehensive guidance to NPS employees responsible for managing, conserving, and protecting the natural resources found in park units. It addresses management of natural resources (including air; disturbed land; endangered, threatened and rare species; geologic resources; vegetation; etc.), resource uses, and planning (e.g., emergency management, and environmental compliance).
6. Director’s Order #28 and *NPS-28: Cultural Resource Management Guideline* address park cultural resource management programs, compliance with Section 106 of the National Historic Preservation Act, and issues related to archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources.
7. The 1995 Joshua Tree National Park General Management Plan (GMP) articulation of Park management objectives should be considered.⁸

⁸ GMP, page 8: “Based on the enabling and wilderness legislation, the legislation of October 1994, and biosphere reserve status, the purposes of Joshua Tree National Park are to: protect and interpret areas, sites, structures, and various artifacts associated with occupations by prehistoric, historic, and contemporary Native American groups, historic miners, and subsistence cattle ranchers; protect and interpret the biologically diverse examples of the Mojave and Colorado desert ecosystems; serve as a natural laboratory for understanding and managing the Mojave and Colorado desert ecosystems; preserve the character and values of wilderness in the park; provide visitors with opportunities to experience and enjoy natural and cultural resources through compatible recreational activities. In summary, the purpose of Joshua Tree National Park

5.4 Project Schedule

Upon approval of this TCRA, NPS promptly will retain a project contractor and prepare project plans. It is anticipated that on-site work will begin no later than May 2019, preferably April 2019, and be completed within two (2) weeks.

5.5 Estimated Costs

This TCRA is a relatively straightforward excavate, bag, transport, and dispose project. The EE/CA estimated costs of \$130,300 in 2013 [EE/CA p. 118], so even with inflation it is anticipated to cost well under \$250,000.

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

If the proposed TCRA removal action is delayed or not taken, the toxic mill tailings at the Site will be further exposed and transported in the direction of the downstream wash and heavily used public trail, increasing health risks to Park visitors and ecological receptors. Moreover, the contamination released into the environment from the tailings will further migrate from their source, increasing public health risks to visitors and ecological receptors and increasing the scope and cost of a future response action. The Park may need to consider re-routing the popular and heavily used Cottonwood Spring Trail, which currently crosses through the Site and is in the immediate vicinity of the hazardous substances.

7.0 OUTSTANDING POLICY ISSUES

No outstanding policy issues exist for this removal action.

8.0 ENFORCEMENT

The milling activities responsible for the toxic mill tailings ended nearly a century ago. A search was conducted, but no potentially responsible parties have been located.

is to preserve unimpaired the natural and cultural resources of the Mojave and Colorado Deserts so that they can be interpreted, understood, and enjoyed by present and future generations.”

9.0 REFERENCES

IT Corporation, Inc. (IT), 2001. “*Preliminary Assessments for the National Park Service,*” Joshua Tree National Park, October.

Tetra Tech EM Inc.(Tetra Tech), 2003. “*Park-Wide Inspection of Inactive Historical Mills at Joshua Tree National Park,*” Riverside and San Bernardino Counties, California. Prepared for U.S. Department of the Army, U.S. Army Corps of Engineers, May.

Environmental Cost Management, Inc. (ECM), 2013. “*Draft Engineering Evaluation/Cost Analysis Report, Joshua Tree National Park, 14 Inactive Mill Sites,*” Riverside and San Bernardino Counties, California. Prepared for U.S. Department of the Interior, National Park Service, February.

10.0 RECOMMENDATION

On the basis of the evaluations conducted and the factors outlined in the NCP, NPS has determined that the release and ongoing threat of future releases of hazardous substances at the Site pose a risk to human health and the environment and that a TCRA is necessary and appropriate to abate and contain the release and mitigate the ongoing migration of hazardous substances off-site and the associated risks to public health, welfare, and the environment.

NPS previously anticipated a non-time critical removal action at the Site to address the toxic mill tailings releasing hazardous substances, including arsenic, cadmium, copper, lead, mercury, and vanadium. NPS has now determined that a TCRA is appropriate because Site conditions have deteriorated, making the response time sensitive. High-intensity flash floods in the Site have resulted in ongoing, exacerbated erosion and active transport of these toxic mill tailings towards the downstream wash. NPS has determined the need to take prompt action that begins on-Site within six (6) months of the NPS decision to proceed with the action.

11.0 AUTHORIZATION

This decision document represents the selected removal action for the Gray Eagle Mill Site at Cottonwood Spring, located within Joshua Tree National Park. This TCRA decision document was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP.

Because conditions at the Site meet all applicable CERCLA and NCP criteria for undertaking a time-critical removal action, I recommend/concur/approve that NPS implement the TCRA as proposed herein.

Recommended: ____ [signed on file] _____ Date: _____
Francis M. McCormick
Archeologist
Joshua Tree National Park

Concurred: ____ [signed on file] _____ Date: _____
David Smith
Superintendent
Joshua Tree National Park

Concurred: ____ [signed on file] _____ Date: _____
Stephen J. Mitchell, PE
Operations/Environmental Programs Branch Chief
National Park Service, Pacific West Region

Approved: ____ [signed on file] _____ Date: _____
Stanley J. Austin
Regional Director
National Park Service, Pacific West Region