ARCADIS Design & Consultancy for natural and built assets

BNSF Railway Company

REMOVAL WORK PLAN

Haystack Mines Site
Baca/Prewitt Chapter, Navajo Nation
McKinley County, New Mexico

July 27, 2017

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APPENDICES

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ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
AOC	Administrative Settlement Agreement and Order on Consent for Removal Action
ARAR	Applicable or Relevant and Appropriate Requirement
Arcadis	Arcadis U.S., Inc
AUM	abandoned uranium mine
bgs	below ground surface
BIA	Bureau of Indian Affairs
BNSF	BNSF Railway Company
CFR	Code of Federal Regulations
cpm	counts per minute
CRS	cultural resources survey
DCRM	Dinétahdóó Cultural Resources Management
GPS	global positioning system
GRWP	General Radiation Work Permit
HASP	Site-Specific Health and Safety Plan
HEPA	high-efficiency particulate air
NNEPA	Navajo Nation Environmental Protection Agency
NPEA	Navajo Preference in Employment Act
QA	quality assurance
QC	quality control
RSO	Radiation Safety Officer
Site	Haystack Mines Site, located in the Baca/Prewitt Chapter of the Navajo Nation, McKinley County, New Mexico
SOP	standard operating procedure
SRWP	Specific Radiation Work Permit
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traffic Control Plan
TCRA	Time Critical Removal Action
U.S.NRC	United States Nuclear Regulatory Commission
USEPA	United States Environmental Protection Agency

Weston	Weston Solutions, Inc.
Work Plan	Removal Work Plan
°F	degrees Fahrenheit
µrem	microrem
µrem/hr	microrem per hour

1 INTRODUCTION

On behalf of BNSF Railway Company (BNSF), Arcadis U.S., Inc. (Arcadis) prepared this Removal Work Plan (Work Plan) for the Haystack Mines Site, located in the Baca/Prewitt Chapter of the Navajo Nation, McKinley County, New Mexico (Site). This Work Plan will be implemented pursuant to the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC; Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 09-2017-02 and Docket No. 06-02-17) executed between the United States Environmental Protection Agency (USEPA) and BNSF (Appendix A). This Work Plan was prepared in accordance with the provisions of the interim Time Critical Removal Action (TCRA) AOC, and submittals required by this Work Plan are subject to USEPA review and approval as provided in the AOC (Appendix A).

The intent of this Work Plan is to gain approval on the overall TCRA approach and methodologies. It is assumed that additional coordination between BNSF and the agencies, as well as preconstruction surveys (Section 4.1), will be required before actual implementation and changes to this Work Plan (i.e., a revised Removal Work Plan submittal) or an addendum will be required.

1.1 Site Description

The Site is located approximately 5 miles east of Prewitt, New Mexico, in and immediately outside of the southeast portion of the Navajo Nation (Figure 1), within a rural area of northwestern New Mexico. The Site is atop the Haystack Butte, approximately 500 feet south of the Haystack Mountain and next to County Road 41 (Figure 2). The Site consists of three adjacent abandoned uranium mines (AUMs), including Haystack No. 1 AUM, Bibo Trespass AUM, and Section 24 AUM:

- *Haystack No. 1 AUM*. This AUM is situated primarily on privately owned land (Section 19), with a smaller northern portion on Indian Allotment land (Section 18). The geographic coordinates for the approximate center of Haystack No. 1 are 35.345713° N latitude and 107.943650° W longitude, and encompasses approximately 69 acres.
- *Bibo Trespass AUM*. This AUM is located on land (Section 13) administered by the Bureau of Indian Affairs (BIA). The geographic coordinates for the approximate center of the Bibo Trespass AUM are 35.349522° N latitude and 107.94863° W longitude, and encompasses approximately 22 acres.
- *Section 24 AUM*. This AUM is located on Indian Allotment land (Section 24). The geographic coordinates for the approximate center of the Section 24 AUM are 35.346544° N latitude and 107.947928° W longitude, and encompasses approximately 27 acres.

Six distinct areas are the focus of the TCRA removal actions required by the AOC (Appendix A) and this Work Plan (Figure 3). The TCRA areas are located in Sections 13, 18, and 19. One residence (with two primary structures) is located within the boundaries of a TCRA area and approximately 10 residences and a church are located within ½ mile of the overall site area.

1.2 History

Mining-related activities occurred from approximately 1952 to 1981, under various persons and entities, and more than 400,000 tons of uranium ore were extracted. The Site was reclaimed in the early 1990s through a combination of USEPA, U.S. Department of Energy, and private party coordination. Upon completion of reclamation, the USEPA deemed the area protective of public health (Appendix A). Specific AUM details include:

- Mine operations occurred on Haystack No. 1 AUM and included numerous surface pits. The pits were reclaimed in 1991 and are no longer present.
- Mine operations at Bibo Trespass AUM (22 acres) included at least one surface pit, which was reclaimed in 1992 and is no longer present.
- Mining operations in Section 24 AUM (27 acres) included at least three pits, which were reclaimed in 1991 and are no longer present.

In October 2007, the Navajo Nation and multiple federal agencies initiated a Five-Year Plan (USEPA 2017a) regarding uranium contamination on the Navajo Nation properties, and a directive was issued to have federal agencies collaborate with the Navajo Nation to address the issue. Both the USEPA and the Navajo Nation Environmental Protection Agency (NNEPA) were selected to lead the effort. In 2014, the USEPA initiated a second Five-Year Plan (USEPA 2017a) to build on the previous investigation efforts and to focus on the AUMs posing the most potential risk.

Site-specific investigations include a Site Screening Report completed for each of the three AUMs in 2009 by Weston Solutions, Inc. (Weston): Haystack No. 1 AUM Site Navajo AUM Eastern Region (Weston 2009a), Bibo Trespass AUM Site Navajo AUM Eastern Region (Weston 2009b), and Nan-a-bah Vandever AUM Site Navajo AUM Eastern Region (Weston 2009c). Subsequently, a Removal Assessment Report (Weston 2015) was completed for the Site in 2014.

1.3 Physical Setting and Geology

The Site is located in the southeastern part of the Colorado Plateau Physiographic Province. The plateau is characterized by large regions of folding with broad uplifts and intervening basins. The Site is located at the juncture of several of these major structures: San Juan Basin, Zuni Uplift, and Defiance Uplift. Mineralized uranium deposits were found within discrete portions of the Todilto limestone, which locally overlies the Entrada Sandstone. The Todilto Limestone acts as the caprock defining Haystack Butte, and underlies the Summerville Sandstone exposed in cliffs north of the site along Haystack Mountain.

The native soil within the area of the Site is formed from erosion of Todilto limestone and Entrada and Summerville sandstones, and generally consists of well-drained silty sands and inorganic silts and clays, characteristic of a semiarid pinyon-juniper region. The Site lies within the Rio Grande Basin, east of the local continental divide between Prewitt and Gallup.

Wind speeds over the Site are usually moderate except in exposed areas by cliffs, although relatively strong winds often accompany occasional frontal activity during late winter and spring, and during the late summer monsoon. Based on Grants historical climate data, average temperatures reach as high as 91 degrees Fahrenheit (°F) in summer and as low as 15°F in winter (U.S. Climate Data 2017). Grants

receives an average of 0.5 inch of precipitation in February and 1.8 inches in August, with a total annual average precipitation of 10.5 inches. Potential evaporation in New Mexico near the Site is greater than average precipitation.

1.4 Time Critical Removal Action Objectives

This Work Plan addresses the work to be performed under the AOC (Appendix A). The TCRA objectives include removal of surface material to the shallower of: the maximum depth for each area, which is provided below; the top of the bedrock or refusal; or the depth at which a surface survey yields a gamma count of less than 75,000 counts per minute (cpm). At BNSF's discretion, backfill or cover may be used in lieu of additional excavation to ensure that the surface survey yields a gamma count of less than 75,000 cpm. Restoration of the TCRA areas will be performed per Section 5.6, as needed. Waste rock, soil, and other material removed from the TCRA areas will be placed in a consolidated waste pile(s) as described in Section 5.7. This consolidated waste pile(s) is planned for Haystack No. 1 AUM, within Section 19.

The current TCRA areas are shown on Figure 3. Descriptions and objectives for each are summarized below:

1. *Northeast access road*. Residential access road with eroded surface drainage channels (Figure 4). Work in this area requires removal of surficial soil piles, to a maximum depth of 1 foot below ground surface (bgs), located along the southern fence line of the entrance road leading from Red Mountain Road (County Road 41) to the residences on Haystack Butte.
2. *Northeast drainage*. Drainage running along the northeast access road (Figure 4). Work in this area requires removal of surficial ore-bearing material, to a maximum depth of 1 foot bgs, along an approximately 100-foot section of drainage north of the northeast access road to its end point at County Road 41.
3. *Residential area*. This area consists of two trailers and other structures housing up to eight residents and parts of the surrounding field (Figure 5). Work in this area requires removal of surficial ore-bearing material, to a maximum depth of 2 feet bgs, in the area surrounding the residence located near the southwest corner of Section 18, and the one-acre area surrounding the residence.
4. *Western Drainage 2/road*. This area consists of an unimproved road (Figure 6). Work will consist of removal of surficial ore-bearing material along approximately 100 feet of road to a maximum depth of 2 feet bgs.
5. *Western Drainage 1*. This area is immediately above the cliffs forming the western edge of Haystack Butte (Figure 7). Work in this area requires removal of surficial ore-bearing material to a maximum depth of 1 foot bgs and optional construction of storm water erosion controls, at the discretion of BNSF. For project safety considerations, the scope of TCRA activities in this area are limited to removal of waste rock at and or near the head of the drainage as accessed from the top of the cliff area.
6. *East stockpile*. This is a former stockpiling area (approximately 50 by 50 feet) for mine materials and is the one TCRA area below Haystack Butte (Figure 8). This area has not been previously investigated and work in this area will include a surface gamma scan comparable to that performed

during the 2014 removal assessment (Weston 2015). If required, removal of surficial ore-bearing material will be excavated to a maximum depth of 2 feet bgs.

1.5 Optional Restoration Tasks within Section 19

In addition to the required TCRA scope outlined above, various test pits located in the southern portion of Section 19 may be backfilled during the same time period that the TCRA activities are performed. The previously excavated material, typically located next to each test pit depression, will be used to backfill the depression if a surface gamma survey of the soil yields a gamma count of less than 75,000 cpm or is comparable to native material immediately adjacent to the test pit. If the previously excavated soil does not meet these criteria it will be placed in the consolidated waste pile and the test pit depression will be backfilled with clean imported backfill.

1.6 Work Plan Organization

The remainder of this Work Plan is organized into the following sections:

- *Section 2 – Project and Construction Team Management*. Describes the site stakeholders, roles and responsibilities, and project control/logistic considerations.
- *Section 3 – Project Execution*. Describes the various overarching assumptions and requirements for the TCRA. These include performance requirements, assumptions, constraints and dependencies, licenses, permits and statutory approvals, Applicable or Relevant and Appropriate Requirements (ARARs), and site access.
- *Section 4 – Time Critical Removal Action and Optional Restoration Approach*. Overview of the proposed TCRA and optional restoration approach including preconstruction surveys, removal methodologies, confirmation gamma scanning, restoration, and consolidation waste pile construction.
- *Section 5 – Time Critical Removal Action and Optional Restoration Methodologies*. Describes the specific TCRA construction and optional restoration methodologies that will be implemented.
- *Section 6 – Schedule*. Outlines the scheduling requirement and next steps for the TCRA and optional restoration tasks.
- *Section 7 – References*. Lists the references cited in this Work Plan.

2 PROJECT AND CONSTRUCTION TEAM MANAGEMENT

This section describes the site stakeholders, roles and responsibilities, and project control/logistic considerations.

2.1 Project Team

2.1.1 BNSF Railway Company

The Project Manager for BNSF, Mr. Mike Makerov, will be responsible for overall program execution and quality. Mr. Makerov will have overall responsibility for execution of activities associated with this Work Plan. He will take the lead on all agency communications for BNSF and will be responsible for the activities of Arcadis and other contractors. Mr. Doug McReynolds is also a Project Manager for BNSF and will serve as an alternate Project Manager to Mr. Makerov.

2.1.2 Arcadis U.S., Inc.

The Arcadis Project Manager, Dr. Maher Zein, PhD, PE, will be responsible for the overall coordination of activities covered under this Work Plan. He will be assisted by Mr. Drew Werth, a Project Engineer, who will serve as acting manager in charge of the TCRA. Mr. Matt Wetzel, a Construction Principal, will provide senior review of construction planning and activities. Mr. Ryan Mattson, PE, a Principal Engineer will coordinate civil designs, as-builts, and other construction activities. Ms. Allison Wilding, CHP, a Principal Certified Health Physicist, will provide senior review on radiological matters with assistance or review as needed by Dr. Les Skoski, PhD, RSO (a Senior Health Physicist and corporate RSO). Mr. Jesse Kass, a Project Geologist/Health Physicist, will have overall responsibility for radiological and geological assessment on site and serve as the site Radiation Safety Officer (RSO).

2.1.3 Regulatory Oversight

Per the executed AOC (Appendix A), the USEPA Region 9 Remedial Project Manager and On-Scene Coordinator is Mr. Steve Calanog; Warren Zehner of the Emergency Management Branch, Region 6, is the alternate On-Scene Coordinator. Per the AOC and recent USEPA correspondence (USEPA 2017b), BNSF will submit deliverables to the following recipients:

- Steve Calanog (USEPA)
- Warren Zehner (USEPA)
- Dr. Donald Benn (NNEPA)
- Vivian Craig (NNEPA)
- Jeff Lewellin (New Mexico Environment Department)
- D.J. Ennis (New Mexico Minerals and Mining Division)

2.2 Construction Team Management

2.2.1 Workforce

BNSF will lead the TCRA work activities and Arcadis will be BNSF's lead contractor for managing the construction and radiological activities. A field oversight manager will be assigned by Arcadis to coordinate daily work directly under Arcadis Project Managers. Arcadis will also be responsible for field verification scanning. A lead field radiation specialist (the site RSO or designee) will be responsible for coordinating a group of radiation technicians on a daily basis and will report to the Arcadis RSO.

Soil removal and construction will be performed by Arcadis and/or a Remedial Contractor. A Construction Supervisor will be assigned by the Remedial Contractor to lead daily construction operations.

2.2.2 Health, Safety, and Security Management

The Site-Specific Health and Safety Plan (HASP) was submitted on June 14, 2017 (Arcadis 2017). The HASP covers emergency response procedures for the project, identifies key health and safety personnel, describes required training, and serves as the main tool for site-specific hazard communication. The HASP is considered a fluid document and will be revised, as needed, to address potential future additional hazards and considerations.

As part of the qualification process, any Remedial Contractor(s) will provide evidence of a health and safety program that considers the normal hazards involved with excavation/backfilling and transporting environmentally impacted soil; these programs must be consistent with BNSF health and safety requirements. In addition, the Remedial Contractor must be familiar with the site conditions.

2.3 Project Controls and Logistics

The Project Managers for the Engineer and Remedial Contractor are responsible for the project logistics. For logistical arrangements that directly affect the local residents, these arrangements will be defined in consultation with USEPA and NNEPA representatives and, if required, a local representative of the residents.

At this time, it is assumed:

- Contractors and site personnel will be lodged in Grants or Gallup, New Mexico.
- The Arcadis Project Managers (or designees) for the Engineer and Remedial Contractor(s) will be present in the field throughout the project execution.
- A staging area will be required where contractors can place vehicles and materials during field activities. The location will be determined after consultation with the USEPA, the NNEPA and local community members, as needed.

2.3.1 Contracts

BNSF has contracted with Arcadis for construction design and oversight, and radiological and erosion management practices. Arcadis will provide engineering construction oversight during the soil removal

and construction of the consolidation waste pile(s). Arcadis and/or a Remedial Contractor will perform earthwork, including soil excavation and construction of consolidation waste pile(s).

2.3.2 Stakeholder Consultation and Management

The USEPA will be the lead authority for stakeholder interactions and will work in consultation with the NNEPA and local allottees and landowners who are potentially directly affected by the activities described in this Work Plan. Per the AOC (Appendix A) and if requested by USEPA, BNSF will participate in community involvement activities pursuant to this Work Plan.

3 PROJECT EXECUTION

This section describes the various overarching assumptions and requirements for the TCRA. These include performance requirements, assumptions, constraints and dependencies, licenses, permits and statutory approvals, ARARs, and site access.

3.1 Performance Requirements

In each of the TCRA areas (per the AOC, bounded in yellow on Figure 3), BNSF will excavate material to meet the TCRA objectives detailed in Section 1.4. Post-removal gamma survey readings will be measured using a Ludlum 2241 ratemeter with a 3-inch x 3-inch probe. Excavated material will be stored in a consolidated waste pile(s) anticipated to be located within Section 19.

3.2 Assumptions

The following assumptions apply to the TCRA:

- The USEPA and the NNEPA will provide support in obtaining access to achieve the goals of the AOC (Appendix A).
- Unless directed by the USEPA, no removal activities will commence without access from the appropriate stakeholders.
- Within the TCRA boundaries, a preconstruction gamma scan survey will be used to help verify lateral extents of removal activities.
- Excavation work will be guided by field gamma scanning.
- A confirmation gamma scan of the excavated area will be performed. At least 10 static gamma count readings will be measured on a randomly selected grid system. Removal areas will be deemed acceptable when the TCRA objectives detailed in Section 1.4 are achieved.
- Excavated material is planned to be placed in a consolidated waste pile to be located in Section 19 on Haystack Butte, within the Haystack No. 1 AUM.

3.3 Constraints and Dependencies

A cultural resource survey (CRS) and biological survey of the Site is required, per the AOC (Appendix A). These surveys will identify potentially sensitive areas and/or threatened and endangered species which may alter construction, monitoring, or schedule requirements.

3.4 Licenses, Permits, and Statutory Approvals

Per the AOC (Appendix A), BNSF was informed by the USEPA that no licenses, permits, or statutory approvals are required to execute the work described in this Work Plan because this work is defined by the USEPA as a TCRA, with the potential exception noted in Section 5.8.

3.5 Applicable or Relevant and Appropriate Requirements

This section describes the potential ARARs identified for the removal action for an interim time-critical removal action in accordance with the AOC (Appendix A).

3.5.1 Regulatory Program

The removal action proposed at the Site is being conducted by a federal agency consistent with CERCLA.

3.5.2 Potentially Applicable Relevant and Appropriate Requirements

Removal actions must attain potential ARARs to the extent practicable, considering site-specific circumstances, including the urgency of the situation, the scope of the removal action, and impact of potential ARARs on cost and duration of the removal action (40 CFR 300.415(9)(j)).

No federal, state or local permits are required for remedial actions conducted entirely on site (CERCLA 121(e), 42 U.S.C. 9621(e) and 40 CFR 300.400(e)(1)). Onsite remedial actions must meet only the substantive requirements, not administrative requirements, of potential ARARs. Administrative requirements, such as permits, reports, and records, along with substantive requirements, apply only to hazardous substances sent off-site for further management. The substantive requirements identified as potential ARARs for the Site removal action were based upon an evaluation of federal environmental laws and more stringent state and Navajo Nation environmental and facility siting laws identified in a timely manner. Several terms used throughout this section are defined below:

- *Applicable Requirements*. Under the National Contingency Plan, applicable requirements are defined as, "those 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 circumstance found at a CERCLA site" [40 CFR 300.5].
- *Relevant and Appropriate Requirements*. Relevant and appropriate requirements are, "those 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, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site" [40 CFR 300.5].
- *State and Navajo Nation Standards*. State standards are ARARs if they are "promulgated, are identified by the state in a timely manner, and are more stringent than federal requirements." The term "promulgated" means that the standards are of general applicability and are legally enforceable [40 CFR 300.400(g)(4)].
- *ARAR Waiver Criteria*. ARARs may be waived under certain circumstances. The waiver criteria include the following:
  - The remedial action is being conducted as an interim measure;
  - Compliance with the ARAR would result in greater risk to health and the environment;

- Compliance with the ARAR is technically impractical;
- Equivalent standard of performance;
- Inconsistent application of state requirements; and
- Fund balancing (applicable to Superfund-funded sites only). (CERCLA 121(d)(4), 42 U.S.C. 9621(d)(4)).

No ARAR waivers are specifically identified or requested in this Work Plan at this time. The following sections provide summaries of potential chemical-specific, location-specific, and action-specific ARARs identified for this Work Plan.

3.5.3 Chemical-Specific ARARs

Chemical-specific ARARs are health-based or risk-based numerical values or methodologies, which when applied to site-specific conditions, result in establishment of numerical values. The ARAR values may identify an acceptable amount or concentration of a hazardous substance that may be found in or discharged to the environment. No potential chemical-specific ARARs for soil, groundwater, or surface water have been identified.

3.5.4 Location-Specific ARARs

Potential location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because the substances occur or activities are conducted in specified locations. These requirements may limit the type of potential remedial action that can be implemented or may impose additional constraints on remedial alternatives. Potential location-specific ARARs are identified and discussed in Table 1. These potential location-specific ARARs will continue to be evaluated and refined as the selected removal action is developed and finalized.

3.5.5 Action-Specific ARARs

Potential action-specific ARARs are usually technology- or activity-based requirements or restrictions on actions taken with respect to hazardous substance(s). These potential requirements are triggered by the remedial alternative and set performance, design or other standards that will be used to implement the proposed remedial action. Potential action-specific ARARs are presented and discussed in Table 2. These potential action-specific ARARs will continue to be evaluated and refined as the selected removal action is developed and finalized.

3.6 Access

Site access will be coordinated by BNSF and Arcadis with support from the USEPA and the NNEPA. The specific aspects of site access that must be confirmed in writing to the USEPA prior to beginning field execution activities include:

- Confirmation of safe physical access to all areas of the project.
- Identification of any outstanding issues or concerns of the local residents with respect to managing access to the Site.

Before Arcadis can perform work onsite, unless otherwise directed by the USEPA, access must be granted by each stakeholder for their respective land.

4 TIME CRITICAL REMOVAL ACTION AND OPTIONAL RESTORATION APPROACH

This section of the Work Plan outlines the conceptual phased-manner approach for implementing the TCRA related-activities and the optional restoration tasks. The specific phases include:

- Preconstruction surveys
- Removal activities
- Confirmation gamma scanning
- Restoration
- Consolidation waste pile construction.

This section further describes each of these phases. Additional details on construction-related considerations are provided in Section 5.

4.1 Preconstruction Assessments

Preconstruction surveys, including both desktop and on-site efforts, will be conducted prior to construction work. Based on the results of these surveys a Work Plan addendum (or revised Work Plan), documenting necessary changes and additional detail required for construction and excavation work, may be submitted for review and approval by the USEPA.

4.1.1 Cultural Resources Survey

A CRS of the Site was performed by Dinétahdóó Cultural Resources Management (DCRM). For the CRS, DCRM conducted a literature search, archeological inventory, and ethnographic interviews to identify potentially sensitive areas that may need protection during construction activities. As required under the AOC (Appendix A), the CRS report will be submitted under separate cover.

If significant cultural findings merit protection, the removal actions will be modified as needed.

4.1.2 Biological Survey

A biological evaluation has been requested and will be submitted under separate cover. A field survey will be conducted, if necessary. If species of concern are identified, the EPA, USFWS, and NNDFW will be consulted to resolve any potential impacts before on-site work begins.

4.1.3 Preconstruction Radiological and Geological Survey

A preconstruction radiological and geological survey will be completed before construction activities to assess the distribution of radiologically elevated material within the TCRA areas and the optional restoration areas. The radiological survey will include additional walkover gamma surveying to supplement the existing removal site evaluation data.

Additionally, static gamma measurements will be taken in each TCRA area. The radiological assessment will evaluate, where possible, the presence of Todilto limestone and surrounding soil within the TCRA areas.

4.2 Removal Methods

Arcadis anticipates using three primary removal methods to achieve the objectives of this TCRA and optional restoration tasks. From preliminary observations, the TCRA areas and potential test pits appear to vary in physical setting, distribution, and homogeneity of radiologically elevated material (e.g., isolated pieces of waste rock vs. volumes of homogenous elevated material). By using three potential removal methods instead of selecting one, Arcadis' objective is to minimize disturbance, waste handling, and restoration efforts while still meeting the TCRA objectives. The three primary removal methods anticipated for TCRA removal activities are manual, vacuum, and mechanical removal:

1. *Manual removal.* This method may be applicable for material that consists of discrete waste rock (not including soil matrix) that exhibits activity in excess of the removal objectives, and is either too large for vacuum removal or is not of sufficient content to warrant removal by mechanical or vacuum methods.
2. *Vacuum removal.* Vacuum removal may be applicable for material that consists of discrete waste rock and surficial soil that does not penetrate to depth, and of a size and quantity that does not warrant mechanical removal. Furthermore, this method will be appropriate for removal of material from within drip lines of trees that are intended to remain, avoid damage to root systems, as well as to remove material from remote areas that do not allow heavy equipment to access or from beneath structures.
3. *Mechanical removal.* This method will be applicable to areas requiring bulk removal of waste rock and/or affected soil, and to depths, material size, and quantities that exceed the capacity of manual and vacuum removal.

Gamma survey instrumentation (i.e., Ludlum 2241 ratemeter with a 3-inch x 3-inch probe) will help guide the removal process.

4.3 Confirmation Gamma Scanning

The gamma scanning methods detailed in this section will be used to confirm that each TCRA area meets the TCRA excavation and gamma confirmation objectives as put forth in the AOC (Appendix A).

4.3.1 Data Quality Objectives Process

Construction monitoring and initial verification of the TCRA will be conducted with gamma radiation measurements. Using the data quality objectives process (USEPA 2006), use of the gamma radiation measurement program for confirmation by static gamma measurements is summarized below:

- *State the problem.* Several drainages, roads, and stockpile areas at the Site have been affected by former mining-related activities.
- *Identify the goal of the study.* Verify that excavation of affected material is complete within the TCRA areas.

- *Identify information inputs*. Measure surface gamma radiation with follow-up confirmation by static gamma measurements within the TCRA areas.
- *Define the boundaries of the study*. Drainages, roads, stockpile areas, and residences limited to the spatial TCRA boundaries (shown in yellow on Figures 3 through 8).
- *Develop the decision rule*. A static gamma survey of the excavated areas will be performed using a Ludlum 2241 ratemeter with a 3-inch x 3-inch probe. Counts will be performed at a minimum of 10 randomized locations along a grid in the survey unit to meet the TCRA objectives detailed in Section 1.4.
- *Specify the tolerable limits on the decision errors*. Static gamma counts will be taken over a minute period to increase the precision gamma reading and will be acceptable in meeting the TCRA objectives.
- *Optimize the design for obtaining the data*. A final survey of the areas will be performed using a Ludlum 2241 ratemeter with a 3-inch x 3-inch probe, positioned 6 inches above the ground surface[1]. This will include 1-minute static gamma measurements at a minimum of 10 randomized locations along a grid[2] in the survey unit, using appropriate Multi-Agency Radiological Site Survey Investigation Manual procedures (USEPA 2000).

4.3.2 Quality Assurance

Radiological data collected for the purpose of implementing TCRA excavation and construction decisions will solely depend on surface gamma radiation measurements, as required by the AOC (Appendix A). Soil sampling or other laboratory analysis of radionuclides will not be used in the TCRA decision-making process.

The selected gamma radiation instrument is a 3-inch x 3-inch sodium iodide scintillator (Ludlum Model 44-20, or equivalent) with a scaler/ratemeter (Ludlum Model 2241), for use as count rate meters for confirmation gamma scans. Radiological instruments and equipment used will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations. All instruments used on-site will have been calibrated within the past year. Daily operational quality control (QC) checks will be performed for all radiological instruments before first use and at the end of each work day, with a mid-day check performed as necessary. Equipment that fails QC checks or becomes otherwise inoperable during the work will be repaired or removed from service and segregated to prevent inadvertent use. Such equipment will be properly tagged to indicate that it should not be used until the problem can be corrected. Equipment requiring repair or recalibration must be approved for use by the site RSO or designee before it is placed back into service. Equipment that cannot be repaired or recalibrated will be replaced. Potentially affected data acquired on such equipment will be identified and evaluated for usability and potential impact on data quality.

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[1] Site gamma data collected in 2014 was collected with all-terrain vehicles, each mounted with two Trimble® Geo XT global positioning system (GPS) units, two Ludlum Model 2241 ratemeters, and two detector Model 44-20 units with 3-inch x 3-inch sodium iodide gamma scintillators positioned six inches above the ground (Weston 2015).

[2] Predefined grids, with varying distances between nodes, will be created before the field mobilization. Depending on the final excavated area, an appropriately spaced grid will be selected so a minimum of 10 static counts will fall within the excavated area.

Radiological measurements and other data with an associated spatial position will be collected in conjunction with a GPS/global navigation satellite system unit. GPS readings from this equipment typically achieve submeter accuracy using real-time differential GPS correction, followed by office differential GPS post-processing for additional accuracy.

Arcadis will manage data pertinent to this project in a centralized database management system. Data (i.e., gamma readings) and other information (e.g., photos) collected during this field event will be provided to the USEPA in the Removal Completion Report.

For the purposes of streamlining review and approval of this Work Plan, the data collection and quality assurance approach outlined in this Section (4.3) and supplemented by additional information in this Work Plan and attached SOPs (Appendix B) were provided to be consistent with the AOC requirements for quality assurance, sampling and data analysis.

4.4 Consolidation Waste Pile

The consolidation waste pile is planned for Section 19. This area will be cleared of existing vegetation and prepared for construction. The conceptual soil consolidation area design will consist of a flat top and sides sloped at an approximate ratio of three-to-one (3H:1V). The consolidation waste pile will be surveyed and fenced (e.g., five-strand barbed wire fence), with signs posted on the fence. Additional information regarding the consolidation waste pile is included in Section 5.

5 TIME CRITICAL REMOVAL ACTION METHODOLOGIES

This Work Plan addresses activities related to the remedial activities associated with excavation and construction to be performed at the Site. This section explains the means and methods of how Arcadis intends to perform the work, and is organized by the assumed work sequence after the preconstruction surveys are complete (Section 4.1):

- Mobilization and site preparation
- Excavation methodologies
- Confirmation gamma scanning
- Restoration of the excavated areas, once gamma scanning is complete
- Construction of the consolidation waste pile(s)
- Dust, erosion, decontamination, and traffic control plans
- Monitoring and oversight
- Demobilization of equipment, personnel, and any excess materials from the Site.

5.1 Mobilization and Site Preparation

Prior to mobilization, Arcadis will confirm that project team members have required training and have completed site-specific safety orientation. Members of the project team will review, understand, and sign off on the HASP. As new project team members mobilize to the Site throughout the project, each person will undergo appropriate site-specific training and orientation.

5.1.1 Site Reconnaissance

Potentially concurrent with the pre-construction radiological and geological survey, Arcadis will perform a site reconnaissance to verify existing conditions, delineate work areas, and determine site access points and the location for temporary facilities.

5.1.2 Staging

Arcadis proposes to stage any office trailer(s), sanitary facilities, tool crib, and heavy construction equipment in the Haystack No. 1 AUM boundary, within Section 19 (this area is subject to change prior to field activities). Access will be restricted to the staging area and any construction areas during the removal activities. Visitors will be met by the on-site Construction Manager.

Generally, working hours will be Monday through Friday during daylight hours.

5.1.3 Resident Considerations

Prior to the potential relocation of residents, Arcadis will coordinate with the USEPA, the NNEPA, and the local residents. Additionally, and if required, animals such as horses and cattle will be relocated to secure areas outside of the excavation areas.

5.2 Site Preparation

Soil erosion and sedimentation controls will be installed prior to the start of major construction activities, such as excavation and stockpiling, clearing and grubbing, or any significant excavation within the limits of work.

Arcadis will contact a private utility locator to identify any buried utilities. The Remedial Contractor will contact the local one-call center prior to digging and will wait for complete clearance prior to breaking ground. Arcadis and the Remedial Contractor will make note of aboveground utilities during the pre-construction surveys.

5.3 Removal Activities

5.3.1 Removal Methods

As discussed in Section 4.2, Arcadis anticipates using three primary removal methods to minimize disturbance footprints, waste handling, and restoration efforts while still achieving the objectives of the TCRA. The three primary removal methods anticipated for TCRA removal activities are manual, vacuum, and mechanical removal:

- *Manual removal.* Select material will be removed by hand, shoveling, or other methods and placed directly into buckets, wheel barrows, or skidsteer buckets as appropriate for the volume of removal. This material will be placed into bulk lift sacks lined with 6-mil liners, or dump trucks, for transport to the waste staging area. Removal will proceed with guidance from, and in conjunction with screening; upon removal of sufficient material to achieve the gamma confirmation scanning criteria, the area will be fully scanned and sampled. Dust generation by these methods are expected to be minimal, but controls will be used during removal as described in Section 5.9.
- *Vacuum removal.* Vacuum removal will use high-efficiency particulate air (HEPA) filtered industrial vacuums such as Vecloaders™ or Guzzler-type air movers to remove material and convey directly into bulk lift sacks lined with 6-mil liners, vacuum rolloff boxes, or dump trucks for conveyance to the waste pile area. If larger waste rock or larger volume removal is required, Guzzler-type vacuums may be substituted; these units may transport the material directly to the consolidation waste pile area, or place the material directly into vacuum rolloff containers for transport to the consolidation waste pile area. These systems will be HEPA filtered. Workers will move vacuum hoses through the removal area and may require manual loosening of material to allow the vacuum system to remove material. Removal will proceed with guidance from, and in conjunction with screening; upon removal of sufficient material to achieve the TCRA objectives. Dust generation by this method is anticipated to be minimal to insignificant; methods described in Section 5.9 will be employed as necessary.
- *Mechanical removal.* Mechanical removal will use trackhoes of varying sizes to remove waste rock or affected soil. Material will be removed in 6- to 12-inch lifts by trackhoe. For the initial lift, material will be placed directly into a dump truck for transport to the consolidation waste pile area. If access is poor, material may be shuttled to a dump truck by a wheel loader. Equipment will be staged outside the area being excavated. If areas are excessively broad and prevent staging outside the excavation area, 6-mil reinforced poly and mats may be placed in the excavation area to provide a clean platform

to allow access. Soil or road base may be substituted for mats; if maintained without secondary contamination, the soil or road base will be used for restoration of removal areas (if not, this material will be removed and placed in the consolidation waste pile). Finally, if heavy equipment is required to be tracked directly into excavation areas, the equipment will be decontaminated as described in Section 5.12.

5.3.2 Removal Work Sequencing and Anticipated Removal Methods

Subject to change based on the preconstruction surveys, Arcadis anticipates the following sequence/approach for each of the TCRA areas:

- *Consolidation waste pile preparation*. The area will be prepared by clearing vegetation and running a dozer over the footprint, where materials will be placed, to level and flatten the surface.
- *Northeast Access road*. The area will be scanned to confirm the material warranting removal. Conventional mechanical excavation is planned followed by backfill and restoration.
- *Northeast drainage*. The area will be scanned to confirm the material warranting removal. Targeted industrial vacuum removal is planned followed by backfill and restoration.
- *Residential area*. The area will be scanned to confirm the material warranting removal. Targeted industrial vacuum removal is planned followed by backfill and restoration.
- *Western Drainage 2/road*. The area will be scanned to confirm the material warranting removal. Conventional mechanical excavation is planned followed by backfill and restoration.
- *Western Drainage 1*. The area will be scanned to confirm the material warranting removal. Conventional mechanical excavation, only at the top of the drainage, is planned followed by restoration.
- *East stockpile*. The area will be scanned to confirm the material warranting removal, and a combination of conventional mechanical excavation and industrial vacuum removal may be used.
- *Optional Restoration Areas*. Test pits located in the southern portion of Section 19 may be backfilled during the TCRA activities listed above. To meet the objectives outlined in Section 1.5, conventional mechanical equipment is planned to be used for either 1) backfilling of the test pits with the previously excavated material, or 2) removal of the test pit material and restoration.
- *Consolidation waste pile construction*. As conventional mechanical excavation and industrial vacuum removal progresses at the TCRA areas and the optional restoration areas identified above, material will be stored at the consolidation waste pile. The material will be placed in the designated footprint and will be spread and compacted using construction equipment. The edges of the consolidation waste pile have an approximately 3:1 horizontal to vertical slope. The surface of the consolidation waste pile will be sloped at approximately 3 percent to ensure proper drainage. Dust suppression that is required during these activities is described in Section 5.9. Upon completion, the consolidation waste pile will be covered with a geotextile and soil to limit the potential for erosion. An erosion-control blanket may be utilized on the slopes, if necessary (Figure 9).

5.3.3 Limits of Excavation

Per the AOC, the spatial boundaries of the TCRA excavation are shown in yellow on Figure 3. Vertical excavation boundaries will be limited to achieving the TCRA objectives detailed in Section 1.4 and maximum excavation depth criteria as follows:

- Northeast access road: maximum depth of 1 foot bgs.
- Northeast drainage: maximum depth of 1 foot bgs.
- Residential area: maximum depth of 2 feet bgs.
- Western Drainage 2/road: maximum depth of 2 feet bgs.
- Western Drainage 1: maximum depth of 1 foot bgs.
- East stockpile: if removal is required, excavation depth will not exceed 2 feet bgs.

5.4 Confirmation Gamma Scanning

To confirm the TCRA excavation objectives have been achieved, a static confirmation gamma scan will be performed following the methods described in Section 5.3. Predefined grids with randomly selected origins will be created before field mobilization and stored on field GPS units. Depending on the final limits of excavation, one of the predefined grids will be selected such that a minimum of 10 static counts will fall within the limits of construction. The site RSO will position the Ludlum 2241 with a 3-inch x 3-inch probe at 6 inches above the ground surface over each predefined node. The probe will be held in place for 1 minute and a gamma reading will be recorded from each location. The site RSO will document the results and confirm the TCRA objectives detailed in Section 1.4 have been achieved. Additional gamma survey procedures are provided in the Field Gamma Radiation Surveys SOP (Appendix B).

5.5 Stockpiling

Imported materials (e.g., commercial general fill, road gravel, topsoil) may be stockpiled on-site prior to placement. Wherever possible, delivery will be scheduled so that these materials can be placed directly near a work area to avoid double handling. Stockpiling of material will only be done to create an available inventory for site work to continue without interruption. Locations of the stockpiles will be coordinated with and approved by the Arcadis field oversight lead. Best management practices will be deployed for stockpiles during storm and/or erosion events.

5.6 Restoration

Backfill for restoration will generally use commercially available import materials; site or local borrow materials are not anticipated to be used. The restoration material will be placed in the designated footprint and will be spread and compacted using construction equipment. Backfill and grading will restore removal areas to pre-removal condition with like kind and similar structure and vegetation. A seed mix, using local and native species, will be applied.

5.7 Consolidation Waste Pile

Excavated material from the TCRA areas will be hauled to a consolidation waste pile located within the Haystack No. 1 AUM, on Section 19 (the final location will be determined). Arcadis will check the footprint area prior to the placement of materials to ensure that vehicles can safely access and work within the storage area. Any necessary clearing and grubbing will be completed, as well as placement of erosion-control measures, prior to depositing excavated material within the area. If required for access, localized grading will be performed so construction equipment can safely access the area.

The final dimensions of the consolidation waste pile will be based on the total quantities requiring removal from the TCRA. A foundation will be graded using conventional construction equipment, including bulldozers, graders, and/or front-end loaders. The excavated material will be placed in the designated footprint and spread/compacted using construction equipment. The top surface will be sloped at approximately 3 percent to ensure proper drainage and the slopes will be an approximate 3:1 horizontal to vertical slopes. Dust suppression that is required during these activities is described in Section 5.9. Upon completion, the consolidation waste pile will be covered with a geotextile and soil to limit the potential for erosion. An erosion-control blanket may be utilized on the slopes, if necessary. Each roll will be affixed to the soil with metal anchors as shown on Figure 9. Once complete, the consolidation waste pile will be secured with a fence (e.g., five-strand barbed wire fence) and proper signage.

5.8 Erosion and Sediment Control

For erosion and sediment control, work will be conducted in a manner to minimize the potential for soil erosion and track out. Excavation will not be conducted during periods of excessive wind or heavy precipitation. Excavated areas will be scanned and cleared for restoration/backfilling as described in Sections 5.4 and 5.6, respectively. Excavated areas will be promptly backfilled, contoured, and compacted.

Straw wattles or hay bales will protect soil from erosion caused by high winds or significant precipitation. Until the soil stabilizes, temporary erosion controls may be necessary to protect the soil in some work areas from erosion due to runoff from nearby areas. Straw bales and/or silt fences may be used to reduce the velocity of sheet and channel flow as it enters a work area and to trap sediment in flows leaving a work area. In areas of larger channel flows, sand bags may be used to dyke upstream and intermittently through the channel to slow the velocity of water and to trap sediment.

The performance of installed controls and the need for additional controls will be evaluated during inspections of areas where excavation has taken place. If the inspections reveal the need to enhance existing controls or to install controls where none exist, the needed controls will be installed.

A Stormwater Pollution Prevention Plan (SWPPP) has not yet been prepared due to the unknown final footprint of construction activities. The USEPA is the regulatory authority for stormwater permitting in New Mexico and it is unknown if the construction activities warrant an SWPPP (e.g., will the construction exceed a disturbance of 1 acre). A final determination will be made after the preconstruction surveys are complete.

5.9 Dust Control

Dust control measures will primarily rely on vehicle speed controls and the application of water on working surfaces during material removal. Dust control measures will be implemented to minimize migration of dust generated by construction activities. A Dust Control Plan is included in Appendix C. The Dust Control Plan (Appendix C) will be finalized after coordination with the Remedial Contractor.

The Remedial Contractor will excavate and transport material in a manner that will minimize the generation of dust. The material may be moistened with water prior to excavation and sprayed, as necessary, during excavation. After the excavated material is placed in a dump truck, a 1-foot freeboard will be maintained in the truck box to minimize dusting during transport. During placement in the waste pile, material will again be moistened with water to reduce dust generation. Water will also be applied during grading activities in the consolidation waste pile area, as necessary, to reduce dust generation. The Remedial Contractor will exercise care not to water the soil more than necessary to minimize track out and interferences with field gamma radiation measurements.

5.10 Traffic Control Plan

Work performed on or adjacent to roadways and parking areas will be conducted in a manner that will protect workers from potential site traffic. Traffic control devices will be implemented using a combination of barriers and signage, personal protective equipment (PPE), and flaggers. Specifically, these traffic control devices may include:

- *Barriers and signage.* Use of orange safety fencing and/or high visibility caution tape in conjunction with 42-inch tall channelizer cones. Signage may be used to regulate, warn or guide traffic away from the work area. Safety fencing, caution tape, channelizer cones and signs will be inspected and maintained in good, secure condition at all times when used on the project.
- *Personal protective equipment.* In addition to PPE required for the construction activities, each employee will need to wear, at a minimum, a Class II retroreflective vest, shirt or coat meeting ANSI 107-1999 requirements.
- *Flaggers.* A dedicated and trained flagger(s) may be used to protect workers and work areas from potential vehicle traffic.

5.11 Radiological Monitoring and Oversight

Personnel present on-site will follow the requirements of the radiation safety program contained in the HASP for tasks that have the potential for radiation exposure. The site RSO or RSO-designated representative will be present in a given work area when activities take place in exclusion zones to confirm appropriate monitoring and dose assignment. Site visitors will consult with the Site Safety Officer and site RSO about on-site hazards before entering the Site and will receive visitor site-specific health and safety training.

5.11.1 Exclusion Zones and Radiological Monitoring

The site RSO will establish control boundaries for exclusion and support zones. The zones will be reviewed by the site RSO during tailgate meetings and documented on site figures. Exclusion zones within work areas will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The site RSO will determine if any radiation scanning or other measures are necessary prior to or during the work.

Work will maintain exposures to workers, the public, and the environment as low as reasonably achievable (ALARA). As such, an ALARA approach will be adopted onsite with particular attention paid to exclusion zones. Personnel will not loiter in exclusion zones. As practical, equipment such as tools and sampling bottles will be placed on disposable surfaces (i.e., plastic sheeting) when not in use and inside proper disposal containers when work is finished. Good housekeeping practices will be followed to minimize the amount of material that must be decontaminated or disposed of.

Entrance and exit to the exclusion zone will only be through controlled access points established for each work area. Each access point will include a contamination reduction zone where all decontamination activities will occur before personnel enter the surrounding support zones or leave the Site. The exclusion zone will be surrounded by a support zone that includes the job trailer, personnel parking, and safety facilities.

5.11.2 Personnel Radiation Monitoring

Before field work begins, a General Radiation Work Permit (GRWP) for the Site will be issued by Arcadis, addressing the following requirements and providing for additional Specific Radiation Work Permits (SRWPs), if needed.

5.11.2.1 General Radiation Work Permit

For operational simplicity, the exclusion zone under the GRWP will consist of the portion of the Site where data collection, excavation, restoration, or consolidation activities are ongoing. This exclusion zone will be used as the overall exclusion zone defined in the HASP.

Work in the exclusion zone will require active scanning of the surrounding work area as deemed necessary by the site RSO. Time spent in the area by project personnel will be monitored by the site RSO and documented daily. A daily dosage greater than background will be assigned to individual workers based on the gamma count readings near the individual's work area. The daily doses received by individual workers will be tallied to confirm that it does not exceed a total allowable dose determined by the project health physicist and RSO. The total allowable dose will be determined by multiplying the United States Nuclear Regulatory Commission (U.S.NRC) annual dose limit for individual members of the public of 100 millirems per year (10 Code of Federal Regulations [CFR] 20) by the fraction of a year that each worker spends working at the Site. For example, if a 2,000-hour work year for each worker is assumed, regardless of the fraction of the year required, this will equate to an average dose over the length of the project of 50 microrems (µrems) per day worked above background, though this can be distributed unevenly.

In addition, dosimetry badges will be worn by workers who will be on site in work areas within the exclusion zone for a length of time to be determined by the site RSO based on site conditions. Badge dose readings will be compared to the total allowable dose set by the project health physicist and RSO, as specified above.

TCRA workers leaving the on-site GRWP exclusion zone will be checked for removable contamination by an appropriately trained worker (workers may be trained on site) with a Ludlum 44-9 Pancake Probe at the controlled access point on the perimeter, as described below and in the Radiological Decontamination SOP (Appendix B).

5.11.2.2 Specific Radiation Work Permit

Access to areas exhibiting a surface gamma action level greater than 1,000 microrems per hour (µrems/hr) at a distance of 12 inches will require an SRWP and approval from the site RSO. The surface gamma action level is 50 percent of the U.S.NRC hourly dose limit for individual members of the public (2,000 µrems) in 1 hour (10 CFR 20). Prior to preparing this Work Plan, no locations on site had dose rates meeting this action level; the highest surface gamma levels in the TCRA areas occur at the road at the northwestern corner of Bibo Trespass, in Section 13 (Western Drainage 2/road TCRA area). Other areas exceeding these levels may be found through further scanning or during excavation, but are not anticipated.

If levels greater than 1,000 µrems/hr are detected, work will stop and all personnel will leave the area. To re-enter the area, the site RSO will first consult with the project health physicist and project management team to determine an appropriate mitigation plan. This plan will be included in a new SRWP that specifies additional personnel time tracking and dose assignment requirements.

Ongoing work in the radiation permit zone will require the site RSO or Radiation Safety Worker, acting under the RSO, to actively scan the surrounding work area. Limits on total time spent in the radiation permit zone will be determined by the site RSO. Time spent by individual personnel in the radiation permit zone will be tracked and controlled to confirm that the 2,000 µrems in 1 hour is never exceeded. All other requirements of the HASP and GRWP will remain in place under a given SRWP.

Work conducted within an exclusion zone will be monitored by the RSO or appropriately trained designee having appropriate scanning equipment.

5.12 Field Decontamination

When TCRA workers leave the exclusion zone, the site RSO or RSO designee must frisk personnel and equipment to ensure that no contamination is leaving the exclusion zone. Details on personnel and equipment decontamination procedures are provided below.

5.12.1 Personnel Decontamination

Decontamination will generally follow the procedures contained in the Equipment and Personnel Decontamination (Appendix B).

When TCRA workers leave the exclusion zone, the site RSO or RSO designee must frisk personnel to ensure that no contamination is leaving the exclusion zone. If excess contamination is discovered on

hands or boots, or any equipment, the primary decontamination method to be employed is dry brushing. Once dry decontamination is complete, the TCRA personnel/workers must be frisked again to verify that the decontamination methods were successful. If frisking shows that additional decontamination methods are needed and dry brushing was unsuccessful in attaining the release criteria, washing will be conducted using a hand-pumped water sprayer or with lukewarm, soapy water.

TCRA worker's contaminated personal clothing will be disposed of, as appropriate for the type of contamination. The wastes at this Site are generally soil-like materials and, with the exception of radon progeny deposited from the atmosphere, are generally easily removed by washing with soap and water. If the contamination is persistent, the item or portions of the item will be disposed as naturally occurring radioactive material impacted material.

5.12.2 Vehicle and Equipment Decontamination

Efforts will be made to decontaminate the equipment used on site for unrestricted release per the Radiological Decontamination SOP (Appendix B). After decontamination, vehicles and other equipment used in exclusion zones will be surveyed for contamination and returned for additional decontamination as necessary. Before leaving the Site, a vehicle's wheels, work surfaces, and other areas having acquired site soil or dust will be frisked. Vehicles that are not required for work in the exclusion zone will not be permitted in the exclusion zone.

5.13 Waste Disposal

No offsite waste disposal is anticipated during the removal activities. Waste generated during removal activities will be stored onsite in the consolidation waste pile area per Section 5.7. Generation of equipment and personnel decontamination wastes will be restricted to the TCRA areas or to the waste consolidation area per SOP Equipment and Personnel Decontamination (Appendix B). General trash will be scanned by the site RSO or designated RSO before disposal as common trash.

5.14 Field Documentation

The site RSO or designated RSO will keep daily logs, per the Field Log Book Entries SOP (Appendix B), documenting individual workers' entry and exit to the exclusion zone, radiation monitoring badge distribution and return, and personnel and vehicle decontamination. The site RSO will also document radiation scanning equipment on site, calibration QC of equipment, and results from field gamma surveys and other radiological data acquisition. The RSO will be responsible for monitoring, assigning, and tracking worker doses in given work areas.

The site RSO, in conjunction with the construction field lead, will complete daily activity/field reports to document the project progress. The report will include, at a minimum, the following information:

- Project name
- Date
- Weather conditions
- Contractors on site and number of people on site for each contractor

- Description of work completed
- Summary of meetings or important discussions/directives
- Health and safety: tailgate topic, stop works, near misses, incidents
- Audits and results (as applicable)
- Materials imported/deliveries and associated quality assurance (QA)/QC data
- Material volumes excavated, hauled, and placed (as applicable) by work area
- Amount of water used as dust suppression
- Production delays and/or issues encountered
- Proposed work activities for the following day.

The Remedial Contractor will provide Arcadis with necessary information for the daily report, including, but not limited to:

- Health and safety: stop works, near misses, incidents
- Materials imported/deliveries and associated QA/QC data
- Material volumes excavated, hauled, and placed (as applicable) by work area
- Amount of water used as dust suppression
- Description of work completed
- Proposed work activities for the following day.

5.15 Demobilization and Inspections/Maintenance

After removal activities have been completed, all personnel and equipment will be demobilized from the site. Periodic inspections and potential maintenance of the excavated areas and consolidation waste pile area is anticipated. Inspections are planned to be quarterly for the first year after construction, semi-annual for the second year, and annual thereafter. Maintenance of fencing and cap erosion will be addressed during the inspections. These requirements may be updated based on the final removal activities.

6 SCHEDULE

To date, the following TCRA AOC technical milestones (Appendix A: Paragraphs 32, 34, and 36) have been completed:

- Request information on biological resources (May 30, 2017)
- Submit a Health and Safety Plan (June 14, 2017)
- Submit a Removal Work Plan (June 29, 2017)
- Submit a Cultural Resource Survey Report (June 29, 2017; separate cover)

The schedule for the TCRA construction activities are predicated on several tasks: access agreements, CRS, biological survey, and the preconstruction survey. Arcadis plans to provide a refined TCRA construction schedule at a future date, but have currently assumed the following:

- *Pre-construction surveys*. Surveys are anticipated to take 5 work days and be completed 45 days after securing access.
- *TCRA Construction Mobilization*. TCRA construction mobilization is anticipated to take 3 work days and be completed 45 days after the pre-construction surveys are complete and removal activities are finalized.
- *TCRA Construction Activities*. TCRA construction activities are anticipated to take 15 work days and be completed immediately following mobilization.
- *TCRA Construction Demobilization*. TCRA construction demobilization is anticipated to take 3 work days and be completed immediately following construction activities.
- *Removal Completion Report*. A Removal Completion Report is planned to be submitted 60 days after TCRA activities are complete.

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TABLES

Table 1
Potentially Applicable Relevant and Appropriate Requirements - Location-Specific

ARCADIS Design & Consultancy for natural and built assets

Removal Work Plan
Haystack Mines Site
Baca/Prewitt Chapter, Navajo Nation
McKinley County, New Mexico

Requirement	Citation	Description	Evaluation
National Historic Preservation Act	16 USC 470; 36 CFR 800; 36 CFR 65 and 60; Navajo Nation Code (NNC), Section 19, Section 11, Sections 1001-1061	The National Historic Preservation Act (NHPA) requires federal agencies to assess the impact of proposed actions on historic or culturally important sites, structures, or objects within the site of the proposed projects. It further requires federal agencies to assess all sites, buildings, and objects on the site to determine if any qualify for inclusion in the National Register of Historic Places (NRHP) or as a National Historic Landmark. Criteria for evaluation are included in 36 CFR Part 60.4. If historic properties or landmarks are eligible or included in the NRHP, and exist within the areas where remedial activity will occur, the remedial activities must be designed to minimize the effect on such properties or landmarks.	These requirements are potentially applicable to the areas of the site that may be considered for inclusion on the Federal Register of Historic Places. NNC requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. If there are impacts to private land, coordinate with the New Mexico Office of Cultural Affairs. If remedial activities may impact sites, buildings or objects listed on the Federal Register of Historic Places, the remedial activities will be designed to minimize impacts.
Historic Site, Buildings and Antiquities Act	16 USC 461-471; 40 CFR 6.301(a); NNC, Section 19, Section 11, Sections 1001-1061	This act requires that historic sites, buildings, and objects of national significance be preserved.	If sites, buildings or objects are identified for listing or listed on the Historic Site, Buildings and Antiquities Federal Register, then these requirements are potentially applicable if remedial activities will impact such areas. NNC requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. If there are impacts to private land, coordinate with the New Mexico Office of Cultural Affairs.

ED_005011_00000509-00036

Table 1
Potentially Applicable Relevant and Appropriate Requirements – Location-Specific

ARCADIS Design & Consultancy for natural and built assets

Removal Work Plan
Haystack Mines Site
Baca/Prewitt Chapter, Navajo Nation
McKinley County, New Mexico

Requirement	Citation	Description	Evaluation
Archaeological and Historic Preservation Act	16 USC 469; NNC, Section 19, Section 11, Sections 1001-1061	This act establishes procedure to provide for the preservation of historical and archeological data that might be destroyed through alteration of terrain as a result of a federally licensed activity or program. Presence or absence of such data on the site must be verified. If historic or archaeological artifacts are present in the area where the remedial activity will occur, the remedial activity must be designed to minimize adverse effects on the artifacts.	This requirement is potentially applicable if historical or archeological data are found in areas of the site potentially disturbed during remedy implementation. NNC requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. If there are impacts to private land, coordinate with the New Mexico Office of Cultural Affairs.
Native American Graves Protection and Repatriation Act	25 USC 3001 et. seq; 43 CFR 10.1, 10.4, and 10.5; NNC, Section 19, Section 11, Sections 1001-1061	This act protects Native American burial sites and funerary objects. If Native American graves are discovered within the area where the remedial activity occurs, the US Department of Interior and the Indian tribe with ownership must be notified of the inadvertent discovery. And the activity must cease until a reasonable effort is taken to protect the discovered items.	This requirement is potentially applicable to land disturbing activities implemented during the remedial action if Native American burial sites or funerary objects are encountered. NNC requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. If there are impacts to private land, coordinate with the New Mexico Office of Cultural Affairs.
Archaeological Resources Protection Act	16 USC 470aa; 43 CFR 7.1, 7.7 and 7.33; NNC, Section 19, Section 11, Sections 1001-1061	This act and regulations specify the steps that must be taken to protect archaeological resources and sites that are on public and Native American lands and to preserve data uncovered. The presence of archeological sites should be identified before beginning any remedial activity.	This requirement is potentially applicable to land disturbing activities implemented during remedial action if archaeological resource or sites are encountered. NNC requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. If there are impacts to private land, coordinate with the New Mexico Office of Cultural Affairs.

Table 1
Potentially Applicable Relevant and Appropriate Requirements – Location-Specific

ARCADIS Design & Consultancy for natural and built assets

Removal Work Plan
Haystack Mines Site
Baca/Prewitt Chapter, Navajo Nation
McKinley County, New Mexico

Requirement	Citation	Description	Evaluation
Fish and Wildlife Conservation Act (FWCA)	16 USC 2901; 50 CFR 83; Navajo Nation Department of Fish and Wild Life (NNDFW) RCS-44-08; 17-2-40.1 NMSA	The FWCA requires federal agencies to use their authority to conserve and promote conservation of non-game fish and wildlife. Non-game fish and wildlife are defined as fish and wildlife that are not taken for food or sport, that are not endangered or threatened and that are not domesticated. This potential ARAR requires consultation with EPA, US Fish and Wildlife Service (USFWS), New Mexico Department of Game and Fish, and NNDFW.	This requirement is potentially applicable to areas that contain habitat for non-game fish and wildlife. NNDFW requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. New Mexico Wildlife Conservation Act (WCA) regulations apply to non-Indian Allotment/BIA lands. Appropriate measures would be identified through consultation with USFWS and NNDFW, as appropriate.
Endangered Species Act	16 USC 1531-1543, 50 CFR 402 50 CFR 17; NNDFW RCS-44-08; 17-2-40.1 NMSA; Resource Committee Resolution RCAU-103-05	This act protects fish, wildlife and plants that are threatened or endangered (T/E) with extinction. It also protects habitat designated as critical to the conservation of the species. The act requires consultation with resource agencies for remedial actions that may affect these species. This potential ARAR requires consultation with EPA, USFWS, New Mexico Department of Game and Fish, and NNDFW and evaluation of the list of T/E species developed by NNDFW for work on tribal lands.	This requirement is potentially applicable if federally–listed candidate species are present in the areas impacted during remedy implementation. NNDFW requirements only apply to those areas of the site that are Indian Allotment Land or managed by the BIA. WCA regulations apply to non-Indian Allotment/BIA lands.

ED_005011_00000509-00038

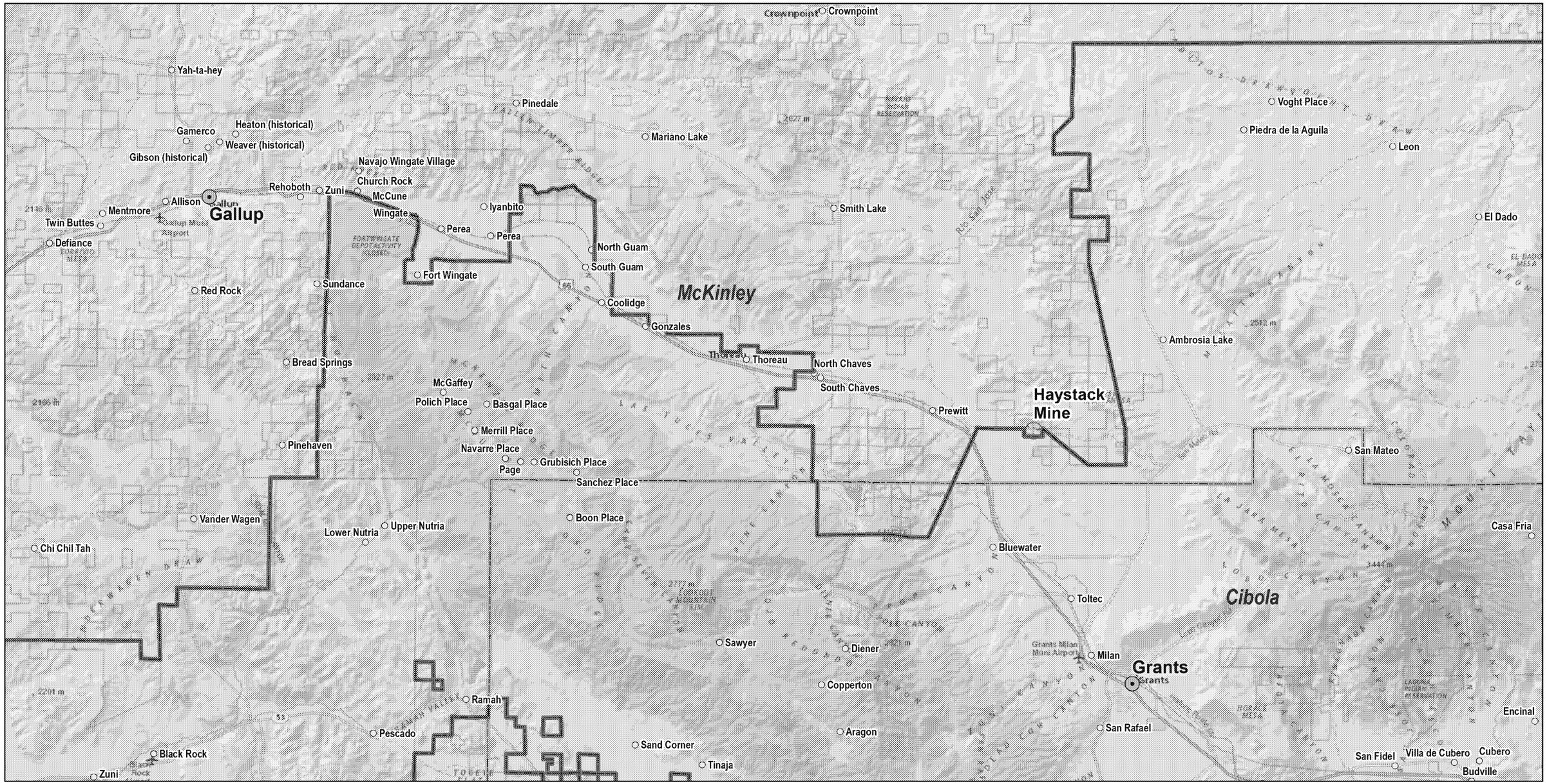
Table 2
Potentially Applicable Relevant and Appropriate Requirements - Action-Specific

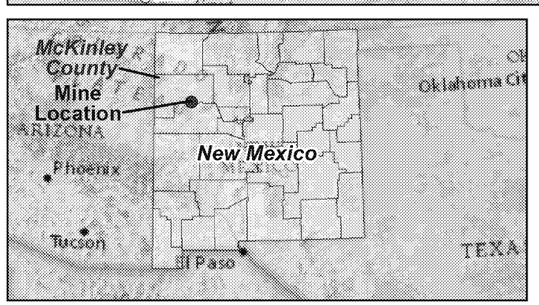
ARCADIS Design & Consultancy for natural and built assets

Removal Work Plan
Haystack Mines Site
Baca/Prewitt Chapter, Navajo Nation
McKinley County, New Mexico

Requirement	Citation	Description	Evaluation
Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES) Regulations	40 CFR 122.26	The CWA regulates the discharge of pollutants from point sources into waters of the United States. The NPDES regulations apply to construction activities involving one acre or more.	The stormwater provisions are potentially applicable to activities involving disturbance of one acre or more on both private and Indian Allotment Land/BIA properties.

FIGURES





Legend

- Haystack Mine Location
- Cities of Grants and Gallup Locations
- Surrounding Locations
- County Boundary
- Navajo Nation Boundary

0 5 10
Miles

Base Image Source: ESRI World Imagery 2016

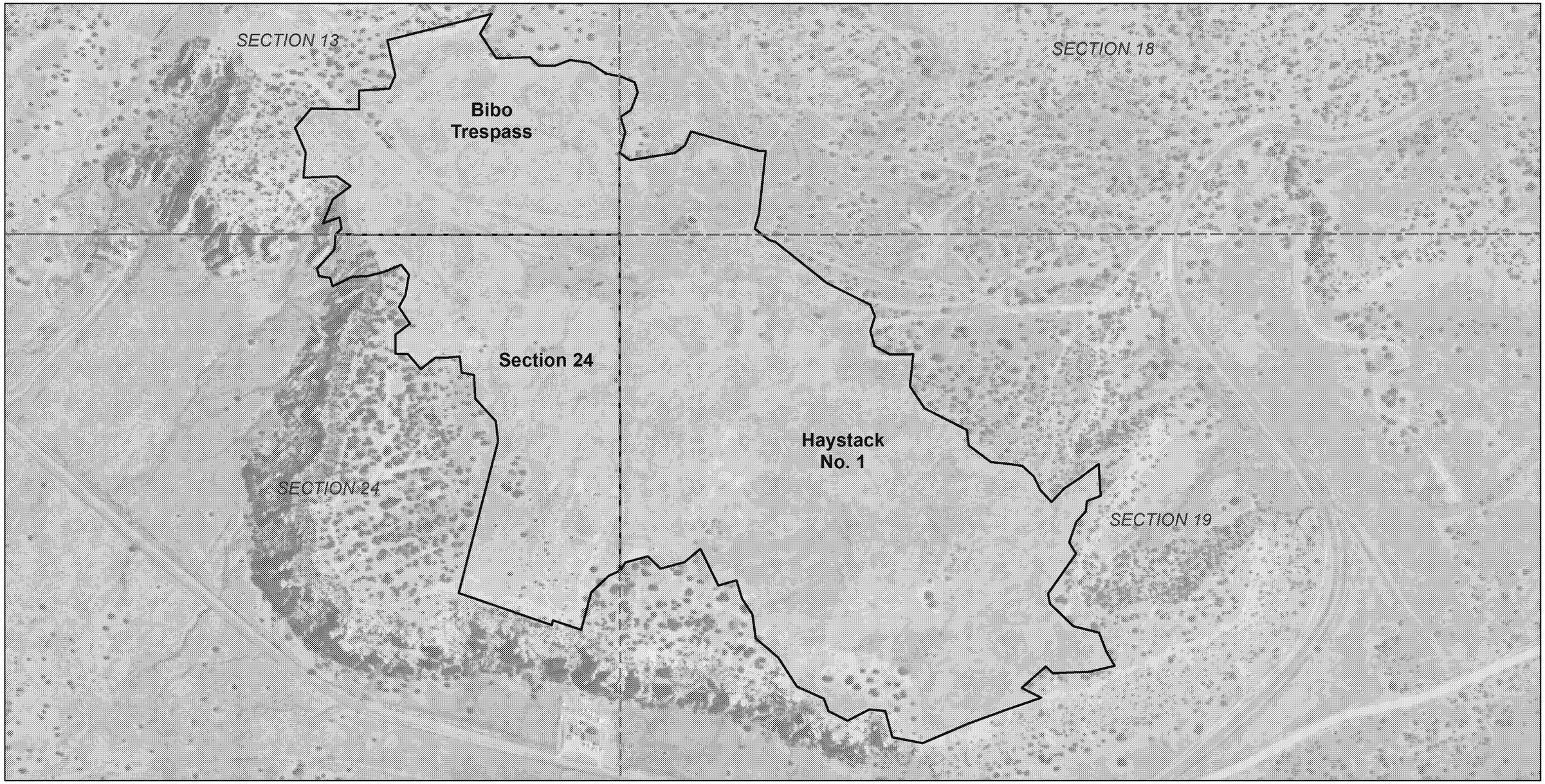
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

GENERAL SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

User: kpeters Location: On-Site Citrix
Path: Z:\GIS\Projects_ENV\BNSF\BNSF_HAYSTACKMINE_NMMXD\RemovalWorkPlanFigure1_GeneralSiteLocationMap.mxd



Legend

- Abandoned Uranium Mines
- PLSS Section and Identification Number

0 500 1,000
Feet

Base Image Source: ESRI World Imagery 2016

BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

SITE MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

User: kgeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\Removal\WorkPlan\Figure2_SiteMap.mxd

SECTION 13

SECTION 18

WESTERN DRAINAGE 1

WESTERN DRAINAGE 2 / ROAD

Bibo Trespass (Section 13)

RESIDENTIAL

NORTHEAST DRAINAGE AND ACCESS ROADS

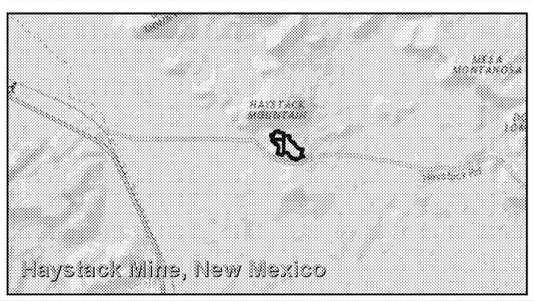
EASTERN STOCKPILE AREA

Section 24

Haystack No. 1

SECTION 24

SECTION 19



Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)
- PLSS Section and Identification Number

0 500 1,000
Feet

Base Image Source: ESRI World Imagery 2016

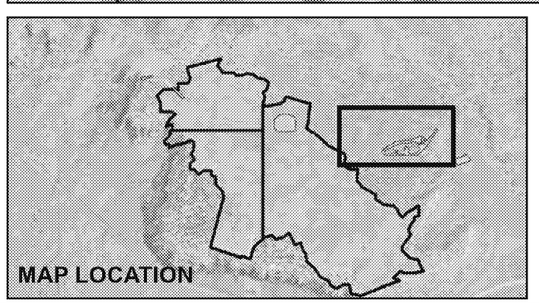
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

TIME CRITICAL REMOVAL ACTION AREAS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

User: kgeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\RemovalWorkPlan\Figure3_TimeCriticalRemovalActionAreas_TCRA_Only.mxd



Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)

0 100 200
Feet

Base Image Source: ESRI World Imagery 2016

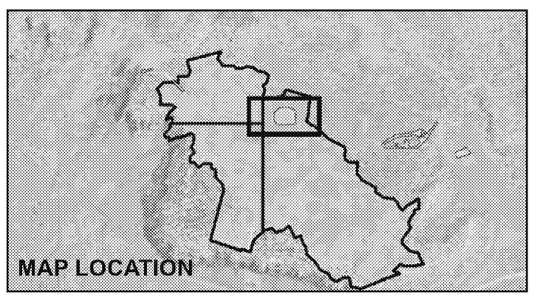
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

Northeast Access Drainage and Access Road

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4

User: kpeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\Removal\WorkPlan\Figure4_TimeCriticalRemovalActionAreas_mapset.mxd



Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)

0 60 120
Feet

Base Image Source: ESRI World Imagery 2016

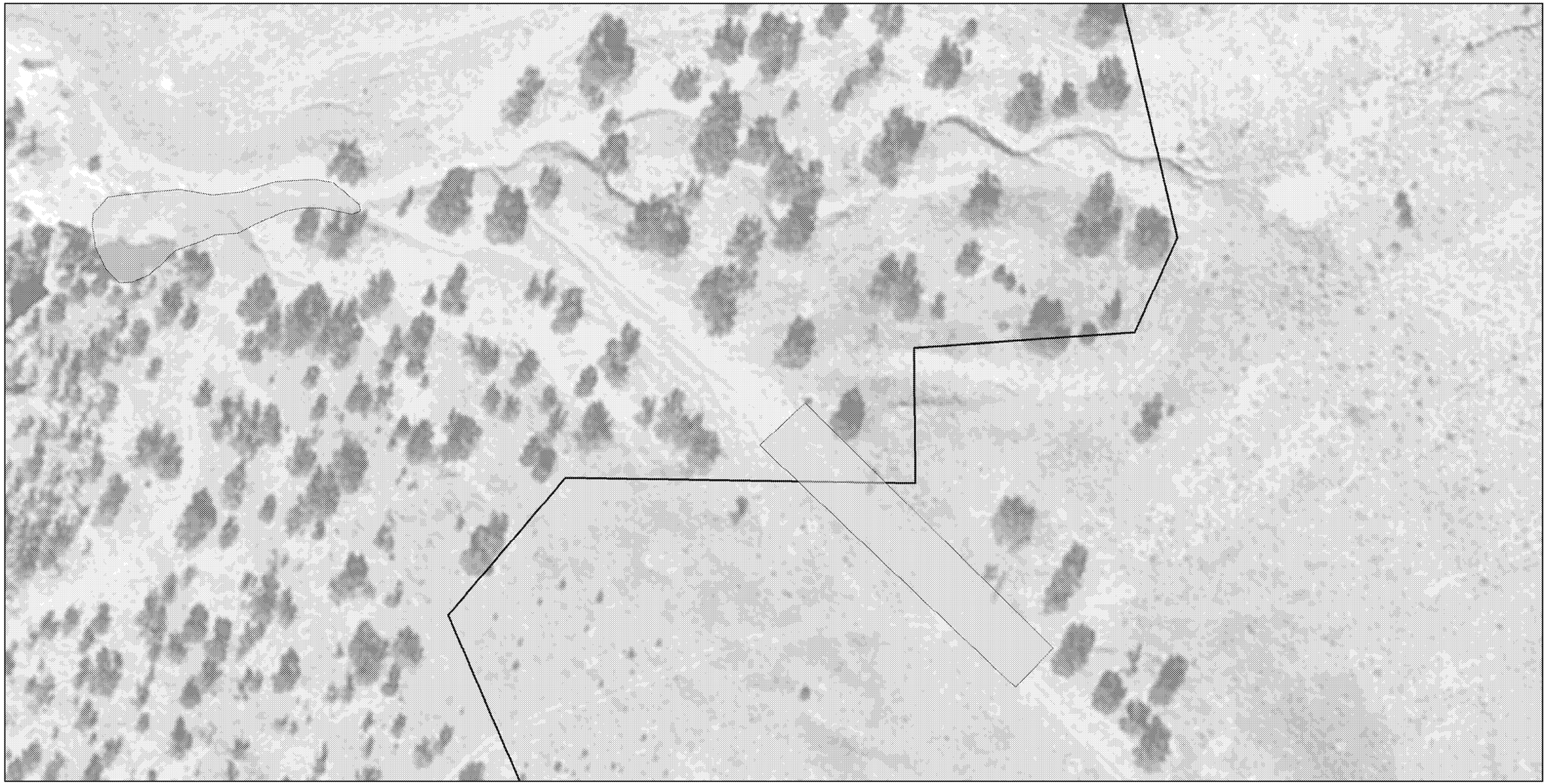
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

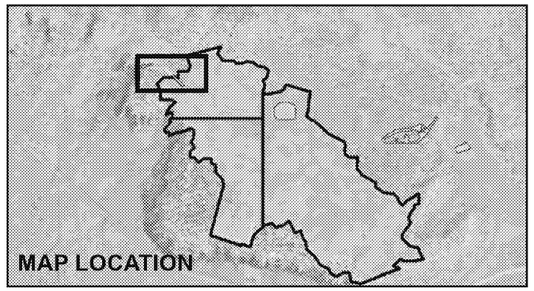
Residential Area

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5

User: kgeters Location: On-Site Citrix
Path: Z:\GIS\Projects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\RemovalWorkPlan\Figure4_TimeCriticalRemovaActionAreas_mapset.mxd





Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)

0 60 120
Feet

Base Image Source: ESRI World Imagery 2016

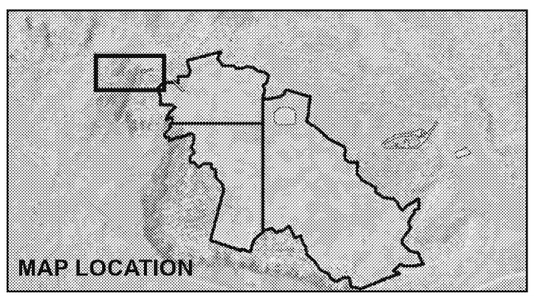
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

Western Drainage 2/Road

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6

User: kgpeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\RemovalWorkPlan\Figure4_TimeCriticalRemovalActionAreas_mapset.mxd



Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)

0 60 120
Feet

Base Image Source: ESRI World Imagery 2016

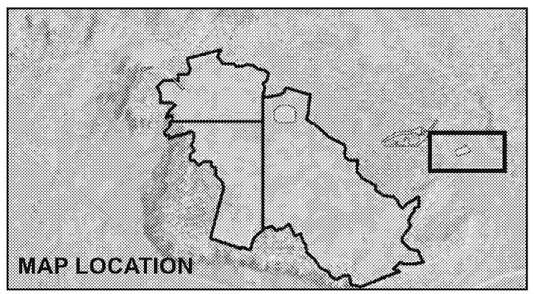
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

Western Drainage 1

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

User: kgeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NM\MXD\RemovalWorkPlan\Figure4_TimeCriticalRemovalActionAreas_mapset.mxd



Legend

- Abandoned Uranium Mine (AUM) Boundaries
- Time Critical Removal Action Area (per AOC)

0 60 120
Feet

Base Image Source: ESRI World Imagery 2016

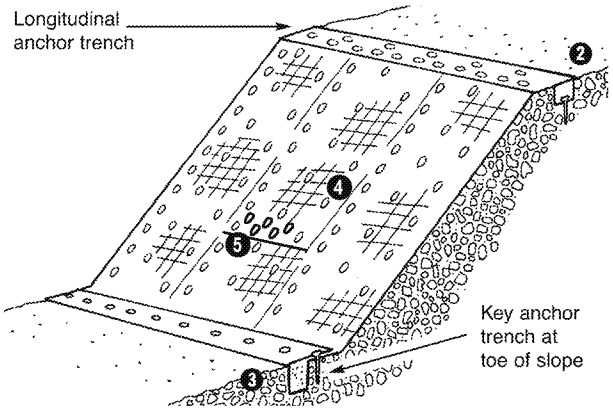
BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

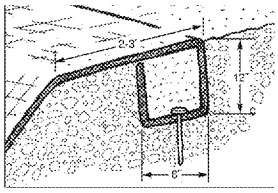
East Stockpile

ARCADIS Design & Consultancy for natural and built assets

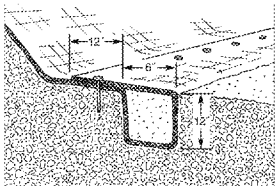
FIGURE
8

User: kgpeters Location: On-Site Citrix
Path: Z:\GISProjects_ENV\BNSF\BNSF_HAYSTACKMINE_NMMXD\RemovalWorkPlan\Figure4_TimeCriticalRemovalActionAreas_mapset.mxd

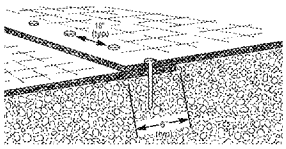




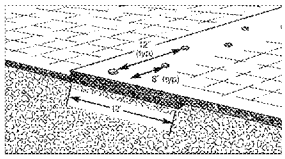
2-TOP OF SLOPE



3-TOE OF SLOPE



4-OVERLAP AT ROLL EDGE



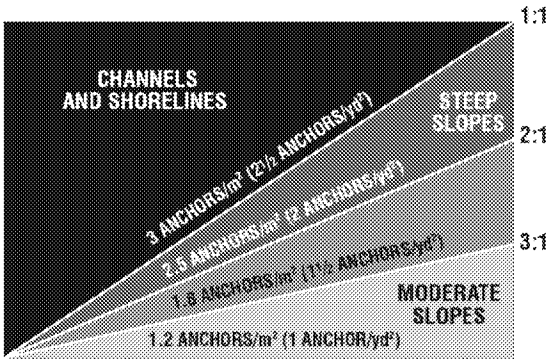
5-OVERLAP AT ROLL END

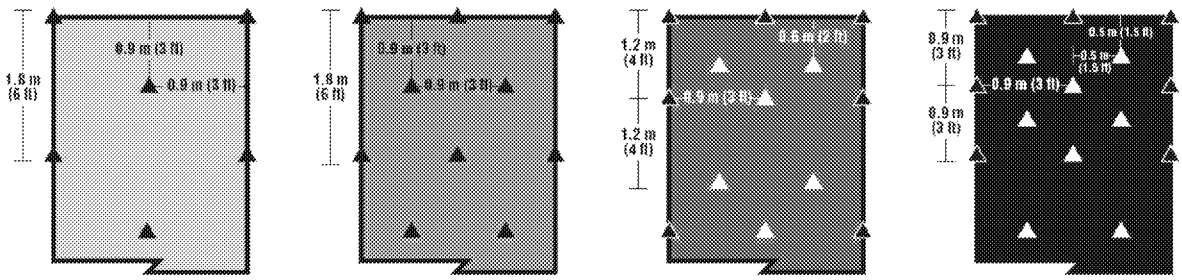
NOTES:

1. OVERLAPS 6" MINIMUM.
2. SPACE ANCHORS 18" ALONG OVERLAPS DOWN THE SLOPE
3. AT TOP OF SLOPE, SPACE ANCHORS 12" ALONG TRENCH.
4. ANCHOR PATTERN SHALL BE IN ACCORDANCE WITH DETAIL 2.

EROSION CONTROL BLANKET INSTALLATION ON SLOPE (1)

NOT TO SCALE





EROSION CONTROL BLANKET ANCHOR PATTERN (2)

NOT TO SCALE

BNSF
HAYSTACK MINE, NEW MEXICO
REMOVAL WORK PLAN

CONCEPTUAL DESIGN OF CONSOLIDATION WASTE PILE EROSION CONTROLS

NOT FOR CONSTRUCTION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
9

G:\ENVCAD\TALLAHASS-FL\ACT\CA000860.0005 00002FIG 10.PDF
XREFS: IMAGES: PROJECTNAME: ----

APPENDIX A

Administrative Settlement Agreement and Order on Consent for Removal Action

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IX and REGION VI

IN THE MATTER OF: Haystack Mines Site BNSF Railway Company, Respondent Proceeding Under Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622	CERCLA Docket No. 09-2017-02 CERCLA Docket No. 06-02-17 **ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION**

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent ("Settlement") is entered into voluntarily by the United States Environmental Protection Agency ("EPA") and BNSF Railway Company, formerly known as Burlington Northern and Santa Fe Railway Company ("Respondent"). This Settlement provides for the performance of an interim time-critical removal action by Respondent and the payment of certain response costs to be incurred by the United States at or in connection with the Haystack Mines Site (the "Site") generally located at SE ¼ Section 13, T13N, R11W; NE ¼ Section 24, T13N, R11W; SW ¼ Section 18, T13N, R10W; and Section 19, T13N, R10W, in McKinley County, New Mexico, and the Baca/Prewitt Chapter of the Navajo Nation.

2. This Settlement is issued under the authority vested in the President of the United States by Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622 ("CERCLA"). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2923 (Jan. 29, 1987), and further delegated to Regional Administrators by EPA Delegation Nos. 14-14-A (Determinations of Imminent and Substantial Endangerment, Nov. 1, 2001), 14-14-C (Administrative Actions Through Consent Orders, Apr. 15, 1994) and 14-14-D (Cost Recovery Non-Judicial Agreements and Administrative Consent Orders, May 11, 1994). These authorities were further redelegated by the Regional Administrator of EPA Region IX to the Branch Chief, Superfund Division (now Assistant Director) by Region IX Delegation Nos. R9 1290.13, R9 1290.15, and R9 1290.20, and by the Regional Administrator of EPA Region VI to the Director, Superfund Division, by EPA Region 6 Delegations R6-14-14A, R6-14-14-C, and R6-14-14-D.

3. EPA has notified the State of New Mexico (the "State") and the Navajo Nation of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

4. EPA and Respondent recognize that this Settlement has been negotiated in good faith and that the actions undertaken by Respondent in accordance with this Settlement do not constitute an admission of any liability. Respondent does not admit, and retains the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Settlement, the validity of the findings of facts, conclusions of law, and determinations in Sections IV (Findings of Fact) and V (Conclusions of Law and Determinations) of this Settlement. Respondent agrees to comply with and be bound by the terms of this Settlement and further agrees that it will not contest the basis or validity of this Settlement or its terms.

II. PARTIES BOUND

5. This Settlement is binding upon EPA and upon Respondent and its successors, and assigns. Any change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter Respondent's responsibilities under this Settlement.

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6. Respondent shall provide a copy of this Settlement to each contractor hired to perform the Work required by this Settlement and to each person representing Respondent with respect to the Site or the Work, and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Settlement. Respondent or its contractors shall provide written notice of the Settlement to all subcontractors hired to perform any portion of the Work required by this Settlement. Respondent shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work in accordance with the terms of this Settlement.

III. DEFINITIONS

7. Unless otherwise expressly provided in this Settlement, terms used in this Settlement that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Settlement or its attached appendices, the following definitions shall apply:

"Affected Property" shall mean all real property at the Site and any other real property where EPA determines, at any time, that access, land, water, or other resource use restrictions are needed to implement the removal action, including, but not limited to, the following properties: SE ¼ Section 13, T13N, R11W, New Mexico ("Section 13"); NE ¼ Section 24, T13N, R11W, New Mexico ("Section 24"); SW ¼ Section 18, T13N, R10W, New Mexico ("Section 18"); and Section 19, T13N, R10W, New Mexico ("Section 19").

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675.

"Day" or "day" shall mean a calendar day. In computing any period of time under this Settlement, where the last day would fall on a Saturday, Sunday, or federal or State holiday, the period shall run until the close of business of the next working day.

"Effective Date" shall mean the effective date of this Settlement as provided in Section XXIX.

"EPA" shall mean the United States Environmental Protection Agency and its successor departments, agencies, or instrumentalities.

"EPA Hazardous Substance Superfund" shall mean the Hazardous Substance Superfund established by the Internal Revenue Code, 26 U.S.C. § 9507.

"Future Response Costs" shall mean all costs incurred after the Effective Date, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing deliverables submitted pursuant to this Settlement, in overseeing implementation of the Work, or otherwise implementing, overseeing, or enforcing this Settlement, including but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Section IX (Property Requirements) (including, but not limited to, cost of attorney

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time and any monies paid to secure or enforce access or land, water, or other resource use restrictions, including, but not limited to, the amount of just compensation), Section XIII (Emergency Response and Notification of Releases), Paragraph 83 (Work Takeover), Paragraph 38 (Community Involvement Plan), Section XV (Dispute Resolution), and all litigation costs. Future Response Costs shall also include Agency for Toxic Substances and Disease Registry (ATSDR) costs regarding the Site, and all Interim Response Costs.

"Haystack Mines Site Special Account" shall mean the special account within the EPA Hazardous Substance Superfund, established for the Site by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3), and this Settlement.

"Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year. Rates are available online at http://www.epa.gov/ocfopage/finstatement/superfund/int_rate.htm.

"Interim Response Costs" shall mean all costs, including but not limited to direct and indirect costs, (a) paid by the United States in connection with the Site between March 3, 2016 and the Effective Date, or (b) incurred between March 3, 2016 and the Effective Date, but paid after the Effective Date.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"Navajo Nation EPA" or "NNEPA" shall mean the Navajo Nation Environmental Protection Agency.

"Paragraph" shall mean a portion of this Settlement identified by an Arabic numeral or an upper or lower case letter.

"Parties" shall mean EPA and Respondent.

"Post-Removal Site Control" shall mean actions necessary to ensure the effectiveness and integrity of the removal action to be performed pursuant to this Settlement consistent with Sections 300.415(*l*) and 300.5 of the NCP and "Policy on Management of Post-Removal Site Control" (OSWER Directive No. 9360.2-02, Dec. 3, 1990).

"RCRA" shall mean the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992 (also known as the Resource Conservation and Recovery Act).

"Respondent" shall mean BNSF Railway Company.

"Section" shall mean a portion of this Settlement identified by a Roman numeral.

"Settlement" shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto (listed in Paragraph 112 (Integration/Appendices)). In the event of conflict between this Settlement and any appendix, this Settlement shall control.

"Site" shall mean the Haystack Mines Site, encompassing approximately 174 acres, located at SE ¼ Section 13, T13N, R11W, New Mexico; NE ¼ Section 24, T13N, R11W, New Mexico; SW ¼ Section 18, T13N, R10W, New Mexico; and Section 19, T13N, R10W, New Mexico, in McKinley County, New Mexico, and the Baca Prewitt Chapter of the Navajo Nation, and depicted generally on the map attached as Appendix A.

"State" shall mean the State of New Mexico.

"Transfer" shall mean to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.

"United States" shall mean the United States of America and each department, agency, and instrumentality of the United States, including EPA.

"Waste Material" shall mean (a) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (d) any toxic pollutant or water contaminant as defined by Title 20, Chapter 6, Part 2 of the New Mexico Administrative Code or any constituent identified in Table 1 of the New Mexico Environment Department's *Risk Assessment Guidance for Site Investigation and Remediation.*

"Work" shall mean all activities and obligations Respondent is required to perform under this Settlement except those required by Section XI (Record Retention).

IV. FINDINGS OF FACT

EPA makes the following Findings of Fact:

8. The Haystack Mines Site is located atop the Haystack Butte, approximately 500 feet south of Haystack Mountain, and approximately five miles east of Prewitt, McKinley County, New Mexico.

9. EPA performed a removal site evaluation pursuant to 40 C.F.R. § 300.410 at the Site in 2014. The removal evaluation area consists of a former open pit complex including at least three adjacently-located abandoned uranium mines ("AUMs"), where elevated surface gamma activity has been detected.

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10. The AUMs that make up the Haystack Mines Site were owned and operated by various persons and entities from approximately 1952 to 1981 and produced a total of over 400,000 tons of uranium ore.

11. The removal evaluation area encompassed a total of approximately 174 acres. The removal evaluation area is currently used for livestock grazing, and one residence is located within the boundary of the Haystack No.1 AUM. Approximately 10 other residences and a church are located within ¼ mile of the removal assessment area.

12. The Haystack No. 1 AUM encompasses approximately 69 acres, and comprises the eastern portion of the removal assessment area. The geographic coordinates for the approximate center of the AUM are 35.345713 North latitude and 107.943650 West longitude. The AUM is situated on both Indian Allotment land (Section 18) and privately-owned land (Section 19). The former ore-mining operations occurred on all 69 acres and included numerous pits. The pits were reclaimed in 1991 and are no longer present at the AUM. The AUM was screened in 2008 by EPA for surface gamma activity, at which time elevated gamma activity was found at the AUM.

13. The Bibo Trespass AUM encompasses approximately 22 acres, and comprises the northwestern portion of the removal assessment area. The geographic coordinates for the approximate center of the Bibo Trespass AUM are 35.349522 North latitude and 107.94863 West longitude. The AUM is located on federal land administered by the Bureau of Indian Affairs ("BIA"). The former ore-mining operations included at least one pit. The pit was reclaimed in 1992, and is no longer present at the Site. The AUM was screened in 2008 by EPA for surface gamma activity, at which time elevated gamma activity was found at the AUM.

14. The Section 24 AUM encompasses approximately 27 acres, and comprises the southwestern portion of the removal assessment area. The geographic coordinates for the approximate center of the Section 24 AUM are 35.346544 North latitude and 107.947928 West longitude. The AUM is located on Indian Allotment land. The former ore-mining operations included at least three pits. The pits were reclaimed in 1991 and are no longer present at the AUM. The AUM was screened in 2008 by EPA for surface gamma activity, at which time elevated gamma activity was found at the AUM.

15. In 1952, Santa Fe Pacific Railroad Company ("SFPR") formed the Haystack Mountain Development Company ("HMDC"), which began exploration of uranium deposits in limestone at the Haystack Butte. HMDC conducted mining operations on a portion of the Haystack Mines Site during 1952-1957, 1959-1961, and 1963-1965.

16. In 1987, HMDC merged into the Atchison, Topeka and Santa Fe Railway Company. On December 31, 1996, the Atchison, Topeka and Santa Fe Railway Company merged into Burlington Northern Railroad Company and the surviving company was called Burlington Northern and Santa Fe Railway Company. In 2005, the Burlington Northern and Santa Fe Railway Company changed its name to BNSF Railway Company.

17. At the time uranium ore was mined on Section 19, Township 13N, Range 10W, SFPR owned the mineral rights to Section 19. SFPR is a subsidiary of BNSF Railway Company.

18. In 1990, EPA conducted a preliminary radiological assessment at the Bluewater Uranium Mine Sites, which included the areas known as Brown-Vandever and Nan-a-bah Vandever mines (aliases for the mines at the Haystack Mines Site). EPA issued an action memorandum in 1991 to address hazards at the four parcels that included the mines. EPA conducted response actions at the two Indian allotment parcels (Section 24 and Section 18). In addition, EPA conducted work on Section 13 pursuant to an Interagency Agreement with the Department of Energy. EPA also issued an administrative order to the Cerrillos Land Company, the Santa Fe Pacific Railroad Company, and the Atchison, Topeka & Santa Fe Railway Company to conduct hazard reclamation on Section 19. Following the work conducted in 1991 and 1992 on the four parcels, EPA concluded at that time that the areas had been reclamated to levels protective of public health.

19. Between August 10 and 20, 2014, EPA performed a surface gamma activity scan and collected surface and subsurface soil samples and co-located one-minute surface gamma activity counts at the removal assessment area. A summary of the Radium 226 ("Ra-226") analytical data for surface and subsurface soil samples and the co-located one-minute surface gamma activity counts is presented in the Removal Assessment Report. Elevated concentrations of Ra-226 in surface soil were found at certain locations throughout the Site, including in the one-acre area surrounding the residence.

20. As described above, Ra-226 has been documented in soils at the Site. Radium is formed when uranium and thorium break down in the environment. Two of the main radium isotopes found in the environment are radium-226 and radium-228. During the decay process, alpha, beta, and gamma ionizing radiation are released. Radium may be found in air and water. Radium in the soil may be absorbed by plants.

21. Analytical results indicate that concentrations of Ra-226 identified in some soils at the Site are elevated and may pose a potential threat to human health and the environment. Acute inhalation exposure to high levels of radium can cause adverse effects to the blood (anemia) and eyes (cataracts). Radium exposure also has been shown to affect the teeth, causing an increase in broken teeth and cavities. Exposure to high levels of radium can result in an increased incidence of bone, liver, and breast cancer. EPA and the National Academy of Sciences, Committee on Biological Effects of Ionizing Radiation, has stated that radium is a known human carcinogen (ATSDR 1999a). Inhalation of radium contaminated particulates is of particular concern. Radium emits alpha radiation, which, when inhaled, becomes a source of ionizing radiation in the lung and throat, possibly leading to toxic effects.

22. Some of the soils containing elevated concentrations of Ra-226 are fine-grained and therefore could potentially result in human exposure via inhalation or ingestion. The Site contamination is readily accessible to onsite full-time residents and potentially to nearby offsite residents. Persons occupying or traversing the Site may be exposed to contaminated dust by inhalation or ingestion of contamination sorbed to particulate matter. Incidences of direct contact with natural and mechanically generated dust during such activities accounts for known

contamination exposure scenarios at the Site. Ra-226 and uranium may be entrained in naturally and mechanically generated dust and/or transported on shoes and clothing of residents passing over contaminated areas. Gardening and other yard work, including gathering traditional herbs and plants, also may result in exposure to contamination.

23. Activities that occur in contaminated areas that may put persons at risk include walking or hiking, livestock grazing, and different modes of transportation including all- terrain vehicles, motorcycles, or horses. Persons may drive their vehicles over contaminated areas as well, which could contribute to exposure pathways via dust generation. Children may eat contaminated soils during play activities. In addition, Navajo ceremonies conducted on grazing land may also put persons at risk.

24. Contamination documented in soils at the Site may migrate off-site via wind and water transport mechanisms including mechanical dust generation. Some of the radium daughter particles, such as radon, also have a specific tendency to adhere to dust particles and migrate.

25. Rainfall events may lead to transport of the contamination from the Site. High soil erosion rates may indicate transport of contamination from the Site constituting a release of hazardous substances and resulting in secondary contamination sources. In addition, contaminants may migrate during high wind events due to the propensity for contaminants to adhere to windborne dust particles.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

26. Based on the Findings of Fact set forth above, and the administrative record, EPA has determined that:

a. The Haystack Mines Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a). Respondent was an "owner" and/or "operator" of the facility at the time of disposal of hazardous substances at the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2).

e. The conditions described in Paragraphs 20-25 of the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance at or from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

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f. The conditions described in the Findings of Fact above constitute an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from the facility within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

g. The removal action required by this Settlement is necessary to protect the public health, welfare, or the environment and, if carried out in compliance with the terms of this Settlement, will be consistent with the NCP, as provided in Section 300.700(c)(3)(ii) of the NCP.

VI. SETTLEMENT AGREEMENT AND ORDER

27. Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the administrative record, it is hereby Ordered and Agreed that Respondent shall comply with all provisions of this Settlement, including, but not limited to, all attachments to this Settlement and all documents incorporated by reference into this Settlement.

VII. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR, AND ON-SCENE COORDINATOR

28. Respondent shall retain one or more contractors to perform the Work and shall notify EPA of the name(s) and qualifications of such contractor(s) within fifteen days after the Effective Date. Respondent shall also notify EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least ten days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondent. If EPA disapproves of a selected contractor, Respondent shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within ten days after EPA's disapproval. With respect to any proposed contractor, Respondent shall demonstrate that the proposed contractor demonstrates compliance with ASQ/ANSI E4:2014 "Quality management systems for environmental information and technology programs – Requirements with guidance for use" (American Society for Quality, February 2014), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, Reissued May 2006) or equivalent documentation as determined by EPA. The qualifications of the persons undertaking the Work for Respondent shall be subject to EPA's review for verification that such persons meet minimum technical background and experience requirements.

29. Respondent has designated, and EPA has not disapproved, the following individual as Project Coordinator, who shall be responsible for administration of all actions by Respondent required by this Settlement:

Mike W. Makerov
BNSF Railway Company
740 E. Carnegie Drive
San Bernardino, CA 92408
(909) 386-4081

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Mike.makerov@bnsf.com

To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. Notice or communication relating to this Settlement from EPA to Respondent's Project Coordinator shall constitute notice or communication to Respondent.

30. EPA has designated Steve Calanog of the Emergency Response, Preparedness, & Prevention Branch, Region IX, as the On-Scene Coordinator (OSC) and Warren Zehner, of the Emergency Management Branch, Region VI, as the Alternate On-Scene Coordinator. Except as otherwise provided in this Settlement, Respondent shall direct all submissions required by this Settlement to both of these On-Scene Coordinators (collectively, "the EPA On-Scene Coordinators" or "OSCs"). EPA and Respondent shall have the right, subject to Paragraph 29, to change their respective designated OSC or Project Coordinator. Respondent shall notify EPA ten days before such a change is made. The initial notification by Respondent may be made orally, but shall be promptly followed by a written notice.

31. The OSC shall be responsible for overseeing Respondent's implementation of this Settlement. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement, or to direct any other removal action undertaken at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

VIII. WORK TO BE PERFORMED

32. Respondent shall perform, at a minimum, the following:

a. Prepare a Removal Work Plan ("Work Plan"), including a Work Plan schedule;

b. Within 45 days of the Effective Date, complete and submit to EPA a cultural resources survey that evaluates whether or not cultural resources are present on the Affected Property and whether or not the Work required under this Settlement will have an effect on such resources;

c. Within 15 days of the Effective Date, request information on biological resources located on the Affected Property from U.S. Fish and Wildlife Service ("USFWS"), New Mexico Department of Game and Fish, and from Navajo Natural Heritage Program. Within 30 days of receipt of such information, if necessary, prepare a Biological Evaluation pursuant to Navajo Nation Department of Fish & Wildlife's ("NNDFW") Biological Resource Land Use Policies and Procedures (RCS-44-08). If species of concern are identified, Respondent shall work with EPA, USFWS, and NNDFW to resolve any potential impacts before on-site work begins.;

d. Participate in community involvement activities, as directed by EPA, pursuant to Paragraph 38;

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e. Provide temporary alternative housing to impacted residents as necessary during removal activities, as determined by EPA, and pay for all associated costs;

f. Construct/improve access roads to all AUM site areas as necessary to conduct the Work;

g. Secure a water supply for dust suppression activities as necessary to conduct the Work, as determined by EPA;

h. Develop and implement an effluent dust monitoring program to prevent offsite release of contaminated particulate;

i. Develop and implement a site wide traffic plan;

j. In each of the six areas of concern described below and depicted and bounded in red on Haystack AOC Figure 1, attached as Appendix B, excavate material to the maximum depth indicated below for each area, or to a depth at which a post-removal survey of the area yields a gamma count of less than 75,000 counts per minute as measured by a Ludlum 2241 with a 3x3 probe as indicated in the post-removal confirmation plan. Excavation shall be further limited to the top of bedrock or refusal, whichever is shallower. Restoration shall be implemented in all areas of concern, as appropriate, and such activities shall be included in the EPA-approved restoration plan.;

(1) North East Access Road. Work in this area shall include visual identification, based on EPA's Removal Assessment Report and associated scans, and removal of surficial soil piles located along the southern fence line of the entrance road leading from Red Mountain Road (County Road 41) to the residences to a maximum depth of one foot below ground surface ("bgs").

(2) North East Drainage. Work in this area shall include visual identification, based on EPA's Removal Assessment Report and associated scans, and removal of surficial ore-bearing waste rock along an approximately 100 foot section of drainage north of the northeast access road to its end point at County Road 41 to a maximum depth of one foot bgs.

(3) Residential Area. Work in this area shall include visual identification, based on EPA's Removal Assessment Report and associated scans, and removal of surficial ore-bearing waste rock in the area surrounding the residence located near the southwest corner of Section 18, and the one-acre area surrounding the residence, including excavation to a maximum depth of two feet bgs.

(4) Western Drainage 2/Road. Work in this area shall include visual identification, based on EPA's Removal Assessment Report and associated scans, and removal of surficial ore-bearing waste rock along approximately 100 feet of road, including excavation to a maximum depth of two feet bgs.

(5) Western Drainage 1. Work in this area shall include visual identification, based on EPA's Removal Assessment Report and associated scans, and removal of surficial ore-bearing rock, including excavation to a maximum depth of one foot bgs.

(6) East Stockpile. Work in this area (approximately 50 feet x 50 feet) shall include a pre-removal site gamma-count survey. The survey plan is subject to EPA approval as part of the required Sampling and Analysis Plan, described in Paragraph 37. If EPA determines that a time-critical removal action is needed in this area based on EPA's evaluation of the survey, Respondent shall excavate to a maximum depth of two feet bgs.

k. Design and construct a temporary consolidated waste pile(s) as appropriate and as approved in the Work Plan. The design for any consolidated waste pile(s) shall have an approved erosion plan.

l. Develop and implement a confirmation survey and sampling plan. A randomized sampling approach based on the Multi-Agency Radiation Survey and Site Investigation Manual ("MARSSIM") will be used to obtain at least 10 randomized gamma count readings in each area of concern to establish post-removal conditions. These randomized measurements will be based on a grid system developed as part of the confirmation survey plan using MARSSIM.;

m. Design and implement a restoration plan on all excavated or impacted areas based on construction activities. Application of backfill and/or cover may be used to mitigate some areas post removal pursuant to the restoration plan, upon EPA approval. Additionally, ensure that the restoration plan takes into account potential future response actions;

n. Construct a fence and post signs around any consolidated pile(s) as appropriate, reinforce existing fences, and place new signage;

o. Demobilize site; and

p. Provide a Removal Completion Report.

33. For any regulation or guidance referenced in the Settlement, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Work only after Respondents receive notification from EPA of the modification, amendment, or replacement.

34. Work Plan and Implementation.

a. Within 45 days after the Effective Date, in accordance with Paragraph 35 (Submission of Deliverables), Respondent shall submit to EPA for approval a draft work plan for performing the time-critical removal action (the "Removal Work Plan") generally described in

Paragraph 32 above. The draft Removal Work Plan shall provide a description of, and an expeditious schedule for the actions required by this Settlement.

b. EPA may approve, disapprove, require revisions to, or modify the draft Removal Work Plan in whole or in part, provided such revisions do not materially expand the scope of work to be performed as described in this Agreement. If EPA requires revisions, Respondent shall submit a revised draft Work Plan within ten business days after receipt of EPA's notification of the required revisions. Respondent shall implement the Work Plan as approved in writing by EPA in accordance with the schedule approved by EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be incorporated into and become fully enforceable under this Settlement.

c. Upon approval or approval with modifications of the Work Plan, Respondent shall commence implementation of the Work in accordance with the schedule included therein, provided that all access agreements required by Paragraph 43 have been obtained, or access has otherwise been secured by EPA, to accomplish the work described in Paragraph 32 above. Respondent shall not commence any Work except in conformance with the terms of this Settlement.

d. Unless otherwise provided in this Settlement, any additional deliverables that require EPA approval under the Work Plan shall be reviewed and approved by EPA in accordance with this Paragraph.

35. Submission of Deliverables.

a. General Requirements for Deliverables.

(1) Except as otherwise provided in this Settlement, Respondent shall direct all submissions required by this Settlement to the OSC at Steve Calanog, EPA, Region IX, 75 Hawthorne St., San Francisco, CA 94105, calanog.steve@epa.gov, (415) 972-3075, with a copy to Warren Zehner, EPA 6 Regional Laboratory, 10625 Fallstone, Houston, TX 77099, Zehner.warren@epa.gov, (214) 789-1585. Respondent shall submit all deliverables required by this Settlement to EPA in accordance with the schedule set forth in the Work Plan. At the same time that Respondent submits deliverables to EPA, Respondent shall send a copy of such deliverables to Dr. Donald Benn, Executive Director, NNEPA, P.O. Box 339, Window Rock, AZ 86515, donbenn@navajo-nsn.gov.

(2) Respondent shall submit all deliverables in electronic form. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5" by 11", Respondent shall also provide EPA with paper copies of such exhibits.

b. Technical Specifications for Deliverables.

(1) Sampling and/or monitoring data should be submitted in standard regional Electronic Data Deliverable (EDD) format. https://www.epaosc.org/sites/ScribeGIS/files/Scribe_EDD_Templates.zip - additional

information about SCRIBE can be found here: www.epaosc.org/Scribe. Other delivery methods may be allowed if electronic direct submission presents a significant burden or as technology changes.

(2) Spatial data, including spatially-referenced data and geospatial data, should be submitted: (a) in the ESRI File Geodatabase format; and (b) as unprojected geographic coordinates in decimal degree format using North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) as the datum. If applicable, submissions should include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data should be accompanied by metadata, and such metadata should be compliant with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor (EME), complies with these FGDC and EPA metadata requirements and is available at https://edg.epa.gov/EME/.

(3) Each file must include an attribute name for each site unit or sub-unit submitted. Consult http://www.epa.gov/geospatial/policies.html for any further available guidance on attribute identification and naming.

(4) Spatial data submitted by Respondent does not, and is not intended to, define the boundaries of the Site.

36. Health and Safety Plan.

a. Within 30 days after the Effective Date, Respondent shall submit for EPA review and comment a plan that ensures the protection of the public health and safety during performance of on-site work under this Settlement. This plan shall be prepared in accordance with "OSWER Integrated Health and Safety Program Operating Practices for OSWER Field Activities," Pub. 9285.0-OIC (Nov. 2002), available on the NSCEP database at http://www.epa.gov/nscep/index.html, and "EPA's Emergency Responder Health and Safety Manual," OSWER Directive 9285.3-12 (July 2005 and updates), available at http://www.epaosc.org/_HealthSafetyManual/manual-index.htm. In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 C.F.R. Part 1910. If EPA determines that it is appropriate, the plan shall also include contingency planning.

37. Quality Assurance, Sampling, and Data Analysis.

a. Respondent shall use quality assurance, quality control, and other technical activities and chain of custody procedures, if applicable, for all samples consistent with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001, reissued May 2006), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/240/R-02/009, December 2002), and "Uniform Federal Policy for Quality Assurance Project Plans," Parts 1-3, EPA/505/B-04/900A-900C (March 2005).

b. Sampling and Analysis Plan. Within 45 days after the Effective Date, Respondent shall submit a Sampling and Analysis Plan to EPA for review and approval. This plan shall consist of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP) that is consistent with the Removal Work Plan, the NCP and applicable guidance documents, including, but not limited to, "Guidance for Quality Assurance Project Plans (QA/G-5)" EPA/240/R-02/009 (December 2002), "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" EPA 240/B-01/003 (March 2001, reissued May 2006), and "Uniform Federal Policy for Quality Assurance Project Plans," Parts 1-3, EPA/505/B-04/900A-900C (March 2005). Upon its approval by EPA, the Sampling and Analysis Plan shall be incorporated into and become enforceable under this Settlement.

c. If soil sampling is conducted, Respondent shall ensure that EPA personnel and EPA's authorized representatives are allowed access at reasonable times to all laboratories utilized by Respondent in implementing this Settlement. In addition, Respondent shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance, quality control, and technical activities that will satisfy the stated performance criteria as specified in the QAPP and that sampling and field activities are conducted in accordance with EPA's "Field Operations Group Operational Guidelines for Field Activities" (http://www.epa.gov/region8/qa/FieldOperationsGroupOperationalGuidelinesForFieldActivities.pdf) and "EPA QA Field Activities Procedure" (http://www.epa.gov/irmpoli8/policies/2105-p-02.pdf). Respondent shall ensure that the laboratories it utilizes for the analysis of samples taken pursuant to this Settlement meet the competency requirements set forth in EPA's "Policy to Assure Competency of Laboratories, Field Sampling, and Other Organizations Generating Environmental Measurement Data under Agency-Funded Acquisitions" (http://www.epa.gov/fem/pdfs/fem-lab-competency-policy.pdf) and that the laboratories perform all analyses according to accepted EPA methods. Accepted EPA methods consist of, but are not limited to, methods that are documented in the EPA's Contract Laboratory Program (http://www.epa.gov/superfund/programs/clp/), SW 846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm), "Standard Methods for the Examination of Water and Wastewater" (http://www.standardmethods.org/), 40 C.F.R. Part 136, "Air Toxics - Monitoring Methods" (http://www.epa.gov/ttnamti1/airtox.html)."

d. However, upon approval by EPA, Respondent may use other appropriate analytical method(s), if soil sampling is conducted, as long as (i) quality assurance/quality control (QA/QC) criteria are contained in the method(s) and the method(s) are included in the QAPP, (ii) the analytical method(s) are at least as stringent as the methods listed above, and (iii) the method(s) have been approved for use by a nationally recognized organization responsible for verification and publication of analytical methods, e.g., EPA, ASTM, NIOSH, OSHA, etc. Respondent shall ensure that all laboratories it uses for analysis of samples taken pursuant to this Settlement have a documented Quality System that complies with ASQ/ANSI E4:2014 "Quality management systems for environmental information and technology programs - Requirements with guidance for use" (American Society for Quality, February 2014), and "EPA Requirements for Quality Management Plans (QA/R-2)" EPA/240/B-01/002 (March 2001, reissued May 2006), or equivalent documentation as determined by EPA. EPA may consider Environmental Response

Laboratory Network (ERLN) laboratories, laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP), or laboratories that meet International Standardization Organization (ISO 17025) standards or other nationally recognized programs (http://www.epa.gov/fem/accredit.htm) as meeting the Quality System requirements. Respondent shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Settlement are conducted in accordance with the procedures set forth in the QAPP approved by EPA.

e. Upon request, Respondent shall provide split or duplicate samples to EPA or its authorized representatives, if soil sampling is conducted. Respondent shall notify EPA not less than 7 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall provide to Respondent split or duplicate samples of any samples it takes as part of EPA's oversight of Respondent's implementation of the Work.

f. Respondent shall submit to EPA the results of all sampling and/or tests or other data obtained or generated by or on behalf of Respondent with respect to the Site and/or the implementation of this Settlement.

g. Respondent waives any objections to any data gathered, generated, or evaluated by EPA or Respondent in the performance or oversight of the Work that has been verified according to the QA/QC procedures required by the Settlement or any EPA-approved Work Plans or Sampling and Analysis Plans. If Respondent objects to any other data relating to the Work, Respondent shall submit to EPA a report that specifically identifies and explains its objections, describes the acceptable uses of the data, if any, and identifies any limitations to the use of the data. The report must be submitted to EPA within 15 days after the monthly progress report containing the data.

38. Community Involvement Plan. EPA will prepare a community involvement plan, in accordance with EPA guidance and the NCP. If requested by EPA, Respondent shall participate in community involvement activities pursuant to the plan, including participation in (1) the preparation of information regarding the Work for dissemination to the public, with consideration given to including mass media and/or Internet notification, and (2) public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site. Respondent's support of EPA's community involvement activities may include providing online access to initial submissions and updates of deliverables to (1) any community advisory groups, (2) any technical assistance grant recipients and their advisors, and (3) other entities to provide them with a reasonable opportunity for review and comment. community involvement activities conducted by Respondent at EPA's request are subject to EPA's oversight. At EPA's discretion, Respondent shall establish a community information repository near the Site to house one copy of the administrative record.

39. Post-Removal Site Control. In accordance with the Work Plan schedule, or as otherwise directed by EPA, Respondent shall submit a proposal for Post-Removal Site Control which shall include, but not be limited to: ensuring fence integrity annually, and ensuring erosion control integrity annually. Upon EPA approval, Respondent shall either conduct Post-Removal

Site Control activities, or obtain a written commitment from another party to conduct such activities, until such time as EPA determines that no further Post-Removal Site Control is necessary. Respondent shall provide EPA with documentation of all Post-Removal Site Control commitments.

40. Progress Reports. Respondent shall submit a written progress report to EPA concerning actions undertaken pursuant to this Settlement weekly during field work, and monthly at all other times, or as otherwise requested by EPA, from the date of receipt of EPA's approval of the Work Plan until issuance of Notice of Completion of Work pursuant to Paragraph 111, unless otherwise directed in writing by the OSC. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

41. Final Report. Within 60 days after completion of all Work required by this Settlement, other than continuing obligations listed in Paragraph 111 (Notice of Completion), Respondent shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Settlement. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports." The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Settlement, a listing of quantities and types of materials removed off-Site or handled on-Site, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destination(s) of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a responsible corporate official of Respondent or Respondent's Project Coordinator: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

42. Off-Site Shipments.

a. Respondent may ship hazardous substances, pollutants and contaminants from the Site to an off-Site facility only if it complies with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondent will be deemed to be in compliance with CERCLA Section 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if Respondent obtains a prior determination from EPA that the proposed receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).

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b. Respondent may ship Waste Material from the Site to an out-of-state waste management facility only if, prior to any shipment, it provides written notice to the appropriate state or tribal environmental official in the receiving facility's state or territory and to the OSC. This written notice requirement shall not apply to any off-Site shipments when the total quantity of all such shipments will not exceed ten cubic yards. The written notice must include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. Respondent also shall notify the state or tribal environmental official referenced above and the OSC of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. Respondent shall provide the written notice after the award of the contract for the removal action and before the Waste Material is shipped.

c. Respondent may ship Investigation Derived Waste (IDW) from the Site to an off-Site facility only if it complies with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), 40 C.F.R. § 300.440, EPA's "Guide to Management of Investigation Derived Waste," OSWER 9345.3-03FS (Jan. 1992), and any IDW-specific requirements contained in the Removal Work Plan. Wastes shipped off-Site to a laboratory for characterization, and RCRA hazardous wastes that meet the requirements for an exemption from RCRA under 40 C.F.R. § 261.4(e) shipped off-Site for treatability studies, are not subject to 40 C.F.R. § 300.440.

IX. PROPERTY REQUIREMENTS

43. Agreements Regarding Access and Non-Interference.

a. Respondent shall, with respect to Section 19, use best efforts to secure from the owner(s) of Section 19 ("Section 19 Owner") an agreement, enforceable by Respondent and the EPA, requiring that the Section 19 Owner (i) provide the EPA, Respondent, and their representatives, contractors, and subcontractors with access at all reasonable times to such Affected Property to conduct the Work, and any activity regarding the Settlement, including those activities listed in Paragraph 43.d , and (ii) refrain from using such Affected Property in any manner that EPA determines will pose an unacceptable risk to human health or to the environment due to exposure to Waste Material, or interfere with or adversely affect the implementation, integrity, or protectiveness of the removal action.

b. Respondent shall, with respect to Section 13, use best efforts to obtain from the Department of the Interior, Bureau of Indian Affairs, written consent to provide the EPA, Respondent, and their representatives, contractors, and subcontractors with access at all reasonable times to such Affected Property to conduct any activity regarding the Settlement.

c. Respondent shall, with respect to Section 18, use best efforts to obtain individual access consent forms signed by allottees for each parcel who may be impacted by any activity conducted by Respondent pursuant to this Settlement. Such allottees should, at a minimum, include persons actually residing on the Affected Property, or actively using the Affected Property for purposes such as farming and grazing. Additionally, Respondent shall obtain individual access consent forms signed by any other persons who reside and/or have a

homesite lease on the Affected Property. Respondent shall notify all allottees who have an interest in the Affected Property about the nature and scope of the work to be performed by Respondent at least twenty days before such work begins. The list of allottees with an interest in the Affected Property should be obtained from the Bureau of Indian Affairs ("BIA") Regional Land Office at Crownpoint, New Mexico.

d. Access Requirements. The following is a list of activities for which access is required regarding the Affected Property:

(1) Performing and monitoring the Work;

(2) Verifying any data or information submitted to EPA;

(3) Conducting investigations regarding contamination at or near the Site;

(4) Obtaining samples;

(5) Assessing the need for, planning, implementing, or monitoring response actions;

(6) Assessing implementation of quality assurance and quality control practices as defined in the approved QAPP;

(7) Implementing the Work pursuant to the conditions set forth in Paragraph 83 (Work Takeover);

(8) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondent or its agents, consistent with Section X (Access to Information); and

(9) Assessing Respondent's compliance with the Settlement;

44. Best Efforts. As used in this Section, "best efforts" means the efforts that a reasonable person in the position of Respondent would use so as to achieve the goal in a timely manner, including the cost of employing professional assistance and the payment of reasonable sums of money to secure access and/or use restriction agreements, as required by this Section. If Respondent is unable to accomplish what is required through "best efforts" in a timely manner, Respondent shall notify EPA, and include a description of the steps taken to comply with the requirements. EPA may assist Respondent or take independent action in obtaining such access and/or use restrictions. All costs incurred by the United States in providing such assistance or taking such action, including the cost of attorney time and the amount of monetary consideration or just compensation paid, constitute Future Response Costs to be reimbursed under Section XIV (Payment of Response Costs). Respondent may seek relief under the provisions of Section XVI (Force Majeure) for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any access and/or use restriction agreement, provided that Respondent

has used best efforts to secure such access and/or use restriction agreement as described in this subparagraph.

45. Notwithstanding any provision of the Settlement, EPA retains all of its access authorities and rights, including enforcement authorities related thereto under CERCLA, RCRA, and any other applicable statute or regulations.

X. ACCESS TO INFORMATION

46. Respondent shall provide to EPA, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as "Records") within Respondent's possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Settlement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information regarding the Work. Respondent shall also make available to EPA, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

47. Privileged and Protected Claims.

a. Respondent may assert all or part of a Record requested by EPA is privileged or protected as provided under federal law, in lieu of providing the Record, provided Respondent complies with Paragraph 47.b, and except as provided in Paragraph 47.c.

b. If Respondent asserts such a privilege or protection, it shall provide EPA with the following information regarding such Record: its title; its date; the name, title, affiliation (e.g., company or firm), and address of the author, of each addressee, and of each recipient; a description of the Record's contents; and the privilege or protection asserted. If a claim of privilege or protection applies only to a portion of a Record, Respondent shall provide the Record to EPA in redacted form to mask the privileged or protected portion only. Respondent shall retain all Records that it claims to be privileged or protected until EPA has had a reasonable opportunity to dispute the privilege or protection claim and any such dispute has been resolved in Respondent's favor.

c. Respondent may make no claim of privilege or protection regarding: (1) any data regarding the Site, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological, or engineering data, or the portion of any other Record that evidences conditions at or around the Site; or (2) the portion of any Record that Respondent is required to create or generate pursuant to this Settlement.

48. Business Confidential Claims. Respondent may assert that all or part of a Record provided to EPA under this Section or Section XI (Record Retention) is business confidential to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Respondent shall segregate and clearly identify all Records

or parts thereof submitted under this Settlement for which Respondent asserts business confidentiality claims. Records submitted to EPA determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies Records when they are submitted to EPA, or if EPA has notified Respondent that the Records are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such Records without further notice to Respondent.

49. Notwithstanding any provision of this Settlement, EPA retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

XI. RECORD RETENTION

50. Until ten (10) years after EPA provides Respondent with notice, pursuant to Paragraph 111 (Notice of Completion of Work), that all Work has been fully performed in accordance with this Settlement, Respondent shall preserve and retain all non-identical copies of Records (including Records in electronic form) now in its possession or control, or that come into its possession or control, that relate in any manner to its liability under CERCLA with regard to the Site. Respondent shall also preserve and maintain all Records that relate to the liability of any other person under CERCLA with respect to the Site. Respondent must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any Records (including Records in electronic form) now in its possession or control or that come into its possession or control that relate in any manner to the performance of the Work, provided, however, that Respondent (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Work and not contained in the aforementioned Records required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

51. At the conclusion of the document retention period, Respondent shall notify EPA at least 90 days prior to the destruction of any such Records, and, upon request by EPA, and except as provided in Paragraph 47 (Privileged and Protected Claims), Respondent shall deliver any such Records to EPA.

52. Respondent certifies that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any Records (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA or the State and that it has fully complied with any and all EPA and State requests for information regarding the Site pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927, and state law.

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XII. COMPLIANCE WITH OTHER LAWS

53. Nothing in this Settlement limits Respondent's obligations to comply with the requirements of all applicable state, tribal and federal laws and regulations, except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 6921(e), and 40 C.F.R. §§ 300.400(e) and 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-site actions required pursuant to this Settlement shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) under federal environmental or state or tribal environmental or facility siting laws. Respondent shall identify ARARs in the Removal Work Plan subject to EPA approval.

54. No local, state, tribal, or federal permit shall be required for any portion of the Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work), including studies, if the action is selected and carried out in compliance with Section 121 of CERCLA, 42 U.S.C. § 9621. Where any portion of the Work that is not on-site requires a federal, tribal or state permit or approval, Respondent shall submit timely and complete applications and take all other actions necessary to obtain and to comply with all such permits or approvals. Respondent may seek relief under the provisions of Section XVI (Force Majeure) for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit or approval required for the Work, provided that Respondent has submitted timely and complete applications and taken all other actions necessary to obtain all such permits or approvals. This Settlement is not, and shall not be construed to be, a permit issued pursuant to any federal, tribal or state statute or regulation.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

55. Emergency Response. If any event occurs during performance of the Work that causes or threatens to cause a release of Waste Material on, at, or from the Site that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action to prevent, abate, or minimize such release or threat of release. Respondent shall take these actions in accordance with all applicable provisions of this Settlement, including, but not limited to, the Health and Safety Plan. Respondent shall also immediately notify the OSC and the alternate OSC, or, in the event of their unavailability, the Regional Duty Officer at (415) 947-8120 of the incident or Site conditions. In the event that Respondent fails to take appropriate response action as required by this Paragraph, and EPA takes such action instead, Respondent shall reimburse EPA all costs of the response action not inconsistent with the NCP pursuant to Section XIV (Payment of Response Costs).

56. Release Reporting. Upon the occurrence of any event during performance of the Work that Respondent is required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. § 11004, Respondent shall immediately notify the OSC and the Alternate OSC, or, in the event of their unavailability, the Regional Duty Officer at (415) 947-8120, and the National Response Center at (800) 424-8802. Respondent shall submit a written report to EPA within 7

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days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

XIV. PAYMENT OF RESPONSE COSTS

57. Payments for Future Response Costs. Respondent shall pay to EPA all Future Response Costs not inconsistent with the NCP.

a. Within thirty (30) days of the Effective Date, Respondent shall pay EPA $100,000 in prepayment of Future Response Costs. The total amount paid shall be deposited by EPA in the Haystack Mines Site Special Account, within the EPA Hazardous Substance Superfund. These funds will be used by EPA to conduct or finance future response actions at or in connection with the Site. Any amounts received under this subparagraph will be credited to Respondent in the final accounting pursuant to subparagraph 57.d.

b. Shortfall Payments. If at any time prior to the date EPA sends Respondent the first bill under Paragraph 57.c (Periodic Bills), or one year after the Effective Date, whichever is earlier, the balance in the Haystack Mines Site Special Account falls below $40,000, EPA will so notify Respondent. Respondent shall, within 30 days after receipt of such notice, pay $60,000 to EPA. Payment shall be made in accordance with Paragraphs 57.e and 57.f (Payment for Future Response Costs). The amounts paid shall be deposited by EPA in the Haystack Mines Site Special Account. These funds shall be retained and used by EPA to conduct or finance future response actions at or in connection with the Site.

c. On a periodic basis, EPA will send Respondent a bill requiring payment of Future Response Costs, that includes a cost summary, which includes direct and indirect costs incurred by EPA, its contractors, subcontractors, and the United States Department of Justice. Respondent shall make all payments within 30 days after Respondent's receipt of each bill requiring payment, except as otherwise provided in Paragraph 59 (Contesting Future Response Costs).

d. Unused Amount. After EPA issues the Notice of Completion of Work pursuant to Paragraph 111 and EPA has performed a final accounting of the Haystack Mines Site Special Account (including crediting Respondent for any amounts received under Paragraphs 57.a (Prepayment of Future Response Costs), 57.b (Shortfall Payments), or 57.c (Periodic Bills), EPA will offset the next Future Response Costs bill by the unused amount paid by Respondent pursuant to Paragraphs 57.a (Prepayment of Future Response Costs), 57.b (Shortfall Payments), or 57.c (Periodic Bills).

e. Respondent shall make payment to EPA by Fedwire Electronic Funds Transfer (EFT) to:

Federal Reserve Bank of New York

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ABA = 021030004
Account = 68010727
SWIFT address = FRNYUS33
33 Liberty Street
New York, NY 10045
Field Tag 4200 of the Fedwire message should read "D 68010727 Environmental Protection Agency"

and shall reference Site/Spill ID Number A956/A6LJ and the EPA docket number for this action.

For ACH payment:

Respondent shall make payment to EPA by Automated Clearinghouse (ACH) to:

PNC Bank
808 17th Street, NW
Washington, DC 20074
Contact – Jesse White 301-887-6548
ABA = 051036706
Transaction Code 22 - checking
Environmental Protection Agency
Account 310006
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and shall reference Site/Spill ID Number A956/A6LJ and the EPA docket number for this action.

For online payment:

Respondent shall make payment at https://www.pay.gov to the U.S. EPA account in accordance with instructions to be provided to Respondent by EPA.

f. At the time of payment, Respondent shall send notice that payment has been made to On Scene Coordinator Steve Calanog, 75 Hawthorne St, SFD-9-2, U.S. Environmental Protection Agency, San Francisco, CA 94105, and to the EPA Cincinnati Finance Office by email at cinwd_acctsreceivable@epa.gov, or by mail to

EPA Cincinnati Finance Office
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

Such notice shall reference Site/Spill ID Number A956/A6LJ and the EPA docket number for this action.

g. Deposit of Future Response Costs Payments. The total amount to be paid by Respondent pursuant to Paragraphs 57.a, 57.b, and 57.c shall be deposited by EPA in the Haystack Mines Site Special Account to be retained and used to conduct or finance response

actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund, provided, however, that EPA may deposit a Future Response Costs payment directly into the EPA Hazardous Substance Superfund if, at the time the payment is received, EPA estimates that the Haystack Mines Site Special Account balance is sufficient to address currently anticipated future response actions to be conducted or financed by EPA at or in connection with the Site. Any decision by EPA to deposit a Future Response Costs payment directly into the EPA Hazardous Substance Superfund for this reason shall not be subject to challenge by Respondent pursuant to the dispute resolution provisions of this Settlement or in any other forum.

58. Interest. In the event that any payment for Future Response Costs is not made by the date required, Respondent shall pay Interest on the unpaid balance. The Interest on pre-paid Future Response Costs shall begin to accrue on the Effective Date. The interest on all subsequent Future Response Costs shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Respondent's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondent's failure to make timely payments under this Section, including but not limited to, payment of stipulated penalties pursuant to Paragraph 70 (Stipulated Penalties - Work).

59. Contesting Future Response Costs. Respondent may initiate the procedures of Section XV (Dispute Resolution) regarding payment of any Future Response Costs billed under Paragraph 57.c if Respondent determines that EPA has made a mathematical error or included a cost item that is not within the definition of Future Response Costs, or if it believes EPA incurred excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP. Such Notice of Dispute shall be submitted in writing within 30 days after receipt of the bill and must be sent to the OSC. Any such Notice of Dispute shall specifically identify the contested Future Response Costs and the basis for objection. If Respondent submits a Notice of Dispute, Respondent shall within the 30-day period pay all uncontested Future Response Costs to EPA in the manner described in Paragraph 57.e. Simultaneously, Respondent shall establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the Federal Deposit Insurance Corporation (FDIC), and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Respondent shall send to the OSC a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. If EPA prevails in the dispute, within 5 days after the resolution of the dispute, Respondent shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 57.e. If Respondent prevails concerning any aspect of the contested costs, Respondent shall pay that portion of the costs (plus associated accrued interest) for which it did not prevail to EPA in the manner described in Paragraph 57.e. Respondent shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XV (Dispute Resolution) shall be the

exclusive mechanisms for resolving disputes regarding Respondent's obligation to reimburse EPA for its Future Response Costs.

XV. DISPUTE RESOLUTION

60. Unless otherwise expressly provided for in this Settlement, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement. The Parties shall attempt to resolve any disagreements concerning this Settlement expeditiously and informally.

61. Informal Dispute Resolution. If Respondent objects to any EPA action taken pursuant to this Settlement, including but not limited to disputes over billings for Future Response Costs, Respondent shall send EPA a written Notice of Dispute describing the objection(s) within 20 days after such action. EPA and Respondent shall have 20 days from EPA's receipt of Respondent's Notice of Dispute to resolve the dispute through informal negotiations (the "Negotiation Period"). The Negotiation Period may be extended at the sole discretion of EPA. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Settlement.

62. Formal Dispute Resolution. If the Parties are unable to reach an agreement within the Negotiation Period, Respondent shall, within 20 days after the end of the Negotiation Period, submit a statement of position to the OSC. EPA may, within 20 days thereafter, submit a statement of position. Thereafter, an EPA management official at the Region IX Assistant Division Director level or higher or at the Region VI Division Director level or higher will issue a written decision on the dispute to the Parties. EPA's decision shall be incorporated into and become an enforceable part of this Settlement. Following resolution of the dispute, as provided by this Section, Respondent shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs.

63. Except as provided in Paragraph 59 (Contesting Future Response Costs) or as agreed by EPA, the invocation of formal dispute resolution procedures under this Section does not extend, postpone, or affect in any way any obligation of Respondent under this Settlement. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 73. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Settlement. In the event that Respondent does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XVII (Stipulated Penalties).

XVI. FORCE MAJEURE

64. "Force Majeure" for purposes of this Settlement, is defined as any event arising from causes beyond the control of Respondent, of any entity controlled by Respondent, or of Respondent's contractors that delays or prevents the performance of any obligation under this Settlement despite Respondent's best efforts to fulfill the obligation. The requirement that

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Respondent exercises "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. "Force majeure" does not include financial inability to complete the Work or increased cost of performance.

65. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement for which Respondent intends or may intend to assert a claim of force majeure, Respondent shall notify EPA's OSC orally or, in his or her absence, the alternate EPA OSC, or, in the event both of EPA's designated representatives are unavailable, the Director of the Superfund Division, EPA Region IX, and the Director of the Superfund Division, EPA Region VI, within seven days of when Respondent first knew that the event might cause a delay. Within five days thereafter, Respondent shall provide in writing to EPA an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondent's rationale for attributing such delay to a force majeure; and a statement as to whether, in the opinion of Respondent, such event may cause or contribute to an endangerment to public health or welfare, or the environment. Respondent shall include with any notice all available documentation supporting its claim that the delay was attributable to a force majeure. Respondent shall be deemed to know of any circumstance of which Respondent, any entity controlled by Respondent, or Respondent's contractors knew or should have known. Failure to comply with the above requirements regarding an event shall preclude Respondent from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite the late or incomplete notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 64 and whether Respondent has exercised its best efforts under Paragraph 64, EPA may, in its unreviewable discretion, excuse in writing Respondent's failure to submit timely or complete notices under this Paragraph.

66. If EPA agrees that the delay or anticipated delay is attributable to a force majeure, the time for performance of the obligations under this Settlement that are affected by the force majeure will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure, EPA will notify Respondent in writing of its decision. If EPA agrees that the delay is attributable to a force majeure, EPA will notify Respondent in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure.

67. If Respondent elects to invoke the dispute resolution procedures set forth in Section XV (Dispute Resolution), Respondent shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, Respondent shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure, that the duration of the delay or the extension sought was or will be warranted

under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Respondent complied with the requirements of Paragraphs 64 and 65. If Respondent carries this burden, the delay at issue shall be deemed not to be a violation by Respondent of the affected obligation of this Settlement identified to EPA.

68. The failure by EPA to timely complete any obligation under the Settlement is not a violation of the Settlement, provided, however, that if such failure prevents Respondent from meeting one or more deadlines under the Settlement, Respondent may seek relief under this Section.

XVII. STIPULATED PENALTIES

69. Respondent shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 70 and 71 for failure to comply with the requirements of this Settlement specified below, unless excused under Section XVI (Force Majeure). "Compliance" by Respondent shall include completion of all activities and obligations, including payments, required under this Settlement, or any deliverable approved under this Settlement, in accordance with all applicable requirements of law, this Settlement, and any deliverables approved under this Settlement and within the specified time schedules established by and approved under this Settlement.

70. Stipulated Penalty Amounts - Work (Including Payments and Excluding Deliverables).

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 70.b:

Penalty Per Violation Per Day	Period of Noncompliance
$1,500	1st through 14th day
$2,000	15th through 30th day
$3,500	31st day and beyond

b. Compliance Milestones.

(1) Respondent's failure to pay billed Future Response Costs as required by Paragraph 5757.c.

(2) Failure to use best efforts to secure access agreements or consent to access pursuant to Paragraph 43.

(3) Establishment and maintenance of financial assurance in compliance with the timelines and other substantive and procedural requirements of Section XXV (Financial Assurance).

71. Stipulated Penalty Amounts - Deliverables. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate deliverables pursuant to this Settlement:

Penalty Per Violation Per Day	Period of Noncompliance
$750	1st through 14th day
$1,500	15th through 30th day
$2,500	31st day and beyond

72. In the event that EPA assumes performance of all or any portion(s) of the Work pursuant to Paragraph 83 (Work Takeover), Respondent shall be liable for a stipulated penalty in the amount of $25,000. Stipulated penalties under this Paragraph are in addition to the remedies available to EPA under Paragraphs 83 (Work Takeover) and 105 (Access to Financial Assurance).

73. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. Penalties shall continue to accrue during any dispute resolution period, and shall be paid within 15 days after the agreement or the receipt of EPA's decision or order. However, stipulated penalties shall not accrue: (a) with respect to a deficient submission under Paragraph 34 (Work Plan and Implementation), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Respondent of any deficiency; and (b) with respect to a decision by the EPA Management Official at the Assistant Division Director level or higher, under Paragraph 62 of Section XV (Dispute Resolution), during the period, if any, beginning the 21st day after the Negotiation Period begins until the date that the EPA Management Official issues a final decision regarding such dispute. Nothing in this Settlement shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement.

74. Following EPA's determination that Respondent has failed to comply with a requirement of this Settlement, EPA may give Respondent written notification of the failure and describe the noncompliance. EPA may send Respondent a written demand for payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Respondent of a violation.

75. All penalties accruing under this Section shall be due and payable to EPA within 30 days after Respondent's receipt from EPA of a demand for payment of the penalties, unless Respondent invokes the Dispute Resolution procedures under Section XV (Dispute Resolution) within the 30-day period. All payments to EPA under this Section shall indicate that the payment is for stipulated penalties and shall be made in accordance with Paragraph 57.e (Payments for Future Response Costs).

76. If Respondent fails to pay stipulated penalties when due, Respondent shall pay Interest on the unpaid stipulated penalties as follows: (a) if Respondent has timely invoked dispute resolution such that the obligation to pay stipulated penalties has been stayed pending the outcome of dispute resolution, Interest shall accrue from the date stipulated penalties are due pursuant to Paragraph 73 until the date of payment; and (b) if Respondent fails to timely invoke dispute resolution, Interest shall accrue from the date of demand under Paragraph 75 until the

date of payment. If Respondent fails to pay stipulated penalties and Interest when due, the United States may institute proceedings to collect the penalties and Interest.

77. The payment of penalties and Interest, if any, shall not alter in any way Respondent's obligation to complete the performance of the Work required under this Settlement.

78. Nothing in this Settlement shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondent's violation of this Settlement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(*l*) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(*l*), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), provided however, that EPA shall not seek civil penalties pursuant to Section 106(b) or Section 122(*l*) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided in this Settlement, except in the case of a willful violation of this Settlement or in the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 83 (Work Takeover).

79. Notwithstanding any other provision of this Section, EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Settlement.

XVIII. COVENANTS BY EPA

80. Except as provided in Section XIX (Reservations of Rights by EPA), EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for the Work, and Future Response Costs. These covenants shall take effect upon the Effective Date. These covenants are conditioned upon the complete and satisfactory performance by Respondent of its obligations under this Settlement. These covenants extend only to Respondent and do not extend to any other person.

XIX. RESERVATIONS OF RIGHTS BY EPA

81. Except as specifically provided in this Settlement, nothing in this Settlement shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing in this Settlement shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.

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82. The covenants set forth in Section XVIII (Covenants by EPA) do not pertain to any matters other than those expressly identified therein. EPA reserves, and this Settlement is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:

a. liability for failure by Respondent to meet a requirement of this Settlement;

b. liability for costs not included within the definition of Future Response Costs;

c. liability for performance of response actions other than the Work;

d. criminal liability;

e. liability for violations of federal or state law that occur during or after implementation of the Work;

f. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

g. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

h. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site not paid as Future Response Costs under this Settlement.

83. Work Takeover.

a. In the event EPA determines that Respondent: (1) has ceased implementation of any portion of the Work; (2) is seriously or repeatedly deficient or late in its performance of the Work; or (3) is implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA may issue a written notice ("Work Takeover Notice") to Respondent. Any Work Takeover Notice issued by EPA (which writing may be electronic) will specify the grounds upon which such notice was issued and will provide Respondent a period of 3 days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the 3-day notice period specified in Paragraph 83.a, Respondent has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portion(s) of the Work as EPA deems necessary ("Work Takeover"). EPA will notify Respondent in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 83.b. Funding of Work Takeover costs is addressed under Paragraph 105 (Access to Financial Assurance).

c. Respondent may invoke the procedures set forth in Paragraph 62 (Formal Dispute Resolution) to dispute EPA's implementation of a Work Takeover under Paragraph 83.b. However, notwithstanding Respondent's invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Work Takeover under Paragraph 83.b until the earlier of (1) the date that Respondent remedies, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, or (2) the date that a written decision terminating such Work Takeover is rendered in accordance with Paragraph 62 (Formal Dispute Resolution).

d. Notwithstanding any other provision of this Settlement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XX. COVENANTS BY RESPONDENT

84. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, Future Response Costs, and this Settlement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the EPA Hazardous Substance Superfund through Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claims under Sections 107 and 113 of CERCLA, Section 7002(a) of RCRA, 42 U.S.C. § 6972(a), or state law regarding the Work, Future Response Costs, and this Settlement;

c. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the New Mexico Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, or at common law.

d. any direct or indirect claim for return of unused amounts from the Haystack Mines Site Special Account, except for unused amounts that EPA determines shall be returned to Respondent in accordance with Paragraph 57.d (Unused Amount).

85. These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to any of the reservations set forth in Section XIX (Reservations of Rights by EPA), other than in Paragraph 82.a (liability for failure to meet a requirement of the Settlement), 82.d (criminal liability), or 82.e (violations of federal/state law during or after implementation of the Work), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

86. Notwithstanding the foregoing, this Settlement shall not bar or have any effect on claims, causes of action or defenses that Respondent has or may have pursuant to CERCLA against the United States or any of its agencies or departments, other than EPA, based on their

alleged status as a potentially responsible party pursuant to CERCLA, 42 U.S.C. §9607(a), relating to the Work, Future Response Costs, or this Settlement Agreement.

87. Nothing in this Settlement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

88. Respondent reserves, and this Settlement is without prejudice to, its rights to bring claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, and brought pursuant to any statute other than CERCLA or RCRA and for which the waiver of sovereign immunity is found in a statute other than CERCLA or RCRA, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States, as that term is defined in 28 U.S.C. § 2671, while acting within the scope of his or her office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, the foregoing shall not include any claim based on EPA's selection of response actions, or the oversight or approval of Respondent's deliverables or activities.

XXI. OTHER CLAIMS

89. By issuance of this Settlement, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent. The United States or EPA shall not be deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement.

90. Except as expressly provided in Section XVIII (Covenants by EPA), nothing in this Settlement constitutes a satisfaction of or release from any claim or cause of action against Respondent or any person not a party to this Settlement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages, and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

91. No action or decision by EPA pursuant to this Settlement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XXII. EFFECT OF SETTLEMENT/CONTRIBUTION

92. Nothing in this Settlement shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Settlement. Except as provided in Section XX (Covenants by Respondent), each of the Parties expressly reserves any and all rights, defenses (e.g. divisibility and apportionment), claims, demands, and causes of action (including those under CERCLA) which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto. Nothing in this Settlement diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of

CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

93. The Parties agree that this Settlement constitutes an administrative settlement pursuant to which Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), and is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, or as may be otherwise provided by law, for the "matters addressed" in this Settlement. The "matters addressed" in this Settlement are the Work, and Future Response Costs.

94. The Parties further agree that this Settlement constitutes an administrative settlement pursuant to which Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B).

95. Respondent shall, with respect to any suit or claim brought by it for matters related to this Settlement, notify EPA in writing no later than 60 days prior to the initiation of such suit or claim. Respondent also shall, with respect to any suit or claim brought against it for matters related to this Settlement, notify EPA in writing within 10 days after service of the complaint or claim upon it. In addition, Respondent shall notify EPA within 10 days after service or receipt of any Motion for Summary Judgment and within 10 days after receipt of any order from a court setting a case for trial, for matters related to this Settlement.

96. In any subsequent administrative or judicial proceeding initiated by EPA, or by the United States on behalf of EPA, for injunctive relief, recovery of response costs, or other relief relating to the Site, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenant by EPA set forth in Section XVIII (Covenants by EPA).

XXIII. INDEMNIFICATION

97. The United States does not assume any liability by entering into this Settlement or by virtue of any designation of Respondent as EPA's authorized representative under Section 104(e) of CERCLA, 42 U.S.C. § 9604(e), and 40 C.F.R. 300.400(d)(3). Respondent shall indemnify, save, and hold harmless the United States, its officials, agents, employees, contractors, subcontractors, and representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, and any persons acting on Respondent's behalf or under its control, in carrying out activities pursuant to this Settlement. Further, Respondent agrees to pay the United States all costs it incurs, including but not limited to attorneys' fees and other expenses of litigation and settlement arising from, or on account of,

claims made against the United States based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Settlement. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Settlement. Neither Respondent nor any such contractor shall be considered an agent of the United States.

98. The United States shall give Respondent notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondent prior to settling such claim.

99. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondent shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXIV. INSURANCE

100. No later than 15 days before commencing any on-site Work, Respondent shall secure, and shall maintain until the first anniversary after issuance of Notice of Completion of Work pursuant to Paragraph 111 (Notice of Completion of Work), commercial general liability insurance with limits of $1 million, for any one occurrence, and automobile insurance with limits of $1 million, combined single limit, naming EPA as an additional insured with respect to all liability arising out of the activities performed by or on behalf of Respondent pursuant to this Settlement. In addition, for the duration of the Settlement, Respondent shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondent shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Settlement, Respondent shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Respondent in furtherance of this Settlement. If Respondent demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an lesser amount, Respondent need provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor.

XXV. FINANCIAL ASSURANCE

101. In order to ensure completion of the Work, Respondent shall demonstrate and secure financial assurance, initially in the amount of $500,000 ("Estimated Cost of the Work"), for the benefit of EPA. The financial assurance must be one or more of the mechanisms listed

below, in a form substantially identical to the relevant sample documents available from the "Financial Assurance" category on the Cleanup Enforcement Model Language and Sample Documents Database at http://cfpub.epa.gov/compliance/models/, and satisfactory to EPA. Respondent may use multiple mechanisms if they are limited to surety bonds guaranteeing payment, letters of credit, trust funds, and/or insurance policies.

a. A surety bond guaranteeing payment and/or performance of the Work that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. An irrevocable letter of credit, payable to or at the direction of EPA, that is issued by an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency;

c. A trust fund established for the benefit of EPA that is administered by a trustee that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency;

d. A policy of insurance that provides EPA with acceptable rights as a beneficiary thereof and that is issued by an insurance carrier that has the authority to issue insurance policies in the applicable jurisdictions and whose insurance operations are regulated and examined by a federal or state agency;

e. A demonstration by Respondent that Respondent meets the relevant financial test criteria of 40 C.F.R. § 264.143(f) and reporting requirements of this Section for the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; or

f. A guarantee to fund or perform the Work executed in favor of EPA by one of the following: (1) a direct or indirect parent company of Respondent; or (2) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Respondent; provided, however, that any company providing such a guarantee must demonstrate to EPA's satisfaction that it meets the relevant financial test criteria of 40 C.F.R. § 264.143(f) and reporting requirements of this Section for the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee.

102. Respondent has selected, and EPA has found satisfactory, as an initial financial assurance, a demonstration by Respondent that Respondent meets the relevant financial test criteria of 40 C.F.R. section 264.143(f) and reporting requirements of this Section for the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee.

103. If Respondent provides financial assurance by means of a demonstration or guarantee under Paragraph 101.e or 101.f, Respondent shall also comply and shall ensure that its guarantors comply with the other relevant criteria and requirements of 40 C.F.R. § 264.143(f)

and this Section, including, but not limited to: (a) the initial submission to EPA of required documents from the entity's chief financial officer and independent certified public accountant no later than 30 days after the Effective Date; (b) the annual resubmission of such documents within 90 days after the close of each such entity's fiscal year; and (c) the notification of EPA no later than 30 days, in accordance with Paragraph 104, after such entity determines that it no longer satisfies the relevant financial test criteria and requirements set forth at 40 C.F.R. § 264.143(f)(1). Respondent agrees that EPA may also, based on a belief that an affected entity may no longer meet the financial test requirements of Paragraph 101.e or 101.f, require reports of financial condition at any time from such entity in addition to those specified in this Paragraph. For purposes of this Section, references in 40 C.F.R. Part 264, Subpart H, to: (1) the terms "current closure cost estimate," "current post-closure cost estimate," and "current plugging and abandonment cost estimate" include the Estimated Cost of the Work; (2) the phrase "the sum of the current closure and post-closure cost estimates and the current plugging and abandonment cost estimates" includes the sum of all environmental obligations (including obligations under CERCLA, RCRA, and any other federal, state, or tribal environmental obligation) guaranteed by such company or for which such company is otherwise financially obligated in addition to the Estimated Cost of the Work under this Settlement; (3) the terms "owner" and "operator" include each Respondent making a demonstration or obtaining a guarantee under Paragraph 101.e or 101.f; and (4) the terms "facility" and "hazardous waste management facility" include the Site.

104. Respondent shall diligently monitor the adequacy of the financial assurance. If Respondent becomes aware of any information indicating that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this Section, Respondent shall notify EPA of such information within seven days. If EPA determines that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this Section, EPA will notify Respondent of such determination. Respondent shall, within 30 days after notifying EPA or receiving notice from EPA under this Paragraph, secure and submit to EPA for approval a proposal for a revised or alternative financial assurance mechanism that satisfies the requirements of this Section. EPA may extend this deadline for such time as is reasonably necessary for Respondent, in the exercise of due diligence, to secure and submit to EPA a proposal for a revised or alternative financial assurance mechanism, not to exceed 60 days. Respondent shall follow the procedures of Paragraph 106 (Modification of Amount, Form, or Terms of Financial Assurance) in seeking approval of, and submitting documentation for, the revised or alternative financial assurance mechanism. Respondent's inability to secure and submit to EPA financial assurance in accordance with this Section shall in no way excuse performance of any other requirements of this Settlement, including, without limitation, the obligation of Respondent to complete the Work in accordance with the terms of this Settlement.

105. Access to Financial Assurance.

a. If EPA issues a notice of implementation of a Work Takeover under Paragraph 83.b, then, in accordance with any applicable financial assurance mechanism, EPA is entitled to: (1) the performance of the Work; and/or (2) require that any funds guaranteed be paid in accordance with Paragraph 105.d.

b. If EPA is notified by the issuer of a financial assurance mechanism that it intends to cancel such mechanism, and Respondent fails to provide an alternative financial assurance mechanism in accordance with this Section at least 30 days prior to the cancellation date, the funds guaranteed under such mechanism must be paid prior to cancellation in accordance with Paragraph 105.d.

c. If, upon issuance of a notice of implementation of a Work Takeover under Paragraph 83, either: (1) EPA is unable for any reason to promptly secure the resources guaranteed under any applicable financial assurance mechanism, whether in cash or in kind, to continue and complete the Work; or (2) the financial assurance is provided under Paragraph 101.e or 101.f, then EPA may demand an amount, as determined by EPA, sufficient to cover the cost of the remaining Work to be performed. Respondent shall, within 15 days of such demand, pay the amount demanded as directed by EPA.

d. Any amounts required to be paid under this Paragraph 105 shall be, as directed by EPA: (i) paid to EPA in order to facilitate the completion of the Work by EPA or by another person; or (ii) deposited into an interest-bearing account, established at a duly chartered bank or trust company that is insured by the FDIC, in order to facilitate the completion of the Work by another person. If payment is made to EPA, EPA may deposit the payment into the EPA Hazardous Substance Superfund or into the Haystack Mines Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

e. All EPA Work Takeover costs not paid under this Paragraph 105 must be reimbursed as Future Response Costs under Section XIV (Payments of Response Costs).

106. Modification of Amount, Form, or Terms of Financial Assurance. Respondent may submit, on any anniversary of the Effective Date or at any other time agreed to by the Parties, a request to reduce the amount, or change the form or terms, of the financial assurance mechanism. Any such request must be submitted to EPA in accordance with Paragraph 102, and must include an estimate of the cost of the remaining Work, an explanation of the bases for the cost calculation, and a description of the proposed changes, if any, to the form or terms of the financial assurance. EPA will notify Respondent of its decision to approve or disapprove a requested reduction or change pursuant to this Paragraph. Respondent may reduce the amount of the financial assurance mechanism only in accordance with: (a) EPA's approval; or (b) if there is a dispute, the agreement or written decision resolving such dispute under Section XV (Dispute Resolution). Any decision made by EPA on a request submitted under this Paragraph to change the form or terms of a financial assurance mechanism shall be made in EPA's sole and unreviewable discretion, and such decision shall not be subject to challenge by Respondent pursuant to the dispute resolution provisions of this Settlement or in any other forum. Within 30 days after receipt of EPA's approval of, or the agreement or decision resolving a dispute relating to, the requested modifications pursuant to this Paragraph, Respondent shall submit to EPA documentation of the reduced, revised, or alternative financial assurance mechanism in accordance with Paragraph 102.

107. Release, Cancellation, or Discontinuation of Financial Assurance. Respondent may release, cancel, or discontinue any financial assurance provided under this Section only: (a) if EPA issues a Notice of Completion of Work under Paragraph 111 (Notice of Completion of Work); (b) in accordance with EPA's approval of such release, cancellation, or discontinuation; or (c) if there is a dispute regarding the release, cancellation, or discontinuance of any financial assurance, in accordance with the agreement or final decision resolving such dispute under Section XV (Dispute Resolution).

XXVI. MODIFICATION

108. The OSC may modify any plan or schedule in writing or by oral direction. Any oral modification will be memorialized in writing by EPA promptly, but shall have as its effective date the date of the OSC's oral direction. Any other requirements of this Settlement may be modified in writing by mutual agreement of the parties.

109. If Respondent seeks permission to deviate from any approved work plan or schedule, Respondent's Project Coordinator shall submit a written or oral request to EPA for approval outlining the proposed modification and its basis. Respondent may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to Paragraph 108. Respondent shall follow such oral request or approval with written documentation of such request and approval.

110. No informal advice, guidance, suggestion, or comment by the OSC or other EPA representatives regarding any deliverable submitted by Respondent shall relieve Respondent of its obligation to obtain any formal approval required by this Settlement, or to comply with all requirements of this Settlement, unless it is formally modified.

XXVII. NOTICE OF COMPLETION OF WORK

111. When EPA determines, after EPA's review of the Final Report, that all Work has been fully performed in accordance with this Settlement, with the exception of any continuing obligations required by this Settlement, including Post-Removal Site Controls, payment of Future Response Costs, or record retention, EPA will provide written notice to Respondent. If EPA determines that such Work has not been completed in accordance with this Settlement, EPA will notify Respondent, provide a list of the deficiencies, and require that Respondent modify the Removal Work Plan if appropriate in order to correct such deficiencies. Respondent shall implement the modified and approved Removal Work Plan and shall submit a modified Final Report in accordance with the EPA notice. Failure by Respondent to implement the approved modified Removal Work Plan shall be a violation of this Settlement.

XXVIII. INTEGRATION/APPENDICES

112. This Settlement and its appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement. The parties acknowledge that there are no representations, agreements, or

understandings relating to the settlement other than those expressly contained in this Settlement. The following appendices are attached to and incorporated into this Settlement:

a. Appendix A is a map and description of the Site.

b. Appendix B is Haystack AOC Figure 1.

XXIX. EFFECTIVE DATE

113. This Settlement shall be effective five days after the Settlement is signed by both the Superfund Division Director of EPA Region IX and the Superfund Division Director of EPA Region VI, whichever is later.

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IT IS SO AGREED AND ORDERED:

U.S. ENVIRONMENTAL PROTECTION AGENCY:

4/12/17
Dated

Enrique Manzanilla
Director, Superfund Division
Region IX

Dated

Carl Edlund, P.E.
Director, Superfund Division
Region VI

IT IS SO AGREED AND ORDERED:

U.S. ENVIRONMENTAL PROTECTION AGENCY:

_____
Dated

_____
Enrique Manzanilla
Director, Superfund Division
Region IX

May 10, 2017
Dated

_____
Carl Edlund, P.E.
Director, Superfund Division
Region VI

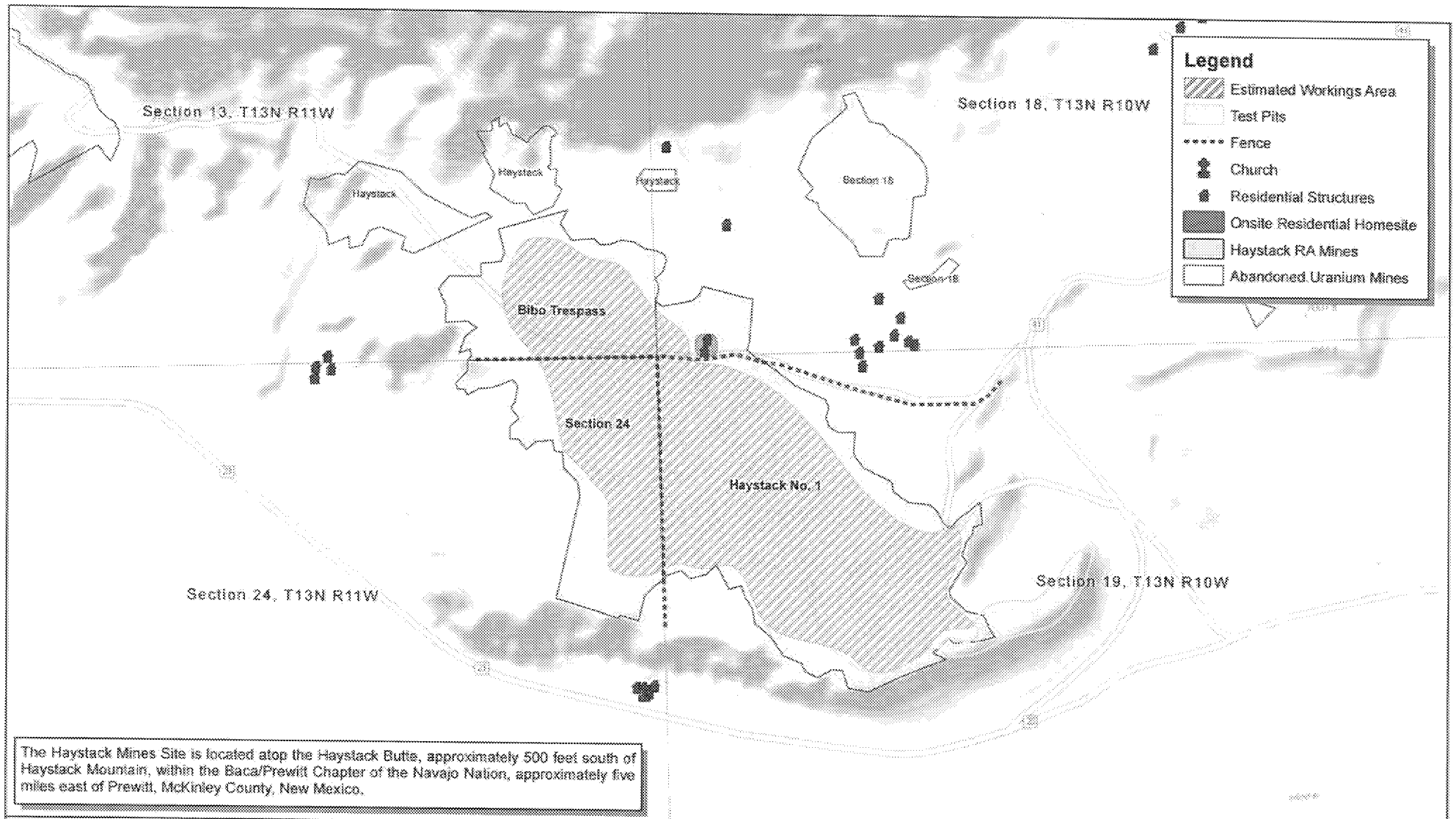
Signature Page for Settlement Regarding Haystack Mines Site

FOR BNSF Railway Company, Respondent:

2/14/17
Dated

John D. Lovenburg
Vice President, Environmental
BNSF Railway Company
2500 Lou Menk Drive
Fort Worth, TX 76131

APPENDIX A



The Haystack Mines Site is located atop the Haystack Butte, approximately 500 feet south of Haystack Mountain, within the Baca/Prewitt Chapter of the Navajo Nation, approximately five miles east of Prewitt, McKinley County, New Mexico.

N

0 Feet 1,500

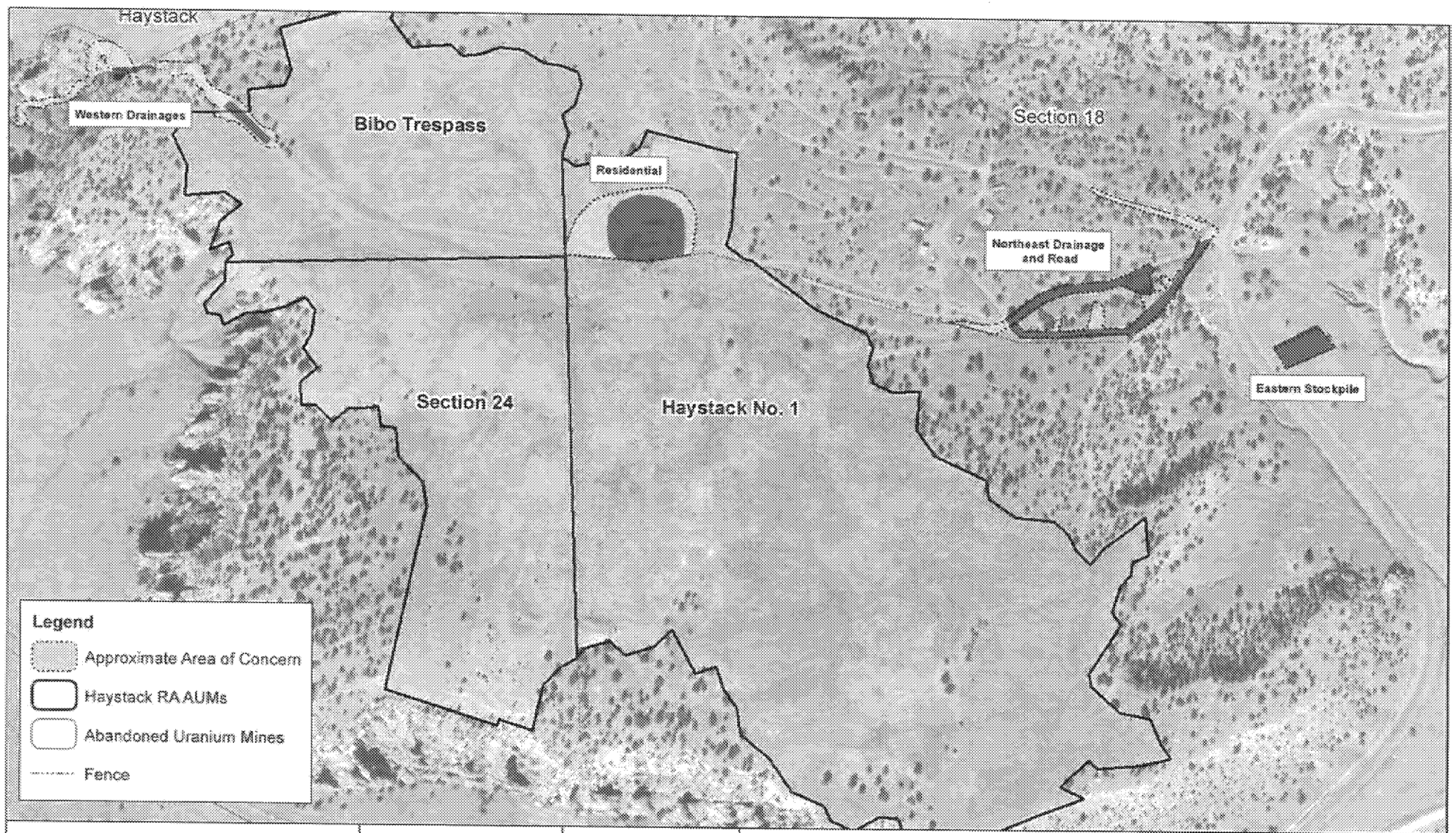
PREPARED BY:
Region 9, START
Weston Solutions, Inc.
1340 Treat Blvd, Ste 210
Walnut Creek, CA 94597

PREPARED FOR:
EPA Region 9
Pacific
Southwest

HAYSTACK MINES SITE LAYOUT

Baca/Haystack Chapter
Navajo Nation, NM

APPENDIX B



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EPA Region 9
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Southwest

FIGURE #1
AREAS OF CONCERN
Haystack No. 1 Removal Assessment
Baca/Haystack Chapter, Navajo Nation, NM

Contract: EP-S5-13-02; TDD: 0002/1302-72-R9-14-07-0001

APPENDIX B

Standard Operating Procedures

ARCADIS Design & Consultancy for natural and built assets

DAILY OPERATIONAL HEALTH PHYSICS

Haystack Mine

Baca/Prewitt Chapter, McKinley County, NM

June 2017

APPROVAL SIGNATURES

Prepared by: DRAFT Date: _____

Reviewed by: DRAFT Date: _____
(Technical Expert)

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1 SCOPE

1.1 Purpose

This standard operating procedure (SOP) describes methods and equipment for operational health physics tasks during field work. It is a guidance document that outlines health physics tasks for characterization, construction, and related activities.

1.2 Applicability

This SOP applies to general health physics and radiation safety tasks necessary during field work to protect personnel, the general public, and the environment. This document is not intended to provide an all-inclusive discussion of health physics tasks; specific characterization or construction work may require adaptation of existing methodology. Such innovations shall be described in the project-specific sampling plan and/or the final work product.

2 EQUIPMENT AND MATERIALS

2.1 Sampling and Scanning Equipment and Materials

The following equipment may be employed in routine health physics tasks. Environmental air sampling equipment, decontamination equipment, field documentation requirements, sampling forms, and sampling equipment are discussed in detail in the following SOPs: Field Gamma Radiation Surveys; Field Log Entries; Equipment and Personnel Decontamination; and Environmental Particulate Air Sampling.

- Scaler Ratemeter (Ludlum Model 2241 with Model 44-20 3-inch x 3-inch sodium iodide probe or equivalent) and Check Source for data collection and assessing AOC gamma threshold
- MicroR Meter or Tissue Equivalent Exposure Meter (Ludlum Model 19, Model 12S, or equivalent) and Scaler/Ratemeter (Ludlum Model 2221 with Model 44-10 2-inch x 2-inch sodium iodide probe or equivalent) as needed,
- Optically Stimulated Luminescent Dosimeters (OSLDs) Whole Body Dose Badges or equivalent.
- Ludlum Model 44-9 Pancake G-M detector coupled to a Ludlum Model 3 or Model 12 Ratemeter or equivalent. This system is commonly referred to as a 'frisker".
- Alpha Probe (Ludlum Model 4 with Model 43-5 probe or equivalent) and Check Source
- Alpha Counter or Scaler (Ludlum Model 2000 Scaler with Model 43-1 probe or equivalent) and Check Source(s)

3 DAILY OPERATIONAL HEALTH PHYSICS PROCEDURES

Daily radiological and health physics operations will be overseen by the onsite Radiation Safety Officer (RSO). The daily operational health physics tasks include monitoring of personnel, conducting surveys of equipment, and environmental monitoring. These tasks are followed to ensure that personnel and public

doses are maintained as low as reasonably achievable (ALARA) and to monitor environmental levels for mitigation as needed.

3.1 Daily Instrument Checks

Instruments should be checked twice daily using provided radioactive check sources and logged in. Any instrument not performing within the specifications of its current calibration shall be removed from service.

3.2 Personnel Monitoring

Personnel working on site regularly should be issued an OSLD or other radiation dosimetry badge for personal dose monitoring; issuance is determined by a health physicist. Dosimetry badges are issued each morning and collected each evening by the site radiation safety officer or designee, with all control badges stored offsite at a documented location. Badges are not to be taken home and should be stored in the bag provided with the badges. Dosimetry badge issuance is documented.

All personnel and visitors shall have their hands, boot bottoms, and all other potentially contaminated areas scanned by qualified staff prior to leaving any contamination reduction zone using the Ludlum 44-9 "frisker." Monitoring using smear samples shall be based on the type of work being done and as determined by the site radiation safety officer or designee. All personnel and visitors shall also have their hands surveyed prior to lunch, water/food breaks, or restroom breaks using the frisker. Personnel who are coming on site from a separate radiation site should be surveyed upon arrival on site. Contamination above allowable limits must be removed prior to release of personnel from the site. Measurable contamination below release limits should also be removed in accordance with ALARA concepts. Results shall be documented on the sign-in sheet for scan surveys and in the field logbook for smear samples. Decontamination procedures are documented in SOP: Equipment and Personnel Decontamination, and may be supplemented as needed by the site radiation safety officer.

3.3 Equipment Surveys

Equipment should be surveyed prior to release off site as determined by the project radiation safety officer. This will be performed by frisking the equipment using the Ludlum 44-9 "frisker". If activity is present, the equipment will be decontaminated and resurveyed. Monitoring using the alpha probe and smear samples is required to confirm that it meets the release criteria if activity is still detected by the Ludlum 44-9 "frisker" after decontamination. The number of samples will be based on the type of work being done and as determined by the safety and health representative. Equipment coming on site from another area that may have radiation levels above background should also be surveyed using smears prior to use on site. Results shall be documented in the field logbook. Contamination above allowable release limits must be removed prior to release of equipment from the site. Measurable contamination below release limits should also be removed in accordance with ALARA concepts. Decontamination procedures are documented in SOP Equipment and Personnel Decontamination, and may be supplemented as needed by the safety and health representative.

4 CONTAMINANTS OF POTENTIAL CONCERN

Contaminants of concern are radioactive materials and are site dependent. For Naturally Occurring Radioactive Materials Site (NORM sites) the radionuclides of concern are uranium or thorium and perhaps potassium-40, all very longed lived materials also called "primordial" radionuclides. For other sites the isotopes/contaminants of concern are site dependent. For the Haystack Mine Site the NORM materials of concern are uranium and radium-226.

4.1 Uranium

Uranium is an actinide that occurs naturally in low concentrations of a few parts per million in soil, rock, and water. Natural uranium consists of two "series' or decay chains, the U-238/U-234 series and the U-235 series. The natural abundance is approximately 99.27% uranium-238 (U-238), 0.71% uranium-235 (U-235), and 0.01% uranium-234 (U-234 is a daughter of U-238). U-238 has a half life of 4.47 billion years, while U-235 has a half life of 704 million years. Uranium decays by emitting an alpha particle. In nature uranium is typically found in "secular equilibrium" with its daughters. Secular equilibrium is when the activity of the parent is the same as the activity of the daughter. Many of the daughters are gamma emitters. The energies of these gammas make it possible to detect uranium contamination at low levels in the field. Uranium is a heavy metal, and the potential health effects of uranium contamination are similar to those of other heavy metals. The primary health effect is necrosis of the kidney.

4.2 Radium-226

Radium-226 (Ra-226) is an alkaline earth metal found in trace amounts in the environment. Ra-226 has a half-life of 1,600 years and decays into radon gas (radon-222). Ra-226 decays via alpha particles, giving off a 4.78 MeV alpha particle 94.5% of the time and a 4.60 MeV alpha particle 5.5% of the time. Ra-226 also produces a gamma of 0.186 MeV 3.3% of the time. Some of the short lived daughters of Ra-226 are energetic gamma ray emitters (e.g. Bismuth-214 and Lead-214 and are often used as surrogates for radium measurements including field soil investigations. The gamma radiation energies of the surrogates make it possible to detect radium contamination at low levels in the field. Radium acts similarly to calcium in the body and is a bone seeker.

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ENVIRONMENTAL PARTICULATE AIR SAMPLING

Haystack Mine

Baca/Prewitt Chapter, McKinley County, NM

June 2017

APPROVAL SIGNATURES

Prepared by: DRAFT Date: _____

Reviewed by: DRAFT Date: _____
(Technical Expert)

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1 SCOPE

This standard operating procedure (SOP) describes the procedures to collected air samples for the analysis of particulate matter. In particular, environmental air samples can be collected to estimate airborne concentrations of radionuclide particulates to ensure protective measures are adequate.

Air sampling is conducted to determine if airborne contamination is present. In areas with elevated radiation, air sampling can provide a method for estimating the potential radiation dose to workers and members of the public. Sampling for airborne concentrations of radionuclide particulates is part of an overall program to ensure compliance with regulatory limits and to keep exposure to radiation as low as reasonably achievable (ALARA). High volume air samplers with an airflow across the filter of between 30 to 60 cubic feet per minute (cfm) are used because large quantities of air can be sampled in a relatively short period of time. This provides a conservative estimate of potential airborne concentrations of radionuclides which is then used to assist in decisions regarding protective actions.

2 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), and experience conducting radiological health and safety oversite, as needed. Arcadis field sampling personnel will be well versed in the relevant SOPs and possess the required skills and experience necessary to successfully complete the desired field work. Arcadis personnel responsible to leading the particulate air sampling collection activities must have previous ambient air sampling experience.

In addition, for sites in radioactive areas, the radiation safety officer (RSO) on-site will have radiological worker training and other field personnel or visitors will either have completed a radiological worker training or will be trained by the RSO. The project HASP and other documents will identify any other training requirements such as site-specific safety training or access control requirements.

3 EQUIPMENT LIST

The following equipment will be used for environmental air sampling:

- Health and safety equipment, as required in the Site Health and Safety Plan (HASP)
- Appropriate-sized open-end wrench
- Chain-of-custody form
- Field notebook
- camera
- High volume air samplers, 110-125 Volt, 50-60 Hertz, with 8" x 10" filter holders
- Tri-pods or aluminum outdoor shelters
- GPS
- Power for high volume air samplers, options include:
    - Generators and gas can with gas

  - Power from the grid
- Ludlum Model 4 ratemeter with Model 43-5 alpha scintillation probe (or equivalent)
- Glass fiber filter paper, 8" x 10", box of 100
- Gallon size plastic Ziploc® bags for filter paper storage
- Envelopes for filter paper storage/shipping
- Sandbags as needed to hold shelters and tripods in place
- Barometric pressure and temperature for area
- Weather resistant logbook
- Permanent ink pen or marker

4 CAUTIONS

Care must be taken to minimize the potential for introducing interferences during the sampling event. If the canister is not to be overseen for the entire sample duration, precautions should be taken to maintain the security of the sample.

Care should also be taken to ensure that the flow controller is pre-calibrated to the proper sample collection time (confirm with laboratory). Sample integrity is maintained if the sample event is shorter than the target duration, but sample integrity can be compromised if the event is extended to the point that the canister reaches atmospheric pressure.

A Shipping Determination must be performed, by DOT-trained personnel for all environmental and geotechnical samples that are to be shipped, as well as some types of environmental equipment/supplies that are to be shipped.

5 HEALTH AND SAFETY CONSIDERATIONS

Field activities associated with particulate air sampling will be performed in accordance with a site-specific HASP, a copy of which will be present on-site during such activities.

Field sampling equipment must be carefully handled to minimize the potential for injury and the spread of hazardous substances.

6 PROCEDURE

6.1 Air Sampler Placement

The following procedures outline the placement of air sampling equipment.

6.1.1 Community

Air sampling equipment should be placed adjacent to the excavation areas. Sampling equipment will be placed as outlined in a work plan. Samples located adjacent to the excavation areas the community should be collected over a several day period prior to the beginning of work on-site, if possible, to

establish baseline conditions. Make sure the air samples are located within aluminum shelters for weather protection and general protection from the public.

6.1.2 Operational Area

One air sampler will be placed upwind of work being performed at the site. The air sample collected from this location will serve as background for the project. Another air sampler will be placed directly downwind of the areas where work is occurring. If the wind direction changes significantly, by 45 degrees or more, change the air filter per the instructions below and relocate the air sampling equipment to a more downwind location. The downwind air sampler will monitor airborne radioactivity potentially liberated by work at the site and can be considered a conservative measure of breathing conditions for workers. Finally, an air sampler will be placed further downwind, near the site boundary if possible, to measure breathing conditions for members of the public.

6.2 Sample Collection

The following procedure applies to samples taken in the community prior to the beginning of work, during work activities, and upwind and downwind during on-site activities.

6.2.1 Sample Equipment Setup

1. Set up the sampler in either an aluminum outdoor shelter or on a tripod with sandbags (as needed for windy conditions). Setup must occur in the morning prior to beginning site activities (or at the same approximate time for samples taken in the days prior to work commencing). Record the GPS coordinates of the sample equipment location.
2. Visually inspect a new 8" x 10" filter for physical damage prior to use. With the sampler turned off, place the filter paper in the filter holder on the sampler. Do not touch the collection area of the filter.
3. If using a generator, do pre-operational checks and ensure fuel level is at least half full. Add fuel as needed.
4. Turn the air sampler on. Record the time the sampler was turned on and the airflow rate. For EPA measurements, use a flow rate of 40 cfm.

6.2.2 Equipment Checks During the Day

1. Depending on site conditions, airflow and fuel level of the generator should be checked every 2-3 hours. The airflow and time of observation should be recorded in the logbook. The filter should be changed if a drop in flow rate of 20% or more is observed.
2. During routine checks during the day, turn off the air sampling equipment and estimate the count rate of the filter in counts per minute (cpm) using an alpha scintillation detector. Place the detector face against the filter, first covering the top half of the filter, then the bottom half, and then an average of the two readings.
3. If the airflow has dropped or when the work day has ended, record the flow rate and turn off the air sampler and follow End of Sampling Period instructions below.

4. If the weather is windy such that it becomes difficult to work or the samplers may blow over, then the samplers will be taken down.
5. If precipitation above a very light mist occurs, the samplers will also be taken down.
6. If the filter needs to be changed, insert a new filter and follow Sample Equipment Setup instructions above.

6.2.3 End of Sampling Period

1. Using the beginning and ending flow rates, calculate the approximate average flow rate for the sampling period. Using the barometric pressure and temperature for the area obtained from the nearest weather station, correct the flow rate.
2. Carefully remove the filter and place a small "x" on the flow entry side of the filter and place the filter into a clean, dry plastic bag labeled with the following information:
    a. Model and serial number of the air sample equipment
    b. Model and serial number of the filter holder
    c. GPS coordinates of the sample location, including identification of field markings used to mark locations
    d. Beginning, end, average, and corrected flow rates
    e. Date
    f. Start and stop time of the sample
    g. Radiation levels from the alpha scintillation detector
    h. Wind direction and weather conditions
    i. Type of filter
    j. Laboratory to which the filter should be sent for processing
3. Obtain an estimate of the count rate of the filter using the alpha scintillation detector. Place the detector face against the filter, first covering the top half of the filter, then the bottom half, and then an average of the two readings.
4. Filters should be allowed to sit for at least 4-5 hours before final counting to allow for decay of short-lived radon daughter products. Thoron daughter products are gone after 3 days and should be considered to be present unless ruled out.
5. The health physicist and/or Radiation Safety Officer for the project must assess sample results after each day's analysis by comparing downwind sample results with upwind background results. Filters should be read intermittently to track decay of short-lived daughter products and to assess field results after their decay is complete.
6. Additional protective actions must be considered if doses to the public or workers have the potential to exceed 10% of allowable limits.

7 WASTE MANAGEMENT

No specific waste management procedures are required.

8 DATA RECORDING AND MANAGEMENT

The following information must be recorded in the log book for each sample location.

- Radiation levels and times of measurement using the alpha scintillation detector.
- Information recorded on each sample container (plastic bag) as outlined above.
- Health physicist/Radiation Safety Officer assessment of potential dose to the public and workers.

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FIELD GAMMA RADIATION SURVEYS

Haystack Mine

Baca/Prewitt Chapter, McKinley County, NM

June 2017

APPROVAL SIGNATURES

Prepared by: DRAFT Date: _____

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(Technical Expert)

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1 SCOPE

The purpose of this standard operating procedure (SOP) is to provide general reference information for scanning surface exposure rates and excavation surface exposure rates at the Haystack Mine Site.

2 EQUIPMENT

1. Ludlum Model 44-20 3-inch x 3-inch sodium iodide (NaI) detector or equivalent
2. Ludlum Model 2241 Ratemeter or equivalent
3. Ludlum Model 44-10 2-inch x 2-inch sodium iodide (NaI) detector or equivalent, as needed
4. Ludlum Model 2221 Ratemeter or equivalent, as needed
5. Ludlum Model 19, Model 12S, or equivalent MicroR Survey Meter
6. Ludlum Model 44-9 Pancake G-M detector, coupled with a Ludlum Model 3 or Model 12 ratemeter
7. Gamma Check Source
8. Digital Camera
9. Laptop Computer
10. Map(s) of site being surveyed
11. Global positioning system (GPS)
12. Tape measures and/or compass

3 GENERAL GUIDELINES AND REQUIREMENTS

1. Count rates will be measured with a Ludlum model 44-20 NaI gamma scintillation detector coupled to a Ludlum model 2241 rate meter
2. Personnel performing radiation surveys will take the necessary precautions to maintain their exposures as low as reasonably achievable (ALARA). The following precautionary measures will be considered:
    a. Review previous surveys and operations performed in the area to determine the radiation exposure rates expected to be encountered.
    b. Perform response check, battery check, and background check in the field office prior to commencement of field activities. Record data on quality control form.
    c. Ensure instrument operability prior to entering the area to be surveyed or the controlled area surrounding the area to be surveyed.
    d. Ensure that necessary support equipment is available (e.g., recording equipment, watch, bags for contamination control) prior to entering the area or surrounding controlled area.
    e. If an instrument must be carried through or into a contaminated or potentially contaminated area and is likely to become contaminated, ensure the instrument is enclosed in protective material prior to entering the area, or decontaminate the instrument thoroughly after leaving the area.
    f. Enter survey areas with instrument set on a scale appropriate for expected radiation levels. (Avoid saturation of the detector.)

3. Radiation will be surveyed in such a manner that no portion of the surveyor's body is placed between the sensitive portion of the detector and the source of radiation. For example, the surveyor should not wrap his/her hand completely around the instrument probe. The probe will be held at the base or may be held by a rope attached to the top of the probe. This will ensure that the most accurate measurements possible are obtained.

4 SURVEY PROCEDURE

1. Prior to entering the property, confirm access to the property was granted.
2. Obtain or develop maps for the area to be surveyed.
3. Record all required survey and instrument information in quality control forms.

4.1 Gamma Surveying

Scan surveys will be performed by walking with the detector at approximately 6 inches from the ground surface with the scaler/ratemeter. Scan surveys will be performed within each survey area by walking between boundary transects to locate and along survey area boundaries. The scan rate will be approximately three feet per second based on an acceptable minimum detectable concentration (MDC). 100% coverage of all scanned areas will be conducted, using 5-6 foot transect spacing or a geometry providing an equivalent coverage.

1. In-situ soils, stockpiles, excavation pits, and/or road base will be scanned. Walk the transect at the speed selected by the site RSO with the NaI detector swaying back and forth along the ground surface at about 6 inches above the surface. Note all areas that are not accessible on the site map or appropriate GIS file.
2. The boundaries of the inaccessible areas will be recorded on the site map or appropriate GIS file.
3. The NaI detector and GPS will be connected during the preconstruction radiological survey to fill in data gaps from the 2014 gamma scan and also during the final survey of the area after excavation is complete, so continuous surface exposure rate readings can be taken across the site.
4. When scanning work areas for excavation, all work must be overseen by the site RSO.
5. Excavation should be conducted in lifts of a maximum individual depth of 6-inches, unless otherwise approved by the site RSO. Each newly excavated surface must be re-scanned before additional excavation occurs.
6. Material removed from excavations should be scanned when removed, unless it is directly loaded to a dump truck or other vehicle.
7. As required by the site RSO, excavation or trenching soils that are laid down for permanent or semi-permanent storage onsite must be scanned to determine average surface dose.
8. If small sub areas are to be scanned where the NaI detector and GPS are not connected in order to obtain continuous readings (during the preconstruction survey to fill in data gaps or during final survey of the area), the field crew will note the locations where the maximum exposure rates were encountered (hot spots). The maximum of four to eight readings will be recorded, and 60-second counts will be taken. The field crew should collect readings from different types of material (e.g., sandy vs. rocky soil) in the sub-area where possible. At each of these locations, a 60-second

count will be taken to obtain an accurate measurement. Maximum exposure rate locations will be measured, where possible, using the GPS (SOP Field Log Entries).

9. If small sub areas (hot spots) are to be scanned, the geographical extent of each maximum count rate will be delineated. When the survey is conducted with the GPS linked to the NaI detector, this information is automatically recorded in the ASCII file. For surveys where the two instruments are not linked together, this is achieved by scanning outward from each of the recorded maximum count rate locations in all directions until a count rate approximately equivalent to the site-specific action level of 75,000 cpm is encountered. When the site-specific action level is encountered in all directions around this location, take a sufficient number of 30-second count readings to adequately delineate the area of concern. The geographical extent of each area of concern will be located using either the GPS or tape measurers.
10. All field activities will be documented in accordance with SOP Field Log Entries.
11. All field personnel and field instruments will be frisked out with a Model 19 Pancake Geiger-Mueller (G-M) detector. Results of the frisking will be compared to background levels. If radiological contamination is detected on field personnel or field instruments at concentrations above background levels, the decontamination procedures, as outlined in Equipment and Personnel Decontamination will be followed.

4.2 Static surveys

Static surveys will be performed at specified grid nodes within survey areas. The detector will be held at approximately 6 inches from the ground surface. The scaler/rate meter will be set in the integrating (scaler) mode. A one-minute count of gamma radiation levels will be obtained at each location for static gamma radiation surveys.

5 QUALITY CONTROL

Meters are checked in the morning prior to use and in the evening after use. The parameters checked include high voltage and battery check, count rate check with a source in a standard configuration, and a background count in a standard configuration. The source count rate and background count rate should be within two sigma of the average over a few days. As time does not permit this, ten one minute counts will be taken and averaged. The two sigma will be calculated and documented. If either is out of this range the HP will be notified.

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FIELD LOG ENTRIES

Haystack Mine

Baca/Prewitt Chapter, McKinley County, NM

June 2017

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1 SCOPE AND APPLICATION

This Arcadis Standard Operating Procedure (SOP) covers the entries needed in a field log book.

This SOP does not address all of the entries that may be needed for a specific project, and does not address health and safety, equipment decontamination, field parameter measurements, sample preservation, chain-of-custody, or laboratory analysis. For direction on requirements in these areas, refer to other Arcadis SOPs, the project work plans including the quality assurance project plan, sampling plan, and health and safety plan, as appropriate.

Additionally, some of the items specified in this procedure may be documented on other forms rather than in the field log book. For example, daily operational checks of radiological instrumentation may be documented on a dedicated form rather than in the field log book. These forms and the field log book will be stored with the project files.

2 PERSONNEL QUALIFICATIONS

Arcadis personnel participating in fieldwork and making entries into the field log book should have a minimum of one (1) year of field experience (or be under the supervision and accompanied in the field by someone who does) and current health and safety training including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and CPR, as needed. Field personnel will also be compliant with client-specific training requirements. In addition, Arcadis field sampling personnel will be versed in the relevant SOPs and possess the required skills and experience necessary to successfully complete the desired field work.

3 EQUIPMENT LIST

- Field Log Book
- Ball point (medium point) pen with blue or black ink (black preferred). A fine point Sharpie pen may be used if the ink does not bleed through the page and become visible on back side of the page. If weather conditions prevent the use of a pen, indicate so in the log and use an alternate writing instrument.
- Zip-lock baggie or other weather-proof container to protect the field log book from the elements.

4 CAUTIONS

All entries in the field log must be legible and archivable. Do not leave the field log book exposed to the elements or other conditions that might moisten the pages and smear/dissolve the entries. When not in the field, the log book should be stored in a location that is easily accessible to field crews.

5 HEALTH AND SAFTEY CONSIDERATIONS

ARCADIS field personnel will be familiar and compliant with work plan health and safety requirements.

6 PROCEDURE

- Print legibly. Do not use cursive writing.
- The name of the project, project number and project location should be written in indelible ink on the outside of the field log book.
- On the inside of the front cover, write "If Found, Please Return to Arcadis" and include the appropriate address and phone number, the name of the person to which the book is assigned, and the name of the project manager.
- Reserve the first page of the book for a Table of Contents.
- Reserve the last five (5) pages of the book for important contacts, notes, reminders, etc.
- Each day of field work, the following should be recorded in the field log book as applicable:
    - Project Name
    - Date and time arrived
    - Work Site Location
    - Names of people on-site related to the project including ARCADIS employees,
    - visitors, subcontractor employees, agency personnel, client representative, etc.
    - Describe the work to be performed briefly, and list the equipment on-site
    - Indicate the health and safety (H&S) level to be used
    - Record instrument calibrations and checks
    - Record time and general content of H&S briefing
    - Describe the weather conditions, including temperature, precipitation, and wind speed and direction
    - List periodic time entries in the far left hand column of each page
    - Minimize unused space on each page
- The tailgate meeting must be recorded in the log book and the tailgate form completed. If H&S monitoring is performed, record the time and results of initial and follow up monitoring.
- Note factual observations including collection of QA/QC samples, delays, well damage, accidents, work plan deviations, instrument problems, and problem resolutions.
- Describe work performed and how documented such as photographs, sample core logs,
- water sampling logs, etc.
- Describe bases for field decisions including pertinent conversations with visitors, regulators, or project personnel.
- Note final instrument calibrations and checks.
- Sign the log book at the end of each day at a minimum. Draw a line to the end of the page to indicate no further entries on that page. Sign the bottom of each page if possible.
- If an entry to the log book is changed, strike out the deleted text or item with a single line such that the entry remains legible, and initial and date the change. Such changes should only be made by the same person that made the initial entry. · Field log book entries must be made in the field at the site, not at a later time at a different location. Supplemental entries to the log book may be made at a later date. The supplemental entry must be clearly identified as such and the entry must be signed and dated as described in this SOP.
- Problems noted in the field log book must be brought to the attention of the project manager and task manager in a timely fashion. Problems may be reported in person, on the telephone, or in a

written daily log form. If daily logs are prepared and you will not be able to personally give the daily log to the project manager, send the daily log via FAX or overnight courier to the project manager and task manager.

7 WASTE MANAGEMENT

Investigation-derived waste will be managed as described in the Investigation-Derived Waste Handling and Storage SOP. A drum/waste inventory should be maintained on a pre-designated page in the field log book.

8 DATA RECORDING AND MANAGEMENT

Each page of the field log book should be scanned for electronic/digital archiving at periodic intervals. This will ensure that copies of the field notes are available in the event the field book is lost or damaged, and that field data can be easily disseminated to others without the risk of physically sending the field log book. Field log books that are full should be archived with the project files, and readily retrievable. Additionally, other project forms (e.g., form with daily operational checks of radiological instrumentation) should also be stored with the project files.

9 QUALITY ASSURANCE

Be mindful that the field log book may be produced in court. All entries should be legible (as discussed above).

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EQUIPMENT AND PERSONNEL DECONTAMINATION

Haystack Mine

Baca/Prewitt Chapter, McKinley County, NM

June 2017

APPROVAL SIGNATURES

Prepared by: DRAFT Date: _____

Reviewed by: DRAFT Date: _____
(Technical Expert)

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1 SCOPE

1.1 Purpose

Decontamination of personnel, excavation and monitoring equipment, and support vehicles is an important aspect of environmental construction and removal work. Proper decontamination is a key element in reducing the potential for cross-contamination from different locations and to protect the public and workers.

1.2 Applicability

The procedures outlined in this standard operating procedure (SOP) shall be followed during decontamination of field equipment. Three major categories of field equipment, along with applicable decontamination methods for each, are discussed below.

1.3 Definitions

Decontamination: The process of neutralization, washing, rinsing, and/or removing contamination to minimize the potential for contaminant migration.

Cross-Contamination: The transfer of contaminants from their known or suspected location into a non-contaminated location.

Frisking: Scanning of field personnel and equipment using a scaler/ratemeter coupled to a Geiger-Mueller (G-M) detector ("pancake" style), or equivalent, to identify the presence of contamination.

Fixed Contamination: Is contamination which cannot be removed without affecting the removal of some portion of the surface that is contaminated or covering the contamination, or where there is no possibility of surface contaminant migration due to the non-intrusive work during property investigations. Examples of fixed contamination can be contaminated soil or building structures covered with physical barriers (e.g., grass, asphalt, concrete, brick, tiles, foundation rocks, paint, wood), and contamination commingled with asphalt, concrete, or building structures.

Removable Contamination: The amount which can be easily removed where the potential for surface or airborne contaminant migration is likely to occur. Examples of loose contamination include contaminated and exposed surface soil, contaminated surface sediment, and loose surface contamination on building structures.

2 EQUIPMENT AND MATERIALS

The following equipment will be used in the decontamination procedure:

- Brushes and broom
- Trowel
- Mallet

- Steel wool or equivalent
- Potable water
- Dionized/distilled water
- Phosphate-free detergent (e.g., AlconoxTM)
- 55-gallon (non-leaking) drums
- Large (5-gallon) buckets with lids
- Ludlum Model 44-9 Pancake G-M detector
- Steam cleaner/pressure washer (when necessary)
- Clean plastic bags
- Water containment basin

3 FRISKING AND DECONTAMINATION GUIDELINE

Frisking is performed to determine if personnel or equipment exceed radionuclide surface contamination limits. Decontamination is performed to minimize the potential for cross-contamination and to minimize the potential for contaminant migration (i.e., the transfer of uncontrolled contaminants to areas outside the exclusion zone).

The need for personnel and equipment frisking is contingent on site physical conditions (e.g., presence of potential loose surface contamination). At the discretion of the site RSO, personnel and equipment frisking will not be required if the area does not contain loose contamination or only fixed contamination is found where the potential for contaminant migration is unlikely.

Personnel and equipment frisking must be performed if the area exhibits loose surface contamination with a potential for contaminant migration. All frisking and other decontamination will be overseen by the site RSO.

4 DECONTAMINATION PROCEDURES

All decontamination will be overseen by the site RSO.

4.1 Excavation Equipment and Large Vehicles

The following procedures shall be used for decontamination of large pieces of equipment including excavation equipment and support vehicles. This may include excavators, backhoes, trackhoes, support vehicles, and other equipment and tools that may have possible contamination. Frisking will be conducted by the site RSO or trained personnel designed by the site RSO.

- Remove visible dirt as much as possible.
- Brush or scrub any areas likely to come in contact with and retain elevated radiological material (e.g. tires, tracks, etc.)
- Rinse with minimal potable water, collecting water in a large plastic drum/bucket.
- Steam clean the external surfaces and internal surfaces, when necessary, on equipment using high-pressure hot water from an approved water source. If necessary, scrub using a phosphate-

free detergent (e.g., AlconoxTM), or equivalent laboratory-grade detergent until all visible dirt, grime, grease, oil, loose paint, rust, and other residue, have been removed.

- Decontamination will typically be performed within the exclusion zone or the contamination reduction zone. Although not anticipated, the RSO may designate a decontamination pad or similar location to collect rinsate and associated soil or chemicals if needed. The decontamination pad will be constructed in a designated area. The precise location of the decontamination pad shall be determined based on such factors as ease of access for personnel and proximity to work site and rinsate storage or staging areas. The decontamination pad will be large enough to accommodate vehicles present at the site. Procedures for containment, storage, and disposal of rinsate are discusses in Section 5.0 below.
- Steam cleaning of equipment will be performed in the exclusion area, contamination reduction zone, or a dedicated decontamination pad, if required by the RSO. If a decontamination pad is required, the flooring of the decontamination pad shall be impermeable to water and have a sump or low area to collect the rinsate for transfer into storage containers.

4.2 Decontamination Procedure for Field Personnel

This section outlines the procedures to be followed for decontamination of field personnel.

1. All clothing and bare skin of field personnel that may have come in contact with radiological contamination will be frisked with a Ludlum 44-9 Pancake G-M detector prior to leaving a contaminated area. When deemed appropriate by the site RSO, frisking may occur prior to decon. Initially, the clothing and skin will be scanned with the detector; however, if any elevated readings are found, that area will be further investigated and if the reading persists, a fixed count will be collected. Frisking will be conducted by the site RSO or trained personnel designed by the site RSO.
2. If radiological contamination is detected on field personnel (i.e., above two times the ambient conditions), use brushes (and steel wool on clothing if needed) to scrub and remove soil or other foreign material.
3. If brushing/scrubbing does not remove elevated material, a strip of tape will be used to pull off soil. Place contaminated tape inside a designated plastic bag, properly seal the bag, and dispose of with other radiologically contaminated investigation-derived waste (IDW).
4. For skin, if clear tape does not remove the residual contamination, the affected area of skin will be washed gently with warm water using a mild (non-abrasive) cleaner. If warm water and mild cleaner does not remove the contamination, then the affected area will be covered with a piece of plastic, duct taped, and placed under a lamp to cause the area to sweat. The affected area will then be washed gently with warm water using a mild (non-abrasive) cleaner.
5. For clothing, if clear tape does not remove residual contamination, the clothing will be placed inside a designated sealed bag and disposed of with other radiologically contaminated IDW.
6. After decontamination, all field personnel will be re-frisked. If contamination is still found above the ambient level, repeat step 1 as necessary.

5 PROCEDURE FOR OTHER WASTE DISPOSAL

When decontamination is performed in the exclusion zone or the contamination reduction zone, the decontamination soils and fluids (typically washwater) will remain within the exclusion zone (i.e., the TCRA area). If a decontamination pad is required, the washwater produced on a decontamination pad will be segregated from solids to the extent practicable (i.e., solids will be allowed to settle out of the washwater on the decontamination containment pad). Washwater will then be containerized and stored in the waste consolidation area onsite. Solids will also be containerized in a separate container to and stored the waste consolidation area onsite.

The site RSO will determine the appropriate means of disposal for the rinsate, in consultation with the project team. If deemed necessary, the rinsate collected from the decontamination pad and from other on-site decontamination activities will be stored in labeled containers until the proper disposal protocol is established pending characterization. Otherwise, if the rinsate is determined to have background levels of radiological material in solution or suspension, it may be used for dust suppression water as needed within the TCRA areas.

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APPENDIX C

Dust Control Plan

ARCADIS Design & Consultancy for natural and built assets

BNSF Railway Company

DUST CONTROL PLAN

Haystack Mine
McKinley County, New Mexico

June 2017

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1 INTRODUCTION

On behalf of BNSF Railway Company (BNSF), Arcadis U.S., Inc., (Arcadis), prepared this Dust Control Plan (DCP) for the Haystack Mine Site located in McKinley County, New Mexico (Site). This DCP has been developed for the primary purposes of controlling construction activities, as outlined in the Removal Work Plan, and to develop strategies that would control or mitigate ambient dust released to the environment during this work. The proposed scope of work is outlined below.

2 SITE DESCRIPTION AND FEATURES

The Site is located approximately 5 miles east of Prewitt, New Mexico, in and immediately outside of the southeast portion of the Navajo Nation, within a rural area of northwestern New Mexico. The Site comprises 174 acres and is atop the Haystack Butte, approximately 500 feet south of the Haystack Mountain and next to County Road 41. The Site consists of three adjacent Abandoned Uranium Mines (AUMs) Haystack No. 1 AUM, Bibo Trespass AUM, and Section 24 AUM.

The scope of work is to excavate material to meet the TCRA objectives (Section 1.4 of the Removal Work Plan) and place the removed material in a consolidated waste pile(s). The approximate areas of excavation are shown on Figure 3 of the Removal Work Plan and include:

- North East Access Road
- North East Drainage
- Residential Area
- Western Drainage 2/Road
- Western Drainage 1
- East Stockpile

In addition to the required TCRA scope outlined above, various test pits located in the southern portion of Section 19 may be backfilled during the same time period that the TCRA activities are performed.

3 DUST CONTROL

This DCP was created to control dust generated during removal activities, as outlined in the Removal Work Plan, and to control or mitigate dust release to the environment.

Dust control measures will primarily rely on vehicle speed controls and the application of water on working surfaces during the period in which soil is being removed and will consist of the following measures:

- Vehicle speeds on the Site will remain below 15 miles per hour.
- An adequate water supply will be provided.
- Water will be applied as needed to control dust.

- Water will be applied uniformly using pressure-type distributors, pipelines equipped with spray systems, or hoses with nozzles.
- All water will be applied at locations, rates, and frequencies as directed by the on-site supervisor or construction foreperson, in consultation with the Radiation Safety Officer (RSO) and relevant health and safety staff.
- Dust will be controlled on active roads, staging areas, and on the Site during all periods not described above.

Water for the dust control activities will be brought on site using one of two methods:

1. Water will be obtained from the City of Gallup or Grants, or other acceptable source. This water will be supplied to the Site by the Remedial Contractor. Tanks will be staged at the Site and will be filled by a supply tanker.
2. Water will be supplied to the Site through coordination with the local chapter. Several supply tankers will be filled, as needed, from the nearest water supply and brought to the Site.

Water will be applied to the TCRA areas, as needed, and will depend on the activity, traffic, and weather conditions that prevail. Water will be applied at all hours, including nights and weekends, to control dust, if necessary. Water will be applied uniformly as described above. In addition, water will be applied at the locations, rates, and frequencies as decided by the on-site supervisor or construction foreperson, in consultation with the RSO and relevant health and safety staff.

Dust control performance will be assessed by two air monitoring methods, which are discussed in further detail below:

1. Ambient air monitoring to assess offsite dust levels
2. Occupational health monitoring

3.1 Air Monitoring

Air monitoring will be conducted to monitor potential inhalation of naturally occurring radioactive material-(NORM-) impacted dust generated during the removal activities. Radium-226 is of primary concern on site, in addition to uranium and non-radiological nuisance dust generated during work.

The calculations presented immediately below demonstrate that the relevant regulatory air effluent limits significantly exceed plausible levels of dust generation occurring during work, even when making protectively conservative assumptions.

The Nuclear Regulatory Commission concentration limit for radium-226 in air effluent is 9x10-13 microcuries per milliliter (µCi/ml) or 0.9 picocuries per cubic meter (pCi/m3) (10 Code of Federal Regulations [CFR] 20, Appendix B). The highest radium-226 concentration found during the Removal Site Evaluation was 37.2 picocuries per gram of soil (pCi/gsoil). Assuming the soil in this area becomes airborne and applying a safety factor of 3 (111.6 pCi/gsoil), the 0.9 pCi/m3 radiological limit converted to mass units is 8 milligrams of soil per cubic meter (mgsoil/m3). This dust loading is substantially larger than likely concentrations found on site during work activities, as in comparable desert environments, dust storms exceeding heavy equipment-generated dust can result in dust loading of 3 mgsoil/m3. This dust

loading is much lower than the calculated cutoff above and is much less than expected at the Site. Thus, radium-226 dust levels are not expected to pose problems during excavation and other activities during the TCRA.

Uranium has an 8-hour time-weighted average (TWA) of 0.25 mg/m3 (29 CFR 1910.1000 Table Z-1) Assuming secular equilibrium with radium-226 (37.2 pCi/gsoil) and converting to milligrams per kilogram (mg/kg) using the specific activity for naturally-occurring uranium from 10 CFR 71 Appendix A (7.1E-7 Ci/g), uranium concentrations are expected to be 52 mg/kg. 52 milligrams represent 0.0052% by mass. To meet the uranium TWA, sustained dust levels at the Site must be at least 4,810 mgsoil/m3. Similar to the calculations presented above for radium-226, these values represent very extreme dust loading unlikely to be observed during Site activities.

Accordingly, radium-226 and uranium levels in dust will not be monitored directly in all work areas over the course of the TCRA. However, to assure that no unexpected conditions or radiological exposure occurs, the RSO will oversee limited dust monitoring in select work areas and portions of the Site where conditions most warrant monitoring. This monitoring will involve both ambient air monitoring to assess risk to nearby community members and occupational monitoring to confirm worker safety.

At all times, specific dust monitoring requirements will be determined and may be changed by the RSO, in consultation with the health physicist and the project team.

3.1.1 Ambient Air Monitoring

To address the risk of inhalation of NORM-impacted dust generated during the TCRA, ambient air will be monitored at specific locations in order to assess the potential risk to community members near the Site. This monitoring will be performed although the risk of exposure from NORM-impacted dust is minimal, as demonstrated in Section 3.1. Ambient air samples for monitoring radioactivity are collected per Arcadis SOP 'Environmental Particulate Air Sampling.'

Ambient air will be monitored initially in at least three locations throughout the Site. These locations will be chosen based on areas of soil removal and potential risk to nearby residents. Three stationary air monitoring stations will be placed near each active work area, with one station located downwind and outside the perimeter of the work area, one station located upwind and outside the perimeter of the work area (to establish background windblown dust levels), and one station located further downwind from the worksite to monitor conditions for nearby residents. The number and location of sampling locations may be increased or decreased if determined by the Arcadis project team, health physicist, and/or RSO to warrant such changes.

Each location will include a real-time airborne particulate monitor such as a DustTrak DRX 8533 or equivalent for measuring nuisance dust according to the HASP, and Staplex TFA69 or equivalent air sampler in stationary housings. The filter samplers will have approximate flow rates of 30 to 60 cubic feet per minute (cfm). The air filters within the samplers will be glass fiber or equivalent. The ambient air samples will be analyzed for the following constituents:

- radium-226 by United States Environmental Protection Agency (EPA) Analytical Method 903.1 (radon emanation)

- total uranium by Solid Waste (SW)-846, 3rd Edition, EPA Method 6020A (inductively couple plasma-mass spectroscopy [ICP-MS])

Filters will be collected approximately one to two times a week, with each covering a minimum of a 24-hour operational period, and packaged for shipment for laboratory analysis. Sample collection intervals may be reduced if the ARCADIS project team, health physicist, and/or RSO determine that the monitoring data are sufficiently steady. At each location, the real-time airborne particulate monitor will measure PM 10 and PM 2.5.

3.1.2 Occupational Health Monitoring

To address the risk to field personnel present during TCRA activities, occupational air monitoring will be conducted although the risk of internal exposure is minimal as demonstrated in Section 3.1.

When real-time work zone particulate monitoring is required, a Thermo MIE pDR-1000 DataRam or equivalent personal air quality monitors will be used. Additionally, select workers will be required to wear individual worker breathing zone (BZ) air sampling devices during a variety of dust generating activities. At a minimum, one BZ air sampler will be assigned each day to the worker with the greatest potential for internal exposure (i.e., the maximally exposed individual). AirLite Sampler Model 110-100 BZ pumps by SKC Inc. or equivalent will be used. These pumps will be calibrated daily using a 1,000-milliliter (mL) bubbler calibration tube. Alternately, AirChek 52 pumps by SKC Inc. or equivalent will be used and calibrated with a new Mini-Buck Model M-5 Calibrator daily.

Air samples collected from these pumps will be analyzed for the following constituents:

- radium-226 by EPA Analytical Method 903.1 (radon emanation), and
- Total uranium by SW-846, 3rd Edition, EPA Method 6020A (ICP-MS).

The number of air sampling devices may be increased if determined by the Arcadis project team, health physicist, and/or RSO to warrant such changes.

All air samples collected from the occupational breathing zone must have measured Ra-226 and natural uranium both less than ten percent (10%) of the applicable occupational derived air concentrations (DACs) from 10 Code of Federal Regulations (CFR) 20, Appendix B, Table 1.

4 REPORTING

A report will be prepared to document the dust control activities. The report will include at a minimum the following:

- Summary of site conditions and background information
- A scaled site plan illustrating ambient air monitoring locations and other relevant site features
- Documentation of field activities performed in connection with the dust control plan
- Laboratory analytical results of the dust and air samples collected
- Conclusions relevant to the dust control objective

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