November 2023

Eagle Mesa Mine
Mining and Reclamation Plan

Prepared for:

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Abbreviations and Acronyms

BLM	Bureau of Land Management
BMP	best management practice
Clearance Area	Eagle Mesa Mine Clearance Area
Contract Area	Eagle Mesa Mine Contract Area
dBA	hourly A-weighted sound level in decibels
DOT	Department of Transportation
Ecosphere	Ecosphere Environmental Services
EMNRD	Energy, Minerals, and Natural Resources Department
°F	degrees Fahrenheit
FFO	Farmington Field Office
FA	financial assurance
MBTA	Migratory Bird Treaty Act
Mine	Eagle Mesa Mine
Mining Permit	Minimal Impact Mining Operation Permit
MMD	Mining and Minerals Division
MMSC	Mineral Materials Sales Contract
NAAQS	National Ambient Air Quality Standard
NM	New Mexico
NMCRIS	New Mexico Cultural Resource Information System
NMPM	New Mexico Principal Meridian
NMOSE	New Mexico Office of the State Engineer
NRHP	National Register of Historic Places
Plan	Mining and Reclamation Plan
PM	Particulate Matter
RMP	Resource Management Plan
RAMMSCO	RAMMSCO Operations, Inc.
ROW	right-of-way
RPFO	Rio Puerco Field Office
Staging area	Staging/Loading area
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WATERS	Water Administration and Technical Engineering Resource System
Woods Canyon	Woods Canyon Archaeological Consultants

1.0 Mining and Reclamation Plan

1.1 General Information

RAMMSCO Operations, Inc. (RAMMSCO) needs to update their existing Mining and Reclamation Plan (Plan) for the Eagle Mesa Mine (Mine), a Minimal Impact Surface Mine. In accordance with the Bureau of Land Management (BLM) Rio Puerco Field Office (RPFO) Resource Management Plan (RMP) (USDI/BLM 1986), this Plan was prepared to evaluate the current state of reclamation at the Mine, to provide an ongoing plan for mining and reclamation, and to provide an interdisciplinary review of the environmental impacts of an application request for additional active mining operations acreage.

RAMMSCO mines two materials at the Mine—humate and "organic clay." Humate is an organic material rich with humic acids, occurring as a deposit within carbonaceous shale or claystone. It is used for various purposes, most notably as a soil amendment and livestock feed supplement. A brown, "organic clay" soil layer associated with the humate deposit in this formation is also being mined as part of mining operations. The "organic clay" contains fulvic acids and is also used as a soil amendment and livestock feed supplement. The existing Mine has been in operation since 1997 (16 years).

1.2 Permittee

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1.3 Administration, Contracts, and Permits

The entire Clearance Contract Permit Area is located on BLM lands. The BLM/RPFO administers the surface and mineral estate across the entire Clearance Contract Permit Area and Minimal Impact Surface Mine.

RAMMSCO's initial 535 acres Mineral Materials Sales Contract (MMSC) for mining the humate and "organic clay" was registered with the BLM/Albuquerque Rio Puerco Field Office (FFO) as Contract #NMNM128614. The MMSC was renewed in 2014 under the same contract number (NMNM128614, dated April 1, 2014). As of the date of this Plan, the BLM/RPFO is currently working with RAMMSCO to renew the contract. The new MMSC Contract Number is # _R_____ (to be filled in by BLM/RPFO).

Within the Initial 535 acres, Mineral Materials Sales Contract, RAMMSCO holds an existing Minimal Impact Mining Operation Permit (Mining Permit up to 40 acres of disturbed area, per N.M. Code R 19.10.3.304), with the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD) Mining and Minerals Division

(MMD), Permit Number SA009MN Eagle Mesa Mine – Minimal Impact New Mine – Modification 16-1. According to David J Ennis of the MMS, additional acres, within the 535 Clearance Contract Permit Area can be open to mining as areas are reclaimed, as-long-as, the bonding funds cover the expansion acreage.

1.4 Location

The Mine is located approximately 5.5 miles west of Johnson Trading Post, 7.5 miles north of Torreon, 6 miles southeast of Ojo Encino, and 19 miles west-southwest of Cuba, New Mexico (Map A-1, Appendix A).

1.5 Clearance Contract Permit Area

As shown on Map A-1 in Appendix A, the Eagle Mesa Mine Clearance Area (Clearance Area) covers approximately 535 acres in Sections 8 and 9 of Township 19 North, Range 4 West, New Mexico Principal Meridian (NMPM) in Sandoval County, NM. The legal description for the Clearance Area is as follows:

Table 4-1. Clearance Area Legal Description

Section 8	**Acres**
Southeast ¼ Section	160.0
Southeast ¼ of Southwest ¼ Section	40.0
South ½ of Southwest ¼ of Southwest ¼ Section	20.0
Southeast ¼ of Northeast ¼ of Southwest ¼ Section	10.0
Southeast ¼ of Southwest ¼ of Northeast ¼ of Southwest ¼ Section	2.5
Southeast ¼ of Northeast ¼ of Northeast ¼ of Southwest ¼ Section	2.5
Total Acres in Section 8	**235.0**
Section 9	Acres
South ½ of Northeast ¼ Section	80.0
South ½ of Northwest ¼ Section	80.0
North ½ of Southwest ¼ Section	80.0
North ½ North ½of Southeast ¼ Section	40.0
South ½ of Northeast ¼ of Northwest ¼ of Section	20.0
Total Acres in Section 9	**300.0**
TOTAL ACRES	**535.0**

1.6 Minimal Impact Surface Mine Contract Area

The Minimal Impact Surface Mine Contract Area is defined as any disturbed areas up to 40 acres and future mining areas within the Clearance Contract Permit Area. The Active Minimal Impact Surface Mine is located within the Clearance Contract Permit Area.

1.7 Current Disturbed Mining Area

The current disturbed area comprises 18.827 acres, which include 11.397 Disturbed acres and 7.43 Future Mining acres (Map A-2 in Appendix A).

Disturbed Areas Mining, Roads and Top-soil and Overburden Storage

11.397 Acres Current disturbed acres

7.43 Acres Future near term expansion of mining (disturbed area)
18.827 TOTAL Acres

1.8 Mining Activities

The thickness of the humate and "organic clay" layers throughout the Clearance Area vary greatly. RAMMSCO has documented the humate seam on site as up to 8 feet thick and as thin as 0 feet. Remaining humate reserves in the Clearance Area are conservatively estimated based on the assumptions of a 1-8 foot thick discontinuous humate seam across the area at a density of 1,850 pounds of humate per cubic yard (D. Williams) approximately 750,000 tons proven reserves. The "organic clay" layer also varies between 0 and 3 feet thick across the Contract Area. "Organic clay" reserves in the Clearance Permit Contract Area are conservatively estimated based on the assumptions of a Thinning and thickening of a 3-foot thick "organic clay" seam across the area and a density of 2,300 pounds of "organic clay" per cubic yard (D. Williams. The estimated amount of humate and "organic clay" in reserve within the 2019 Active and Additional Mining areas is estimated at approximately 850,000 tons indicated , (according to BLM Geologist, David Sitzer letter Jan 5, 2001).

Reclamation earthwork and seeding has been performed on approximately 8.39 previously-mined acres of the minable Contracted Minimal Impact Surface Mine. (Map A-2, Appendix A).

Active disturbance will not exceed 40 acres at any time as required by MMD (D. Ohori, pers. communication, August 29, 2018). As mining progresses each calendar year, RAMMSCO may apply for a partial release of financial assurance (FA) in-order-to release reclaimed acreage for earthwork.

2.0 Existing Environment

2.1 Regional and Local Topography

The elevation throughout the Clearance Area ranges between 6,600 and 6,820 feet, and the Contract Area lies at approximately 6,660 feet. The Continental Divide runs 8.5 miles northeast of the Clearance Area boundary. The natural topography within the mining areas consists of gently rolling hills sloping generally to the east-southeast. Slopes within the Contract Area are gentle, ranging between 0 and 5 percent.

2.2 Climate

The climate within the general Clearance Area averages maximum year-round temperatures between 40 and 100 degrees Fahrenheit (°F) and minimum temperatures between -9.1°F and 50.2°F (www.worldclimate.com). Average annual rainfall in the general vicinity is 12.8 inches per year, with the highest percentage in July and October (2.1 to 6 inches).

2.3 Clearance Contract Permit Area Description and Maps

The Clearance Area is located on the United States Geological Survey (USGS) 7.5-minute quadrangle topographic map for Ojo Encino Mesa, NM. The Clearance Area is not located within any specially designated area such as a Wilderness Area, Wilderness Study Area, or an Area of Critical Environmental Concern. A vicinity map of the Clearance Area is presented in Appendix A (Map A-1). The location of the Clearance Area is described in Section 1.1, Project Description.

2.4 Major Rights-of-Way

One major maintained gravel road—Tinian Road—crosses through the Clearance Area, connecting Pipeline Road to the south with Indian Service Route 474 to the north. Other unmaintained dirt roads and two-tracks occur across the Clearance Area, including access to a storage shack south of the Contract Area, general rancher access, and the gravel road accessing the Contract Area and active Mine.

An existing oil/gas pipeline right-of-way (ROW) bisects the Clearance Area from northwest to southeast, primarily through the east half of Section 8. This pipeline lies to the west and outside of the Contract Area.

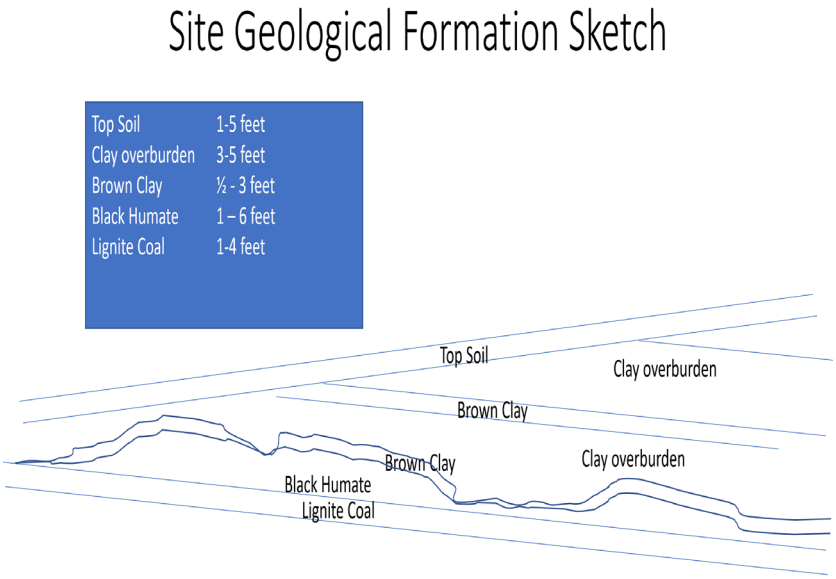
2.5 Current Land Use

The current land uses within the Clearance Area are livestock grazing, wildlife use, utility corridors, and mineral materials mining. The Contract Area is located within the Star Lake Community grazing allotment. The project area has been previously disturbed by past mining, grazing, and vehicle access. Existing un-improved two-track roads provide access into the Contract Area.

2.6 Deposit Geology

The desired geological formation containing the humate and "organic clay" material is derived from the Fruitland Formation of the Upper Cretaceous period (Beaumont 1998). There are no known potentially hazardous materials that could be exposed during the extraction of the humate material.

2.6.1 Geological Cross-Section



Generalized illustration of the distribution of humates and clays in the minable Contract Area

The actual humate and "organic clay" deposits in the minable Contract Area are highly variable in sequence, thickness, and extent due to previous mining, erosion, uplifts, and faulting (Figure 1-1). No natural outcroppings occur within the Contract Area. Within the minable Contract Area, site conditions are expected to include (from the surface down):

- A thin layer of topsoil (generally 1 to 4 feet thick)
- A 4- to 6-foot layer of sand and soil overburden
- A 2- to 3-foot layer of "organic clay" (brown clay)
- A 3- to 5-foot layer of unusable (gray) clay
- A 1-foot layer of "organic clay" (brown clay)
- A 1- to 8-foot layer of humate

- ½ - 3 feet of Lignite coal and unusable clay

2.7 Watershed, Surface, and Ground Water

The Contract Area is in the Middle Rio Grande Hydrologic Region on the east side of the Continental Divide, within the Arroyo Chico watershed.

The Contract Area lies approximately 5.1 miles due north of the confluence of the San Isidro Wash and Torreon Wash—both ephemeral drainages. There are no perennial surface water resources in the form of rivers, lakes, ponds, or streams, nor any wetlands, springs, or riparian habitats within the Clearance Area. Precipitation is generally absorbed by the sandy soils or collects as runoff in an unnamed ephemeral drainage southwest of the Contract Area. Within the past 25 years, two small stock ponds have been constructed in sequence on this drainage to collect surface flows—one stock pond was in existence prior to Rammsco's mining operation. These stock ponds allow sediment to settle out of the water and provide a water source for livestock and wildlife. Outfall from these stock ponds flows 0.25 mile into another unnamed ephemeral drainage, which is a tributary to San Isidro Wash.

The primary aquifers in the area are the sandstone-based Uinta-Animas and the Mesaverde (USGS 1995). Groundwater is readily available in most of the area and is of fair to poor quality. A search of the New Mexico Office of the State Engineer (NMOSE) Water Administration and Technical Engineering Resource System (WATERS) database for the Clearance Area and vicinity (4-mile radius) was performed (NMOSE 2012). There are no recorded water wells located within 4 miles of the Clearance Area. The nearest water column data available on the WATERS database is located approximately 4.5 miles east of the Contract Area. The minimum depth to water at that windmill location in San Isidro Wash (Section 6, Township 19 N, Range 3 W) is 21 feet. Depth to groundwater within the minable Contract Area is expected to be deeper than at this location since the Contract Area is not located within an existing wash. The next nearest water column data available on the Waters database is 6 miles southwest of the Contract Area. The minimum depth to water at that location (Section 7, Township 30 N, Range 4 W) is 95 feet.

2.8 Vegetation and Wildlife

The vegetation within the Clearance Area and the surrounding area is limited and does not fall within any documented fire hazard zones. A summary of the vegetation and wildlife occurring within the Clearance Area (including the Contract Area) is provided below. A detailed evaluation of the potential for federal- and state-listed species and other sensitive species designations was submitted to the BLM/RPFO under separate report cover in May 2013: *Biological Survey Report for Rammsco Operations, Inc. Eagle Mesa Mine* (Ecosphere 2013).

The Clearance Area is located within the Great Basin Desert Scrub vegetation community (Dick-Peddie 1993). The overall vegetation ground cover in undisturbed areas was observed to be 20 to 40 percent. Vegetation within the Contract Area consists of big sagebrush (*Artemisia tridentata)* with an understory of broom snakeweed (*Gutierrezia sarothrae*) and blue grama (*Bouteloua gracilis*). Other vegetation includes shrubs such as fourwing saltbush (*Atriplex canescens*), rubber rabbitbrush (*Ericameria nauseosa*), and greasewood (*Sarcobatus vermiculatus*). Common grasses include James' galleta (*Pleuraphis jamesii*), alkali sacaton (*Sporobolus airoides*), and Indian ricegrass (*Achnatherum hymenoides*).

The Great Basin Desert Scrub community (Dick-Peddie 1993) supports a variety of wildlife, including mammals, birds, and reptiles. Common mammal species found in Great Basin Desert Scrub include black-tailed jackrabbit (*Lepus californicus*), prairie dog (*Cynomys gunnisonii*), kangaroo rats (*Dipodomys* spp.), and coyote (*Canis latrans*). Common bird species include American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), and roadrunner (*Geococcyx californianus)*. Reptile species that may occur in the Great Basin Desert Scrub community include collared lizard (*Crotaphytus collaris*), short-horned lizard (*Phrynosoma douglasii*), sagebrush lizard (*Sceloporus graciosus*), prairie lizard (*Sceloporus undulatus*), plateau striped whiptail (*Cnemidophorus velox*), bull snake (*Pituophis melanoleucus*), and western rattlesnake (*Crotalis viridis*).

According to the U.S. Fish and Wildlife Service (USFWS), there are nine federally listed threatened, endangered, proposed endangered, or candidate species with potential to occur in Sandoval County, New Mexico. However, no federally listed species or their habitat were identified within the Clearance Area during field surveys (Ecosphere 2013).

According to the State of New Mexico, there are 19 state-listed threatened or endangered species with potential to occur in Sandoval County, New Mexico. Aside from the spotted bat (*Euderma maculatum)* (also listed by the BLM, and discussed below), no state-listed species, or habitats thereof, were identified within the Clearance Area during field surveys (Ecosphere 2013).

According to the BLM/RPFO, there are 27 BLM Sensitive species listed as occurring in Sandoval County (USDI/BLM 1986 and 2012). Ten of these species have potential habitat within the Clearance Area — pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), spotted bat (also a State-listed species), fringed myotis (*Myotis thysanodes),* ferruginous hawk (*Buteo regalis*), loggerhead shrike (*Lanius ludovicianus*), mountain plover (*Charadrius montanus),* western burrowing owl *(Athene cunicularia hypugaea),* grama grass cactus (*Sclerocactus papyracanthus),* New Mexico spiny milkvetch (*Astragalus kentrophyta var. neomexicana),* and tufted evening primrose (*Oenothera caespitosa*).

One BLM special management species—western burrowing owl—was observed in an active prairie dog colony outside of the Clearance Area during the field survey. However, no habitat for the burrowing owl was identified within the Clearance Area (including the Contract Area). Mountain plovers are also associated with prairie dog colonies (NatureServe 2012), but no suitable mountain plover habitat occurs within the Clearance Area and no mountain plovers were observed during the field surveys. No other special status species were observed within or near the Clearance Area (Ecosphere 2013).

The Clearance Area (including the Contract Area) contains potential nesting habitat for the loggerhead shrike but does not contain any potential breeding habitat for any other BLM-listed animal species. The Clearance Area contains potential foraging habitat for the shrike, ferruginous hawk, pale Townsend's big-eared bat, and spotted bat (Ecosphere 2013).

Potential habitat may exist within the Clearance Area for sensitive plant species. However, none of these species were observed during the field surveys. The closest documented occurrences of these species on BLM lands are 21 miles away (grama grass cactus), and 60 miles away (tufted evening primrose and New Mexico spiny milkvetch) (Ecosphere 2013).

The Clearance Area also contains potential nesting and foraging habitat for other bird species protected by the Migratory Bird Treaty Act (Ecosphere 2013). No nests were identified in the Clearance Area or Contract Area during the biological survey. However, detailed nest surveys were not conducted, and the field survey was outside of breeding season. Noise and disturbance of native vegetation from ongoing mining activities could affect the utilization of this area by these species for foraging and breeding. Based on readily available suitable nesting habitat in the vicinity of the Clearance Area, impacted individuals would be expected to move to adjacent areas to avoid disturbance. Over time and as reclamation progresses in mined-out portions of the Contract Area, disturbed areas are expected to revert to the Great Basin Desert Scrub vegetation community that currently exists in undisturbed portions of the Clearance Area.

2.9 Historical, Archaeological, and Cultural Sites

The entire Area of Potential Effect in the Clearance Area was inventoried for archaeological and historic resources by Woods Canyon Archaeological Consultants (Woods Canyon) between August 20 and 23, 2012 and between November 5 and 8, 2012 under BLM Permit No. 49-2920-08-S and New Mexico Cultural Resource Information System (NMCRIS) #125735. The inventory consisted of a 100 percent Class III pedestrian survey of the Clearance Area on BLM lands. A cultural resources inventory report was prepared and initially submitted to the BLM/FFO archeologist in December 2012, and subsequently revised per the BLM/RPFO archeologist's requests and submitted to the BLM/RPFO in April 2013 in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (USDI/BLM 2005). The report was submitted to the BLM under separate report cover: *A Class III Cultural Resource Inventory for the Eagle Mesa Humate Mine Expansion, Sandoval County, New Mexico* (Robinson 2013).

In addition to the on-site field survey, the inventory included a literature search and Traditional Cultural Property search at the BLM/FFO and BLM/RPFO, and an online literature search with the New Mexico Cultural Resource Information System Archeological Records Management Section to determine if any sites had been recorded within 0.5 mile of the clearance area.

The results of the literature search found that 13 previous archeological surveys had been conducted and 12 previously recorded sites had been documented within 0.5 mile of the Clearance Area—LA22382, LA44699, LA44700, LA44701, LA44702, LA44703, LA58937, LA58938, LA123260, LA123261, LA125715, and LA125716.

The Class III inventory identified 11 sites and 26 isolated finds. Six of the sites (LA174629, LA174630, LA174631, LA174632, LA174633, and LA174634) are newly documented, while five sites (LA22382, LA44699, LA 44700, LA44701, and LA44702) were re-recorded. Two of the previously recorded sites (LA58937 and LA123260) were not relocated during the survey. Of the six newly documented sites, two are recommended eligible for listing with the National Register of Historic Places (NRHP) (LA174632 and LA174633), because they meet Criterion D of 36 Code of Federal Regulations 60.4. Two sites may be eligible but need additional data to make a recommendation (LA174629 and 174631), and the remaining two sites (LA 174630 and 174634) are recommended as ineligible for listing with the NRHP.

Woods Canyon consulted the NRHP and the State Register of Cultural Properties and determined that there were no cultural properties in the survey area on either register. Numerous attempts were made to contact the

Ojo Encino Chapter president, Roger Toledo, to discuss and obtain additional information regarding possible TCPs in the Clearance Area, and to determine if the Chapter had any management concerns. Two ethnographically documented ceremonial locations may occur within the Clearance Area (York and Winter 1988), but these locations have not been verified by tribal elders, and repeated efforts to contact the Ojo Encino Chapter House had not yielded a response at the time of the cultural report or this Plan.

Four sites were located in proximity to the mineable Contract Area. Site LA 174632 is recommended as eligible for NRHP listing. Sites 44699, 44701, and 44702 are recommended as ineligible, but could be potentially impacted or destroyed by mining activities, and consultation between the BLM and the Navajo tribal government is pending. All four sites will be protected and avoided through installation of high-visibility fencing using T-posts and orange plastic safety fencing around a 10-meter buffer of each site. Assistance from the BLM/RPFO will be required to locate these fences as the exact site locations are unknown to the mine operator.

If previously undocumented cultural sites are encountered during construction, all activities will stop in the vicinity of the discovery and the BLM/RPFO will be immediately notified. The site would then be evaluated. Mitigation measures such as data recovery may be required by the BLM/RPFO to prevent impacts to newly identified cultural resources.

2.10 Paleontological Sites

The Clearance Area was inventoried for paleontological resources by John Burris, Ph.D., BLM-Permitted Consulting Paleontologist (Permit # NM12-001C) on August 10, September 3, and September 22, 2012 (Burris 2013). Within the Clearance Area, all geologic outcrops and anthills in the vicinity of outcrops were examined closely for vertebrate fossils, as were the previously exposed humate mine and spoils piles. The paleontological resources report has been submitted to the BLM/RPFO in association with this Mining and Reclamation Plan, but under the separate report cover—*Paleontology Survey Report, RAMMSCO Operations, Inc., Eagle Mesa Mine, Section 8 & 9, T19N, R4W, Sandoval County, New Mexico.*

The inventory found no vertebrate fossils and there are no known localities within the Clearance Area. However, determination of the presence or extent of paleontological resources could not be completed for much of the area due to the soil cover over the geologic layer where vertebrate fossils would most likely occur. The subsurface Fruitland Formation geologic layer has the potential to contain significant fossils (Burris 2013). Monitoring during excavation is recommended by the BLM-Permitted Consulting Paleontologist. If previously undocumented paleontological resources are encountered during mine operations, the BLM's Discovery Stipulation would apply.

BLM Discovery Stipulation

The permittee shall immediately notify the BLM Authorized Officer of any paleontological resources discovered as-a-result-of-operations under this authorization. The permittee shall suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and shall protect the discovery from damage or looting. The permittee may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered

locality or be continued elsewhere. The Authorized Officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

2.11 Noise Levels

Noise levels are measured utilizing instruments that are calibrated to measure hourly A-weighted sound level in decibels (dBA). The dBA scale is a measure of sound levels that are present at a given location that would be audible to the human ear. The dBA scale does not measure levels of noise that would not be audible to the human ear, generally not measuring extremely low range noise, and not measuring high pitched sounds. Some urban noises that represent the range of noise levels that are commonly heard are provided in Table 2. Noise levels at the Contract Area are expected to peak at 85 dBA during operating hours at the noise source.

Table 4-2. Examples of General Noise Levels in Common Activity Areas

Noise Generator	General Noise Level (dBA)
Construction Site	85
Caterpillar D9H Bulldozer	81[1]
Caterpillar D7F	81
Caterpillar 950F Wheel Loader	84[1]
Trojan 3500Z Wheel Loader	84[1]
Cat Road Grader	85[1]
Pick-up Truck	80
Automobile	65
Residential Area (daytime)	50
Residential Area (nighttime)	45
Rural Area (nighttime)	35
Hearing threshold	20

[1] Average noise level readings taken at 15 m (USDT-FHWA 2010).

Noise compliance standards for operations within the BLM/RPFO jurisdiction were not located for this Plan. The BLM/FFO uses a noise standard to determine compliance with the BLM/FFO's Notice to Lessees for Noise (USDI/BLM 2004). The sound level must be less than or equal to 48.6 dBA over a continuous 24-hour period based on a distance of 300 feet from the source of noise.

The increase in noise levels associated with the mining activity would be localized to the Mine site and would decrease with increasing distance from the source. Maximum construction hours will be limited to daylight hours, 5 days a week. A minimal amount of equipment would be used on-site, and all equipment would comply with industry and New Mexico Department of Transportation (DOT) standards.

No residences occur within a 1-mile radius of the minable Contract Area. There is an existing residence located approximately 1.3 miles (7,000 feet) west-northwest of the minable Contract Area. Noise levels in the area surrounding the Mine are generally low, given its rural nature.

2.12 Air Quality

The areas of the Mine lease are considered a Class II air quality area. A Class II area allows moderate amounts of air quality degradation. Air quality in the area near the proposed project is generally good and is not located in any of the areas designated by the United States Environmental Protection Agency (USEPA) as “non-attainment areas” for any listed pollutants regulated by the Clean Air Act. Currently Sandoval County is in attainment of all federal National Ambient Air Quality Standards (NAAQS).

Air quality would be directly impacted with pollution from exhaust emissions and dust. Air pollution from the motorized equipment and dust dissemination would continue for the duration of mining and reclamation activities. Impacts from emissions and dust would generally be localized to the active mining areas within the Contract Area. Other factors that currently affect air quality in the area include dust from use of roads for vehicular traffic, dust from livestock herding activities and recreational use, and emissions from oil and gas production activities. The significance threshold for particulate matter (PM) of 35 micrograms per cubic meter daily $PM_{2.5}$ NAAQS is not expected to be exceeded.

2.13 Traffic Conditions

Tinian Road, traveling through the Clearance Area from northeast to southwest and located north of the Contract Area, is used by local-residents, ranchers, oil and gas workers, and mining traffic. The road provides access to State Highway 197 via Indian Service Route 474 and Pipeline Road. The unnamed road receives infrequent maintenance (i.e., graded periodically, but not plowed during snowstorms and with few installed culverts). The Mine has approximately 15 to 20 haul truck-trips per month delivering humate from the Mine to the truck scales. Light vehicles are used to transport the employees to and from the site in the mornings and evenings. Observations of traffic levels on the unnamed road during field visits to the site suggested the road gets approximately 1 to 2 cars per hour, with most of the traffic being local residents.

2.14 Demographics

Demographic information for the area is based on information included in the Chapter Images 2004: Profiles of 110 Navajo Nation Chapters (Navajo Nation 2004) and based on information from the 2010 United States Census (U.S. Census Bureau 2010). The closest population center to the Clearance Area is Ojo Encino. The total population of the Ojo Encino chapter was documented as 709 persons, 350 males, and 359 females. The majority of the people were between 5- and 9-years-old and the second highest between 25- and 34-years-old,

the median age being 21.9 years. American Indians/Alaska Natives made up 97.9 percent of the population (Navajo Nation 2004; U.S. Census Bureau 2010).

2.15 Visual Setting

The Clearance Area, including the Contract Area, is located in a broad valley southwest of Eagle Mesa. The terraced cliffs of Eagle Mesa are visible about 2 miles northeast of the Clearance Area. The valley bottom is dissected by a series of named and unnamed dendritic drainages, including San Isidro Wash and Torreon Wash, and is punctuated by isolated eroded mesas, buttes, and ridges.

The area is currently classified as Visual Resource Management Class IV, as mapped in the BLM/RPFO Resource Management Plan (USDI/BLM 1986). VRM Class IV management objectives provide for activities that require major modification of the existing landscape character. The level of change to the landscape can be high, and management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the visual impact of these activities.

3.0 Proposed Operations

The humate and "organic clay" deposits in the Contract Area are highly variable in thickness and extent. Remaining humate reserves in the 535-acre Clearance Contract Permit Area are conservatively estimated in Section 1.14 Mining Activities as approximately 850,000 tons of humate and "organic clay."

Total annual humate extraction is estimated to be 6,000 tons per year, based on an average of 15 humate extracted per month. Total annual "organic clay" extraction is estimated to be 6,000 tons per year, based on an average of 15, truckloads of "organic clay" extracted per month.

RAMMSCO proposes to operate the Mine only during daylight hours on weekdays (Monday through Friday) between 8:00 am to 4:00 pm, except for holidays. Orders for humate and "organic clay" product are bunched for pickup into groups of 5 to 10 truckloads at a time, at 23 cubic yards per truckload for humate and 20 cubic yards per truckload for "organic clay." After a group of pickups is completed, mining operations are put on hold until new orders are received. On average, 10 to 15 truckloads each of humate and "organic clay" are removed from the Mine per month (D. Williams, email message to Ecosphere November 19, 2012).

To accomplish the mining activities and proper reclamation, the mining operations will follow the main Stages as outlined below.

3.1 Reclamation Process

Stage I — Remove and store top-soil in isolated stockpile with erosion controls in place.

Six to 18 inches of top-soil will be removed from the mining area and stored separately in top-soil stockpile.

Stage II Removal and stockpiling of overburden.

The overburden of soils and clays above the 1st and 2nd layers of humate and clays will be stockpiled in separate location for reclamation of earthwork.

Stage III Mining of Humate and organic clay will be removed and stockpiled in staging area to be loaded onto trucks for transport.

Stage IV Over-burden will be replaced back into pit with contouring and small catchments for erosion control and vegetation enhancement as intermediate step in completion of earthwork and reclamation. Slopes will be less than 3 feet horizontally to 1 ft vertical.

Stage V **Erosion control earthwork will commence to contour area and create catchments for water to enable growth of reclamation vegetation. Table 4-3. Erosion Control BMPs**

BMP	How It Works	Location at Eagle Mesa Mine
Setbacks	Setting back ground-disturbing activities from perennial or ephemeral watercourses provides a buffer between potential sediment sources and the watercourse. All mining activities and associated disturbance will be set back a minimum of 100 feet from any perennial or ephemeral watercourses.	Ephemeral drainage southwest of the minable Contract Area.
Berms	Soil berms built on the downhill side of a disturbed area (either in the active mining area or the reclaimed area) trap stormwater. Berms should be 3 feet high and compacted to be effective.	Topsoil and overburden stockpiles, and at the base of any sloped, disturbed areas that drain outside of the Contract Area.
Mining Pit	In the open pit area, all stormwater is contained in the pit.	Active mining area.
Rapid Reclamation	Rapid reclamation (surface contouring, surface roughening, and seeding) help to stabilize soil with vegetation.	Topsoil and overburden stockpiles, reclaimed areas.
Sediment Basin	There is one sediment basin within the Mine, which collects stormwater from the eastern half of the Mine. It is a closed basin (no outlet). Southwest of the minable Contract Area are two sediment basins (or stock ponds), which collect and hold for infiltration some surface runoff from the extreme southwest portion of the active mining area. All three impoundments allow the sediment to settle out of the water, and the water to infiltrate back into the subsurface soils.	Within interim reclamation area R-1; southwest of the active mining area.
Surface Contouring	Surface contouring (grading) creates low spots where water collects or directs stormwater into a sediment pond.	Reclaimed areas.
Stockpile Location Planning	All stockpiles will be located on flat ground, away from drainage areas. This reduces the chance of materials slumping downhill or being carried away by surface water flows.	Active mining area.

BMP	How It Works	Location at Eagle Mesa Mine
Stockpile Stabilization	Topsoil and overburden soils to remain stockpiled greater than 6 months (180 days) shall be seeded with the herbaceous components of the reclamation seed mix provided in Section 2.5.3–Seeding to provide erosion control. This will protect the soil from eroding or mobilizing and will maintain the existing microorganisms and other soil constituents through natural nutrient cycling. Shrub seed is not required for stockpile stabilization. Soil berms shall be constructed around the base of the stockpiles to 3 feet high and compacted.	Topsoil and overburden stockpiles.
Surface Roughening	Surface roughening creates small ridges and gullies with the teeth of the bucket of the front-end loader or with the grooves of tracked equipment. These ridges and gullies go across the slope (that is, along the contour of the slope), trapping stormwater and helping with revegetation. To create these ridges/gullies with tracked equipment, the equipment should be run up/down the slope (that is, perpendicular to the contour of the slope).	Reclaimed areas.

Stage VI The topsoil will be spread evenly over the overburden that has been contoured with mini-catchments for erosion control and water.

Stage VII Seeding preparation will be done by furrowing the ground along strike of the topographical lines. This will ensure moisture retention and minimal seed cover for the seeds to germinate.

Stage VIII Seed planting will occur immediately after furrowing to provide the best environment for the successful germination of the seeds.

Stage IX Fencing and/or fence posting of recently reclaimed area will commence to protect area from any encroachment of vehicles.

Stage X Monitoring and maintenance oversight of growth of seedlings to prevent any unwanted weeds and to ensure growth of native vegetation. Prevention of (*Halogeton glomeratus*), a Class B noxious weed.

1. Train on-site personnel to recognize *Halogeton*.

2.Complete two inspections per year (in May-June and after monsoon season) of all disturbed areas. Spot-treat *Halogeton* plants using an appropriate herbicide in strict accordance with the manufacturer's recommendations or remove *Halogeton* mechanically.

3. Decontaminate new mining equipment prior to introduction into the Contract Area.

Halogeton has been exterminated on the mine but continued diligence to kill or remove any Halogeton will continue.

Stage XI **Final Closure**

When reclamation success has been determined by the BLM and MMD, all fencing will be removed, the mine operator will recover the appropriate bond sum, and the Mine will be considered closed.

3.2 Equipment and Personnel Information

RAMMSCO proposes to operate the Mine periodically, and only during daylight hours on weekdays (Monday through Friday) between 8:00 a.m. and 5:00 p.m., except for holidays. The proposed Mine would employ one or two full-time employees working a maximum 8-hour shift, no more than 5 days a week.

All vehicles will be restricted to haul roads and active mine operations. Once areas are reclaimed, no vehicles will be operated within the reclaimed areas without the express written clearance from the MMS and BLM. On-site haul road and for restoration maintenance or rehabilitation activities will be maintained. The following equipment for each phase of the project would be operated by the employees, except for the haul truck and trailer, which are operated by employees of the materials purchaser and are not controlled by the mine operator.

Table 4-4. Equipment Required for Mining Plan

Equipment	Stage I Initial Reclamation	Stage II Staging & Stockpiling	Stage III Mine Operation	Stage IV Final Reclamation/Closure
Front-End Loader	X	X	X	X
Bulldozer	X	X	X	X
Haul Truck			X	

3.3 Production Verification/Inspection and Enforcement

Production rates are determined based on weight logs recorded for each load upon arrival at the truck scales. See Section 1.3.3, Stage III: Mine Operation, for more information.

3.4 Committed Procedures

The previous procedures will be followed to prevent degradation or destruction of soils.

3.5 Travel/Transport (Roads, Residences, Bridges, Etc.)

The proposed travel route between the Mine site and Albuquerque, NM is expected to follow Tinian Road north of the Contract Area northeast to Indian Service Route 474, then east to State Highway 197 northeast to US Highway 550, then south to Bernalillo, and south on I-25 to scale in Albuquerque. Gross weight before delivery will be taken then tare weight to nearest scale after delivery will be taken for reporting.

All Mine-related vehicles will be required to follow posted speed limits, and all vehicles including haul trucks and personal vehicles, will adhere to load limits outlined by the New Mexico DOT and Navajo DOT. Use will be limited to only necessary travel (e.g., partial loads will not be transported). The maximum weight on bridges will not be exceeded. All loads departing the Mine will be covered for the duration of transport, according to New Mexico DOT standards, to avoid damage to windshields, etc. When encountered, right-of-way will be given to the nearby residents.

3.6 Post Mining Land Use

All Mine-related disturbance within the entire Clearance Contract Area will be properly reclaimed and returned to grazing use for livestock and wildlife after mining operations are complete. Reclamation procedures are outlined in Section 2, Reclamation Plan.

3.7 Surface and Ground Waters

All mining activities and associated disturbance shall be set back a minimum of 100 feet from any ephemeral watercourses. During periods of precipitation, runoff, or snowmelt when soils are wet or saturated, if heavy equipment creates ruts in excess of 6 inches deep, the soil is considered to be too wet to adequately support the equipment, and all vehicular travel on site shall be suspended until soils can again support the equipment. A SWPPP shall be implemented and maintained through the life of the project until final reclamation has been achieved (Ecosphere 2019). Erosion control measures shall be installed and maintained throughout the life of the Mine (see Section 2.5.5, Erosion Control and Stormwater). Hazardous materials in the form of fuel and lubricants for the construction and operation equipment shall be contained in designated secondary containment areas (see Section 1.6.8, Site Housekeeping).

3.8 Vegetation and Wildlife

All activities during all phases of mining operations will be restricted to the boundaries of the Contract Area (see Map A-2 of Appendix A). Extreme care will be taken to avoid all wildlife or livestock within the roads and surrounding area.

In accordance with the Migratory Bird Treaty Act (MBTA), any vegetation clearing required to prepare undisturbed areas of the Contract Area to be mined shall be cleared between October 1 and March 31 to avoid damaging or destroying any migratory bird nests, which is considered a violation of the MBTA.

3.9 Invasive Species/Noxious Weeds

In accordance with the standard operating procedures found in BLM/RPFO Instruction Memorandum NM-010-99-01 (USDI/BLM 1999), an approach for weed prevention and treatment is included in this Plan. The mine operator will manage and control noxious weeds throughout the life of the mining operation until final reclamation has been achieved. A list of noxious weeds identified as occurring on BLM/RPFO lands is provided in Section 2.7, Invasive/Noxious Species Control, and a list of weeds identified for control by the State of New Mexico is provided in Appendix C: Noxious Weed Information. Control of noxious species is discussed further under Section 2.7, Invasive/Noxious Species Control, (See Appendix, Noxious Weed Species).

3.10 Air Quality, Noise, Light, and Vibration

Operations will occur only during daylight hours. Minimal amounts of equipment will be used to accomplish the mining operations.

3.11 Visual Resources

Impacts to visual resources are related to land disturbance, amount and types of equipment, machinery, and vehicles, infrastructure, and project emissions. Siting and design considerations to reduce, avoid, or mitigate visual impacts at the mining site will include:

- Minimization of all surface (ground) disturbances for all road or facilities infrastructure.
- To the extent practicable, location of facility infrastructure or equipment storage will not be on high land features and along "skylines" that are readily visible from nearby sensitive viewpoints.
- Storage of equipment and vehicles will be kept within the limits of the initially disturbed areas.
- Avoiding impacts to public road ROWs. Existing vegetation and topography within the ROWs will be left undisturbed.
- Minimization of vehicular and human activities as practicable during mining operations. Neither vehicular nor human activities will occur outside of daylight hours to minimize disturbance to neighboring landowners.

3.12 Site Housekeeping

The Contract Area will be regularly maintained to keep a tidy site. Equipment kept on site will be stored neatly in the staging areas when not in use, including heavy equipment, vehicles, hoses, pumps, trash bins, etc. Equipment that is inoperable will be removed from the site and not stored at the site. In general, inoperative equipment and poor housekeeping creates a poor image of the activity in the eyes of the public.

Since RAMMSCO operates on an on-demand basis for the materials being extracted, the Mine is not active every day. All heavy equipment used in the project area shall be inspected for leaks on each day that the mine operator is on site and the Mine is active/in operation, and a written log of inspections and maintenance will be completed each day that the Mine is active/in operation. The inspection and maintenance logs will be kept on site or in the mine operator's possession whenever the operator is on site.

3.13 Waste Disposal

General domestic solid wastes (garbage) are considered non-hazardous materials, and include food wastes, non-hazardous packaging wastes, non-petroleum oils and greases, and other non-hazardous solid materials considered inert.

Due to the possibility of theft and vandalism at the mining site, no waste container will be located on-site. All domestic solid waste shall be collected daily by the mine operator, removed from the site, and disposed of legally and properly at an appropriate off-site waste disposal facility. No illegal dumping or littering shall occur.

The following materials are considered potentially hazardous materials and shall be disposed of at a legal, appropriate, off-site, permitted hazardous waste disposal facility:

- Spent oil filters and petroleum containers.
- Used car/truck/equipment batteries.
- Pressurized or empty aerosol cans.
- Empty reagent containers or drums.
- Other containers holding resins, solvents, glues/cements, cleaners, or paint.
- Used petroleum products.
- Absorbent materials used in any spill cleanup.

Potentially hazardous wastes shall be containerized, and these wastes and empty hazardous materials containers shall be periodically removed for disposal in conformance with all applicable federal and state requirements. At the completion of all mining and reclamation activities, all hazardous materials and hazardous wastes shall be removed from the site and disposed of properly.

3.14 Spill Prevention and Response Plan

HAZMAT program is located on site as per MSHA.

3.15 Mine Safety

Periodic MSHA oversight is done at the mine.

4.0 RECLAMATION BOND

4.1 Reclamation Bond

As part of the MMD Mining Permit and the BLM/RPFO MMSC, an FA estimate from the mine operator is required. This estimate is based on the cost of reclaiming the site by a third party. The FA bond must be placed jointly in the name of the State of New Mexico EMNRD-MMD and the United States Department of the Interior/BLM. Applicable bonding methods include a Surety Bond, CD, or a cash account. MMD can provide further information on bonding methods if needed. MMD requires a minimum 12-year period after reclamation for withholding release of the FA for third-party re-vegetation costs. Other FA for reclamation costs such as earth moving may be released earlier pursuant to 19.10.12.1210 NMAC.

A reclamation bond estimate is provided in Appendix B. The estimate is for a reclamation area of 13.68 acres, which is the maximum acreage the Mine will have open/ disturbed at any given time under the Mining Permit (see Table 1-5 in Section 1.3.3, Stage III: Mine Operation).

4.2 Progressive Reclamation

According to David J Ennis of the MMS, additional acres, within the 535 Clearance Contract Permit Area can be open to mining as areas are reclaimed, as-long-as, the bonding funds cover the expansion acreage.

Reclamation of mined areas shall occur as follows:

- Surface Re-contouring and Seedbed Preparation
    - Backfill of excavated areas with stockpiled subsurface overburden materials.
    - Contouring of reclaimed subsurface to 3H:1V or flatter.
    - Even placement of stockpiled topsoil over area to be reclaimed.
    - Create mini-catchments every 75 feet for water resource for vegetation .
    - Furrow surface of final topsoil grade for seedbed preparation.
- Seeding
    - Seed application by broadcast seeding. 85% of bond can be released after completed and inspection by MMS and/or BLM.
- Monitoring
    - Baseline plots established.
    - Two monitoring plots randomly located within each reclaimed phase, with two transects each.
- Invasive/Noxious Species Control until release of bond.

Final reclamation for the Contract Area will include final grading, soil preparation, seeding, erosion control, and fencing of all the remaining disturbed (un-reclaimed) areas within the Contract Area.

The Schedule of Mining and Reclamation Work does not account for weather contingencies, but activities that cannot be completed under the schedule due to weather will be completed as soon as the weather allows, limiting exposure of non-reclaimed surfaces.

The MMD requires at least 2 weeks' notice prior to the commencement of reclamation approved in this Reclamation Plan.

Table 4-1. Seed Mix and Recommended Drill Seeding Rate

Species	Planting Rate[1] (lbs/acre)	Contribution in Seeds/sq. ft. Based on Planting Rate
Western wheatgrass (*Pascopyrum smithii*)	5.0	13
Blue grama (*Bouteloua gracilis*)	2.0	38
James' Galleta (*Pleuraphis jamesii*)	2.0	8
Indian ricegrass (*Achnatherum hymenoides*)	4.0	13
Mountain Brome (*Bromus marginatus*)	4.0	6
Fourwing saltbush (*Atriplex canescens)*	3.0	4
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.1	2
TOTAL:	**20.1**	**84**

[1] If broadcast seeding, this rate shall be doubled.

The seed mix, when available, in Table 2-2 has been recommended by the New Mexico EMNRD MMD in humate mine areas where halogeton is present (D. Ohori, email message to Ecosphere, August 8, 2012). Any seed mixture used in reclamation or erosion control activities must be certified weed-free, with no primary or secondary noxious weeds in the seed mixture. Seed labels from each bag shall be kept on site and made available to the BLM staff for inspection during seeding activities.

Seeding shall be repeated if a satisfactory stand has not established as determined by the BLM's authorized officer following evaluation after the second growing season (USDI/BLM 2012), or as determined by the MMD representative for release of the FA bond.

4.3 Reclamation Protection/Fencing

During and following reclamation activities, RAMMSCO shall monitor and protect the reclaimed landscape to help ensure reclamation success to the BLM and MMD requirements. Fencing of the reclaimed areas is intended to protect the newly seeded areas from livestock impacts and fencing of the 1-acre Vegetation Reference Area (see Section 2.8–Revegetation Monitoring) is intended to exclude livestock and human disturbance. A 3-strand wire fence (top wire smooth, bottom two wires barbed) with wires at 16, 26, and 38 inches above the ground and stays approximately 15 feet apart shall be installed around the 2019 Mine Contract Area Map A-1, Appendix A). This fencing conforms to New Mexico Department of Game and Fish standards for fencing in big game habitats. Fencing may be removed by the mine operator at the time the reclamation is deemed successful by the BLM/RPFO and the MMD.

4.4 Invasive/Noxious Species Control

Noxious weed control is a BLM-required compliance action for surface reclamation (USDI/BLM 2012). The objective of the BLM/RPFO weed management program is to detect invasive plant species populations, prevent the spread of new invasive populations, manage existing populations using the tools of integrated weed management, and eradicate invasive populations using the safest environmental methods available. Preventing the introduction of noxious weeds into an area is the most effective and economical means of weed control and management.

4.5 Vegetation Reference Area

The Vegetation Reference Area will be used as a standard of comparison for determining revegetation success for perennial vegetation cover. The Vegetation Reference Area is a 1-acre area undisturbed by mining operations, located immediately west of the minable Contract Area and north of the access road into the Contract Area, and containing established native vegetation cover equivalent to the undisturbed areas of the Mine. The location of the Vegetation Reference Area established for the 2013 MRP is within areas proposed for new mining. Thus, a new Vegetation Reference Area is proposed west of the 2019 Contract Area, between the old access road and the proposed new access road. Upon final approval of the location by the MMD, the Vegetation Reference Area will be fenced to prevent human or livestock disturbance.

4.6 Methodology and Success Criteria

Reclamation revegetation monitoring will incorporate two methodologies—ocular estimation for overall vegetative cover and belt transects for shrub cover. Data gathered from the Vegetation Reference Area will constitute the basis of performance standards for determining reclamation success. Revegetation monitoring locations, methods, and success criteria will be approved by the MMD prior to monitoring commencement.

4.7 Ocular Estimation (Overall Vegetation)

Vegetation cover monitoring will be conducted by ocular estimation, a vegetation monitoring technique used to determine the vegetative cover of a reclamation area compared to vegetative cover in a pre-designated reference area (the Vegetation Reference Area).

A quadrat or frame plot 20 cm x 50 cm in size will be utilized. Ten quadrats will be randomly placed in the Vegetation Reference Area and data from the quadrat plots collected. In the area of reclamation, 10 quadrats will be randomly placed for every full acre of reclamation and data from the quadrat plots collected. For reclamation acreage under one full acre, at least 10 quadrats will be randomly placed within the reclamation area. One hundred percent bare soil will not be accepted as reference data for a quadrat plot.

The percent of ground covered within the quadrat will be estimated (to the nearest percent) as a vertical projection. Ground cover will be recorded by vegetation, litter (including woody debris), rock, or bare soil. Vegetation data should be reported by individual species and by total vegetation cover. Species values can

exceed 100 percent due to overlap. Total vegetation cover, when added to the vertical projection of litter, rock, or bare solid contained within the plot, will equal 100 percent.

Total vegetation cover for the Vegetation Reference Area will be determined as an average of the total vegetation cover of the 10 quadrat plots. This total vegetation cover constitutes the basis of performance standards for the reclamation areas.

Total vegetation cover for the reclamation area will be determined as an average of the total vegetation cover across all quadrat plots for the reclamation area. This total vegetation cover will be compared to the Vegetation Reference Area cover as part of determining overall reclamation success.

Sorensen's Similarity Index for vegetation cover will be provided in the final monitoring report for review by the BLM/RPFO and MMD. Sorensen's Similarity Index can be calculated as follows (Sorenson 1948):

$$SI = \frac{2C}{A+B} \times 100$$

Where: SI = Similarity Index;
A = Total number of species in Vegetation Reference Area;
B = Total number of species in Reclamation Area; and
C = Number of species common to both communities.

4.7 Belt Transect (Shrubs)

Revegetation monitoring of shrub cover/density per acre will be determined through belt transect methodology. A randomly-placed 50-meter straight-line transect is established within the survey area (Vegetation Reference Area or Reclamation Area) using a 50-meter tape secured at both ends. Shrubs are counted within the area extending one meter from the transect line, on one side of the tape only (the 'belt'). The number of shrubs that are rooted within the 1-meter-wide belt are counted, even if all of the shrub canopy is not within the belt. Shrubs that are not rooted within the belt are not counted. The number of shrubs per acre is obtained by multiplying the number of shrubs counted in the belt by 43,560, then dividing the product by the area of the belt, or 538.196 (50 square meters = 538.196 square feet).

Two shrub belt transects will be counted within the Vegetation Reference Area, and the number of shrubs per acre averaged between the two transects. This shrub cover/density per acre constitutes the basis of performance standards for the reclamation areas.

For the reclamation areas, two shrub belt transects for every 1 acre of reclamation will be counted. Acreages will be rounded to the nearest whole number. For example, if the reclamation area is 4.6 acres in size, the acreage would be rounded to 5, and ten randomly placed belt transects will be counted. Similarly, a 4.3-acre reclamation area would be rounded to 4 acres, and eight belt transects counted. The number of shrubs per acre within the reclamation area will be an average of all the shrubs-per-acre counts for all the belt transects in the reclamation area. This total shrub cover/density per acre will be compared to the Vegetation Reference Area cover/density as part of determining overall reclamation success.

4.8 Success Criteria

Revegetation success criteria is based on professional judgment of reasonable expectations for revegetation in the arid Great Basin Desert Scrub vegetation community over the course of a 12-year FA bonding period. Success criteria may be revised by the BLM/RPFO or the MMD based on agency-specific requirements.

Vegetation cover at the Mine will be considered successfully attained if the reclaimed area equals at least 75 percent of the vegetation cover in the Vegetation Reference Area. Species diversity using the Sorenson Similarity Index shall approximate Vegetation Reference Area conditions, and invasive species percent cover does not exceed that of the Vegetation Reference Area.

Shrub cover/density per acre will be considered successfully attained if the reclaimed area shrub density per acre equals at least 35 percent of the shrub density of the Vegetation Reference Area.

4.9 Bond Release

Once the FA bond period is attained and the vegetative success criteria standards are met, RAMMSCO will prepare and submit a letter requesting the BLM and MMD release RAMMSCO from financial responsibility for the mining area. MMD requires a minimum 12-year period after reclamation for withholding release of FA for third-party revegetation costs. Other FA for reclamation costs, such as earth-moving, may be released earlier pursuant to 19.10.12.1210 NMAC (D. Ohori, email message to Ecosphere, November 29, 2012).

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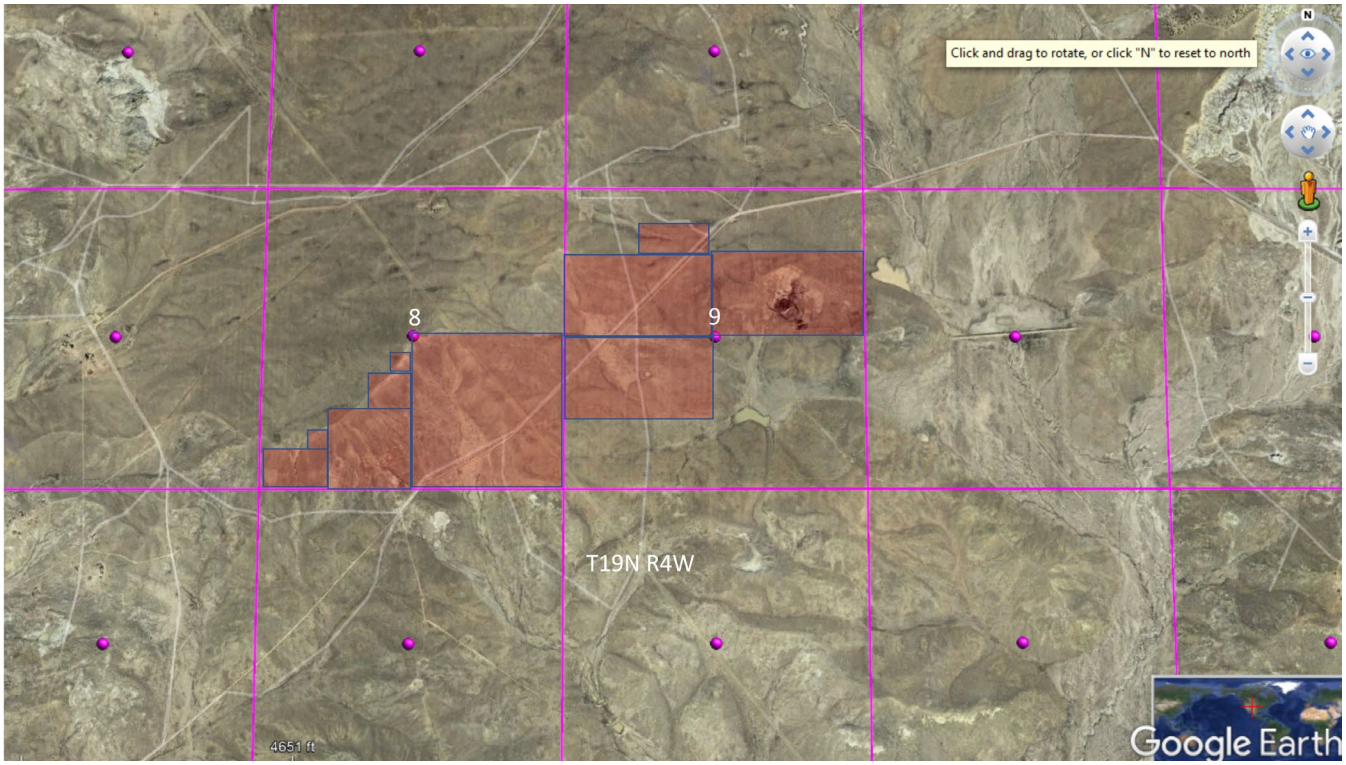
6 List of Preparers

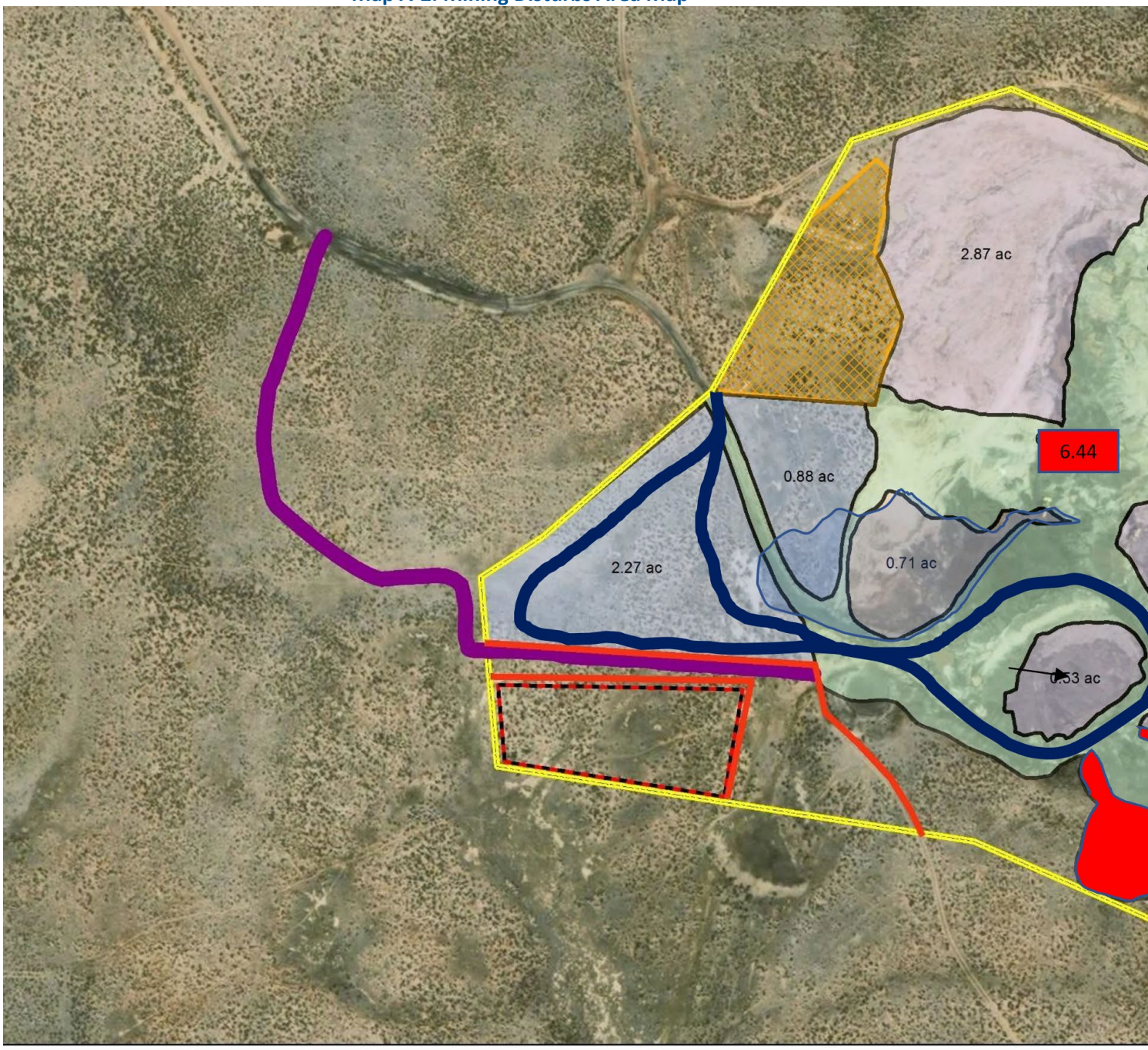
Name	Title	Role
Rodney Blackford	Project Manager	▪ Project Management ▪ Technical Review ▪ GIS and Mapping

Appendix A – Maps and Tables

Map A-1. Clearance Contract Permit Area Map



Map A-2. Mining Disturbs Area Map



Reclamation Cost Estimate A-3 RAMMSCO - EAGLE MESA HUMATE MINE

Estimate for Reclamation Activities for Financial Assurance Bond

Project Size: 24.57 Acres

Item	Number of Units	Units	Amt. Needed for 24.57 Acres	Units	Unit Cost[1]	TOTAL	Rate N
Direct Costs							
Light Equipment Mobilization/Demobilization (Trailer Rental) Costs[3]	--	Unit Cost	7	Weeks[4]	$171.00	$1,260.44	SWA: 2 when r
Light Equipment Mobilization/Demobilization Mileage	--	Unit Cost	300.00	Miles	$0.55	$165.00	300 mi Inc., in
Heavy Equipment (Loader, Dozer) Mobilization/Demobilization Costs[5]	--	Unit Cost	1.00	Delivery/ Pick Up Unit Cost	$2,896.00	$2,896.00	WR: $4 charge WRD: charge
Bulldozer Rental	2.5	Days/Acre	1.9	Month[4]	$5,582.00	$10,844.43	WR: CA
Front End Loader Rental	1	Days/Acre	1.3	Month[4]	$12,337.00	$16,389.70	WRD: (
Water Truck Rental[6]	2.5	Day1s/Acre	3.00	Month[4]	$3,095.00	$9,285.00	WR: 2,
Farm Tractor (50 hp) Rental	1.5	Days/Acre	39.00	Days[4]	$182.00	$7,098.00	SWA: $
Proprietary Seed Mix- Drill Seeding Rates	10.5	Lbs/Acre	257.99	Lbs	$4.85	$1,251.23	SWS
6 ft. 3-point Tandem Disk Implement Rental	0.5	Days/Acre	15.00	Days[4]	$85.50	$1,282.50	SWA: $ tractor
8 ft. Pasture/Blanket Harrow Rental	0.5	Days/Acre	15.00	Days[4]	$26.75	$401.25	SWA: $ tractor
Drill Seeder (2-box) Rental	0.5	Days/Acre	15.00	Days[4]	$160.00	$2,400.00	SWA: $
Mulch	0.5	Tons/Acre	12.00	Tons	$139.00	$1,668.00	SWA: $
Skid-mounted Straw Blower (18 hp) Rental	0.25	Days/Acre	9.00	Days[4]	$107.00	$963.00	SWA: $ pickup
3-point Straw Crimper Rental	0.25	Days/Acre	9.00	Days[4]	$53.50	$481.50	SWA: $ tractor
SUBTOTAL DIRECT COSTS:						**$56,386.05**	
Labor Costs							
Reclamation Labor Cost (assumes $15/hour rate, and 2 employees)[7]	4.00	Days/Acre	197.00	Days	$120.00	$23,640.00	
Mob./Demob. Labor Cost (assumes $13/hour rate and 2 employees)[8]	--	Unit Cost	12.00	Days	$104.00	$1,248.00	
Vegetation Monitoring & Reporting, Bond Period Yrs. 11 and 12	--	Unit Cost	2.00	Years	$3,600.00	$7,200.00	
SUBTOTAL LABOR COSTS:						**$32,088.00**	
Third-Party Indirect Costs[9]							
Project Management						$3,383.16	6% of D
Contractor Profit and Overhead						$16,915.82	30% of
Contingencies						$1,127.72	2% of D
Engineering Re-design						$1,127.72	2% of D
MMD Procurement Costs						$5,638.61	10% of
Third-Party Indirect Costs Subtotal						**$28,193.03**	

Item	Number of Units	Units	Amt. Needed for 24.57 Acres	Units	Unit Cost[1]	TOTAL	Rate N
TOTAL						**$116,667.08**	
Total per Acre						**$11,666.71**	

[1]*Cost includes taxes unless otherwise noted.*

[2]*Rates provided by the following companies:* ***AF****=American Fence, Farmington, NM.* ***BC****=Basin Co-op in Durango, CO.* ***SWA****=South West Ag,* ***SWS****=Southwest Seed in Dolores, CO.* ***WR****=Wagner Rents in Flora Vista, NM.* ***WRD****=Wagner Rents in Durango, CO.*

[3]*Cost of Transportation of Light Equipment to/from site for tractor and various implements using a 22' rental trailer pulled by a 3/4-ton pi truck used.*

[4]*Includes Rental cost for days of reclamation work and for transportation days.*

[5]*Cost of Transportation of Heavy Equipment to/from site for front-end loader and bulldozer; Wagner Rents labor cost is included in fee.*

[6]*Assumes CDL-licensed driver on reclamation staff available to drive truck for delivery to site and return to dealer at close of project. Othe truck will cost $450 each way.*

[7]*Assumes a total of 36 days for site reclamation work on a 8.96-acre site, 2 employees, and 8-hour workdays.*

[8]*Assumes 2 employees 1 day each for: fertilizer/seed/straw pick up in Durango, pick up light equipment rental in Gem Village, unload/mob load/demobilization on-site, return light equipment rental in Gem Village. Assumes 1 employee 1/2 day each for: pick up water truck from truck to Flora Vista.*

[9]*Third Party Indirect Costs are as directed by MMD (D. Ohori, pers. comm., 29 November 2012)*

Noxious Weed Information A-4

Invasive, Non-Native Plant Species of Concern within the BLM/RPFO[1]

Common Name	Scientific Name
Camelthorn	*Alhagi maurorum*
Tree of Heaven	*Ailanthus altissima*
Cheatgrass	*Bromus tectorum*
Hoary cress (Whitetop)	*Cardaria draba*
Musk thistle	*Carduus nutans*
Diffuse knapweed	*Centaurea diffusa*
Spotted knapweed	*Centaurea maculosa*
Russian knapweed	*Centaurea repens*
Yellow starthistle	*Centaurea solstitialis*
Canada thistle	*Cirsium arvense*
Bull thistle	*Cirsium vulgare*
Halogeton	*Halogeton glomeratus*
Tall whitetop (Perennial pepperweed)	*Lepidium latifolium*
Dalmatian toadflax	*Linaria dalmatica*
Yellow toadflax	*Linaria vulgaris*
Scotch thistle	*Onopordum acanthium*
African rue	*Peganum harmala*
Saltcedar	*Tamarix spp.*

[1]USDI/BLM 2012

New Mexico Noxious Weed List

Updated September 2016

Class A Species

Class A species are currently not present in New Mexico, or have limited distribution. Preventing new infestations of these species and eradicating existing infestations is the highest priority.

Common Name	Scientific Name
Alfombrilla	*Drymaria arenariodes*
Black henbane	*Hyoscyamus niger*
Brazillian egeria	*Egeria densa*
Camelthorn	*Alhagi psuedalhagi*
Canada thistle	*Cirsium arvense*
Dalmation toadflax	*Linaria dalmatica*
Diffuse knapweed	*Centaurea diffusa*
Dyer's woad	*Isatis tinctoria*
Giant salvinia	*Salvinia molesta*
Hoary cress	*Cardaria spp.*
Leafy spurge	*Euphorbia esula*
Oxeye daisy	*Leucanthemum vulgare*
Purple loosestrife	*Lythrum salicaria*
Purple starthistle	*Centaurea calcitrapa*
Ravenna grass	*Saccharum ravennae*
Scentless chamomile	*Matricaria perforata*
Scotch thistle	*Onopordum acanthium*
Spotted knapweed	*Centaurea biebersteinii*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*

Class B Species

Class B Species are limited to portions of the state. In areas with severe infestations, management should be designed to contain the infestation and stop any further spread.

Common Name	Scientific Name
African rue	*Peganum harmala*
Bull thistle	*Cirsium vulgare*
Chicory	*Cichorium intybus*
Halogeton	*Halogeton glomeratus*
Malta starthistle	*Centaurea melitensis*
Perennial pepperweed	*Lepidium latifolium*
Poison hemlock	*Conium maculatum*

Quackgrass	*Elytrigia repens*
Russian knapweed	*Acroptilon repens*
Spiny cocklebur	*Xanthium spinosum*
Teasel	*Dipsacus fullonum*

Class C Species

Class C species are wide-spread in the state. Management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation.

Common Name	Scientific Name
Cheatgrass	*Bromus tectorum*
Curlyleaf pondweed	*Potamogeton crispus*
Eurasian watermilfoil	*Myriophyllum spicatum*
Giant cane	*Arundo donax*
Hydrilla	*Hydrilla verticllata*
Jointed goatgrass	*Aegilops cylindrica*
Musk thistle	*Carduus nutans*
Parrotfeather	*Myriophyllum aquaticum*
Russian olive	*Elaeagnus angustifolia*
Saltcedar	*Tamarix spp.*
Siberian elm	*Ulmus pumila*
Tree of heaven	Ailanthus altissima

Watch List Species

Watch List species are species of concern in the state. These species have the potential to become problematic. More data is needed to determine if these species should be listed. When these species are encountered please document their location and contact appropriate authorities.

Common Name	Scientific Name
Crimson fountaingrass	*Pennisetum setaceum*
Meadow knapweed	*Centaurea pratensis*
Myrtle spurge	*Euphorbia myrsinites*
Pampas grass	*Cortaderia sellonana*
Sahara mustard	*Brassica tournefortii*
Syrian beancaper	*Zygophyllum fabago L.*
Wall rocket	*Diplotaxis tenuifolia*

From NMDA 2016 A-5

	rangelands.
Imazapic *Plateau*	**Rate:** 4 to 6 oz product/acre (1 to 1.5 oz a.e./acre) **Timing:** Preemergence or early postemergence to seedlings 1 to 3 inches tall. **Remarks:** For postemergence application, add a surfactant at about 1.5 oz/acre. Imazapic is selective to most native grasses, but will injure some species. Higher rates may suppress seedlings of some cool-season grasses. Imazapic is not registered for use in California.
Metsulfuron *Escort*	**Rate:** 0.5 to 1 oz product/acre (0.3 to 0.6 oz a.i./acre). Apply with surfactant. **Timing:** Postemergence in the late spring or early summer when seedlings have emerged and are growing rapidly, generally 1 to 3 inches tall. **Remarks:** Metsulfuron does not cause injury to grasses and this may be a desirable feature in areas with crested wheatgrass or other forage grasses. Metsulfuron is not registered for use in California.
PHOTOSYNTHETIC INHIBITORS	
Tebuthiuron *Spike 20P*	Tebuthiuron is a pelleted formulation that provides total vegetation control for several years and may be desirable for use on railroad ballast and oil field locations, where halogeton is often found. It has a very long soil residual activity and will provide total vegetation control for 3 to 5 years.

RECOMMENDED CITATION: DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States.* Weed Research and Information Center, University of California. 544 pp.