

Mine Closeout Plan

Imerys Perlite USA, Inc.
No Agua, New Mexico

Permit Number: TA005RE

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1.0 Project Description

1.1 Introduction

This revised Closeout Plan is being submitted pursuant to New Mexico Mining Act Rules, Subpart 5, Section 506. This Plan follows the Mining Bureau's Draft Closeout Plan Guidelines for Existing Mines dated April 30, 1996.

1.2 History

Imerys Perlite USA, Inc. (FKA Harborlite Corporation) in No Agua, NM is a perlite surface mining and processing operation. In 1994, application for permit was made to New Mexico Energy, Mining and Minerals Division. Permit TA005RE was issued at that time.

The No Agua site processes perlite ore that is used primarily in the industrial and commercial construction and retrofitting business. Expanded perlite is used in roofing systems, acoustical tile, low temperature insulation vessels, and other applications relying on its unique physical and chemical properties. It is also used as an additive in thermal, fireproofing, and sound barrier materials.

2.0 Site Specific Characteristics

2.1 Impacted Areas

The original Closeout Plan prepared in 1999 was based on mine closure in 20 years. In the event mining continued beyond this planned closure, or if the nature of mining described in the Plan changed significantly, Imerys would submit a modification to the Closeout Plan. In 2016 just such a change was identified. Imerys owns 1590 acres at the No Agua Mine, of which 590 acres are permitted for mining. In 1999 the estimated disturbance was 274 acres, and this was the assumption until 2016. At that time it was determined that the disturbance was 402.9 acres. This modification to the Closeout Plan is being submitted to address this change in disturbance. The modified Closeout Plan assumes a 20 year mine life measured from March, 2017. If mining extends beyond this period, a modification will be submitted to the Mining Act Reclamation Bureau extending

the closure date, and/or modifying the proposed reclamation methodologies. Figure 1 shows a current map including the Permit Boundary, current disturbance, Design Limit, and anticipated 5 year disturbance.

2.2 Past, Current, and Planned Mining

The No Agua Mine and mill are located approximately 10 miles north of Tres Piedras, New Mexico in Taos County. The mine is located about one mile east of Highway 285, and is situated in Township 29 North, Range 9 East, portions of Sections 11, 12, 13, 14, 23, and 24. The facility has been in continuous operation since 1951 under the business names Harborlite, World Minerals, and is currently owned by Imerys Perlite USA, Inc. The regional location of the mine is shown in Figure 2.

2.3 Watershed Inventories/Water Quality

See Section 2.10 Hydrology

2.4 Improvements

The No Agua mine has consolidated both its fines dump material and overburden dump material into two separate dump areas. A third dump area may be added in the future, if required.

2.5 Hazardous Mine Equipment or Facilities

All hazardous mine equipment and facilities including buildings, structures, equipment, and machinery are operated and maintained by Mine Safety and Health Administration (MSHA) trained professionals. “Private Property” signs and locked gates are used to discourage unauthorized access.

2.6 Industrial and Residential Waste

All solid waste generated by the facility, consisting of office and lunchroom trash, is burned and disposed of on-site. Sewage is treated via an underground septic system.

2.7 Highwalls

Highwalls have existed at the site since its opening in 1951 with no record of failure. Existing highwalls range in height from 15 to 60 feet with 15 foot wide catch basins. This and other similar perlite deposits are known to be relatively stable in this configuration.

Since 2005 all highwalls constructed have used a design specification of 15 foot wide benches and 35 foot bench height. All highwalls constructed going forward will use this specification.

2.8 Other Site Aspects

Other site aspects typically considered, but not applicable to the No Agua mine are vertical openings, portals, unstable piles or embankments, unstable impoundments, slope failures, subsidence, recurrent flooding or ground saturation, and polluted water. None of these aspects is found at the No Agua site.

2.9 Cultural Resources

A request was submitted to the New Mexico Office of Cultural Affairs, Historic Preservation Division (HPD) for a list of archaeological sites on the four sections where the mine is located. To date, no such archaeological sites have been identified on the Sections where the mine lies. However, there are many sites that have been identified within the four topographic quadrangles surrounding the mine. Due to this fact, the HPD suggests that there is a, “very high probability of significant archaeological sites on the Harborlite property.” If any artifacts or other evidence of previous Native American occupation are found during mining or related activities, work will cease and the HPD office will be contacted. Appendix A provides a copy of the HPD correspondence regarding this issue.

2.10 Hydrology

Runoff water from the mine and processing area results exclusively from precipitation and does not contain any hazardous materials. The ore milling is dry. No water, chemicals, or other additives are used except during minor maintenance activities. The only potential impact to runoff is fine particles of perlite, a naturally occurring substance. Four catch basins function to prevent this material from exiting the mine area. No water quality problems have been identified at the operation throughout its history.

There are approximately eight natural drainages leaving the site. Precipitation runoff from active mining areas on South Hill and West Hill drains to the south of the property into a catch basin next to the overburden waste dump. From the center of the four hills, runoff is collected in an additional holding area below the perlite fines waste dump. This holding area has proven highly effective and requires routine removal/redistribution of the fines material collected here. The two basins have been installed below the unconsolidated waste materials to prevent sediment-laden runoff from leaving the site.

Precipitation runoff from the mill on the northwest part of the property flows to the north on either side of the main entrance road. There it is deposited into one of two natural ponding basins where it evaporates. Following precipitation events, some runoff may leave the property from the north and west following the secondary entrance road, ultimately discharging into the Arroyo Aguaje de Petaco. This water is primarily natural runoff from the north end of West Hill.

Routine inspection of the holding areas and ponding basins confirm that they are dry for eight or more months per year.

2.11 Soils

According to the Soil Conservation Service Soil Survey of Taos County and Parts of Rio Arriba and Mora Counties, the soil at the No Agua Mine is identified as Raton-rock outcrop complex. The Raton soil is dark grayish brown very stony silt loam and found at the higher elevations of volcanic cones. Typical thickness of this soil is 10-20 inches. Rock outcrop of volcanic origin accounts for most of the remainder of the area. It consists of folded and broken volcanic flows.

Primary uses for this soil complex are as woodland and native grazing land for domestic livestock and wildlife. In these capacities, it only has moderate potential due to its low available water capacity and rapid runoff. Used for grazing, this soil complex benefits from proper grazing of the understory vegetation, which results in woodland maintenance, improved plant cover, accumulation of plant residue, and reduced erosion. Additionally, grazing will benefit from a management system that alternates grazing and resting which allows critical plants to complete their growth cycle without risk of damage.

Appendix B includes the USDA Web Soil Survey of the No Agua area.

2.12 Vegetation

Four vegetation habitat types are present at the No Agua Mine. They are rabbit brush, big-sage, piñon-juniper, and Ponderosa pine. The original preparation of this Closeout Plan from 1999 included a general vegetation species list (Table 1).

Table 1 - Representative Vegetation Species

Common Name	Type
big sage	shrub
blue grama	grass
curly dock	forb
douglas fir	tree
foxtail barley	grass
fringe sage	shrub
gamble oak	shrub
gooseberry	forb
Greene's rabbit brush	shrub
gum weed	forb
hairy golden aster	forb
Indian rice grass	grass
mountain mahogany	forb
one seed juniper	tree
piñon pine	tree
Ponderosa pine	tree
rocky mountain pine	tree
rubber rabbit brush	shrub
sand dropseed	grass
slender wheatgrass	grass
squirrel tail	grass
starvation cactus	forb
wax currant	forb
wild buckwheat	grass
wild tarragon	forb
yucca	forb

Since 1999, Imerys has performed vegetation surveys of four reference plots on the property, as well as annual vegetation surveys of its three test plots. These surveys have provided a comprehensive list of vegetation found at the site (Table 2).

Table 2 - Vegetation Specific to No Agua Mine Site

Common Name	Type
biennial wormwood	forb
big sage	shrub
blue gramma	grass
Crandall's beardtongue	forb
crested wheatgrass	grass
cushion buckwheat	forb
fineleaf hymenopappus	forb
fringe fage	shrub
Greene's rabbit brush	shrub
ground clover	forb
hairy false goldenaster	forb
hoary tansyaster	forb
Hopi tea greenthread	forb
Indian ricegrass	grass
James buckwheat	grass
oneseed juniper	tree
little sagebrush	shrub
mountain mahogany	tree
mountain muhly	grass
nodding buckwheat	forb
nylon hedgehog cactus	forb
pine dropseed	grass
piñon pine	tree
Ponderosa pine	tree
prickly pear cactus	forb
ragleaf bahia	forb
rubber rabbit brush	shrub
scarlet gilia	forb
silvery lupine	forb
slender wheatgrass	grass
spike muhly	grass
squirreltail	grass
threadleaf ragwort	forb
vegetative grass	grass
Virginia pepperweed	forb
wax currant	forb
western wheatgrass	grass
wild tarragon	forb
yellow sweetclover	forb

The Soil Conservation Service suggests that total annual vegetation production for this soil type is in the range 150 to 400 pounds per acre depending on growing conditions. Typical percentages of production per species are shown in Table 3 (Percentage totaling more than 100% assumed to be due to rounding).

Table 3 – Vegetation Production Percentages

Characteristic Vegetation	Percentage of Production
Piñon Pine	35%
Rocky Mountain Juniper	20%
Western Wheatgrass	15%
Oneseed Juniper	15%
Gambel Oak	5%
Arizona Fescue	5%
Mountain Muhly	5%
Muttongrass	5%
Piñon Ricegrass	5%

2.13 Wildlife

The wildlife present on the No Agua Mine site is representative of the typical wildlife in the area. Visual observations by employees confirm the presence of the species listed in Table 4.

Table 4 - Wildlife Observed

Deer	Elk	Coyote	Cottontail rabbit
Antelope	Jackrabbit	Ground squirrel	Rattlesnake
Townsend solitaire	Horned lark	Raven	Rough-legged hawk
Red-tailed hawk	Junco	Turkey vulture	

In 2001, a biology consultant was commissioned to perform a wildlife survey of the No Agua Mine site. His full report appears as Appendix C. A summary of the species identified appears below (Table 5).

Table 5 - Surveyed Wildlife

Mule deer	Elk	Porcupine	Dusky flycatcher
Sapsucker	Broad-tailed hummingbird	Black headed grosbeak	Hepatic tanager
Song sparrow	Lark sparrow	Meadowlark	Mountain bluebird
Gray vireo	Cottontail rabbit	American crow	Common raven
Black-capped chickadee			

In addition to the common wildlife species at the mine site, species of concern due to rarity are an additional consideration. A current (as of preparation of this document) Biota Information System of New Mexico report detailing the threatened and endangered species in Taos County is included (Appendix D). None of the species listed have been identified on the mine property at any time. If at any time, one of these species is observed, state and federal officials will be notified.

2.14 Geology

The No Agua perlite deposit consists of two distinct domes formed from the intrusive volcanic rhyolite flows 4 to 5 million years ago. Over time the domes have eroded to form four hills. These are referred to as North Hill, South Hill, West Hill, and East Hill. The rate of cooling and water absorption following the volcanic flow determined whether the rhyolite formed perlite or another mineral form. Perlite is found on the top and outer flank of all four hills.

The No Agua deposit is part of the Taos Plateau volcanic field. This field is bounded on the west by the eastward, gently dipping strata of the Tusas Mountains. It is bounded on the east by the western, north-south-trending fault scarp of the Sangre de Christo Mountain range. The volcanic field is made up of a compositionally diverse assemblage of the late Cenozoic (2-7 million year old) volcanic rock covering approximately 1,500 square kilometers of the Rio Grande rift system.

3.0 Post Mining Land Use

Post Mining Land Use (PMLU), as defined by the Mining Act Rules (§19.10.1.7.P(5)), is “a beneficial use or multiple uses which will be established on a permit area after completion of a mining project. The post-mining land use may involve active management of the land. The use shall be selected by the owner of the land and approved by the Director. The uses which maybe be approved as post-mining land uses may include agriculture, commercial or ecological uses that would ensure compliance with Federal, State or local laws, regulations and standards and which are feasible.”

Additional considerations were to make the PMLU compatible with the surrounding land, make use of the existing infrastructure if possible, and maintain economic viability for the nearby communities.

The PMLU originally proposed in 1999 for the No Agua Mine following closure was range management for livestock grazing and wildlife habitat. This still represents the most logical and beneficial use based on the above factors.

4.0 Waiver from Self-Sustaining Ecosystem

No waiver from self-sustaining ecosystem is being requested at this time. If the partial reclamation of pits and highwalls proposed in this Closeout Plan are not acceptable to the State of New Mexico, a waiver may be requested at a later date.

5.0 Description of Closeout Activities

The following sections provide a detailed description of mine closeout activities. All activities intend to restore the mine site to a self-sustaining ecosystem as similar to pre-mining conditions as possible. Wherever feasible the remaining man-made features associated with ore extraction will be removed, “softened,” or disguised. Whenever possible, vegetation species used for reclamation will be native to the site. Post closeout monitoring programs are discussed in Section 7.

5.1 Facilities Removal

Closeout will include the complete dismantling of all structures. Functioning equipment with economic value will be sold or transported to other Imerys facilities for reuse. Asbestos abatement will be performed by a licensed contractor who will obtain appropriate permits. Remaining non-hazardous scrap material and concrete foundations may be broken up and/or buried on the site under a minimum

of three feet of overburden. Following removal of structures, the facility area will be reclaimed in the same manner as other disturbance areas.

5.2 Roads

Upon closure, all roads will be removed from the site with the exception of those unpaved access roads necessary for monitoring. The monitoring roads have been indicated on the Post Reclamation Topographic Map, Figure 3. Information on this map is considered highly confidential. Road removal will include ripping where necessary to remove compaction.

5.3 Waste Dumps

Upon closeout, three dumps of unconsolidated material will remain at the facility. The first pile consists of processed, fine waste perlite. This pile is enclosed on two of three sides by hills. The third side will be constructed to, or at closeout contoured to, a maximum slope of 3:1. This third side will be capped with overburden and rock to mitigate erosion. The remaining two piles consist of overburden material and rock. Slopes on these piles will be re-contoured to no greater than 3:1. Stability of all slopes will be monitored during the five year monitoring period following closure.

5.4 Quarries and Pits

Due to the significant quantity of perlite ore being removed from the deposit, there will be three main surface depressions remaining at closeout. As much as is feasible, overburden and rock will be deposited in the mined areas. Where necessary fencing, berms, and/or signage will be installed to address safety concerns.

The solid, unconsolidated rock highwalls of the pits, ranging in height from 15-60 feet with 15 foot wide catch benches, will be left in place and partially reclaimed. Slope stability and monitoring are not proposed because there have been no significant failure in the history of this and similar sites.

5.5 Watershed and Catch Basins

At closeout, there will be no changes in the locations or directions of the drainage at the property boundaries. The site's final internal watershed configuration may change prior to and during closeout, however it will remain in a productive and stable condition. There are no anticipated impacts to off-site water users. Water quality will be monitored during the five year period as proposed later in this document. Constructed basins may be left in place following the post-closeout period if they have revegetated and blended with the natural surroundings. This will minimize further impacts of re-disturbance.

5.6 Erosion Control

To the fullest extent feasible, all drainages will be directed inward towards one of the three pits. Accepted methods of contouring, water bars, berming, and installation of hay bales and straw wattles will be employed to address any erosion problems. Revegetation will also play a key role in mitigation of erosion. No permanent mechanical structures will be installed, as they have not been found necessary during active mining.

5.7 Topsoil

As previously described, the topsoil at the mine site is very limited with depths ranging from 0-20 inches. To the fullest extent possible, a topsoil/overburden blend will be removed from the overburden dump and deposited in areas devoid of any unconsolidated material. Overburden material will not be removed from dump areas that have stabilized and revegetated naturally to prevent re-disturbance.

In areas where the topsoil/overburden blend is not applied, the surface will be ripped prior to planting. Additionally these areas may receive amendments if necessary.

No addition of the topsoil/overburden blend, ripping, or fertilization will occur on highwalls or highwall benches due to infeasibility. Basins and pit bottoms will also not receive these treatments as they are expected to contain sufficient topsoil and nutrient content collected as runoff from various disturbed and undisturbed areas of the mine.

5.8 Revegetation

This revegetation plan aims to re-establish self-sustaining vegetation following mine closure. The ideal vegetation will be both equivalent to pre-mining conditions and suitable for the Post Mine Land Use of range management for livestock grazing and wildlife habitat.

The seed mix specified in Table 6 is one that was recently used for inter-seeding of the test plots at the mine site. This list represents a suitable mix of life forms and species native to the No Agua Mine site and surrounding areas. It also represents seeds that are readily available from seed vendors and a seed mix that the vendor recommends for No Agua climate and soil type. The broadcast rate for bare ground seeding is 1.5 times (Granite Seed recommendation) the rate for the interseeding project.

Table 6 - Seed List

Broadcast Rate (lbs/acre)	Species Name	Common Name	Life Form
0.3	<i>Sphaeralcea coccinea</i>	scarlet globemallow	forb
0.08	<i>Artemisia frigida</i>	fringed sagebrush	forb
3.0	<i>Lupinus argenteus</i>	silvery Lupine	forb
0.3	<i>Penstemon strictus</i>	Rocky Mountain penstemon	forb
3.0	<i>Elymus elymoides</i>	bottlebrush squirreltail	grass-Cool
3.0	<i>Elymus trachycaulus</i>	slender wheatgrass	grass-Cool
2.25	<i>Hesperostipa comata</i>	needle and thread	grass-Cool
0.38	<i>Muhlenbergia montana</i>	mountain muhly	grass-Cool
3.75	<i>Achnatherum hymenoides</i>	Indian ricegrass	grass-Warm
0.8	<i>Bouteloua gracilis</i>	blue gramma	grass-Warm
1.5	<i>Amelanchier utahensis</i>	Utah serviceberry	shrub
0.38	<i>Ericameria nauseosa</i>	rubber rabbitbrush	shrub
1.5	<i>Vicia americana</i>	American vetch	Legume
20.24	Total Pounds per Acre		

The revegetation plan will address five specific mine areas in distinct manners.

Flat Areas (dump tops, facility areas, road, etc.) – These areas will be seeded with the above seed mix. Application techniques will vary depending on the surface soil type. Examples are topsoil/overburden blend, unconsolidated or ripped unconsolidated material, and consolidated material. A combination of drill, mechanical broadcast, and hand seeding will be used.

Waste Dump Faces – The perlite fines dump and the two topsoil/overburden dumps will be contoured to no greater than a 3:1 slope. At this slope it will be possible to seed using drill, mechanical broadcast, and hand seeding techniques.

Highwall Benches – Accessible highwall benches will be hand broadcast seeded.

Low to Moderate Slope Areas – These areas will be seeded with the above seed mix by means of drill seeding, mechanical broadcast, and/or hand seeding as appropriate.

Pits and Basins – Pits and basins will be hand seeded with the above seed mix.

Random islands of bare root trees will be planted in suitable locations with the exception of dump faces. Small berms will be constructed around the trees to aid in precipitation retention. Trees to be planted and rates are indicated in Table 7.

Table 7 – Revegetation trees

Species Name	Common Name	Rate
<i>Pinus ponderosa</i>	Ponderosa pine	4 stems/acre
<i>Juniperus scopulorum</i>	Rocky Mountain juniper	10 stems/acre

6.0 Environmental Standards Compliance

Determination of revegetation success will be assessed through comparison of reclaimed areas and reference plots that are located in undisturbed areas of the mine.

6.1 Reference Areas

The previous iteration of the Closeout Plan specified comparison to four Reference Areas delineated by a consultant in 1999. Since that time, it has become apparent that Reference Area 1 and Reference Area 2 are dissimilar to the areas of the mine requiring reclamation. Both Areas 1 and 2 are located on the flat to the south of the mine, and both are devoid or nearly devoid of trees. Hence, the standard going forward will be based only on Reference Area 3 and Reference Area 4. If it is MMD's opinion that the two reference areas are not adequately representative, an additional one or two Reference Areas could be designated in appropriate areas and surveyed. Figure 4 shows the location of all four original Reference Areas.

6.2 Cover

The line interception method will be used to estimate cover in a minimum of five, 100 foot long, randomly placed transects in each of the Reference Areas. This method is most appropriate to the site as the reference vegetation is relatively sparse and low growing. Percent cover will be obtained by summing the relative lengths of transects that are covered by vegetation. Species that do not appear in the seed mix will be included. Noxious weeds will not be counted as coverage.

The vegetation standard for reclamation areas within the 1999 Design Limit as specified in the original 1999 Closeout Plan will be 70% of the coverage of the Reference Areas. For those areas outside the 1999 Design Limit (approximately 62.8 acres) due to additional disturbance, the vegetation standard is specified by 508 rules as 90% of Reference Plot cover. The 508 governed areas are indicated in Figure 4.

7.0 Monitoring

At mine closeout, several monitoring programs will be implemented to ensure closeout success.

7.1 Slope Stability Analysis

A Slope Stability Monitoring Program (SSMP) will confirm the stability of Imerys' two unconsolidated waste material dumps. The program will be conducted by a licensed geotechnical engineering firm during the five year period following mine closure. It will confirm the stability of the final dump configuration and sizes.

7.2 Water Quality Monitoring

A Water Quality Monitoring Program (WQMP) will be conducted during the five year period following closure prior to bond release. This program will demonstrate the maintenance of state water quality standards at the site's permanent impoundments (pit bottoms and catch basins). The WQMP will involve water quality sampling of the impoundments twice per year for the first two years and twice during the final year prior to bond release. Samples will be collected, and preserved as necessary, in accordance with procedures approved by the US Environmental Protection Agency. A certified laboratory will analyze the samples for the constituents listed in Table 8 below.

If at any time during the program, samples values are outside the water quality standards, the state will be contacted immediately. Measures will be taken to improve erosion/runoff control structures as soon as possible. Additionally, adequate fencing may be installed around impoundments to preclude wildlife access until the water quality can be restored as confirmed by additional testing. At the conclusion of the WQMP, a report will be provided to the state including all the testing data.

Table 8 – State Water Quality Standards

Constituent	Unit	Standard
dissolved aluminum	mg/l	5.0
dissolved arsenic	mg/l	0.2
dissolved boron	mg/l	5.0
dissolved cadmium	mg/l	0.05
dissolved chromium	mg/l	1.0
dissolved cobalt	mg/l	1.0
dissolved copper	mg/l	0.5
dissolved lead	mg/l	0.1
total mercury	ug/l	0.012
total selenium	ug/l	2
dissolved vanadium	mg/l	0.1
dissolved zinc	mg/l	25.0
chlorine	mg/l	1.0
Ra-226 + Ra-228	pCi/l	30.0
tritium	pCi/l	20,000
Gross Alpha	pCi/l	15
pH	range	6-9

7.3 Revegetation Monitoring Program

A Revegetation Monitoring Program will begin following mine closure and completion of earth work. Per §19.8.20.2065 NMAC, the liability period will be not less than ten years. During this time, vegetation success will be monitored annually using the methods identified in Section 6.0 and measured against the success metrics also specified here. If interim monitoring so indicates, interseeding campaigns maybe used over the entire reclamation area or portions as needed.

8.0 Closeout Plan Permitting Requirements

In addition to the New Mexico Mining and Reclamation Bureau permit, Imerys currently operates under the three permits specified in Table 9 below. The stormwater permit will be maintained until bond release. The other permits will be terminated when mining and processing ceases. The permit for asbestos removal will be obtained by a licensed asbestos removal contractor.

Table 9 – Operating Permits

Issuing Agency	Permit Number	Permit Type
New Mexico Environmental Department	71A	Air Quality
New Mexico Environment Protection Agency	98 115 3075	Reclaimed Oil Burning
US Environmental Protection Agency	NMR00A818	Stormwater Discharge

9.0 Post Closeout Map

Figure 3 shows a topographic representation of the area following closeout. Information on this map is considered highly confidential.

10.0 Cost Estimate for Closeout

A current Reclamation Cost Estimate based on the information provided in this Closeout Plan is provided as Appendix E. Upon approval of this estimate, Imerys will adjust its existing surety bond from the current value of \$1,152,687 to the new value of \$1,450,646.

11.0 Closeout and Reclamation Schedule

Below is an anticipated schedule for the closeout and reclamation tasks to be completed at mine closure.

Facilities removal – one year

Contouring and covering all waste dumps – six months

Backfilling and contouring open pits – six months

Revegetation of all disturbed areas – two years

Road removal – four months

Figure 1

Permit and Disturbance Area Map

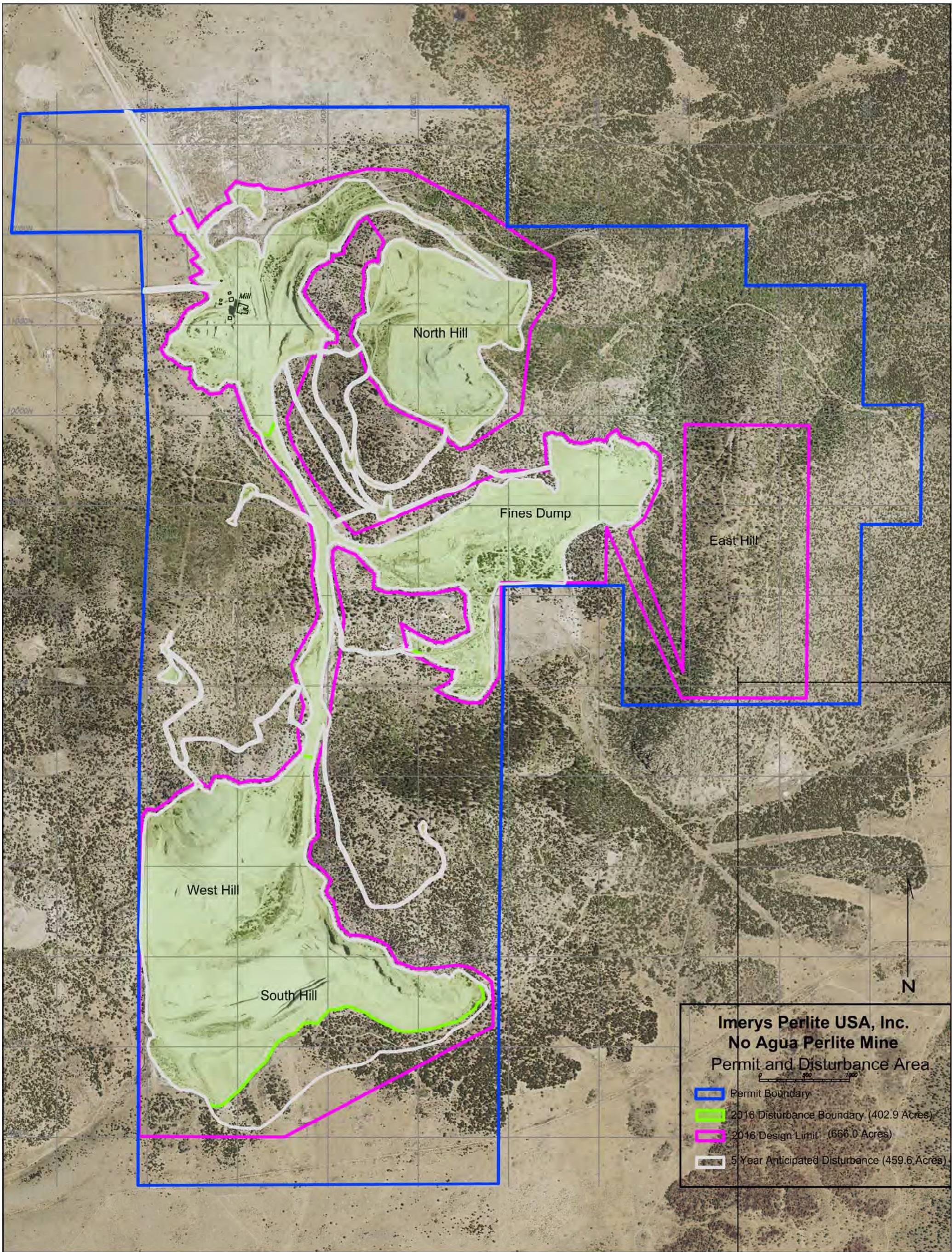


Figure 2

Regional Location Map

No Agua Mine

No Agua Mine Regional Location

Tres Piedras

Taos

Los Alamos
Los Alamos

Santa Fe

Google earth

©2016 Google
Image Landsat / Copernicus



20 mi

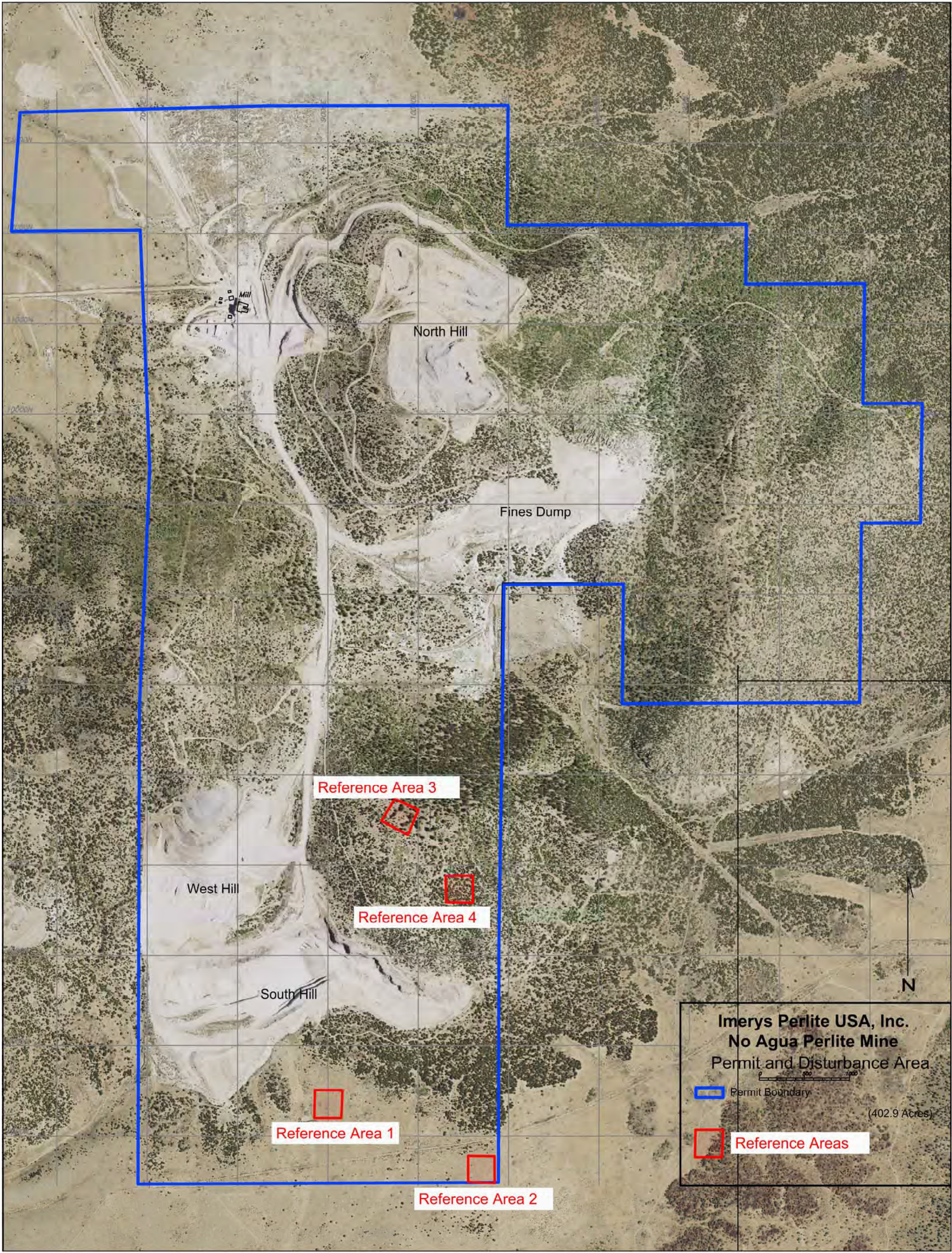
Figure 3

Post Reclamation Topographic Map

Imerys has requested that this map be treated as confidential. It will be delivered separately.

Figure 4

Reference Area Locations



Appendix A

New Mexico Office of Cultural Affairs
Historic Preservation Division Correspondence



RY E. JOHNSON
GOVERNOR

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

VILLA RIVERA BUILDING
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501
(505) 827-6320

March 19, 1998

Ms. Amy Carpenter
World Minerals, Inc.
2500 Miguelito Road
Lompac, CA 93436

Re: Harborlite Mine close-out plan -- archeological concerns

Dear Ms. Carpenter:

As you requested, I have checked our records for known archeological sites in the Harborlite property. My initial database query was conducted for an area defined as T29N, R9E, Sections 11, 12, 13, 14, 23, 24, NMPM. No archeological sites were returned by the query. As we discussed on the phone, this does not mean there are no archeological sites on the Harborlite line property, only that we do not *know* of any.

I checked further into our records, and I believe that there is a very high probability of significant archeological sites on the Harborlite property. I queried an area defined by four USGS 7.5' Topographic Quadrangles surrounding the mine (Codes: 36105-F8, 36105-G8, 36106-F1, 36106-G1). The results of that query suggest the following:

- the area has received considerable attention from archeologists as part of nearby US Forest Service and Bureau of Land Management activities. Although I could find no evidence of any survey actually conducted on the Harborlite Mine, a total of 110 surveys have been conducted in the larger query area.
- we have records for a total of 122 archeological sites in the 4 quadrangle area, many of which appear eligible to the National Register of Historic Places and NM Register of Cultural Properties. Most sites reflect use of the area during the Archaic (ca. 5500 BC -- AD 500) and Historic (late 19th/early 20th century) periods.

These facts suggest that a survey of undisturbed sections of the Harborlite Mine would have a high probability of encountering significant archeological sites.

If you have need for any additional information, please contact us.

Sincerely,

Timothy J. Seaman
ARMS Program Manager

Appendix B

USDA Web Soil Survey for No Agua Soils

Taos County and Parts of Rio Arriba and Mora Counties, New Mexico

RRE—Rock outcrop-Raton complex, moderately steep

Map Unit Setting

National map unit symbol: k1h3

Elevation: 6,400 to 10,000 feet

Mean annual precipitation: 9 to 23 inches

Mean annual air temperature: 42 to 52 degrees F

Frost-free period: 90 to 140 days

Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 45 percent

Raton and similar soils: 40 percent

*Estimates are based on observations, descriptions, and transects of
the mapunit.*

Description of Rock Outcrop

Setting

Landform: Volcanic cones

Typical profile

R - 0 to 60 inches: bedrock

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock

Capacity of the most limiting layer to transmit water (Ksat): Very
low to high (0.00 to 2.05 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Unranked

Description of Raton

Setting

Landform: Volcanic cones

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Eolian deposits derived from sandstone and shale
and/or residuum weathered from basalt

Typical profile

H1 - 0 to 4 inches: very stony silt loam

H2 - 4 to 18 inches: very stony silty clay loam

R - 18 to 22 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: 6 to 20 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very
low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0
to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: Mountain Malpais (R048AY005NM)

Hydric soil rating: No

Minor Components

Orthents

Percent of map unit:

Ecological site: Breaks (R051XA006NM)

Hydric soil rating: No

Stunner

Percent of map unit:

Ecological site: Stony Loam (R036XB018NM)

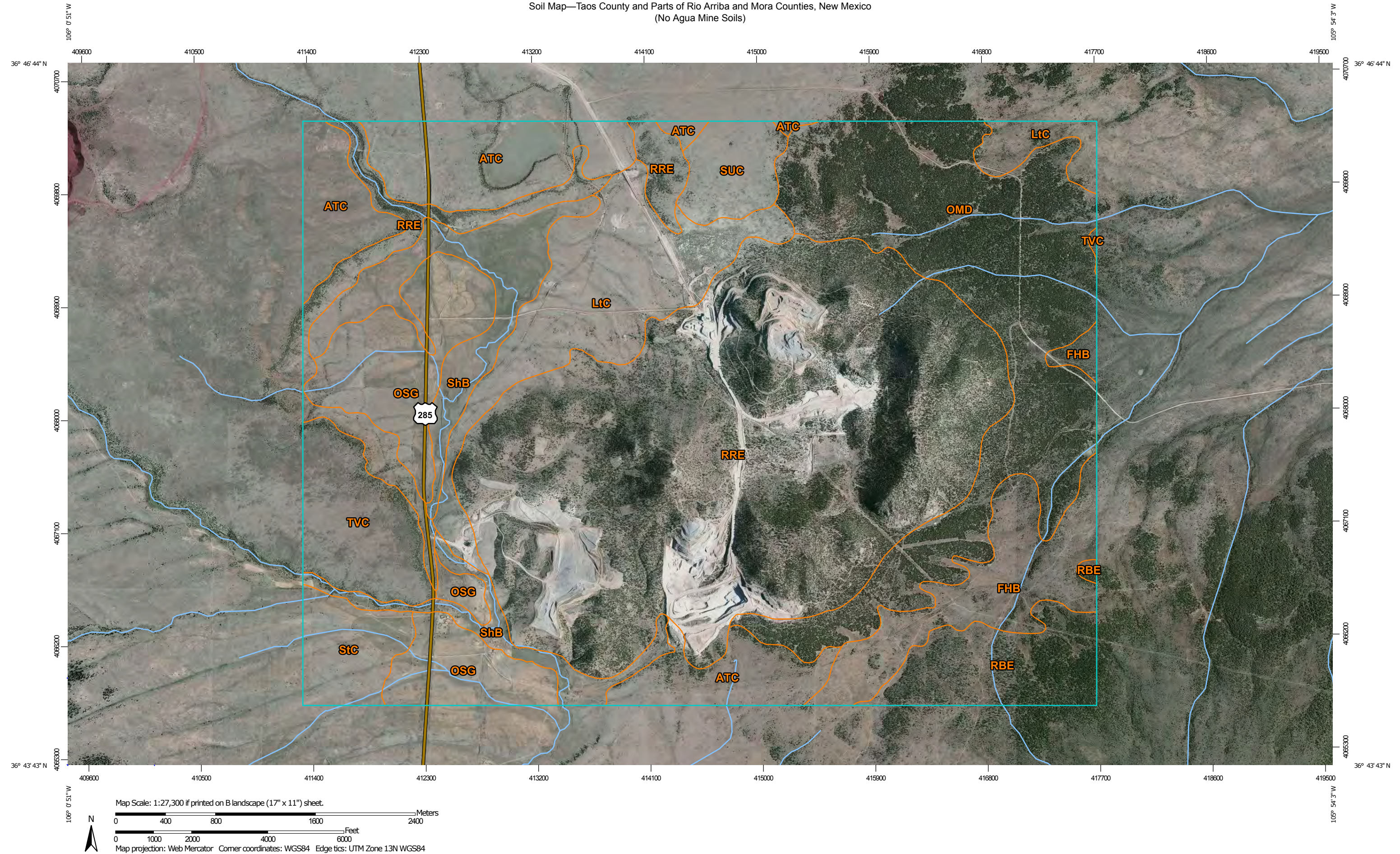
Hydric soil rating: No

Data Source Information

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New
Mexico

Survey Area Data: Version 11, Nov 24, 2015

Soil Map—Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
(No Agua Mine Soils)




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

Soil Map—Taos County and Parts of Rio Arriba and Mora Counties, New Mexico
(No Agua Mine Soils)


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Taos County and Parts of Rio Arriba and Mora Counties, New Mexico

Survey Area Data: Version 11, Nov 24, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2011—Apr 25, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Taos County and Parts of Rio Arriba and Mora Counties, New Mexico (NM670)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ATC	Antonito-Travelers association, gently sloping	641.7	8.8%
FHB	Fernando-Hernandez association, nearly level	371.0	5.1%
LtC	Luhon-Travelers complex, 3 to 7 percent slopes	591.8	8.1%
OMD	Orejas-Montecito association, strongly sloping	1,174.3	16.0%
OSG	Orthents-Calciorthids association, very steep	514.5	7.0%
RBE	Raton-Stunner association, moderately steep	265.7	3.6%
RRE	Rock outcrop-Raton complex, moderately steep	2,795.2	38.1%
ShB	Shawa clay loam, 0 to 3 percent slopes	417.5	5.7%
StC	Stunner cobbly loam, 1 to 5 percent slopes	157.7	2.2%
SUC	Stunner-Luhon association, gently sloping	137.3	1.9%
TVC	Travelers very stony loam, 1 to 8 percent slopes	263.0	3.6%
Totals for Area of Interest		7,329.8	100.0%

Appendix C

Clayton Shonk Wildlife Report

Clayton W. Shonk, student of biology
Biology Consulting
133 Sandia Cir C.R. 520
Bayfield, CO 81122

Survey of Wildlife and Wildlife Activity at the No Agua, Harborlite Perlite Mine, New Mexico

Introduction

Wildlife and evidence of wildlife on the Harborlite property was surveyed from May 11, 2001 to June 9, 2001. Bird species were counted and recorded, identified by sight, song, and nesting sights. Mammals were identified by sight and physical evidence such as tracks, pellet, counts, and bedding sights. These observations were gathered using a line transect method. This technique was used to gather information from disturbed and undisturbed areas, as determined by the mine, on the Harborlite property.

The Harborlite Property consists of a wide variety of vegetational habitats including temperate woodland and shrubland along with low altitude conifer and brush forest on 1590 acres. This produces a wide selection of mammalian and bird wildlife.

Methods

The line transect method was used to observe and collect evidence of animals on the Harborlite property. All animals flushed or otherwise encountered were recorded. Any evidence of wildlife along the transect such as tracks or droppings were also recorded. Four line transects were marked off on the undisturbed plots designated by the Harborlite Corporation. Three were designated in disturbed areas for a total of seven line transects. Each line transect was placed in a random bearing with a random starting point for 200 meters. The line was then cleared of any evidence of wildlife. Droppings and tracks were cleared to determine recent activity of wildlife. Transect 1 was placed in reference plot 3 which was dominated by ponderosa pine and oak. Transect 2 was located within reference plot 4 which was dominated by pinyon and juniper. Transect 3 was located within reference plot 2 which was dominated by pinyon and juniper. Transect 4 was located within reference plot 1 which was dominated by grass and sage brush. Transect 5 was placed on the north side of North Hill. Transect 6 was placed on the east side of West hill. Transect 7 was located on the west side of East hill (Map 1).

Observations

A wide variety of birds and mammals were observed. Birds, browsing mammals, and tree dwelling mammals were observed (Table 1). Browsing mammals and birds were identified on transect 2 (Table 2). Small, ground dwelling mammals and birds were viewed on transect 3 (Table 3). Evidence of browsing mammals and birds were identified on transect 4 (Table 4). Evidence of birds and browsing mammals were observed on transect 5 (Table 5). Browsing and ground dwelling mammals were observed on transect 6 (Table 6). Birds and evidence of browsing mammals were found on transect 7 (Table 7). Travelling between the line transects many other birds, animals, and a nest were observed (Table 8).

Table 1. Line transect 1 starting at north boundary of reference plot 3 at a bearing of 110° off of magnetic north

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	2	N/A	Pellet piles consisting of ~ 150 pellets each
Elk (<i>Cervus canadensis</i>)	2	N/A	Pellet piles consisting of ~ 225 pellets each
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	shed antler
Porcupine (<i>Erethizon dorsatum</i>)	1	feeding	bark chew
Dusky flycatcher (<i>Empidonax oboerholseri</i>)	1	perched	visual sighting
Sapsucker (<i>Shyrapicus ?</i>)	1	pecking	holes in tree
Broad tailed hummingbird (<i>Selasphorus platycercus</i>)	2	flying	visual and sound
Black headed grosbeak (<i>Pheucticus melanocephalus</i>)	1	feeding	visual sighting

Table 2. Line transect 2 starting at north east boundary corner of reference plot 4 at a bearing of 132° off of magnetic north

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	hoof tracks
Elk, female (<i>Cervus canadensis</i>)	3	feeding	visual sighting
Hepatic tanager (<i>Piranga flava</i>)	1	singing	sound
Common nighthawk (<i>Chordeiles minor</i>)	1	roosted	visual sighting

Table 3. Line transect 3 starting at northwest corner boundary of reference plot 2 at a bearing of 187° off of magnetic north

Animal	Number observed	Behavior	Identification
Song sparrow (<i>Melospiza melodia</i>)	1	singing	sound
Lark sparrow (<i>Chondestes grammacus</i>)	1	singing	sound
Meadow lark (<i>Sturnella neglecta</i>)	3	singing	sound
Mountain bluebird (<i>Sialia currucoides</i>)	2	perched, singing	visual sighting, sound
Gray vireo (<i>Vireo vicinior</i>)	1	flushed	visual sighting
Cottontail rabbit (<i>Sylvilagus</i> ?)	1	flushed	visual sighting
Porcupine (<i>Erethizon dorsatum</i>)	1	feeding	bark chew
Mule deer (<i>Odocoileus hemionus</i>)	1	N/A	Pellet pile consisting of 75 pellets

Table 4. Line transect 4 starting at the south east boundary corner of reference plot 1 at a bearing of 284° off of magnetic north

Animal	Number observed	Behavior	Identification
American crow (<i>Corvus brachyrhynchos</i>)	3	singing, flying	sound, visual sighting
Meadowlark (<i>Sturnella neglecta</i>)	2	singing	sound
Song sparrow (<i>Melospiza melodia</i>)	4	singing, perched, feeding	sound, visual sighting
Common Raven (<i>Corvus corax</i>)	1	flying	visual sighting
Mountain bluebird (<i>Sialia currucoides</i>)	1	perched	visual sighting
Mule Deer (<i>Odocoileus hemionus</i>)	2	N/A	Pellet piles consisting of 96 and 104 pellets
Cottontail Rabbit (<i>Sylvilagus</i> ?)	1	N/A	Pellet pile consisting of 84 pellets

Table 5. Line transect 5 on the north aspect of North Hill running east to west.

Animal	Number observed	Behavior	Identification
Mule deer (<i>Odocoileus hemionus</i>)	5	N/A	pellet piles consisting of 75, 102, 140, 94 pellets
black capped chickadee (<i>Poecile atricapillus</i>)	1	singing	sound
Song sparrow (<i>Melospiza melodia</i>)	1	singing	sound

Table 6. Line transect 6 on the east aspect of West hill running east to west

Animal	Number observed	Behavior	Identification
Cottontail rabbit (<i>Sylvilagus</i> ?)	1	feeding	visual sighting
Mule deer (<i>Odocoileus hemionus</i>)	5	flushed out of beds	visual, tracks, beds
Hepatic tanager (<i>Piranga flava</i>)	1	singing	sound

Table 7. Line transect 7 on the west aspect of East Hill running east to west

Animal	Number observed	Behavior	Identification
Elk (<i>Cervus canadensis</i>)	2	N/A	tracks
Common raven (<i>Corvus corax</i>)	2	gliding	visual sighting
Cavity dwelling bird in dead pinyon tree	N/A	N/A	sighting of the nest

Table 8. Observations outside line transects

Common raven nest (*Corvus corax*) on the south aspect of South hill on a cavity in a cliff. Three chicks were observed. Two active adults feeding the chicks and on lookout around the nest.

Bushtit (*Psaltiriparus minimus*) perched on the south aspect of South hill.

Black headed grosbeak (*Pheucticus melanocephalus*) flying.

Mountain bluebird (*Sialia currucoides*) flying.

Two Turkey vultures (*Cathartes aura*) full soar.

Three chipmunks (*Sciuridae* ?) feeding.

Appendix D

New Mexico Wildlife of Concern



Biota Information System of New Mexico

Report County TES Table For Taos

NEW MEXICO WILDLIFE OF CONCERN

For complete up-dated information on federal-listed species, including plants, click here for the

[US Fish & Wildlife Service Planning and Conservation website](#)

For information on state-listed plants, contact the NM Energy, Minerals & Natural Resources Dept, Division of Forestry, or go to <http://nmrareplants.unm.edu/>. If your project is on Bureau of Land Management property, contact the local BLM Field Office for species of particular concern. If your project is on National Forest, please contact the Forest Supervisor's office for species information.

E=Endangered; T=Threatened; SOC=Species of Concern; C=Candidate; Exp= Experimental non-essential population; P=Proposed

Common Name	Scientific Name	NMGF	US FWS	Critical Habitat
Canada Lynx	Lynx canadensis		T	
Pacific Marten	Martes caurina	T		
Meadow Jumping Mouse	Zapus hudsonius luteus	E	E	Y
White-tailed Ptarmigan	Lagopus leucura	E		
Common Black Hawk	Buteogallus anthracinus	T		
Bald Eagle	Haliaeetus leucocephalus	T		
Peregrine Falcon	Falco peregrinus	T		
Arctic Peregrine Falcon	Falco peregrinus tundrius	T		
Yellow-billed Cuckoo (western pop)	Coccyzus americanus occidentalis		T	
Boreal Owl	Aegolius funereus	T		
Mexican Spotted Owl	Strix occidentalis lucida		T	Y
White-eared Hummingbird	Hylocharis leucotis	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Gray Vireo	Vireo vicinior	T		
Baird's Sparrow	Ammodramus bairdii	T		
Sangre De Cristo Peaclam	Pisidium sanguinichristi	T		

Appendix E

No Agua Mine 2017 Reclamation Cost Estimate

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division

No Agua Mine

General Information

01/31/17

Applicant	Imerys Perlite USA, Inc. 150 E. Main, STE 320 Fernley, NV 89408	Contact: Todd Whitacre 541-429-2076
Permit Number	TA005RE	
Number of Acres	590 acres (max disturbance by 2037)	
Type of Operation	Existing/Surface/Perlite	
Location	Tres Piedras (No Agua Hills)	
Prepared by	Clay Diemert	
Recommended Bond	\$1,450,646	

Describe worst-case reclamation scenario:

Remove buildings, sheds, equipment, tanks, fuel, and foundations

Milling equipment, machinery, and metal buildings removed by
salvage contractor (based on El Grande Mine)

Remove abandoned equipment and debris

Remove foundations (or cover) and dispose on-site

Earthmoving

Cover Perlite Fines Dump with 1' depth of soil-overburden blend

Cover low-slope areas of North Hill with 1' depth of perlite-overb. blend

Cover low-slope areas of West Hill and South Hill Pits with 1' depth
of soil-overburden blend

Rip rap from West Hill and South Hill Pits to Overburden Waste Dumps
(3" avg. cover over 10% of total area)

Rip rap from North Hill Pit to Perlite Fines Dump (3" avg. cover)

Ripping

Rip roads

Rip bottom of North Hill Pit

Rip North Hill area

Rip top of Overburden Waste Dump

Rip bottom of West Hill and South Hill Pits

Rip plant area

Grading

Grade all disturbed areas

Remove/reclaim sediment basins

Revegetation

Reveg low-slope areas of North Hill

Reveg low-slope areas of West Hill and South Hill Pits

Reveg Overburden Waste Dumps

Reveg Perlite Fines Dump

Reveg plant area

Reveg roads

Other

Construct rip rap channels and check dams

Monitoring

Monitoring of revegetation

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Building Demolition

No Agua Mine
Worksheet #2
03/21/17
CED

	2008	2012	2017
Location Adjust. Santa Fe	89.8%	89.8%	89.8%
Subtotal Buildings	\$193,214	\$209,912	\$237,930
Other	\$29,894	\$32,478	\$36,813
Disposal	\$6,322	\$6,868	\$7,785
Total Cost	\$229,430	\$249,258	\$282,528

Area Description	Material	Dimensions			Quantity	Unit	Unit Cost	Item Cost	Item Cost	Item Cost
		(ft)					(\$/unit)	(\$)	(\$)	(\$)
Buildings to be demolished:										
Mill	metal	Removed by salvage contractor								
Auxiliary Buildings	metal	Removed by salvage contractor								
Office	metal	Removed by salvage contractor								
Other items to be demolished:										
Grizzley	conc/metal	25	30	15	417	cy	40.72	16,980	18,447	20,910
Foundations	conc				500	cy	32.62	16,310	17,720	20,085
Debris handling and disposal costs:										
Concrete, onsite	conc				1,000	cy	7.04	7,040	7,648	8,669
Total Cost (unadjusted)								\$255,490	\$277,570	\$314,619

Data Source
RS Means 2008 Heavy Construction Santa Fe location adjust. 89.8%

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Material Handling Plan Summary Sheet

No Agua Mine
Worksheet #3
03/21/17
CED

Item	Description	Volume (cy)	Origin	Destination	Haul Distance (ft)	Grade	Equipment
1	Reduce slopes, overburden waste dumps (west half)	93,333	toe	crest	150	33%	Cat D8T
2	Reduce slopes, perlite fines dump	79,000	crest	toe	300	-33%	Cat D8T
3	Cover West Hill Pit bottom	0	waste (west half)	West Hill	3,600	-1%	988/Cat 775
4	Cover South Hill Pit bottom	0	waste (west half)	South Hill	2,800	-5%	988/Cat 775
5	Rip rap to fines dump	11,576	North Hill	fines	6,100	-2%	988/Cat 775
6	Rip rap to overburden waste dumps	0	West Hill	waste	3,600	8%	988/Cat 775
7	Perlite fines to North Hill (top)	0	fines	N Hill (top)	6,000	2%	988/Cat 775
8	Perlite fines to North Hill Pit (bottom of pit)	0	fines	N Hill (pit))	5,400	-6%	988/Cat 775
9	Overburden to North Hill (top)	29,403	waste (west half)	N Hill (top)	16,100	1%	988/Cat 775
10	Overburden to North Hill Pit (bottom of pit)	0	waste (east half)	N Hill (pit))	12,500	4%	988/Cat 775
11	Overburden to Plant area	22,893	waste (west half)	Plant	8,000	5%	988/Cat 775
12	Perlite Fines Dump	69,051	waste (west half)	Fines	9,800	4%	988/Cat 775
13	East Hill Pit	0					
14	Reduce slopes, overburden waste dumps (east half)	15,512	crest	toe	125	33%	Cat D8T

* See note on Worksheet #4

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Earthwork Quantity Worksheet

No Agua Mine
Worksheet #4
03/21/17
CED

	Unit	Description	Area (ac)	Cover Depth (ft)	Swell Factor	Volume
1	Overburden Waste Dump (west half)	Reduce slope to 3:1 *				93,333
2	Perlite Fines Dump	Reduce slope to 3:1				79,000
3	West Hill Pit	Cover: soil-overb. blend	38.4	0.00	1.00	0
4	South Hill Pit	Cover: soil-overb. blend	49.9	0.00	1.00	0
5	Perlite Fines Dump	Rip rap from North Hill	14.4	0.50	1.00	11,576
6	Overburden Waste Dump	Rip rap from West Hill	5.0	0	1.00	0
7	North Hill (top)	Cover: fines to top	36.5	0.00	1.00	0
8	North Hill (pit)	Cover: fines to bottom	10.0	0.00	1.00	0
9	North Hill (top)	Cover: perlite-overb. blend	36.5	0.50	1.00	29,403
10	North Hill (pit)	Cover: perlite-overb. blend	10.0	0	1.00	0
11	Plant Area	Cover: perlite-overb. blend	28.4	0.50	1.00	22,893
12	Perlite Fines Dump	Cover: soil-overb. blend	42.8	1.00	1.00	69,051
13	East Hill Pit	No disturbance to-date	0.0	0.0	0.0	0.0
14	Overburden Waste Dump (east half)	Reduce slope to 3:1				15,512

* West Hill backfill quantity exceeds slope reduction quantity of Overburden Waste Dump, so 3:1 slope will be achieved with D9 grading after scrapers remove needed material

BOND AMOUNT CALCULATION

New Mexico Mining and Minerals Division

Productivity and Hours Required for Dozer Use---Earthmoving

No Agua Mine

Worksheet #5

03/21/17

CED

Description: Reduce slopes, perlite fines dump

Equipment: D8T---perlite fines dump slopes
250' push
fines & overburden (26-4: sand, damp)

Volume	79,000 cy	Time	111 hours
		Productivity	715 cy/hr-dozer
PERFORMANCE FACTORS			
Material Factor	1.20		
Grade	1.60	work hour	50 min/hr
Operator	0.75	soil weight correcti	1506 lb/cy
Slot Dozing	1.20		1.53
normal production	325 cy/hr		

Description: Reduce slopes, overburden waste dumps (west half)

Equipment: D8T---overburden dump slopes, west half
150' push
fines & overburden (26-4: sand, damp)

Volume	93,333 cy	Time	237 hours
		Productivity	393 cy/hr-dozer
PERFORMANCE FACTORS			
Material Factor	1.20		
Grade	1.60	work hour	50 min/hr
Operator	0.75	soil weight correcti	4000 lb/cy
Slot Dozing	1.20		0.58
normal production	475 cy/hr		

Description: Reduce slopes, overburden waste dumps (east half)

Equipment: D8T---overburden dump slopes, east half
75' push
fines & overburden (26-4: sand, damp)

Volume	15,512 cy	Time	25 hours
		Productivity	621 cy/hr-dozer
PERFORMANCE FACTORS			
Material Factor	1.20		
Grade	1.60	work hour	50 min/hr
Operator	0.75	soil weight correcti	4000 lb/cy
Slot Dozing	1.20		0.58
normal production	750 cy/hr		

0

New Mexico Mining and Minerals Division

No Agua Mine
Worksheet #6**Productivity and Hours Required for Dozer Use---Grading**

03/21/17

CED

Description: Recontour all disturbed areas
Pits, plant area, dumps

Equipment:

D8T

14G

Area 101 ac**Time 57 hours****Productivity 1.77 ac/hr-dozer****PERFORMANCE FACTORS**

material	1.00	operator	0.75
grade	1.00	work hour	50 min/hr
soil weight correction	2550 lb/cy	visibility	1.00
prod. method/blade	1.00	elevation	1.00
effective blade width	12.9 feet	direct drive trans.	1.00
speed	2 miles/hr	% work Done	25%

**Productivity and Hours Required for
Ripper-Equipped Dozer Use**

Description: Rip roads

Equipment: D8T, roads

Area	10.0 ac	Time	35.4 hours
Volume	24,200 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

Description: Rip North Hill Pit floor

Equipment: D8T, North Hill Pit floor

Area	4.6 ac	Time	16.3 hours
Volume	11,111 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

Description: Rip West Hill Pit (north) floor

Equipment: D8T, West Hill Pit (north) floor

Area	5.5 ac	Time	19.5 hours
Volume	13,333 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

**Productivity and Hours Required for
Ripper-Equipped Dozer Use**

Description: Rip plant area

Equipment: D8T, plant area

Area	20.0 ac	Time	70.8 hours
Volume	48,400 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

Description: Rip North Hill

Equipment: D8T, North Hill

Area	55.4 ac	Time	196.3 hours
Volume	134,088 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

Description: Rip Overburden Waste Dump top

Equipment: D8T, Overburden Waste Dump top

Area	36.2 ac	Time	128.3 hours
Volume	87,666 cy	Productivity	0.28 ac/hr-dozer
PERFORMANCE FACTORS			
ripping length	300 ft	turn time	0.25 min/pass
ripping width	3.0 ft	work hour	50.00 min/hr
ripper penetration	1.5 ft	passes/hour	13.66
speed	88.0 fpm	BCY/pass	50.00
min/pass	3.66	BCY/Hour	683.23

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Productivity and Hours Required for Loader Use

No Agua Mine
Worksheet #8
03/21/17
CED

2017

Description: Load trucks at West Hill Pit

Equipment: 988, West Hill, rip rap
100' haul

Volume	cy	Time	0.0 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.569 \$/hr	work hour	50 min/hr

Description: Load trucks at West Hill Pit

Equipment: 988, West Hill, rip rap
100' haul

Volume	0 cy	Time	0.0 hours
Net Bucket Capacity	9.4 cy	Productivity	551 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Load trucks at North Hill Pit

Equipment: 988, North Hill, rip rap
100' haul

Volume	11,576 cy	Time	20 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.569 \$/hr	work hour	50 min/hr

Description: Load trucks at North Hill Pit

Equipment: 988, North Hill, rip rap
100' haul

Volume	11,576 cy	Time	20 hours
Net Bucket Capacity	9.4 cy	Productivity	581 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Cover South Hill Pit bottom

Equipment: 988, cover pit bottom (South Hill)
100' haul

Volume	0 cy	Time	0 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Cover West Hill Pit bottom

Equipment: 988, cover pit bottom (West Hill)
100' haul

Volume	0 cy	Time	0 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Overburden to North Hill (top)

Equipment: 988, overburden to North Hill (top)
100' haul

Volume	29,403 cy	Time	81 hours
Net Bucket Capacity	9.4 cy	Productivity	362 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Overburden to North Hill Pit (bottom of pit)

Equipment: 988, overburden to North Hill Pit (bottom)
100' haul

Volume	0 cy	Time	0 hours
Net Bucket Capacity	9.4 cy	Productivity	419 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Overburden to Plant area

Equipment: 988, Plant Cover
100' haul

Volume	22,893 cy	Time	39 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Perlite Fines Dump

Equipment: 988, Overburden to fines dump
100' haul

Volume	69,051 cy	Time	117 hours
Net Bucket Capacity	9.4 cy	Productivity	592 cy/hr-loader
Loader Cycle Time	0.79 min		
PERFORMANCE FACTORS			
heaped bucket capacity	11.00 cy	haul time	0.13 min
bucket fill factor	0.85	return time	0.11 min
		cycle time	0.55 min
Operating Cost	128.56937 \$/hr	work hour	50 min/hr

Description: Rip rap to overburden waste dumps

Equipment: Cat 775, rip rap to overburden waste dump

Volume	0 cy	Time	0.0 hours
Truck Cycle Time	13.6 min	Productivity	551 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	2.7 min
heaped capacity	44.6 cy	return time	2.7 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	3,600 feet	dump/manuev. time	1.1 min
haul grade	8%	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 2.7 min

1 hour	60 minutes	3,600 feet	1 mile
15 miles	1 hour		5280 feet

Return 2.7 min

1 hour	60 minutes	3,600 feet	1 mile
15 miles	1 hour		5280 feet

Description: Rip rap to fines dump

Equipment: Cat 775, rip rap to fines dump

Volume	11,576 cy	Time	20 hours
Truck Cycle Time	12.9 min	Productivity	581 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	2.8 min
heaped capacity	44.6 cy	return time	2.0 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	6,100 feet	dump/manuev. time	1.1 min
haul grade	-2%	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 2.8 min

1 hour	60 minutes	6,100 feet	1 mile
25 miles	1 hour		5280 feet

Return 2.0 min

1 hour	60 minutes	6,100 feet	1 mile
35 miles	1 hour		5280 feet

Description: Cover South Hill Pit bottom

Equipment: Cat 775, cover pit bottom (South Hill)

Volume	0 cy	Time	0 hours
Truck Cycle Time	12.4 min	Productivity	592 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	2.1 min
heaped capacity	44.6 cy	return time	2.1 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	2,800 feet	dump/manuev. time	1.1 min
haul grade	-0.1	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 2.1 min

1 hour	60 minutes	2,800 feet	1 mile
15 miles	1 hour		5280 feet

Return 2.1 min

1 hour	60 minutes	2,800 feet	1 mile
15 miles	1 hour		5280 feet

Worksheet #9
03/21/17
CED

Productivity and Hours Required for Truck Use

Description:	Cover West Hill Pit bottom
Equipment:	Cat 775, cover pit bottom (West Hill)

Volume	0 cy	Time	0 hours
Truck Cycle Time	10.4 min	Productivity	592 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	2.7 min
heaped capacity	44.6 cy	return time	2.7 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	3,600 feet	dump/manuev. time	1.1 min
haul grade	-1%	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 2.7 min

1 hour	60 minutes	3,600 feet	1 mile
15 miles	1 hour		5280 feet

Return 2.7 min

1 hour	60 minutes	3,600 feet	1 mile
15 miles	1 hour		5280 feet

Worksheet #9
03/21/17
CED

Productivity and Hours Required for Truck Use

Description:	Overburden to North Hill (top)
Equipment:	Cat 775, overburden to North Hill (top)

Volume	29,403 cy	Time	81 hours
Truck Cycle Time	20.7 min	Productivity	362 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	7.3 min
heaped capacity	44.6 cy	return time	5.2 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	16,100 feet	dump/manuev. time	1.1 min
haul grade	1%	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 7.3 min

1 hour	60 minutes	16,100 feet	1 mile
25 miles	1 hour		5280 feet

Return 5.2 min

1 hour	60 minutes	16,100 feet	1 mile
35 miles	1 hour		5280 feet

Worksheet #9
03/21/17
CED

Productivity and Hours Required for Truck Use

Description:	Overburden to North Hill Pit (bottom of pit)
Equipment:	Cat 775, overburden to North Hill Pit (bottom)

Volume	0 cy	Time	0 hours
Truck Cycle Time	17.9 min	Productivity	419 cy/hr
PERFORMANCE FACTORS			
struck capacity	34.0 cy	haul time	5.7 min
heaped capacity	44.6 cy	return time	4.1 min
loader cycles per truck	4 /truck	loading time	3.2 min
no. of trucks (select)	4 trucks	truck exchange time	0.7 min
one-way haul	12,500 feet	dump/manuev. time	1.1 min
haul grade	4%	work hour	50 min/hr
rolling resistance	4.0 %	Operating Cost	103.83 \$/hr

Haul 5.7 min

1 hour	60 minutes	12,500 feet	1 mile
25 miles	1 hour		5280 feet

Return 4.1 min

1 hour	60 minutes	12,500 feet	1 mile
35 miles	1 hour		5280 feet

Productivity and Hours Required for Truck Use

Description:Overburden to Plant area

Equipment:Cat 775,Plant Cover

Volume	22,893	cy	Time	39	hours
Truck Cycle Time	11.2	min	Productivity	592	cy/hr
PERFORMANCE FACTORS					
struck capacity	34.0	cy	haul time	3.6	min
heaped capacity	44.6	cy	return time	2.6	min
loader cycles per truck	4	/truck	loading time	3.2	min
no. of trucks (select)	4	trucks	truck exchange time	0.7	min
one-way haul	8,000	feet	dump/manuev. time	1.1	min
haul grade	5%		work hour	50	min/hr
rolling resistance	4.0	%	Operating Cost	103.83	\$/hr

Haul 3.6 min

1	hour	60	minutes	8,000	feet	1	mile
25	miles	1	hour			5280	feet

Return 2.6 min

1	hour	60	minutes	8,000	feet	1	mile
35	miles	1	hour			5280	feet

Productivity and Hours Required for Truck Use

Description:Perlite Fines Dump

Equipment:Cat 775, Overburden to fines dump

Volume	69,051	cy	Time	117	hours
Truck Cycle Time	12.6	min	Productivity	592	cy/hr
PERFORMANCE FACTORS					
struck capacity	34.0	cy	haul time	4.5	min
heaped capacity	44.6	cy	return time	3.2	min
loader cycles per truck	4	/truck	loading time	3.2	min
no. of trucks (select)	4	trucks	truck exchange time	0.7	min
one-way haul	9,800	feet	dump/manuev. time	1.1	min
haul grade	4%		work hour	50	min/hr
rolling resistance	4.0	%	Operating Cost	103.83	\$/hr

Haul 4.5 min

1	hour	60	minutes	9,800	feet	1	mile
25	miles	1	hour			5280	feet

Return 3.2 min

1	hour	60	minutes	9,800	feet	1	mile
35	miles	1	hour			5280	feet

Productivity and Hours Required for Motorgrader Use---Grading

2017

Activity	Quantity	Unit
621E Water Wagon	128	hr
14G Motor Grader	192	hr

Total

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Summary Calculation of Earthmoving Costs

Total Cost									
2008			2016 - Nevada SRCE Cost as of August 1						
Equipment Type	Owning and Operating Cost (\$/hr)	Owning and Operating Cost (\$/hr)	Labor Cost (\$/hr)	Equip. Time Req'd (hrs)	Man Time Req'd (hrs)	Total Cost (\$)	Total Production	Prod. Unit	Unit Cost (\$/unit)
Dozers-Earthmoving									
D8T---perlite fines dump slopes	133.50	139.70	60.50	110.5					
D8T---overburden dump slopes, west half		139.70	60.50	237.3					
D8T---overburden dump slopes, east half		139.70	60.50	25.0					
Dozers-Truck Support									
D8T		139.70	60.50	199.4					
Dozers-Grading									
D8T	133.50	139.70	60.50	57.1					
Loaders									
988, West Hill, rip rap	58.50	172.15	61.81	0.0					
988, North Hill, rip rap	58.50	172.15	61.81	19.9					
988, cover pit bottom (South Hill)		172.15	61.81	0.0					
988, cover pit bottom (West Hill)		172.15	61.81	0.0					
988, overburden to North Hill (top)		172.15	61.81	81.2					
988, overburden to North Hill Pit (bottom)		172.15	61.81	0.0					
988,Plant Cover		172.15	61.81	38.7					
988,Overburden to fines dump		172.15	61.81	116.7					
Trucks									
Cat 775, rip rap to overburden waste dump	135.00	297.16	53.99	0.0					
Cat 775, rip rap to fines dump	135.00	297.16	53.99	0.0					
Cat 775, cover pit bottom (South Hill)		297.16	53.99	0.0					
Cat 775, cover pit bottom (West Hill)		297.16	53.99	0.0					
Cat 775, overburden to North Hill (top)		297.16	53.99	0.0					
Cat 775, overburden to North Hill Pit (bottom)		297.16	53.99	0.0					
Cat 775,Plant Cover		297.16	53.99	0.0					
Cat 775, Overburden to fines dump		297.16	53.99	0.0					
Scrapers									
631D, cover pit bottom (South Hill)									
631D, cover pit bottom (West Hill)									
631D, perlite fines to North Hill (top)									
631D, perlite fines to North Hill Pit (bottom)									
Rippers - Can be done concurrently with Truck Support									
D8T, roads	133.50			35.4					
D8T, North Hill Pit floor	133.50			16.3					
D8T, West Hill Pit (north) floor	133.50			19.5					
D8T, plant area	133.50			70.8					
D8T, North Hill	133.50			196.3					
D8T, Overburden Waste Dump top	133.50			128.3					
Support									
621E Water Wagon		93.58	50.17	128.3					
14G Motor Grader		118.40	61.52	192.4					

2017 - Imerys Cost Model - Contractor							
Owning and Operating Cost (\$/hr)	Labor Cost (\$/hr)	Equip. Time Req'd (hrs)	Man Time Req'd (hrs)	Total Cost (\$)	Total Production	Prod. Unit	Unit Cost (\$/unit)
141.65	61.34	110.5	132.6	\$23,793	79,000	cy	0.30
141.65	61.34	237.3	284.8	\$51,084	93,333	cy	0.55
141.65	61.34	25.0	30.0	\$5,377	15,512	cy	0.35
141.65	61.34	256.5	307.8	\$55,221	63,872	cy	0.86
141.65	61.34	57.1	68.5	\$12,291	101	ac	121.95
174.55	62.67	0.0	0.0	\$0	0	cy	
174.55	62.67	19.9	23.9	\$4,976	11,576	cy	0.43
174.55	62.67	0.0	0.0	\$0	0	cy	
174.55	62.67	0.0	0.0	\$0	0	cy	
174.55	62.67	81.2	97.5	\$20,289	29,403	cy	0.69
174.55	62.67	0.0	0.0	\$0	0	cy	
174.55	62.67	38.7	46.4	\$9,662	22,893	cy	0.42
174.55	62.67	116.7	140.0	\$29,143	69,051	cy	0.42
301.31	54.74	0.0	0.0	\$0	0	cy	
301.31	54.74	19.9	23.9	\$7,311	11,576	cy	0.63
301.31	54.74	0.0	0.0	\$0	0	cy	
301.31	54.74	0.0	0.0	\$0	0	cy	
301.31	54.74	81.2	97.5	\$29,813	29,403	cy	1.01
301.31	54.74	0.0	0.0	\$0	0	cy	
301.31	54.74	38.7	46.4	\$14,198	22,893	cy	0.62
301.31	54.74	116.7	140.0	\$42,823	69,051	cy	0.62
Rippers - Can be done concurrently with Truck Support							
		35.4	42.5	\$0	10	ac	0.00
		16.3	19.5	\$0	5	ac	0.00
		19.5	23.4	\$0	6	ac	0.00
		70.8	85.0	\$0	20	ac	0.00
		196.3	235.5	\$0	55	ac	0.00
		128.3	154.0	\$0	36	ac	0.00
94.89	50.87	128.3	153.9	\$20,000			
120.05	62.38	192.4	230.9	\$37,499			
\$363,480							

Description:
Apply mulch, fertilizer, and seed mix to areas
and chain, plow, and crimp

Location Adjust.	Santa Fe	104.1%	
Total Cost			\$191,544
Area	Area (acres)	Unit Cost (\$/acre)	Subtotal Cost (\$)
North Hill Pit	40	800	32,000
West Hill and South Hill Pits	60	800	48,000
East Hill Pit	0	800	0
Plant Area	20	800	16,000
Overburden Waste Dump	50	800	40,000
Roads	10	800	8,000
Fines Waste Dump	50	800	40,000

230

\$184,000

Data Sources:
Means Construction Cost Data (2008)

Description:
Apply mulch, fertilizer, and seed mix to areas
and chain, plow, and crimp

Location Adjust.	Santa Fe	104.1%	
Total Cost			\$208,098
Area	Area (acres)	Unit Cost (\$/acre)	Subtotal Cost (\$)
North Hill Pit	40	869	34,766
West Hill and South Hill Pits	60	869	52,148
East Hill Pit	0	869	0
Plant Area	20	869	17,383
Overburden Waste Dump	50	869	43,457
Roads	10	869	8,691
Fines Waste Dump	50	869	43,457

230

\$199,902

Data Sources:
Means Construction Cost Data (2008)

Location Adjust.	Santa Fe	104.1%	
Total Cost			\$413,446
Area	Area (acres)	Unit Cost (\$/acre)	Subtotal Cost (\$)
North Hill Pit	63	985	62,508
West Hill and South Hill Pits	117	985	114,967
East Hill Pit	0	985	0
Plant Area	69	985	68,221
Overburden Waste Dump	50	985	49,257
Roads	28	985	27,614
Fines Waste Dump	76	985	74,595

403

\$397,162

2008				
Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
Rip rap channel crew (8 people, 3 weeks)	960	hr	20.00	19,200
Total			\$19,200	

2012				
Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
Rip rap channel crew (8 people, 3 weeks)	960	hr	21.73	20,859
Total			\$20,859	

2017				
Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
Rip rap channel crew (8 people, 3 weeks)	960	hr	24.63	23,644
Total			\$23,644	

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Other Reclamation Activity Costs

No Agua Mine
Worksheet #16
03/21/17
CED

2008

Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
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Total \$0

2012

Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
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Total \$0

2016 - Nevada SRCE Cost as of August 1

Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
Field Work - Field Geologist/Engineer -2 hrs travel, 8 hr work, 0.5hr lunch, 8 days	84	hr	119.95	10,076
Reporting - Field Geologist/Engineer -2, 8 hr days	16	hr	119.95	1,919
Travel -2 hrs/day, 8 days	16	hr	32.71	523

Total	inflation	3%	year 1	\$12,518
			year 2	\$12,894
			year 3	\$13,281
			year 4	\$13,679
			year 5	\$14,090
			year 6	\$14,512
			year 7	\$14,948
			year 8	\$15,396
			year 9	\$15,858
			year 10	\$16,334
10 yr cost:				\$143,509

2017

Activity	Quantity	Unit	Unit Cost (\$/unit)	Item Cost (\$)
Field Work - Field Geologist/Engineer	84	hr	121.62	10,216
Reporting - Field Geologist/Engineer	16	hr	121.62	1,946
Travel	16	hr	33.17	531

Total	inflation	3%	year 1	\$12,693
			year 2	\$13,074
			year 3	\$13,466
			year 4	\$13,870
			year 5	\$14,286
			year 6	\$14,715
			year 7	\$15,156
			year 8	\$15,611
			year 9	\$16,079
			year 10	\$16,562
10 yr cost:				\$145,513

BOND AMOUNT CALCULATION
New Mexico Mining and Minerals Division
Reclamation Bond Summary

No Agua Mine
Worksheet #17
03/21/17
Chris Eustice

No Agua Mine
Worksheet #17
06/28/12
Tony Sumner

No Agua Mine
Worksheet #17
03/17/17
Clay Diemert

			2008		2012		2017
DIRECT COSTS	Facility and Structure Removal		\$229,430		\$277,570		\$282,528
	Earthmoving		\$214,918		\$229,291		\$363,480
	Revegetation @ percent bonded	100%	\$306,470		\$319,843		\$413,446.05
	Other		\$19,200		\$20,859		\$23,644
	Subtotal		\$770,018		\$847,564		\$1,083,098
	Cost Escalation Period (years)	0					
	Cost Escalation Rate	0.0%					
	Adjusted Subtotal		\$770,018		\$847,564		\$1,083,098.01
INDIRECT COSTS	Mobilization and Demobilization (1%-5%)	3%	\$15,400		\$16,951		\$27,077.45
	Contingencies (2%-10%)	3%	\$53,901		\$59,329		\$32,492.94
	Engineering Redesign Fee (2%-10%)	0%	\$46,201		\$50,854		\$0.00
	Contractor Profit and Overhead (3%-14%)	10%	\$77,002		\$84,756		\$108,309.80
	Reclamation Management Fee (2%-7%)		\$38,501		\$42,378		\$145,512.70
	MMD Procurement Cost (2%-10%)	5%	\$46,201		\$50,854		\$54,154.90
TOTAL BOND AMOUNT			\$1,047,225		\$1,152,687		\$1,450,646
							\$297,959