

# FENNEMORE CRAIG, P.C.

2394 East Camelback Road, Suite 600  
Phoenix, Arizona 85016  
(602) 916-5000

**Dawn Meldinger**  
Direct Phone: (602) 916-5470  
Direct Fax: (602) 916-5670  
dmeidinger@fclaw.com

**Law Offices**  
Denver (303) 291-3200  
Las Vegas (702) 692-8000  
Nogales (520) 281-3480  
Phoenix (602) 916-5000  
Reno (775) 786-5000  
Tucson (520) 879-6800

July 7, 2015

*Via FedEx*

Bureau of Land Management  
Attn: Rem Hawes, Field Manager  
Hassayampa Field Office  
21605 North 7<sup>th</sup> Avenue  
Phoenix, Arizona 85027-2929

*Sam 7/8*

**RE: Withdrawal of Material Sale Application (AZA 036765)**

Dear Mr. Hawes,

Kirkland Mining Company ("KMC") has retained our firm to assist with the withdrawal of a prior material sale application and related mine plan of operations submitted via KMC cover letter dated April 21, 2015 and assigned AZA 036765. In addition to retaining our firm, KMC hired Mining & Environmental Consultants Inc. (Fred Brost) to assist them with the preparation of a new material sale application and reclamation cost estimate. Accordingly, we request that BLM close AZA 036765 and assign a new serial number to KMC's new non-competitive (43 CFR § 3602.30-34) material sale application hereby enclosed.<sup>1</sup>

Unfortunately, the April 21, 2015 mine plan of operation was less than clear relative to various matters (e.g., project mining claim number, water use, road improvements, method of loading/hauling, air quality/dust control measures etc.). Those uncertainties perhaps exacerbated community concern relative to potential environmental effects. KMC's new application confirms there will be nominal impact to resources on federal land and clearly demonstrates eligibility for processing the application via use of a categorical exclusion. *See* BLM NEPA HANDBOOK, Appendix 4 (F)(10) (H-1790-1) (disposal of mineral materials, such a sand, stone, gravel, pumice, pumicite, cinders and clay in amounts not exceeding 50,000 cubic yards or disturbing more than 5 acres).

<sup>1</sup> Please note that KMC's submittal of a material sale application for testing of the stockpiled material is in no way an admission that the material is saleable as opposed to locatable. KMC intends to demonstrate the deposit is of uncommon variety and will submit all test results to BLM for appropriate classification prior to any future mining endeavors, which are not the subject of this application.

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Mr. Rem Hawes

July 7, 2015

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It is important to put this material sale application into the proper perspective:

1. The federal land upon which KMC's mining claim (Capital Lode No. 7) is located within a remote area in BLM's Bradshaw Harquahala Planning Area and is designated available for sale or exchange (Bradshaw-Harquahala RMP (2010)). Areas so designated commonly have low resource values or are otherwise difficult for BLM to administer.
2. The proposed activity is in conformance with the existing Bradshaw-Harquahala RMP (2010).
  - o The federal lands proposed for utilization have been the subject of years of prior mining activity.
3. No new mining is planned in conjunction with this application. There is a short-duration removal of a pre-existing material stockpile (est. 3-5 months) on 2.6 acres of land. A pre-disturbed road segment will be utilized for access increasing the total federal land disturbance to 3.6 acres.
4. No water development or use of existing wells on federal land will occur. Dust from the nominal added truck traffic will be managed via water trucks filled off-site from private water sources.
5. The only structures that will be located on federal land will be a gate and cattle guard.
  - o Such structures, by their nature, are eligible for their own categorical exclusion. *See* BLM NEPA HANDBOOK, Appendix 4 (J)(8) (installation of minor devices to protect human life (e.g., grates across mines)).
6. There are no impacts to any register eligible or properties otherwise listed on the National Register of Historic Places.
7. There are no candidate or listed species or designated critical habitat within the project vicinity.
8. There will be no significant impacts on public health or safety.
  - o In particular, KMC undertook testing of the material stockpile (June 2015) and no asbestos containing material or other fibrous minerals are present.

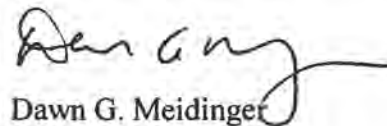
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Mr. Rem Hawes  
July 7, 2015  
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9. There are no highly uncertain and potentially significant environmental effects or unique or unknown environmental risks.
  - o This is verified by the resource analysis provided within the material sale application.
10. There are no highly controversial environmental effects or unresolved conflicts concerning alternative uses of available resources.
  - o The sale, excavation and removal of material similar to this is routinely authorized by the BLM. No alternative uses of the area have been identified that may be of higher value in terms of preservation or protection.

Importantly, "controversy" and "controversial environmental effects" are two very different things and there are none of the latter here. BLM's consideration of this application must be grounded in fact relative to the data before the agency demonstrating a lack of environmental effects on relevant resources and not influenced by unsupported and generalized assertions of harm. We trust you will review the new material sale application through the proper lens and determine that a sale contract can be issued pursuant to the BLM's established categorical exclusion.

Sincerely,



Dawn G. Meidinger

Enclosure

10585507.1/039557 0001

From: (602) 916-5293  
Maria San Jose  
Fennimore Craig  
2394 E. Camelback Rd  
Suite 800  
Phoenix, AZ 85016

Origin ID: ZSYA



J151215022003W

SHIP TO: (623) 580-5500

BILL SENDER

Rem Hawes  
BLM, Hassayampa Field Office  
21605 N. 7th Avenue

PHOENIX, AZ 85027

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CAD: 105717758/MINET3610

Delivery Address Bar Code



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Invoice #  
PO #  
Dept #

RELEASE#: 3785346

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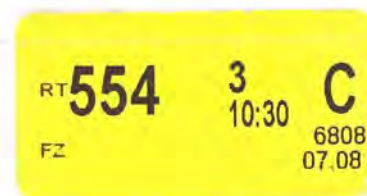
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**STOCKPILE REMOVAL**  
Mineral Material Sale Application

Application Withdrawn 8/5/2015

Submitted to:  
U.S. Department of the Interior  
Bureau of Land Management  
Hassayampa Field Office  
21605 North 7<sup>th</sup> Avenue  
Phoenix, AZ 85027-2929

Prepared for:  
Kirkland Mining Company

*Prepared by:*  
Mining & Environmental Consultants, Inc.  
9314 W. Willowbrook Drive  
Sun City, Arizona 85373



July 7, 2015

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## **1. INTRODUCTION**

Mining & Environmental Consultants, Inc. was commissioned by the Kirkland Mining Company (“KMC”) to submit this Mineral Material Sale Application for the removal of an existing 2.6 acre stockpile having less than 48,000 tons of screened Class N High Quality Natural Pozzolan (“HQP”) from its Capital Seven lode claim (AMC 428994) in Section 28, Township 13 North, Range 4 West, G&SRB&M near Kirkland, Arizona, as shown in Figures 1 and 2.

KMC proposes to excavate the existing stockpile for customer testing of the material as a supplementary cementitious admixture for the concrete and cement industries. KMC will excavate and load the HQP for transport to customers.

Mining has been conducted in this location since the early 1900s. Per the Arizona Department of Mines and Mineral Resources website, the area has been known variously throughout its history as the Arizona Tufa (“Magic Mountain”) Property, Rynearson Quarry, Kitty Litter Mine, and Capital Quarry. In 1958, the Rynearson family leased the quarry to Capital Quarries to provide dimensioned stone for construction of the Arizona State Capital Building; it is estimated that the builders may have used up to 1,000 tons during this operation. In 1979, Kitty Litter Mine began shipping oil absorbent material from the mine that was producing approximately 1,200 tons of tuff per month. The mine was closed in 1985 and the equipment was removed. The stockpile that remains covers approximately 2.6 acres of the Capital Seven lode claim, and contains approximately 48,000 tons of HQP.

In 2014, Arizona State University (“ASU”) performed a study to analyze the potential use of the material located on the Capital Seven lode claim as an alternative, natural replacement for coal Class F fly ash, metakaolin, and other supplementary cementitious materials used in original Portland cement (“OPC”) for structural concrete applications. The study tested the material against Class F fly ash and metakaolin for hydration, compressive strength, pore refinement, and durability characteristics and determined that the raw material meets specifications for HQP per American Society for Testing and Materials (ASTM) Standard C618, based on chemical and physical characteristics as shown in Appendix A.

It was found that KMC HQP material reacts chemically with water at ordinary temperature to form compounds possessing cementitious properties that offer increased strength and durability, and can be used to provide unique solutions for green concrete admixture applications in buildings and structures. ASU also determined that the HQP has properties that offer the potential to be environmentally effective in reducing global CO<sub>2</sub> emissions by replacing targeted percentages of OPC and other cementitious materials with HQP.

If the material testing results infer a scalable demonstration that the HQP can be used as an admixture for making cement, KMC will develop a further mine plan of operations utilizing a phased mining approach for BLM submittal and subsequent approval. Based on the ASU testing and successful outcome of field testing, KMC contemplates pursuing a determination that the material is an uncommon variety of a salable mineral, thus locatable and mineable pursuant to BLM’s 43 CFR 3809 regulations. KMC will compile and provide results of customer testing to BLM at such time in the future, if and when, a further mine plan of operations is submitted for agency review.

## **2. PRINCIPALS**

Kirkland Mining Company (KMC)  
100% Owned by Zouvas Family Trust  
Peter Zouvas, Trustee  
Anne Zouvas, Trustee  
3200 Fourth Avenue, Suite 101A  
San Diego, CA 92103

### **Contact and Representative:**

Areta Zouvas  
Vice President  
3200 Fourth Avenue, Suite 101A  
San Diego, CA 92103  
(619) 688-3939  
[aret@kirklandmining.com](mailto:aret@kirklandmining.com)

## **3. SITE LOCATION**

The existing stockpile of HQP (the "Stockpile Area") that is the subject of this application is located on the Capital Seven lode claim (AMC #428994) on land administered by the Bureau of Land Management ("BLM") in Section 28, T13N, R4W near Kirkland, Arizona. The Site Plan is shown in Figure 3.

## **4. DESCRIPTION OF THE OPERATION**

### **4.1 Access Road**

Access to the Stockpile Area will be via an existing road located on private land, pursuant to an easement held by KMC and then via a continuation of that existing road extending onto the Capital Seven lode claim as shown in Figure 3.

#### **4.1.1 Private Land Segment**

The existing road is located in the Sections 28 and 29 in Township 13 North, Range 4 West and intersects Iron Springs Road adjacent to a one acre parcel of private land owned by KMC (Yavapai County Parcel No. 205-25-034D) and continues to the boundary of the BLM land.

Maintenance of the private land segment of the access road will include the removal of vegetation and overburden on the existing 25 foot wide roadway, grading, and resurfacing using 4" of decomposed granite.



#### **4.1.2 Public Land Segment**

The access road continues onto BLM land, entering the Capital Seven lode claim and continuing another approximately 1,500 feet to the east side of the Stockpile Area. Maintenance to the public land segment of the access road will be the same as for the private segment. In conjunction with maintaining a 25 to 30 foot roadway, removing vegetation and overburden, grading, and resurfacing using 4" of decomposed granite will occur.

#### **4.1.3 Average Annual Daily Traffic (AADT) on Public Roads**

The annualized average 24-hour volume of vehicles at a given point or section of highway is called a traffic count. It is normally calculated by determining the volume of vehicles during a given period and dividing that number by the number of days in that period.

According to the Arizona Department of Transportation ("ADOT"), per the 2013 AADT traffic counts, State Route 89 (SR 89) has an AADT count of approximately 1,100 vehicles per day. KMC plans to remove 800 to 1200 tons of fines per day. At this rate, stockpile removal would add 20 to 40 truck round trips per day, depending on the size of the truck, to Iron Springs Road, Kirkland Road, and SR 89. It would also add a small number of miscellaneous round trips for fuel, supplies and personnel. Although the duration of the hauling operation will depend on the rate of removal, at 800 tons per day the duration of the truck traffic would be less than three (3) months.

#### **4.2 Stockpile Geometry**

KMC recognizes the importance of supporting local businesses and promoting future relationships that can have significant impact on the local economy. On January 29, 2014, R.W. Holmquist & Associates, LLC, ("RWH"), a local surveying company, was contracted to perform a topographic survey and to sample the HQP in the existing stockpile. The stockpile was found to cover 2.6 acres of the Capital Seven lode claim and to contain 44,254 cubic yards of material, plus or minus 15%. The HQP weighs an average of 2,168 pounds (1.08 tons) per cubic yard, giving a total of about 48,000 tons. Roots and other organic matter are anticipated within the top three feet of the stockpile, which will result in the loss of some marketable HQP. The Stockpile Data Sheet is presented in Appendix B.

#### **4.3 Removal Operation**

KMC plans to employ a local contractor to excavate and load the HQP. The HQP will then be transported to the customer by contractor or customer's trucks. Any temporary structures needed will be located on KMC's adjacent private parcel while the stockpile is being removed.

Access to and from the Stockpile Area is through an existing fence and gate. A cattle guard will be installed as shown in Figure 3. A substantial pipe gate will also be installed at the cattle guard. The gate will be open during operating hours for vehicle access and locked during non-operating hours.

Truck loading will begin at the Stockpile Area near the south end. The truck loading area will change as excavation advances into the stockpile and will be within the Stockpile Area. Trucks will be loaded as close as possible to the excavation to minimize loader travel.

Some of the upper stockpile material may not be suitable for use due to the presence of roots and organic debris. Shrubs, bushes and other organic matter will be removed by clearing and grubbing using a tracked dozer. Organic matter will be processed through a wood chipper and piled along the toe of the Stockpile Area for use as compost during reclamation. The layer of HQP containing roots and organic material will be treated as growth medium and also be placed adjacent to the stockpile and wood chips for use in reclamation.

The removal operation will consist of the following activities:

- 1) Removal, wood chipping and piling of vegetation;
- 2) Stripping and placement of growth medium adjacent to the stockpile;
- 3) Loading HQP into trucks for weighing and transport to the customer.

Except for dust control, the operation is a dry process and does not consume water. Water for dust control will be obtained from a well on KMC's private parcel with no water use from sources on BLM land. There is no chemical or other processing of fines on BLM lands or adjacent KMC land.

#### **4.3.1 Material Transport**

It is anticipated that large trucks belonging to a contractor or the customer will transport the HQP to customers for testing.

#### **4.3.2 Operating Conditions**

The operating conditions are summarized as follows:

- A temporary site trailer will be utilized for operational and management purposes and shall be located at 7825 South Iron Springs Road (on KMC's adjacent private parcel).
- The hours of operation for the mining operation will be during daylight hours only, Monday through Friday.
- Trucks will be weighed empty and loaded at a truck scale on the KMC private parcel.
- Vehicle speed will be restricted to 5 mph for safety and dust control.
- Speed limits and maximum vehicle weight will be posted at the entrance/exit.
- Fuel storage, fueling and lubrication will be performed on KMC's private parcel. Used oil and lubricants will be removed from site by a licensed recycler.
- The access road will be gated and locked outside of the hours of operation.

#### **4.3.3 Equipment and Vehicles**

The following equipment is planned for this operation. Note that the number and size of equipment may vary depending on availability.

- 1 Caterpillar 988G front-end loader or equivalent for truck loading
- 1 water truck for dust control
- 1 Caterpillar D6 dozer or equivalent for clearing and grubbing
- 1 pick-up truck for employee transport and supervision
- Bulk dump trucks as needed for hauling HQP to customers

Other vehicles that may be on-site periodically include a grader and various delivery, supplier, and emergency vehicles.

#### **4.3.4 Facilities**

The following temporary facility will be located on KMC's private parcel at 7825 South Iron Springs Road:

- 1 temporary office trailer/scale house
- 1 supplies trailer
- 1 10,000 gallon elevated water tank
- 1 truck scale
- 1 1300 gallon diesel tank
- 1 trash bin

### **5. MEASURES TO PREVENT HAZARDS TO PUBLIC HEALTH AND SAFETY AND TO MITIGATE ENVIRONMENTAL DAMAGE**

#### **5.1 Hazardous Substances**

Fuel storage, fueling and lubrication will be performed on KMC's private parcel. Fuel will be stored in an above-ground, dual containment tank. Used oil and lubricants will be removed from site by a licensed recycler.

#### **5.2 Solid and Hazardous Wastes**

Solid wastes generated by the project will be normal trash and refuse generated by site personnel. These materials will be placed in a bin and removed from the site regularly (usually weekly). KMC or a local trash contractor will remove solid waste from the site and transport it to an approved solid waste disposal facility.

There are not expected to be any hazardous wastes generated by the project.

### **5.3 Fish and Wildlife**

The Biological Resources Survey Report prepared by Environmental Planning Group (“EPG”) for this project is presented in Appendix C.

### **5.4 Cultural Resources**

The Cultural Resources Survey Report prepared by EPG for this project is presented in Appendix D. No cultural resources were identified within or near the area to be disturbed. If previously unreported cultural resources are encountered during ground-disturbing activities, work within 100 feet will stop until the discovery has been documented by a qualified archaeologist and continued work has been authorized by the BLM.

### **5.5 Air Quality**

Regulated air pollutants will primarily be fugitive dust. At the planned production rate, KMC’s operation will be below the permit threshold and will not require a permit. The project site was visited by inspectors from the Arizona Department of Environmental Quality (“ADEQ”) on May 13, 2015. The inspectors reported “No deficiencies were noted during the course of the inspection. No ADEQ action will result from this inspection.”

Fiberquant Analytical Services (“Fiberquant”), specialists in detecting fibrous minerals, tested 18 samples of HQP from the stockpile and other locations on the KMC adjacent claims. Fiberquant did not find any fibers indicating the presence of asbestos, erionite or other fibrous minerals that could be an airborne hazard (Appendix E). KMC will water the haul road regularly and limit vehicle speed to control dust from traffic.

### **5.6 Access Control**

Public access to the Stockpile Area will be controlled by a gate. The gate will be locked after working hours. Traffic and no trespassing signs will also be affixed to the gate consistent with requirements of the Arizona State Mine Inspector.

### **5.7 Equipment**

Mobile equipment used on the project will be parked on KMC’s private parcel during nonworking hours. Equipment will be locked and wheels chocked to prevent movement.

## **6. RECLAMATION**

The KMC stockpile location will be reclaimed to provide a safe and stable post-excavation surface suitable for recreation and livestock grazing.

Reclamation will be developed based upon site-specific conditions and requirements, a review and evaluation of present site conditions by KMC, and general knowledge of successful reclamation techniques identified by the BLM.



In general, reclamation would include the following steps:

- Removal of equipment, trash and debris
- Spreading salvaged growth medium and chipped vegetation on the disturbed area;
- Scarifying and seeding the disturbed area;
- Monitoring and maintenance of vegetation and drainage controls.

The seed mix would be developed in consultation with BLM personnel and based upon availability. Local seed sources would be utilized where possible. Otherwise seed will be purchased from commercial seed suppliers. Seeding rates will generally vary between 10-15 pounds of weed-free, pure live seed (PLS) per acre, depending on the mix.

KMC will make every effort to prevent introduction of noxious weeds, primarily through the use of certified weed-free seed.

Reclamation would be performed using onsite personnel and equipment, or contractors, when operations are complete. Reclamation, except for monitoring, will be completed within 30 days of completion of operations. Monitoring would continue for at least one growing season.

A reclamation cost estimate is included as Appendix F.

## **7. PERMITS**

The following permits were considered in preparation of this application:

**Air Quality Permit.** At the planned production rate, KMC's air emissions will be far below the permit threshold and will not require an Air Quality Permit.

**County Building Codes.** KMC is exempt from county building codes under the State Mining and Metallurgical Exemption, ARS 11-830. KMC will apply for a Yavapai County Mining/Metallurgical Use Exemption.

**Aquifer Protection Permit.** This permit is not required because KMC does not operate a discharging facility as defined in ARS 49-241 and as a "dry" operation, has no potential to discharge a pollutant either directly to an aquifer, to the land surface or the vadose zone in such a manner that there is a reasonable probability that the pollutant would reach an aquifer.

**Section 404 Permit.** KMC's operations are located on uplands not subject to regulation by the Corps of Engineers under Section 404 of the Clean Water Act.

**Section 402 Permit.** KMC will submit an Notice of Intent ("NOI") to ADEQ for stormwater discharge and prepare an appropriate Storm Water Pollution Prevention Plan ("SWPPP") to ensure that silt and other possible surface water pollutants do not leave the project area.

**Spill Prevention, Control and Countermeasures Plan.** KMC's fuel storage tank would be under the permit threshold of 1320 gallons of petroleum products and would not be required to prepare a plan. KMC will use a dual-containment, above-ground tank for storage of diesel fuel and will ensure that best practices are used to prevent fuel or lubricant spills.



**SUBMITTED BY:**  
KIRKLAND MINING COMPANY

  
Aron Zouvas, Vice President

**PREPARED BY:**  
MINING & ENVIRONMENTAL CONSULTANTS, INC.

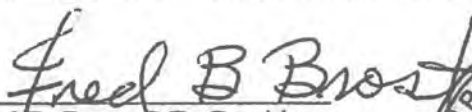
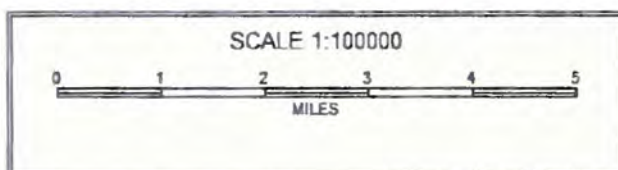
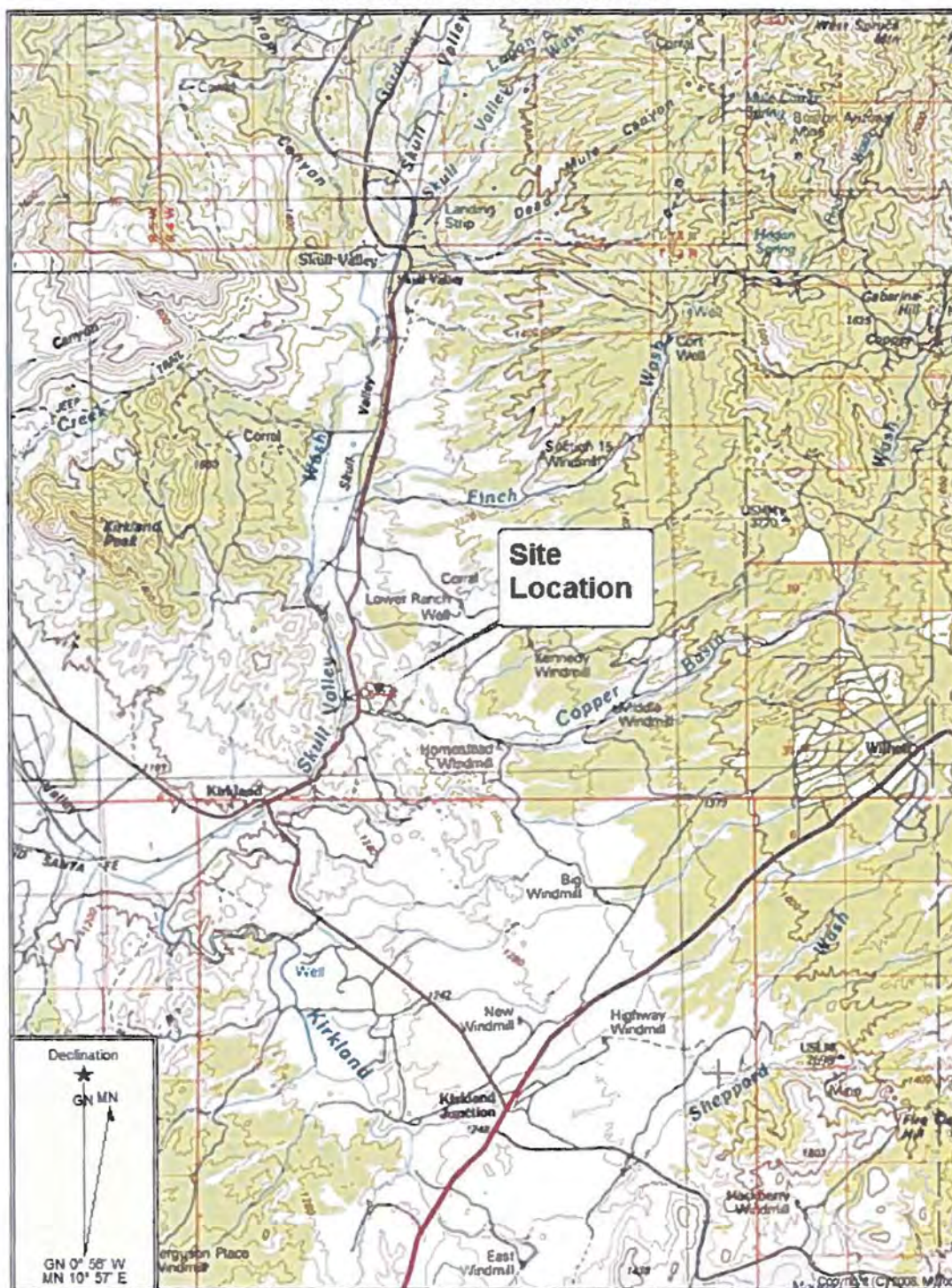
  
Fred B. Brost, P.E., President



FIGURE 1 - SITE LOCATION



KIRKLAND MINING CO.  
FIGURE 1  
SITE LOCATION  
Sec 28, T13N, R4W



FIGURE 2 - CAPITAL CLAIM PARCELS

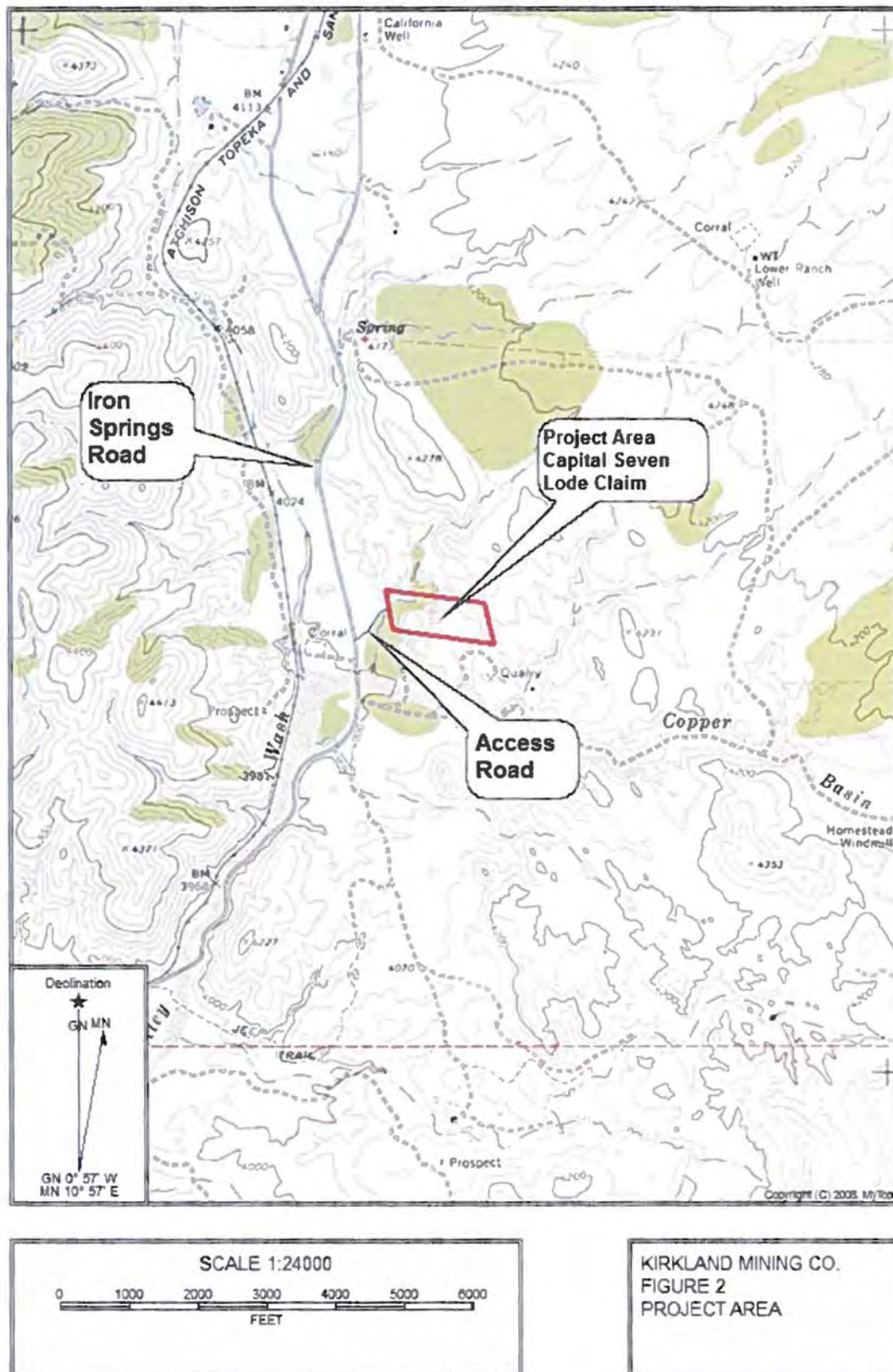




FIGURE 3 - SITE PLAN



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**APPENDIX A**

**POZZOLAN SPECIFICATION CERTIFICATION**



## Chemical and Physical Analysis of Natural Pozzolan

Developed for: Kirkland Mining Company

### Chemical Composition (%)

(Determined by Intertek, using X-ray fluorescence)

	This Pozzolan	ASTM C 618 Specifications		
		Class N	Class F	Class C
Total Silica, Alumina, Iron	90.7	70 (min)	70 (min)	50 (min)
Silicon dioxide	74.8			
Aluminum oxide	14.9			
Iron oxide	0.96			
Calcium Oxide	1.66			
Sulfur trioxide	0.01	4.0 (max)	5.0 (max)	5.0 (max)
Magnesium oxide	1.75			
Sodium oxide	2.10			
Moisture content	2.23	3.0 (max)	3.0 (max)	3.0 (max)
Loss on Ignition	0.39	10.0 (max)	6.0 (max)	6.0 (max)

### Physical Tests and Results

(Information provided below is for ground samples with a median particle size of 10  $\mu$ m).

	This Pozzolan	ASTM C 618 Specifications		
		Class N	Class F	Class C
Specific gravity	2.2-2.3			
N <sub>2</sub> BET surface area (m <sup>2</sup> /g)	41			
Strength activity index (%)				
Ratio to control at 7 days: 10% replacement	89.7			
Ratio to control at 7 days: 20% replacement	78.7			
Ratio to control at 28 days: 10% replacement	84.6			
Ratio to control at 28 days: 20% replacement	76.9	75 (min)	75 (min)	75 (min)
Heat of hydration reduction at 72 h as compared to OPC at same w/p ratio	16%			
calcium hydroxide reduction in cement paste (at 20% mass replacement of OPC)	25%			
Percentage change compared to OPC paste wrt sulfate expansion (ASTM C 1012)	Negligible			
Percentage change compared to OPC paste wrt ASR expansion (ASTM C 1260)	-10%			

Barzin Mobasher, Ph.D., P.E.  
Professor of Civil and Environmental Engineering  
Arizona State University, Tempe, Arizona

*Barzin Mobasher*

School of Sustainable Engineering and the Built Environment  
Civil and Environmental Engineering Program  
Arizona State University, Tempe, Arizona, 87287-3005  
Phone: (480) 965-0141 Fax: (480) 965-0557  
E-mail: [barzin@asu.edu](mailto:barzin@asu.edu) home page: <http://ceaspub.eas.asu.edu/cement/>



*Barzin Mobasher*

**APPENDIX B**  
**STOCKPILE DATA SHEET**

**RW HOLMQUIST & ASSOCIATES, LLC**  
**703 EAST BEALE STREET**  
**KINGMAN, ARIZONA 86401**

**1/29/2014**

**SURVEYORS DATA REPORT FOR THE CAPITAL CLAIM GROUP, FOR THE  
KIRKLAND MINING CO. & AGENTS.**

*This set of data is the results of a topographic survey and sample recovery for the existing millings and raw material on the Capital claim group.*

*The millings cover 2.6 acres of the Capital Survey.*

*The millings weigh an average of 2168 lbs. or 1.08 tons per cubic yard of material.*

*The milling pile contains 44254 cubic yards of material, more or less 15%.*

*The tonnage of the millings pile is 47794, more or less 15%.*

*There is vegetation on the Millings; we found roots and organic debris in the top 3 feet on average.*

*There may be some loss in the removal of organic debris.*

*The circled area on the Capital Six claim is the location of the millings.*

*The triangles are the locations of raw material recovery.*

**COMPLETED IN THE MONTH OF JANUARY, 2014 BY ME**  
**RAND W. HOLMQUIST, RLS**  
**EXP. 3/31/2015**



**APPENDIX C**  
**BIOLOGICAL RESOURCES SURVEY**



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# **Kirkland Mine Biological Resources Survey Report**

Submitted to:

**Bureau of Land Management:  
Phoenix District Office**

Prepared by:

**Environmental Planning Group, LLC**

**June 2015**

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## INTRODUCTION

Kirkland Mining proposes to remove existing stockpiled material on lands administered by the Bureau of Land Management (BLM) Hassayampa Field Office in Yavapai County, Arizona. The purpose of the proposed operation (the Project) is to recover tufa millings remaining from past mining activities for off-site testing. Kirkland Mining proposes to make minor surface repairs to an existing access road on private land, trim or remove vegetation encroaching on the roadway on BLM land, perform overland travel around the millings stockpile, and use mechanized equipment to remove the stockpile for transportation offsite. The millings pile is approximately 2.6 acres, and additional disturbance associated with overland travel around the millings pile would be less than five acres. There will be very little ground disturbance from minor repairs and vegetation trimming along the existing access road. The roadway improvements are estimated to affect up to approximately 0.5 acres on private and BLM land. The total area subject to disturbance (roadway improvements, stockpile area, and additional disturbance adjacent to the stockpile area) is approximately 8.1 acres and is referred to as the Project area, and the 0.25-mile surveyed buffer around the Project area is referred to as the Project vicinity.

This report is prepared by Environmental Planning Group, LLC (EPG), in support of Kirkland Mining's material sale application, and is intended to provide the BLM with a description and record of the current conditions on the site with respect to biological resources.

## METHODS

EPG reviewed existing information on the potential for any special-status species to occur in the Project area. EPG performed queries on the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) online database for species listed under the Endangered Species Act (ESA), the Arizona Game and Fish Department (AGFD) HabiMap online database which searches their Heritage Data Management System (HDMS), and reviewed BLM's sensitive species list for Arizona. Table 1 lists species that were reviewed for potential presence in the Project vicinity, and the IPaC query report is appended to this document.

One EPG biologist conducted a pedestrian survey on March 30, 2015, covering a 0.25-mile radius around the Project area. The survey focused on identifying and recording observed flora and fauna, as well as examining potential bat habitat in rock crevices. Survey results reflect the general conditions but do not provide complete coverage of the Project vicinity. The biologist carried a GPS unit to record a track log of the survey area. Tracks and photo points for photos used in this document are shown on Figure 24, following the summary of survey results.

The Project area is located in interior chaparral, with patches of semidesert grassland and riparian vegetative communities (Brown 1982). This report provides descriptions of several subdivisions of the Project vicinity, where terrain or vegetation changes were likely to result in a change in wildlife and plant species. A complete list of plants observed on the survey is provided in Table 2, following the survey results.

Table 1. Special-status Species that Were Evaluated for Potential Occurrence within the Study Area

BGEPA: Bald and Golden Eagle Protection Act  
BLMS: BLM Sensitive  
C: Candidate for ESA listing  
DPS: Distinct Population Segment

E: ESA Endangered Species  
NEP: Nonessential Experimental Population  
T: ESA Threatened Species  
WSC: Wildlife of Special Concern in Arizona

Common Name <i>Latin Name</i>	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
<b>Mammals</b>				
Black-footed Ferret <i>Mustela nigripes</i>	E, NEP	NA	Arid plains and grasslands. Strongly associated with prairie dogs	Project vicinity is outside of known distribution
Lesser Long-nosed Bat <i>Leptonycteris curasoae yerbabuenae</i>	E	No	Desert grassland and shrubland up to the oak transition. Roosts in caves, mine tunnels, and occasionally abandoned buildings. Forages for nectar and pollen in cactus flowers	Project vicinity is outside of known distribution
Allen's Big-eared Bat <i>Idionycteris phyllotis</i>	BLMS	NA	Ponderosa pine, piñon-juniper woodlands, and riparian habitats dominated by sycamore, cottonwood, and willows. Roosts in caves and abandoned mineshafts. Forages over water for insects.	No suitable habitat present within the Project vicinity
Arizona Myotis <i>Myotis occultus</i>	BLMS	NA	Ponderosa pine and pine-oak woodlands adjacent to water. Roosts in snags, tree cavities, and crevices in close proximity to water it forages over.	No suitable habitat present within the Project vicinity
Banner-tailed Kangaroo Rat <i>Dipodomys spectabilis</i>	BLMS	NA	Great Basin desertscrub and desert grasslands with scattered shrubs, mesquite, or junipers.	Project vicinity is outside of known distribution
California Leaf-nosed Bat <i>Macrotus californicus</i>	BLMS, WSC	NA	Sonoran desertscrub. Roosts in mines, caves, and rock shelters. Captures large, flying insects in air	Project vicinity is outside of known distribution
Cave Myotis <i>Myotis velifer</i>	BLMS	NA	Desertscrub. Roosts in caves, tunnels, mineshafts, under bridges, and abandoned buildings. Forages above the canopy of vegetation for arthropods	Yes
Greater Western Mastiff Bat <i>Eumops perotis californicus</i>	BLMS	NA	Sonoran desertscrub, near cliffs in rugged, rocky canyons. Roosts in crevices above a vertical drop to launch into flight. Forages for insects at substantial heights over open areas.	Yes

Table 1. Special-status Species that Were Evaluated for Potential Occurrence within the Study Area

<b>BGEPA:</b> Bald and Golden Eagle Protection Act <b>BLMS:</b> BLM Sensitive <b>C:</b> Candidate for ESA listing <b>DPS:</b> Distinct Population Segment			<b>E:</b> ESA Endangered Species <b>NEP:</b> Nonessential Experimental Population <b>T:</b> ESA Threatened Species <b>WSC:</b> Wildlife of Special Concern in Arizona	
Common Name <i>Latin Name</i>	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
Gunnison's Prairie Dog <i>Cynomys gunnisoni</i>	BLMS	NA	Grassy areas in mountain valleys and plateaus between 6,000 and 12,000 feet in elevation.	Project vicinity is outside of known distribution.
Spotted Bat <i>Euderma maculatum</i>	BLMS; WSC	NA	Various biotic communities including arid desertscrub, riparian, piñon-juniper woodlands, and montane coniferous forests. Roosts in crevices and cracks of cliff faces. Forages for insects over open ground.	Yes
Pale Townsend's Big-eared Bat <i>Corynorhinus townsendi pallescens</i>	BLMS	NA	Desertscrub to coniferous forests. Day roosts in caves, night roosts in abandoned buildings. Hibernates in cold caves, lava tubes, and mines during the winter. Gleans insects from leaves while in flight.	Yes
<b>Birds</b>				
American Peregrine Falcon <i>Falco peregrinus anatum</i>	BLMS; WSC	NA	Nests on cliffs, often forages near water and in open expanses.	Yes
Bald Eagle <i>Haliaeetus leucocephalus</i>	BGEPA; BLMS; WSC	NA	Common in winter along water courses and reservoirs. Typical roost sites are often clumps of mature, deciduous trees in riparian areas protected from human disturbance.	Yes
California Condor <i>Gymnogyps californianus</i>	E, NEP	Yes, outside of Project vicinity	Steep terrain with rock outcroppings, cliffs, and caves. Arizona populations are NEP.	Project vicinity is outside of known distribution.
Desert Purple Martin <i>Progne subis hesperia</i>	BLMS	NA	Sonoran desertscrub. Nests in cavities of Saguaro Cacti.	No suitable habitat present within the Project vicinity.
Ferruginous Hawk <i>Buteo regalis</i>	BLMS; WSC	NA	Arid grasslands and adjacent farmlands. Wintering habitat may include desertscrub	Yes

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Common Name <i>Latin Name</i>	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
Gilded Flicker <i>Colaptes chrysoides</i>	BLMS	NA	Strongly associated with giant cactus forests of Southwest deserts, but also inhabits riparian woodlands dominated by cottonwoods and willows.	No suitable habitat present within the Project vicinity
Golden Eagle <i>Aquila chrysaetos</i>	BLMS	NA	Open and semi-open habitats within mountainous canyons and grasslands.	Yes
Le Conte's Thrasher <i>Toxostoma lecontei</i>	BLMS	NA	Arid and sparsely vegetated plains dominated by saltbush and creosote bush on sandy ground	No suitable habitat present within the Project vicinity
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	T	Yes, outside of Project vicinity	Mixed-conifer woodlands in shaded canyons	No suitable habitat present within the Project vicinity
Northern Goshawk <i>Accipiter gentilis atricapillus</i>	BLMS, WSC	NA	High, forested mountains and plateaus, usually above 6,000 feet in elevation.	Project vicinity is outside of known distribution.
Pinyon Jay <i>Gymnorhinus cyanocephalus</i>	BLMS	NA	Healthy pinyon-juniper woodlands.	No suitable habitat present within the Project vicinity
Western Burrowing Owl <i>Athene cunicularia hypugaea</i>	BLMS	NA	Prairie grasslands with few scattered shrubs and other open, nearly flat habitats	Yes
Yellow-billed Cuckoo, Western DPS <i>Coccyzus americanus</i>	T	Proposed, outside of Project vicinity	Nests in large blocks of mature riparian woodland.	No suitable habitat present within the Project vicinity
Southwestern Willow Flycatcher <i>Empidonax traillii eximius</i>	E	Yes, outside of Project vicinity	Dense riparian habitat of willow, saltcedar, and box elder.	Project vicinity is outside of known distribution.
<b>Reptiles</b>				
Northern Mexican Gartersnake <i>Thamnophis eques megalops</i>	T	Proposed, outside of Project vicinity	Ponds, cienegas, lowland river riparian woodlands, and upland stream gallery forests	Project vicinity is outside of known distribution
Sonora Mud Turtle <i>Kinosternon sonoriense sonoriense</i>	BLMS	NA	Springs, creeks, ponds, and waterholes of intermittent streams.	No suitable habitat within the Project vicinity

Table 1. Special-status Species that Were Evaluated for Potential Occurrence within the Study Area

<b>BGEPA:</b> Bald and Golden Eagle Protection Act <b>BLMS:</b> BLM Sensitive <b>C:</b> Candidate for ESA listing <b>DPS:</b> Distinct Population Segment			<b>E:</b> ESA Endangered Species <b>NEP:</b> Nonessential Experimental Population <b>T:</b> ESA Threatened Species <b>WSC:</b> Wildlife of Special Concern in Arizona	
Common Name <i>Latin Name</i>	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
Sonoran Desert Tortoise <i>Gopherus morafkai</i>	C, BLMS, WSC	NA	Rocky, steep slopes and bajadas in palo verde-mixed cacti associations. May use desert washes and valley bottoms	No suitable habitat within the Project vicinity
<b>Amphibians</b>				
Chiricahua Leopard Frog <i>Lithobates chiricahuensis</i>	T	Yes, outside of Project vicinity	Cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers	Project vicinity is outside of known distribution
Lowland Leopard Frog <i>Lithobates yavapaiensis</i>	BLMS	NA	Rivers, beaver ponds, cienegas, livestock tanks, and springs	No suitable habitat within the Project vicinity
<b>Fish</b>				
Colorado Pikeminnow <i>Ptychocheilus luctus</i>	E, NEP	NA	Relatively swift waters with clean cobble bottoms. NEP in Salt and Verde River drainages	Project vicinity is outside of known distribution
Desert Pupfish <i>Cyprinodon macularius</i>	E	Yes, outside of Project vicinity	Shallow waters of springs, small streams, and marshes	Project vicinity is outside of known distribution
Desert Sucker <i>Catostomus clarki</i>	BLMS	NA	Rapids and flowing pools of streams and rivers	Project vicinity is outside of known distribution
Gila Chub <i>Gila intermedia</i>	E	Yes, outside of Project vicinity	Smaller headwater streams, cienegas and springs or marshes of the Gila River basin	Project vicinity is outside of known distribution
Gila Topminnow <i>Poeciliopsis occidentalis</i>	E	No	Shallow, warm water with moderate currents and dense aquatic vegetation in headwater springs	Project vicinity is outside of known distribution
Gila Trout <i>Oncorhynchus gilae</i>	T	No	Small, mountain, headwater streams	Project vicinity is outside of known distribution
Headwater Chub <i>Gila nigra</i>	C, BLMS	NA	Cool to warm water in headwater stretches of mid-sized streams in the Gila River basin	Project vicinity is outside of known distribution
Loach Minnow <i>Tiaroga cobitis</i>	E	Yes, outside of Project vicinity	Turbulent, rocky riffles of mainstream rivers and tributaries	Project vicinity is outside of known distribution
Longfin Dace <i>Agostia chrysogaster</i>	BLMS	NA	Intermittent, hot, low-desert streams to clear and cool brooks at higher elevations	Project vicinity is outside of known distribution

Table 1. Special-status Species that Were Evaluated for Potential Occurrence within the Study Area

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Common Name Latin Name	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
Razorback Sucker <i>Xyrauchen texanus</i>	E	Yes, outside of Project vicinity	Various habitat types from slow backwaters of large streams to mainstream rivers and reservoirs.	Project vicinity is outside of known distribution.
Roundtail Chub, Lower Colorado River Basin DPS <i>Gila robusta</i>	C, BLMS	NA	Cool to warm water in mid-elevation streams and rivers.	Project vicinity is outside of known distribution.
Spikedace <i>Medeo fulgida</i>	E, WSC	Yes, outside of Project vicinity	Mid-water habitats of runs, pools, and swirling eddies.	Project vicinity is outside of known distribution.
Sonora Sucker <i>Catostomus insignis</i>	BLMS	NA	Gravelly or rocky pools in streams and rivers.	Project vicinity is outside of known distribution.
Speckled Dace <i>Rhinichthys osculus</i>	BLMS	NA	Rocky riffles, runs and pools of headwaters, creeks, and small rivers.	Project vicinity is outside of known distribution.
Woundfin <i>Plagopterus argentissimus</i>	NEP, WSC	NA	Swift, silty streams avoiding clear waters and pools.	Project vicinity is outside of known distribution.
<b>Invertebrates</b>				
Page Springsnail <i>Pyrgulopsis morrisoni</i>	C, BLMS	NA	Firm substrates, vegetation, and submerged woody debris in association with moderate flows of head springs, and seeps.	Project vicinity is outside of known distribution.
Succineid Snails <i>Succineidae</i> spp.	BLMS	NA	Springs.	No suitable habitat present within the Project vicinity.
<b>Plants</b>				
Arizona Cliffrose <i>Purshia subintegra</i>	E	No	Gentle to steep slopes, open basins, and limestone ledges and outcrops. Restricted to nutrient- deficient calcareous soils. Endemic to Burro Creek and location near Cottonwood in Yavapai County.	Project vicinity is outside of known distribution.
Arizona Sonoran Rosewood <i>Rhus trilobata</i>	BLMS	NA	Base of cliffs, along canyon bottoms and on moderate to steep slopes.	Project vicinity is outside of known distribution.



Table 1. Special-status Species that Were Evaluated for Potential Occurrence within the Study Area

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Common Name Latin Name	Status	Designated Critical Habitat	Habitat and Notes	Occurrence in or near the Project Vicinity
California Flannelbush <i>Fremontodendron californica</i>	BLMS	NA	Well-drained, rocky hillsides and ridges in chaparral and oak pine woodland	Yes
Giant Sedge <i>Carex spissa</i> var. <i>ultra</i>	BLMS	NA	Moist soils near perennially wet springs and streams	Project vicinity is outside of known distribution
Murphey Agave <i>Agave murpheyi</i>	BLMS	NA	Benches or alluvial terraces on gentle bajada slopes above major drainages in desert scrub	Project vicinity is outside of known distribution

## FIELD SURVEY RESULTS

### ROADWAY IMPROVEMENT AREA

The access road would be improved by repairing the surface of the road and removing vegetation encroaching on the roadway. The road area was surveyed from the vehicle during ingress and egress of the Project area, but was not surveyed on foot. Vegetation present along the roadway is similar to that along the northern wash, described below.

### NORTHERN WASH

This segment is located north of the Project area. Survey results reflect the general conditions on this segment but do not provide complete coverage of the segment. Elevations surveyed in the northern wash ranged from approximately 4,050 to 4,100 feet.

Figure 1 represents the relatively level interior chaparral and desert wash present. Dominant plant species include: Sonoran Scrub Oak (*Quercus turbinella*), Hollyleaf Redberry (*Rhamnus ilicifolia*), Alderleaf Mountain Mahogany (*Cercocarpus montanus*), Stansbury Cliffrose (*Purshia stansburiana*), and Broom Snakeweed (*Gutierrezia sarothrae*).



**Figure 1. Representative vegetation in northern wash. UTM 344853E, 3812094N, 12S.**

## PLATEAU

This segment surrounds and includes the Project area. The plateau contains multiple west-facing rock formations as well as patches of exposed tufa bedrock. When examined, no signs of bats were observed in crevices of the rock formations. A semidesert grassland vegetative community dominates the landscape, although sparse junipers (*Juniperus* spp.) exist throughout. Dominant plants include Curly-Mesquite (*Hilaria belangeri*), Broom Snakeweed, Velvet Mesquite (*Prosopis velutina*) and Catclaw Acacia (*Acacia greggii*). The stockpile is close to a monoculture of Stansbury Cliffrose. Elevations surveyed on the plateau ranged from approximately 4,050 to 4,140 feet.



**Figure 2.** Overlooking the plateau. UTM 344956E, 3811969N, 12S.





**Figure 3. Second overview of plateau. UTM 344956E, 3811969N, 12S.**



**Figure 4. Overview of Project area. UTM 344956E, 3811969N, 12S.**





**Figure 5. Plateau overview. UTM 344956E, 3811969N.**



**Figure 6. Plateau close to Project area. UTM 345066E, 3811694N, 12S**





**Figure 7. Vegetation on plateau. UTM 344977E, 3811614N, 12S.**



**Figure 8. Rock formation. UTM 344977E, 3811614N, 12S.**





**Figure 9. Plateau. UTM 345066E, 3811694N, 12S.**



**Figure 10. Rock formation. UTM 344800E, 3811602N, 12S.**





**Figure 11. Top of rock formation near mine site. UTM 344800E, 3811602N, 12S.**



**Figure 12. West-facing rock formation. UTM 344800E, 3811602N, 12S.**





**Figure 13. Second view of formation from Figure 17. UTM 344862E, 3811745N, 12S.**



**Figure 14. Third view of formation from Figure 17. UTM 344862E, 3811745N, 12S.**





**Figure 15. Millings from mine. UTM 344800E, 3811602N, 12S.**



**Figure 16. Millings pile. UTM 344900E, 384605N, 12S.**





**Figure 17. Millings pile. UTM 344900E, 384605N, 12S.**



**Figure 18. Millings pile. UTM 344900E, 384605N, 12S.**



## SOUTHERN WASH

This segment is located south of the Project area. Elevations surveyed in the southern wash ranged from approximately 4,040 to 4,100 feet.

Figure 19 through Figure 23 are representative of the relatively level, desert wash riparian community present. Dominant plant species include: Fremont Cottonwood (*Populus fremontii*), Willow (*Salix* sp.), and Stansbury Cliffrose (*Purshia stansburiana*).

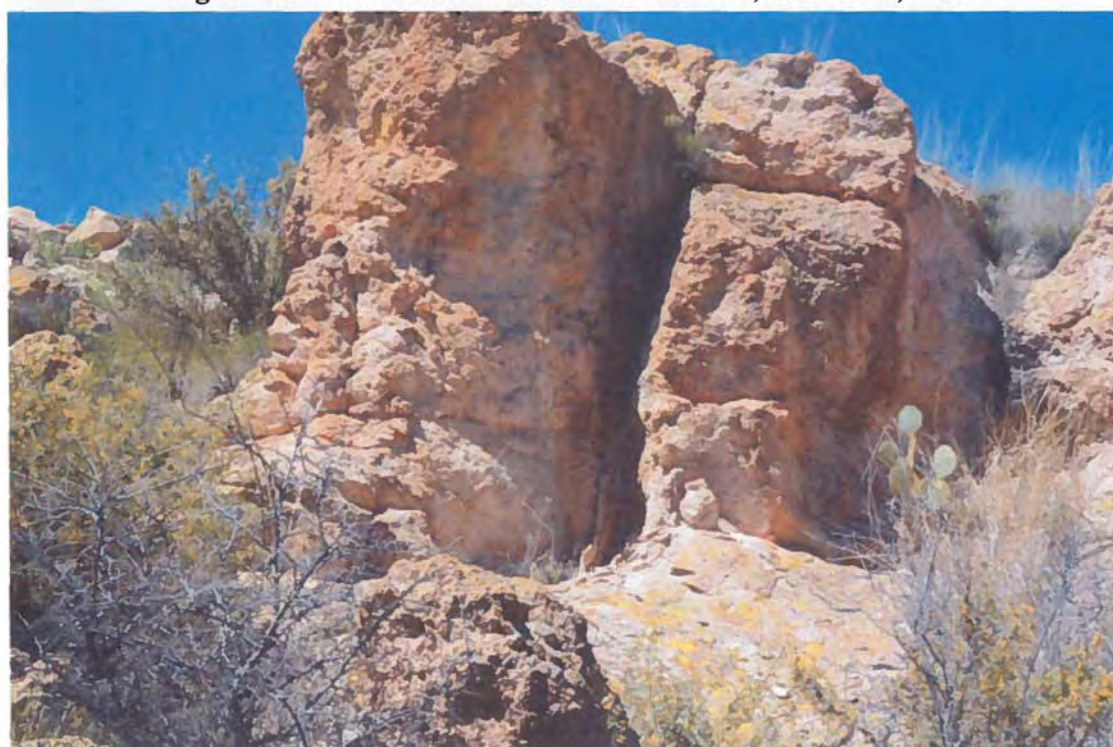


**Figure 19. Southern wash. UTM 345230E, 3811457N, 12S.**





**Figure 20. Southern wash. UTM 345230E, 3811457N, 12S.**



**Figure 21. Rock crevice in southern wash. UTM 345059E, 3811230N, 12S.**





**Figure 22. Cattle tank near southern wash. UTM 344776E, 3811342N, 12S.**

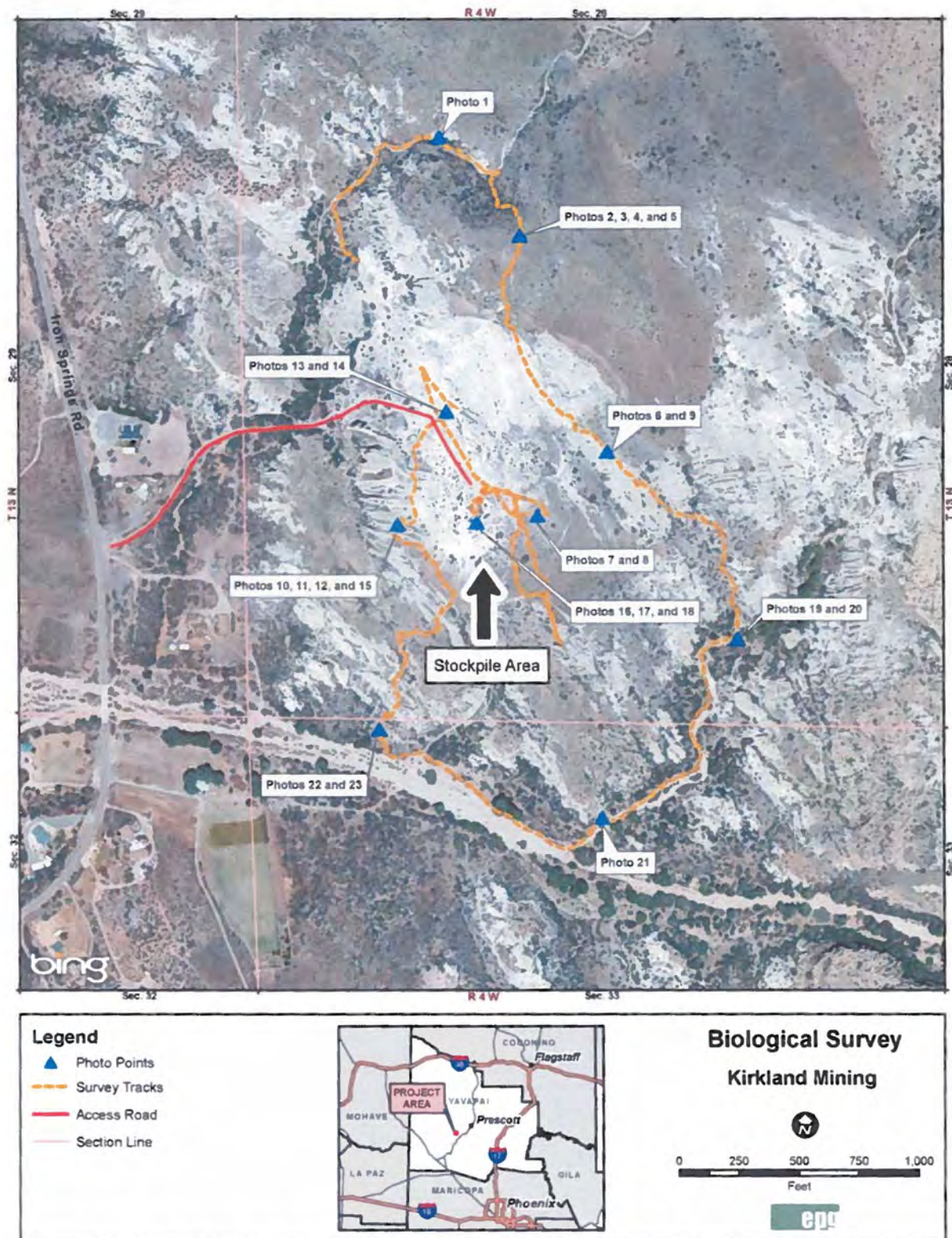


**Figure 23. Second view of Figure 31. UTM 344776E, 3811342N, 12S.**

## SUMMARY

The survey conducted revealed no sign of bats roosting in the Project area, although rock crevices are present within the rock formations. Each segment (northern wash, plateau, and southern wash) contains semidesert grassland, riparian, and chaparral vegetation communities. On the mine site and millings pile, a monoculture of Stansbery Cliffrose (with few other herbaceous plants) developed following the mine closure. No special-status species were observed during the survey. Table 2 provides lists of common plant species observed in the Project area.





**Figure 24. Map of Project area, photo points, and survey track.**



**Table 2. Common Plant Species Observed while Surveying for the Kirkland Mine Project**

<b>Common Name</b> <b>Scientific Name</b>	<b>Family</b>
Banana Yucca <i>Yucca baccata</i>	Agavaceae
Broom Snakeweed <i>Gutierrezia sarothrae</i>	Asteraceae
Button Brittlebush <i>Encelia frutescens</i>	Asteraceae
Brittlebush <i>Encelia farinosa</i>	Asteraceae
Desertbroom <i>Baccharis sarothroides</i>	Asteraceae
Spreading Fleabane <i>Erigeron divergens</i>	Asteraceae
Algerita <i>Mahonia trifoliata</i>	Berberidaceae
Combseed <i>Pectocarya</i> sp.	Boraginaceae
Cryptantha <i>Cryptantha</i> sp.	Boraginaceae
Mustard <i>Brassica</i> sp.	Brassicaceae
Pepperweed <i>Lepidium</i> sp.	Brassicaceae
Cactus Apple <i>Opuntia engelmannii</i>	Cactaceae
Christmas Cactus <i>Leptocaulis cylindropuntia</i>	Cactaceae
Kingcup Cactus <i>Echinocereus triglochidiatus</i>	Cactaceae
Crucifixion Thorn <i>Canotia holacantha</i>	Celastraceae
Prickly Russian Thistle <i>Salsola tragus</i>	Chenopodiaceae
Juniper <i>Juniperus</i> sp.	Cupressaceae
Alfalfa <i>Medicago</i> sp.	Fabaceae
Catclaw acacia <i>Acacia greggii</i>	Fabaceae
Catclaw Mimosa <i>Mimosa aculeaticarpa</i>	Fabaceae
Coues' Cassia <i>Senna covesii</i>	Fabaceae
Foothill Deervetch <i>Lotus humistratus</i>	Fabaceae
Lupine <i>Lupinus</i> sp.	Fabaceae

**Table 2. Common Plant Species Observed while Surveying for the Kirkland Mine Project**

<b>Common Name</b> <b>Scientific Name</b>	<b>Family</b>
Milkvetch <i>Astragalus</i> sp.	Fabaceae
Velvet Mesquite <i>Prosopis velutina</i>	Fabaceae
Whitethorn Acacia <i>Acacia constricta</i>	Fabaceae
Sonoran Scrub Oak <i>Quercus turbinella</i>	Fagaceae
Wright's Silktassel <i>Garrya wrightii</i>	Garryaceae
Redstem Stork's Bill <i>Erodium cicutarium</i>	Geraniaceae
Phacelia <i>Phacelia</i> sp.	Hydrophyllaceae
Bluedicks <i>Dichelostemma capitatum</i>	Liliaceae
Sacahuista <i>Nolina microcarpa</i>	Liliaceae
Desert Globemallow <i>Sphaeralcea ambigua</i>	Malvaceae
Stretchberry <i>Forestiera pubescens</i> var. <i>pubescens</i>	Oleaceae
Plantain <i>Plantago</i> sp.	Plantaginaceae
Blue Grama <i>Bouteloua gracilis</i>	Poaceae
Curly-Mesquite <i>Hilaria belangeri</i>	Poaceae
Low Woollygrass <i>Dasyochloa pulchella</i>	Poaceae
Mutton Bluegrass <i>Poa fendleriana</i>	Poaceae
Red Brome <i>Bromus rubens</i>	Poaceae
Threeawn <i>Aristida</i> sp.	Poaceae
Bastardsage <i>Eriogonum wrightii</i>	Polygonaceae
Buckwheat <i>Eriogonum</i> Sp.	Polygonaceae
Desert Trumpet <i>Eriogonum inflatum</i>	Polygonaceae
Dock <i>Rumex</i> Sp.	Polygonaceae
Desert Ceanothus <i>Ceanothus greggii</i>	Rhamnaceae
Hollyleaf Redberry <i>Rhamnus ilicifolia</i>	Rhamnaceae

Table 2. Common Plant Species Observed while Surveying for the Kirkland Mine Project	
Common Name <i>Scientific Name</i>	Family
Alderleaf Mountain Mahogany <i>Cercocarpus montanus</i>	Rosaceae
Stansbury Cliffrose <i>Purshia stansburiana</i>	Rosaceae
Fremont Cottonwood <i>Populus fremontii</i>	Salicaceae
Willow <i>Salix</i> sp.	Salicaceae
Florida Hopbush <i>Dodonaea viscosa</i>	Sapindaceae
Northwestern Indian Paintbrush <i>Castilleja angustifolia</i>	Scrophulariaceae
Nightshade <i>Solanum</i> sp.	Solanaceae
Southwestern Mock Vervain <i>Glandularia gooddingii</i>	Verbenaceae
Mistletoe <i>Phoradendron</i> sp.	Viscaceae

## REFERENCES

- Brown, D. E. 1982. Desert Plants: Biotic Communities of the American Southwest-United States and Mexico. The University of Arizona for Boyce Thompson Southwestern Arboretum, Superior, Arizona. 342 pp.

**APPENDIX D**  
**CULTURAL RESOURCES SURVEY**



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**STATE HISTORIC PRESERVATION OFFICE  
SURVEY REPORT SUMMARY FORM  
(SURVEY REPORT ABSTRACT)**

For detailed instructions on using this form see *SHPO Guidance for Use and Submittal of the Survey Report Summary Form (SHPO Guidance Point No. 10)*.

**I. REPORT TITLE (whether technical report or SRSF only submitted)**

**Report Title:** A Cultural Survey of 9.8 Acres for the Kirkland Mine near Wilhoit, Yavapai County, Arizona

**Report Author(s):** Christopher E. Rayle

**Date:** 6/24/2015    **Report No.:**    ☒ **Check if this submittal is SRSF for Negative Survey**

**II. AZSITE & SHPO INFORMATION**

**ASM Accession Number:** N/A    **AAA Permit No.:** N/A    **SHPO-20\_\_-\_\_** (if known)

**Project Locator UTM:** 344877 mE, 3811605 mN    **Zone:** 12 NAD 83

**USGS 7.5' Quadrangle Name:** Kirkland, Arizona

**III. CONSULTING FIRM INFORMATION**

**Organization/Consulting Firm:** Environmental Planning Group, LLC

**Internal Project Number:** Ninyo 0003

**Contact Name (Responsible Person\*):** Steve Swanson

**Address:** 4141 N. 32<sup>nd</sup> St., Suite 102, Phoenix, AZ 85018

**Phone:** 602-956-4370    **Email:** sswanson@epgaz.com

\*Responsible person – Preferably cultural resources manager/project director or principal investigator.

**IV. AGENCY/PROJECT INFORMATION**

**Lead Agency/Project Number:** Bureau of Land Management

**Agency Project Name/Number:**

**Route, Mileposts Limits (ADOT projects):**        /

**Nearest City/Town & County:** Wilhoit, Yavapai County

**Address (if appropriate, e.g., cell tower projects):**

**Project Sponsor:** Kirkland Mining Company

**Funding Source(s):** Private (Federal, State, and/or Private)

**Other Permitting/Land Agencies & Permit Numbers:** AZ-000558 (BLM)

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**ASLD Lease Application No.:** N/A

**V. PROJECT DESCRIPTION (What does the project entail? If known, describe the proposed ground-disturbing activities (both surface and subsurface), as well as the purpose of the survey):** Kirkland Mining proposes to make minor surface repairs to an existing access road on private land, trim or remove vegetation encroaching on the roadway on BLM land, perform overland travel around the millings stockpile, and use mechanized equipment to remove the stockpile for transportation offsite. There will be very little ground disturbance from vegetation removal along the existing access road. The survey area included approximately 9.8 acres.

**VI. AREA OF POTENTIAL EFFECTS (APE)/PROJECT AREA DESCRIPTION (provide dimensions, right-of-way or easement, etc. For FCC projects, describe both the physical footprint and the visual APE):** The Project area is approximately 8.1 acres and includes the total area subject to disturbance (roadway improvements, stockpile area, and additional disturbance adjacent to the stockpile area). The millings pile is approximately 2.6 acres, and additional disturbance associated with overland travel around the millings pile would be less than five acres. There will be very little ground disturbance from minor repairs and vegetation trimming along the existing access road. The roadway improvements are estimated to affect up to approximately 0.5 acres on private and BLM land.

**VII. PROJECT AREA INFORMATION**

**Total Acres:** 9.8      **NAD 83; Zone:** 12S; **Meridian:** Gila & Salt River Baseline and Meridian

**Justification for areas not surveyed (identify land jurisdiction):** N/A

**Project Location (expand as necessary).**

Land Jurisdiction	Legal Description (T, R, Q, S)	Acres Surveyed	Acres Not Surveyed
BLM	T13N, R4W, S28, SW¼	9.3	0
Private	T13N, R4W, S28, SW¼ and S29, SE¼	0.5	0

**VIII. INVENTORY CLASS COMPLETED**

**Note:** Previous survey within APE must meet current standards or new survey is required; see SHPO Guidance Point No. 5 for assistance in evaluating whether a survey older than 10 years needs is still adequate.

- ☐ Class I Inventory only      ☒ Class III Intensive Field Survey
- ☐ Other: Identify and provide justification:



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(SURVEY REPORT ABSTRACT)**

**IX. CLASS III SURVEY PERSONNEL AND METHODS**

**Field Personnel (Include Years of Archaeology Experience in Arizona; not necessary to repeat this in technical report)**

**Project Principal Investigator:** Steve Swanson, 21 years

**Project Director/Field Supervisor:** Cara Lonardo, 16 years

**Crew:** Cara Lonardo, 16 years

**Date(s) of Fieldwork:** 3/30/2015

**Methods & Area Surveyed:** Must meet minimal land management standards and adjust for field conditions.

Linear Miles; transect intervals          m apart    Coverage (%):

9.8 Acres Block Survey; transect intervals 15 m apart    Coverage (%): 100

**Site recording criteria used [e.g., ASM, other (identify)]:** ASM

**Ground Surface Visibility:** 70%

**Integrity of Survey Area Current condition; include disturbances, erosion, flooding, dense vegetation, etc.:** Survey area primarily consists of millings piles and waste rock that obscures the majority of the ground surface except for the south portion of the survey area and the access road.

**X. CULTURAL RESOURCES**

☒ **No cultural resources identified**

☐ **Isolated occurrences only          Number of IOs recorded:**

☐ **Archaeological sites present; site summary table attached**

**Number of Previously Recorded Sites:**

**Number of Newly Recorded Sites:**

**Number of Sites Not Re-located:**

☐ **Historic period buildings/structures etc. documented/evaluated; historic property inventory forms attached**

**Note:** Historic property (non-archaeological site) evaluations must be completed by qualified personnel (historian, architectural historian); please identify and include years of relevant experience:

**RECOMMENDATIONS**

**Discuss impacts to historic properties and proposed recommendations for avoidance and/or treatment. For FCC projects, separately discuss impacts to historic properties within the**

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**visual APE:** There are no historic properties within the survey area. The project will have no impacts to historic properties.

**Recommended Finding of Project Effect**

- ☒ **No Historic Properties Affected**  
☐ **No Adverse Effect**  
☐ **Adverse Effect**

**\*Final Draft Report Reviewed By (Consultant):**

Reviewer's Name	Title	Years Experience
Steve Swanson	Cultural Resources Director	21

**\*Not necessary to repeat this information in the technical report.**

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**CONSULTANT CERTIFICATION (Signature of Responsible Party, All Technical Report/SRSF submittals)**

I certify the information provided herein has been reviewed for content and accuracy and all work meets applicable agency standards.



**Signature**

**Date:** June 24, 2015

Cultural Resources Director, EPG

**Title**

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(Include remainder of document for use of SRSF for negative surveys)

**XI. RECORDS SEARCH**

- ☒ **AZSITE**      ☒ **NRHP database**      ☐ **Sanborn Fire Insurance Maps**  
☒ **SHPO Inventories and/or SHPO Library**      ☐ **ADOT Portal**  
☒ **GLO Maps (List file number and date):** 2969, 4/15/1872  
☒ **Land- Managing Agency Files (List all agencies):** BLM Land Status Records  
☐ **Tribal Cultural Resources Files (List all Tribes):**  
☐ **Local Government (LG) Websites/Historic Registers (List all LG's reviewed):**  
☒ **Other (e.g., historic maps, title plats, county plats, etc.) (List all reviewed):** Historic USGS Topographic Maps, recent and historical aerial imagery.

**XII. BACKGROUND RESEARCH RESULTS.** (Illustrate all results on 1:24,000 scale topographic map(s). AZSITE screen shots accepted but must include labels. Separate maps for projects and sites preferred, unless sparse data.)

**Previous Projects**

Reference Number	Author, Year	Report Title <sup>1</sup>
1988-64.ASM	Stone 1988	Cultural Resources Survey for a Proposed Land Use Area Between Kirkland and Skull Valley, Yavapai County, Arizona. Tempe, Arizona.
1996-264.ASM	Christenson 1996	Archaeological Survey of a Mining Lease on State Trust Lands near Kirkland, Yavapai County, Arizona.

<sup>1</sup>SHPO requires full citations only for those projects within the APE (direct and visual APE for FCC projects).



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**Previously Recorded Cultural Resources<sup>1</sup>**

<b>Site Number/ Property Name/ Address</b>	<b>Cultural/Temporal Affiliation</b>	<b>Site Type</b>	<b>Associated Reference (Author, Year)</b>
AZ N:3:32(ASM)	Euro-American/Historic	Santa Fe, Prescott, and Phoenix Railway Line	Indermill 1995
AZ N:10:6(ASM)	Euro-American/Historic	Trash scatter, tent platform and trail	Wright 1996
AZ N:10:2(BLM)	Unknown/Prehistoric	Artifact scatter	Stone 1986

These should all be outside the direct/visual APE; the only exception is a previously recorded site not re-located during the current survey.

**Please check one:**

- ☒ **No archaeological sites/cultural properties in current APE during previous survey.**
- ☐ **Previously recorded archaeological sites/cultural properties in APE not re-located during survey. Describe methods to re-locate:**

**XIII. CULTURAL & ENVIRONMENTAL CONTEXTS**

**Affiliated Culture Area (Prehistoric/Protohistoric/Historic):** Prescott Culture, Euro-American

**Land Form:** base of hills

**Elevation:** 4110 ft amsl

**Surrounding Topographic Features:** Kirkland Peak, Kirkland Valley, Skull Valley

**Nearest Drainage (Distance and Direction):** Skull Valley Wash, 0.2 miles west of project area

**Local Geology:** Central Highlands

**Vegetation:** Juniper, prickly pear, Indian paintbrush, grasses

**Soils/Deposition:** Granite and tuff outcrops, silty sand with cobbles and pebbles

**Potential for Buried Deposits with Justification:** Low potential due to thin sediments, bedrock very close to surface.

**IV. BUILT ENVIRONMENT (If applicable, provide brief description of built environment within and surrounding the APE; identify historic buildings/neighborhoods/districts):** N/A

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(Include remainder of document for use of SRSF for negative surveys)**

**Table of Isolated Occurrences<sup>1</sup>.**

<b>IO #</b>	<b>Cultural/Temporal Affiliation</b>	<b>Description<sup>2</sup></b>	<b>Location (UTM)</b>

**NOTES TO RECORDER**

<sup>1</sup>The IOs are recommended ineligible for inclusion in the A/NRHP (If not, you must provide a technical report).

<sup>2</sup> Include as appropriate - feature type, artifact class, artifact counts, diagnostic artifacts, AND aerial extent, if multiple finds are recorded as a single IO. Include dimensions for features, worked tools, etc.

---

**INADVERTENT DISCOVERIES - AGENCY/CONTRACTOR RESPONSIBILITIES REGARDING SURVEYS WITH NEGATIVE FINDINGS**

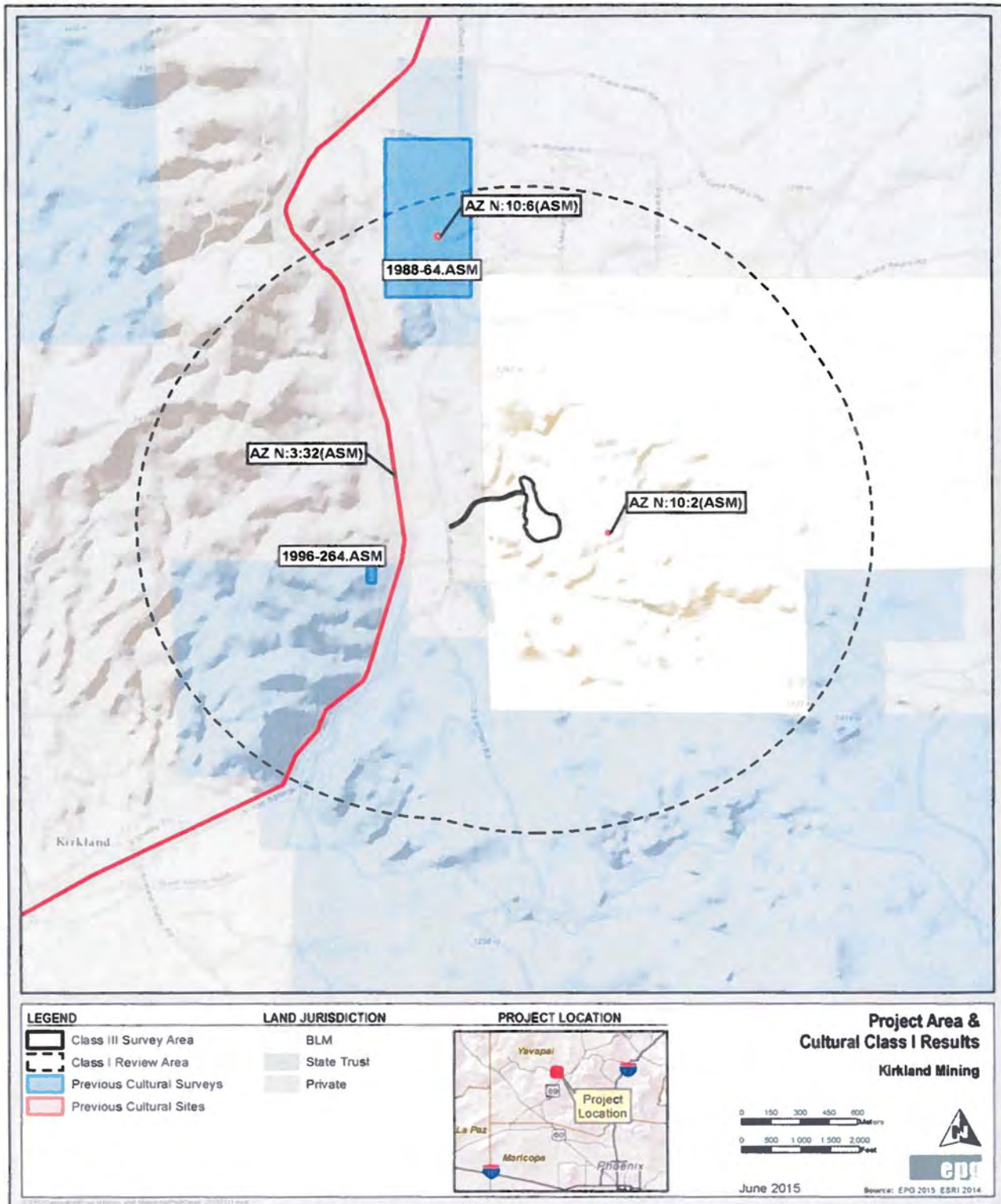
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In the event that previously unreported cultural resources are encountered during ground disturbing activities on federal land, all work must immediately cease within 30 meters (100 feet) until a qualified archaeologist has documented the discovery and evaluated its eligibility for the Arizona or National Register of Historic Places, as appropriate, in consultation with the lead agency, the Arizona State Museum (ASM), the SHPO, and Tribes, as appropriate. Human remains or funerary objects encountered will be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013). Work must not resume in this area without approval of the lead agency.

If human remains or funerary objects are encountered on private land during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the discovery. The Arizona State Museum, lead agency, SHPO, and appropriate Tribes must be notified of the discovery within 24 hours (following ASM and/or agency protocol). All discoveries will be treated in accordance with Arizona burial laws (A.R.S. § 41-844 and A.R.S. § 41-865), and work must not resume in this area without proper authorization.

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(Include remainder of document for use of SRSF for negative surveys)





**APPENDIX E**

**FIBERQUANT ANALYTICAL SERVICES REPORT**

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## **Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample**

**JobNumber:** 201506433

**Client:** KIRKLAND MINING COMPANY

3200 6TH AVENUE, STE 101A

SAN DIEGO, CA 92103-0000

Office Phone: (619) 846-4671

FAX:

**# Samples:** 18 **PLM Rec:** 6/16/2015 **Method:** EPA 600/R-93/116

The "New" Method; see below

**Client Job:**

**PO Number:**

**Report Date:** 6/22/2015

**Date Analyzed:** 6/22/2015

**Routing Number:** -

### **Method and Analysis Information: Fiberquant Internal SOP: PLMn**

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of  $\leq 1\%$  asbestos as "negative" and  $> 1\%$  asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantitation of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain  $\leq 1\%$  asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are  $\leq 1\%$ . The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but  $\leq 1\%$  as "borderline negative", and results where asbestos was  $> 1\%$  but  $\leq 2\%$  as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - In the summary a trace would be reported as  $\leq 1\%$ . The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the



estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

#### Job Analysis Notes:

#### PLM Analysis Summary:

Job Number: 201506433

Sample Number		Lab Number		Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results		
Sample #	<b>C-2</b>		2015-06433- 1	Cementitious	Positive Layer? No
Layer # 1	gray	concrete	no asbestos detected		
Sample #	<b>C-3</b>		2015-06433- 2	Cementitious	Positive Layer? No
Layer # 1	gray	concrete	no asbestos detected		
Sample #	<b>C-7 D</b>		2015-06433- 3	Soil	Positive Layer? No
Layer # 1	off-white	soil	no asbestos detected		
Sample #	<b>C-7 G</b>		2015-06433- 4	Soil	Positive Layer? No
Layer # 1	off-white	soil	no asbestos detected		
Sample #	<b>Home bulk-1</b>		2015-06433- 5	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-2</b>		2015-06433- 6	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-3</b>		2015-06433- 7	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-4</b>		2015-06433- 8	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-5</b>		2015-06433- 9	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-6</b>		2015-06433- 10	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home Stake-7</b>		2015-06433- 11	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>Home bulk-8</b>		2015-06433- 12	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-1A</b>		2015-06433- 13	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-4A</b>		2015-06433- 14	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-5A</b>		2015-06433- 15	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-6A</b>		2015-06433- 16	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-7</b>		2015-06433- 17	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		
Sample #	<b>CAP-bulk-8c</b>		2015-06433- 18	Cementitious	Positive Layer? No
Layer # 1	off-white	concrete	no asbestos detected		

\* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

## PLM Analysis Details

Job Number: 201506433

**Sample** C-2      **Lab Number** 2015-06433- 1      **Sampled:**      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	gray	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** C-3      **Lab Number** 2015-06433- 2      **Sampled:**      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	gray	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:				none						

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** C-7 D      **Lab Number** 2015-06433- 3      **Sampled:** 4/28/2015      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Soil      **Non-fibrous Solid**  
**Homogeneous** No      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** rock, powder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	soil	100	off-white	3	<=1%	-	-	-	-	-
Total %		100	Overall %		<=1%	-	-	-	-	-
Fiber Identification:					cellulose					

Fibers									Refractive Index Determinations				
		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid. Minor adhering wall materials, paint and/or texture, etc. were not analyzed.

## PLM Analysis Details

Job Number: 201506433

**Sample** C-7 G **Lab Number** 2015-06433- 4 **Sampled:** 4/28/2015 **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015 **An?** OK **Apparent Smp Type** Soil **Non-fibrous Solid**  
**Homogeneous** No **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** rock, powder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	soil	100	off-white	3	<=1%	-	-	-	-	-
Total %		100	Overall %		<=1%	-	-	-	-	-
Fiber Identification:					cellulose					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid. Minor adhering wall materials, paint and/or texture, etc. were not analyzed.

**Sample** Home bulk-1 **Lab Number** 2015-06433- 5 **Sampled:** **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015 **An?** OK **Apparent Smp Type** Cementitious **Non-fibrous Solid**  
**Homogeneous** Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers										Refractive Index Determinations				
		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none													
2														
3														
4														
5														
6														

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** Home bulk-2 **Lab Number** 2015-06433- 6 **Sampled:** **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015 **An?** OK **Apparent Smp Type** Cementitious **Non-fibrous Solid**  
**Homogeneous** Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers										Refractive Index Determinations				
		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none													
2														
3														
4														
5														
6														

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

## PLM Analysis Details

Job Number: 201506433

**Sample** Home bulk-3      **Lab Number** 2015-06433- 7      **Sampled:** 4/28/2015      **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers									Refractive Index Determinations				
		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** Home bulk-4      **Lab Number** 2015-06433- 8      **Sampled:** 4/28/2015      **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers									Refractive Index Determinations				
		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** Home bulk-5      **Lab Number** 2015-06433- 9      **Sampled:** 4/28/2015      **Condition:** acceptable  
**Analyzed By** RAM 6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.



## PLM Analysis Details

Job Number: 201506433

**Sample** Home bulk-6      **Lab Number** 2015-06433- 10      **Sampled:** 4/28/2015      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** Home Stake-7      **Lab Number** 2015-06433- 11      **Sampled:**      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** Home bulk-8      **Lab Number** 2015-06433- 12      **Sampled:**      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

## PLM Analysis Details

Job Number: 201506433

**Sample** CAP-bulk-1A      **Lab Number** 2015-06433- 13      **Sampled:** 2/18/2015      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
1	none								Oil	Col Par	Col Per	RI Par	RI Per
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** CAP-bulk-4A      **Lab Number** 2015-06433- 14      **Sampled:** 2/19/2015      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

**Sample** CAP-bulk-5A      **Lab Number** 2015-06433- 15      **Sampled:** 2/19/2015      **Condition:** acceptable  
**Analyzed By** RAM    6/22/2015      **An?** OK      **Apparent Smp Type** Cementitious      **Non-fibrous Solid**  
**Homogeneous** Yes      **# Layers** 1      **Pos Layer?** No      **# Sub-Samples** 3  
**Non-Fibrous Components (in approx. decreasing order):** powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

## PLM Analysis Details

Job Number: 201506433

Sample CAP-bulk-6A Lab Number 2015-06433- 16 Sampled: 2/19/2015 Condition: acceptable  
Analyzed By RAM 6/22/2015 An? OK Apparent Smp Type Cementitious Non-fibrous Solid  
Homogeneous Yes # Layers 1 Pos Layer? No # Sub-Samples 3  
Non-Fibrous Components (in approx. decreasing order): powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

Sample CAP-bulk-7 Lab Number 2015-06433- 17 Sampled: 2/19/2015 Condition: acceptable  
Analyzed By RAM 6/22/2015 An? OK Apparent Smp Type Cementitious Non-fibrous Solid  
Homogeneous Yes # Layers 1 Pos Layer? No # Sub-Samples 3  
Non-Fibrous Components (in approx. decreasing order): powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

Sample CAP-bulk-8c Lab Number 2015-06433- 18 Sampled: Condition: acceptable  
Analyzed By RAM 6/22/2015 An? OK Apparent Smp Type Cementitious Non-fibrous Solid  
Homogeneous Yes # Layers 1 Pos Layer? No # Sub-Samples 3  
Non-Fibrous Components (in approx. decreasing order): powder, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	concrete	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers		Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations				
									Oil	Col Par	Col Per	RI Par	RI Per
1	none												
2													
3													
4													
5													
6													

## Sample Analytical Note

Procedure: tweased apart using forceps. Procedure: dissolution of matrix using dilute HCl acid.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable

Colors: B=black; BL=blue; BR=brown; CL=clear; G=Green; GY=gray; OR=orange; OW=off-white; PN=pink; PU=purple; R=red; TN=tan; W=white; Y=yellow; V=various

Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;

D=fine to coarse fibers, CL-B, brittle; E=coarse fibers, CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper

Iso=Isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; BI=birefringence - may be None, Low, Medium or High

Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining

Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow;

vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.

RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: ROBERT A. McCORMICK

Printed: 22-Jun-15

Original Print Date: 22-Jun-15



Larry S. Pierce, Approved Accreditation Signatory



# FIBERQUANT

ANALYTICAL SERVICES

Mike Bruen

Fiberquant Analytical Services 5025 S. 33rd St.  
Phoenix, AZ 85040; Phone: 602 276-6139; FAX: 602 276-4558;  
info@fiberquant.com

## Analysis Request/Chain-of-Custody Form

Submitted by (Company)		Kirkland Mining Company	
Address		3200 4th Ave Ste. 101A	
City, State, Zip Code		San Diego CA. 92103	
Phone	619-846-4671	FAX	
Email	aveta@kirklandmining.com		
Invoice to (Company)		Kirkland Mining Company	
Address			
City, State, Zip Code			
Phone		FAX	
Contact (print) Areta Zouvas			
Sampled by (signature)			
Job Number or Project Name			
PO Number			

<Analysis Method Requested> ONLY ONE METHOD per COC			Turn-around-time (circle one)			
			Rush	Norm	Ext.	
Asbestos by PLM	Method >	Improved Interim	Urgent Rush <3 hrs	<6 hrs	1-3 days	15- 30 days
	Analyze >	All ATPF				
	If ATPF then >	by Layer by Sample				
Single Layer Protocol >			Yes No			
Fibers by PCM	Method >	7400 (Area) ORM (Personal)	<4 hrs	24 hrs	-	
Asbestos by TEM	In Air >	AHERA Mod. AHERA	<6 hrs	24 hrs	3-5 days	
	In Water* >	Water Sludge	1-2 days	3-5 days	N/A	
	In Bulk (Annex2) >	Chatfield Full Quant.				
	In Dust >	ASTM D5755	3-5 days	5-10 days	N/A	
Pb by FLAA	Analyte >	Pb Other				
	Filter >	MCE FG				
	Matrix >	Paint > by Area (mg/cm <sup>2</sup> ) by Weight (ppm)				
	Soil >					
	Wipe >					
Initial here certifying wipes used are ASTM E1792 compliant			<6 hrs	2-3 days	N/A	
Fungi	Air Sample >	Zefon Aller Other				
	Bulk >	Sample Swab	<6 hrs	1-2 days	N/A	
	Tape Lift >	Qualitative (% & type) Quantitative (type/cm <sup>2</sup> )				
Soot	ASTM D6602-03b	Optical	<6 hrs	1-2 days	N/A	
		Optical & TEM	1-2 days	3-5 days	N/A	
Other			Call	Call		

Sample # (1 per line)	Description/Location	Sample Date	Sample Time	Vol. or Area
1) C-2				
2) C-3				
3) C-7 D	Stockpile Samples	4/28/15		
4) C-7 G	Stockpile Samples	4/28/15		
5) Home bulk - 1				
6) Home bulk - 2				
7) Home bulk - 3		4/28/15		
8) Home bulk - 4		4/28/15		
9) Home bulk - 5		4/28/15		
10) Home bulk - 6		4/28/15		
11) Home STAKE - 7				
12) Home bulk - 8				
13) CAP - bulk - 1A		2/18/15		
14) CAP - bulk - 4a		2/19/15		
15) CAP - bulk - 5a		2/19/15		
16) CAP - bulk - 6a		2/19/15		
17) CAP - bulk - 7		2/19/15		
18) CAP - bulk - 8c				
19)				
20)				

\*Called Areta for Method / AT per MAB PLM - 1-3 days.

1) Relinquished by:	AKASH DAKHANE	Date:	6/16/15	Time:	11:11 am	3) Relinquished by:		Date:		Time:	
2) Received by:		Date:	6/16/15	Time:	11:11 am	4) Received by:		Date:		Time:	
* TEM W/ater: Sampler's name Required by State of Arizona		Print Name		Fiberquant assigned Job Number>		201506433					
Review of Analysis Request (Initials):						EJC					

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

**APPENDIX F**

**RECLAMATION COST ESTIMATE**

## APPENDIX F - RECLAMATION COST ESTIMATE

Note: Input on costs was obtained primarily from the 2015 BLM Reclamation Bond Calculation Spreadsheet.

**Reclamation Scope.** The KMC stockpile area will be reclaimed to provide a safe and stable post-excavation surface suitable for recreation and livestock grazing.

In general, reclamation would include the following steps:

- Removal of equipment, trash and debris
- Spreading salvaged growth medium and chipped vegetation on the disturbed area;
- Seeding the disturbed area;
- Monitoring and maintenance of vegetation and drainage controls.

### Cost Calculations:

**Removal of equipment, trash and debris.** Contractor's equipment will be used on the BLM land. This equipment will be removed at the end of every shift and will be parked on KMC's private parcel for safety and security. This being the case, there will be no equipment to remove.

Trash and debris will be removed regularly by KMC and/or its contractor. It is possible that some trash might be present at the end of the operation. For this estimate it is assumed that one cubic yard of trash might have to be removed and hauled to the transfer station near Skull Valley. The haul distance is approximately eight miles and the transfer fee is \$24 per cubic yard.

Assume two local men and a pick-up truck, two round trips to the transfer station. Approx. time to load and haul trash, 4 hours. Labor cost (Davis Bacon) \$18.33/ man hr. Pick-up truck rental, one day at \$50.

2 men x 4 hrs x \$18.33 =	\$147
Pick-up truck	50
Transfer fee	24
	\$221

### Spreading growth medium and chipped vegetation on the disturbed area.

Assuming that the growth medium stripped from the stockpile averages one foot deep, the growth medium to be spread would be:

2.6 acres x 45,560 sq ft/acre x 1 ft deep/27 cu ft per cu yd =	4195 cu yd
Estimated volume of wood chips, 2.6 acres x 50 cu yd /acre =	130 cu yd
Total	4325 cu yd

Assume one D6 dozer is used to spread the growth medium and wood chips. The average width of the stockpile area is about 250 feet. The average push for the dozer would be about 150 feet.

D6 (SU blade) raw production with a 150 ft push is 400 loose cubic yards (lcy) per hour.  
Average operator factor = 0.75  
Loose stockpiled material factor = 1.20



50 minute hour factor = 0.83

Grade (variable + and -) factor = 1.00

D6 corrected production =  $400 \times 0.75 \times 1.20 \times 0.83 \times 1.00 = 300$  lcy per hour.

Operating hours for spreading =  $4325 \text{ lcy} / 300 \text{ lcy/hr} = 14.4$  hrs.

Assume same D6 is used to recontour the 1500 ft roadway.

D6 can recontour 2000 ft of 30 ft wide roadway per hour, so dozer time =  $1500/2000 = 0.75$  hours.

Total D6 time

Spreading 14.4 hrs + recontouring 0.75 hrs = 15.15 hours, say 16 hours to allow for move.

Total D6 cost

Distance to Empire Equipment Rental, Prescott, about 38 miles. Equipment mobilization time approx. 2 hrs each way (4 hrs each round trip).

Total rental time =  $16 + 4 = 20$  hrs = say three days rental. Weekly rate is less than three days so rental cost including tax and equipment protection plan is = \$4156

Operating time = 16 hrs.

Operator rate (Davis Bacon) =  $\$36.03/\text{hr} \times 16 \text{ hrs} = 576$

D6 operating cost =  $\$28.16/\text{hr} \times 16 \text{ hrs} = 451$

Dozer transport  $\$125/\text{hr} \times 8 \text{ hrs} = 1000$

D6 Total \$6183

#### Seeding the disturbed area

Disturbed area = stockpile, 2.6 acres + road, ~1 acre = 3.6 acres

Seed mix, 15 lbs/acre x 3.6 acres @  $\$213/\text{acre} = 767$

Hand broadcasting, 1 acre per hour, labor  $18.33/\text{hr} \times 3.6 \text{ acres} = \$66$

Seeding total \$833

#### Monitoring and maintenance of vegetation and drainage controls.

Allow for one site visit and minor reseeding = \$1000

#### Total reclamation cost.

Removal of equipment, trash & debris \$ 221

Spreading growth medium and wood chips 6183

Seeding 833

Monitoring 1000

\$8237

Contractor admin costs and profit (20%) 1647

Contract total \$9884

BLM contract management fee (17.1%) 1690

BLM indirect costs (21% of contract management fee) 355

Total \$11,929



For comparison, the BLM Reclamation Bond Calculation Spreadsheet gives a total reclamation cost of \$11,027.