Letter of Transmittal

To: BLM Staff

From: ASK Haz Waste

Date: January 26, 2015

Re: Work Plan Draft

BLM Staff,

Please find attached ASK Haz Wastes draft Work Plan regarding the Sonoran Desert National Monument Project. This draft is being submitted for your comment and will be revised ASAP for final draft approval.

Signed,

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Rough Draft Preliminary Assessment and Focused Site Inspection Work Plan

Sonoran Desert National Monument
Maricopa County, Arizona

Prepared for:
Bureau of Land Management

December 2014

ASK Haz Waste
Flagstaff, Arizona 86001

Bureau of Land Management

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December 2014

Project No. 1

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List of Acronyms

BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
PA/SI	Preliminary Assessment and Site Inspection
QA/QC	Quality Assurance / Quality Control
SAP	Sampling and Analysis Plan
XRF	X-Ray Fluorescence

Executive Summary

This Preliminary Assessment & Site Inspection (PA/SI) Work Plan has been created for the Bureu of Land Management (BLM), with regards to the Sonoran Desert National Monument (SDNM) Recreational Shooting Site Project (RSSP). This joint project between Northern Arizona University (NAU) and the BLM is an educational exercise, as well as an opportunity for the BLM to have areas of interest analyzed for risks associated with contamination.

This Work Plan outlines procedures and gives guidance regarding the PA/SI and includes:

- Project objectives & description;
- Scope of work;
- Project management;
- Background information;
- Investigation approach;
- Methodology of investigation, wastes produced by investigation, management of derived wastes, sample collection, sample/data analysis, and deviations from Work Plan;
- Section descriptions of the PA/SI report; and
- Work Plan schedule.

1.0 Introduction

This Work Plan has been written by ASK Haz Waste for the SDNM RSSP. This collaborative project between Northern Arizona University (NAU) and the Bureau of Land Management (BLM) will create a PA/SI document, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Therefore, in accordance with CERCLA, the following Work Plan has been created.

1.1 Project Objectives

The SDMN RSSP is to provide the BLM with documentation regarding a PA/SI conducted by ASK Haz Waste. This PA/SI deals with contamination caused by gunshot residue (GSR) and other hazards associated with informal recreational shooting. By conducting this study, ASK Haz Waste aims to inform the BLM as to the magnitude and extent of contamination within the area of study. The primary Contaminant of Concern (CoC) is lead. Reason being, this CoC is a regulatory driver and is found in relatively higher concentrations in the chemical make-up of a bullet, as opposed to antimony, arsenic, copper, tin, and zinc. However, the BLM has expressed interest in knowing, in addition to lead, what other metals are found in the areas of concern.

1.2 Project Scope

The scope of services for this project include:

- Preparation of site inspection plans (Combined Work Plan);
- Site inspection (to achieve objectives described above);
- PA/SI documentation.

1.3 Work Plan Structure

This Work Plan contains the following sections and appendices:

Section 1.0: Introduction
Section 2.0: Project Management Approach
Section 3.0: Site Background Information
Section 4.0: Investigative Approach
Section 5.0: Field Investigation Methods and Procedures
Section 6.0: Investigative-Derived Waste Management
Section 7.0: Sample Collection Procedures and Analysis
Section 8.0: Deviations from the Work Plan
Section 9.0: PA/FSI Reporting
Section 10.0: Project Schedule and Deliverables
Section 11.0: References
Appendix A: Health and Safety Plan
Appendix B: Sampling and Analysis Plan
Appendix C: Master Schedule

2.0 Project Management Approach

The following section describes the project management organization, project procedures, quality management, and subcontract management associated with the project.

2.1 Project Management Organization

As mentioned in the previous section, this project is a collaboration between NAU and the BLM. As such, the project has two main leads for each organization.

BLM organization is headed by BLM Contracting Officer Representative (COR), Dr. Bill Harris, PE, Chief Engineering Services. Dr. Harris is responsible for the general direction of the project. He will provide final review and approval of documents; specifically the PA/SI Report submitted by ASK Haz Waste. In addition, Dr. Harris will coordinate major project aspects with the NAU Technical Advisor Dr. Bridget Bero, PE.

The BLM Project Manager is Mr. Matt Plis, Abandoned Mines & Hazmat Coordinator. Matt is to provide document review, and act as the BLMs main contact for ASK Haz Waste.

NAU organization is headed by the Technical Advisor Dr. Bridget Bero PE. Dr. Bero is tasked with: coordinating general project logistics and fieldwork with the BLM, technical advisement, and document review.

ASK Haz Waste consists of NAU undergraduate students, Kamran Khan, Shane Klotzman, and Abdullah Ashkanani. Kamran Khan will act as ASK Haz Waste's project lead. This position's responsibilities consist of correspondence between ASK Haz Waste, the NAU Technical Advisor and the BLM Project Manager. The roles of Project Engineer and Lab Technician are to be held by all three students throughout the project. Further details of these positions are included in section 2.4.

2.2 Project Procedures

Due to being the prime contractor, ASK Haz Waste is responsible for staffing the project. Fieldwork required for the project is to be overseen by the projects technical advisor Dr. Bero, and a BLM liaison. The BLM liaison is to be provided by the BLM Project Manager, who will give ASK Haz Waste access to the site. This fieldwork is to be conducted per the SAP (Appendix B) and the Health & Safety Plan (Appendix A), which will be familiar to all individuals engaging in fieldwork.

2.3 Quality Management

The entirety of fieldwork is to be conducted as detailed in the SAP document (Appendix B). This document outlines QA/QC requirements that promote the usability of data collected, thereby ensuring the success of the project. Before entering the field, and to ensure quality, all individuals partaking in fieldwork are to be well aware of their responsibilities and QA/QC objectives.

2.4 Subcontract Management

ASK Haz Waste will coordinate all subcontracted work required to complete the project. The scope of contracted work is limited to a wet chemistry analysis, conducted by the NAU Lab. ASK Haz Waste will prepare samples for analysis and assist with conducting the wet chemistry analysis in partnership with the NAU Lab. This will reduce costs by roughly 75% and maximize the educational experience. This work will be completed by the ASK Haz Waste Laboratory Technician, which is not specified to any one team member, but will be filled by all staff intermittently through out the scheduled lab work.

3.0 Site Background Information

Below, the location, description, and previous work regarding the project are discussed.

3.1 Site Location

The entire project is located within the Arizona BLM Phoenix District. The sites are located in Sections 9, 10, and 15 of Township 3S and Range 2W Gila-Salt River Meridian. These 15 sites are located along the northern boarder of the park, and found roughly 8 miles east of the Arizona State Route 85 Landfill.

3.2 Site Description

The collection of sites the SDNM RSSP encompasses includes 11.2 acres of BLM land. These sites range from .1 to 2 acres, and are located south of W. Komatke Road and north of a range of hills that runs along the northern edge of the park. This layout creates a topography that slopes from south to north towards W Komatke Rd. A large unnamed wash runs north and south roughly three quarters of a mile from the most eastern site. Infrastructure close to the site includes an underground natural gas pipeline north of the sites, and structures associated with power lines that run along W Komatke Road.

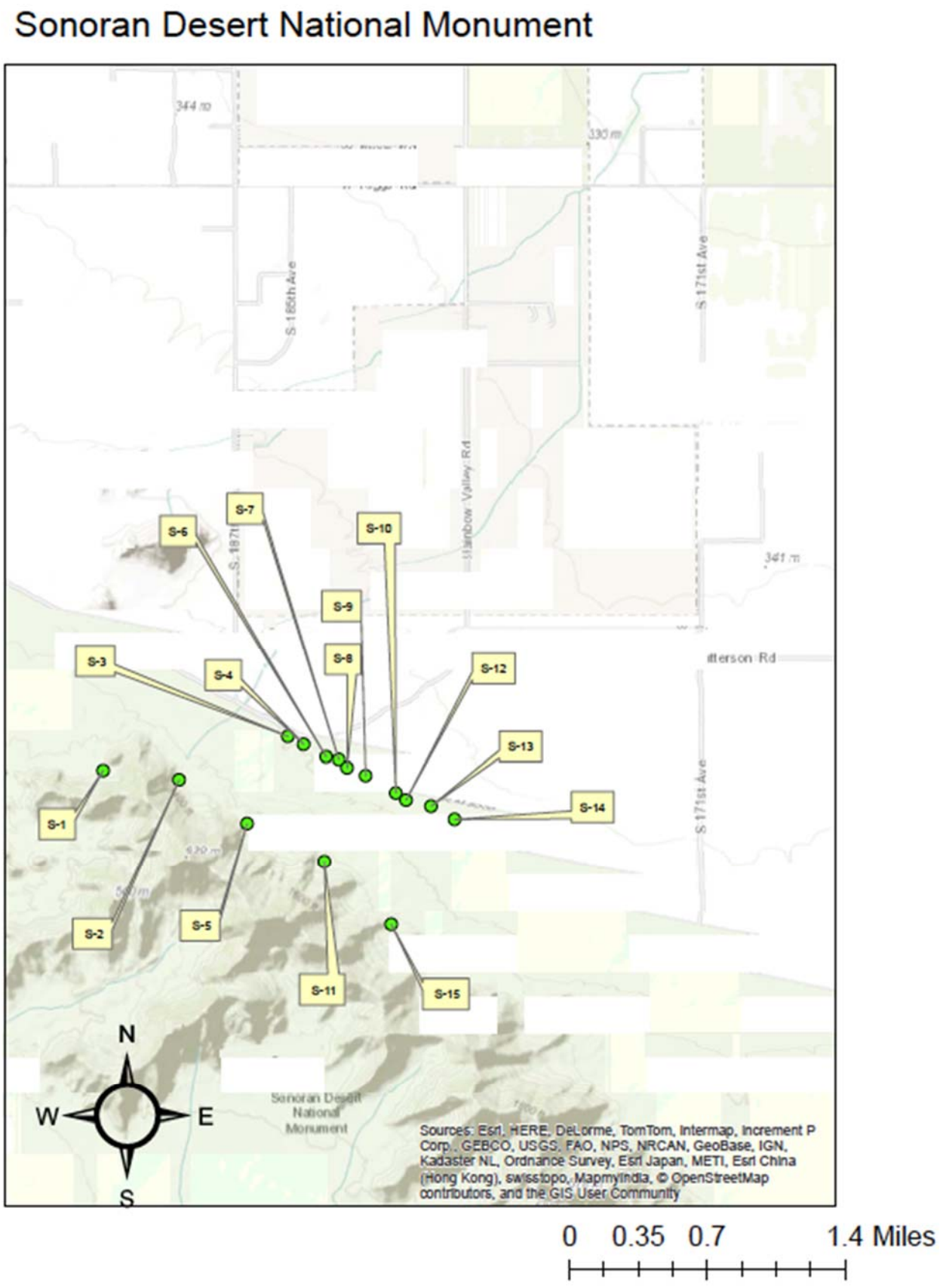


Figure 3.2: Site Locations

3.3 Previous Operations and Investigations

Currently no investigation regarding the 15 sites mentioned above has been conducted. However, In spring of 2012 a SDNM Recreational Target Shooting Analysis, an appendix of the approved resource management plan (ARMP), was published by the BLM which addressed the suitability of recreational target shooting in the park. The analysis performed consisted of two criteria for determining the suitability of sites. The significant presence of monument objects or high natural resource sensitivity, which included but was not limited to: high diversity of vegetation, known desert tortoise burrowing sites in area, raptor nesting sites in the area, and cultural resources. The second criteria was the presence of suitable terrain for shooting, which was defined as existing natural backstops or berms as well as other numerical criteria (distances from varying facilities). Using these criteria, the conclusion was reached that two areas were highly suitable for recreational shooting. These sites were titled Gap Tank and Hidden Valley (Figure 3.3).

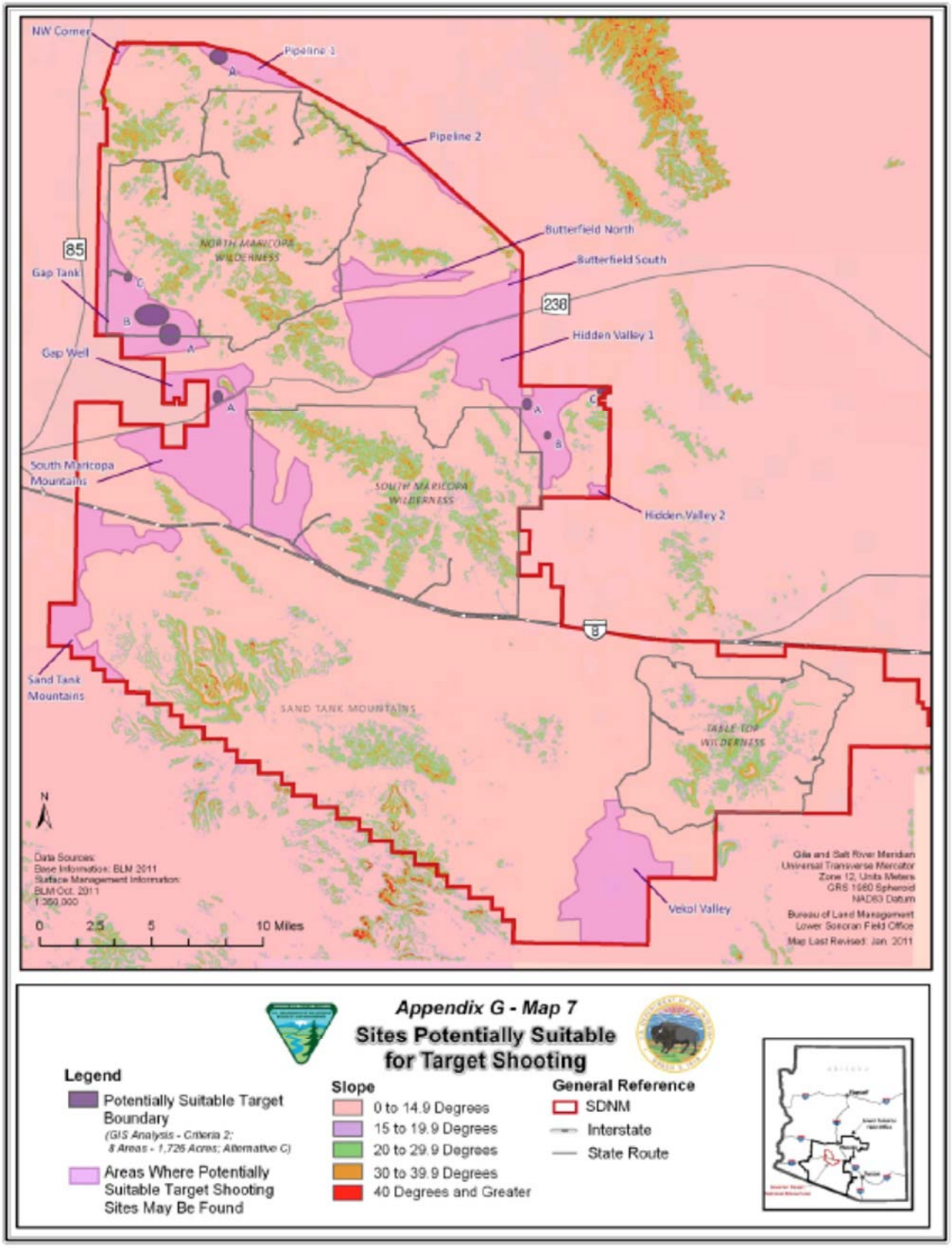


Figure 3.3: Previous Investigation Ideal Shooting Sites

4.0 Investigative Approach

This section describes the site investigation objectives and site investigation general approach within the PA/SI.

4.1 Site Investigation Objective

The goal of the PA/SI is to determine the level of contamination at the 15 sites of interest as well as to determine the extent of transport that may be occurring and what exposure pathways may present excess risk.

4.2 Site Investigation General Approach

ASK Haz Waste's plan for site investigation includes the collection of real-time XRF data for analysis of the contaminants of concern. In addition, soil samples are to be taken in order to correlate XRF data with lab data. Fieldwork will be comprised of:

- Collecting soil samples relating to an overlaying grid
- Gathering samples at hotspots, as located by the XRF analyzer
- Soil samples will be gathered for metals screening with a portable XRF analyzer
- Sample locations will be recorded with a global positioning system receiver
- A photo log of field activities will be taken as described in the SAPS-section 7

The method of the investigation is presented in more detail in the sampling and analysis plan (Appendix B).

5.0 Field Investigation Methods and Procedures

Field investigation methods and procedures are detailed in the SAP Section 4 and includes:

- Team briefing to review the purpose and objectives, an provide final clarification of PA/SI investigation details
- Description of field equipment and calibration of applicable instruments
- Surface soil sample collection, preparation, and field screening methods
- Soil sample location and identification and measurement
- Equipment decontamination procedures

6.0 Investigative-Derived Waste Management

Decontamination procedures will produce waste in the form of water from equipment wash runoff. Solid waste will also be generated during the investigation in the form of soil samples. A discussion on how to handle these wastes is included in the SAP section 5 and detail:

- Disposal of water
- Disposal of solid waste
- Sampling site restoration procedures

7.0 Sample Collection Procedures and Analysis

Data will be collected from both the XRF instrument in the field and grab samples, which are to be analyzed by the NAU lab. The purpose of the grab samples is to determine the quality of the data gathered in the field with the XRF instrument. More detailed descriptions of sample collection procedures can be found in Appendix B.

7.1 Sample Containers, Preservation, and Storage

Sample containers, preservation, and storage is outlined in the SAP Section 6 and includes:

- Description of soil sample containers
- Description of sample preservation methods
- Sample holding times

7.2 Sample Documentation and Shipment

Sample documentation and shipment protocol is out lined in the provided SAP Section 7 and includes:

- Field notes, logs, and photographs
- Sampling labeling
- Chain-of-custody procedures
- Sample custody transfer and shipment

7.3 Field Quality Assurance/Quality Control

In order to ensure the quality of samples collected in the field XRF data is to be correlated with samples collected in the field.

- Assessment of field preservation
- Assessment of field variability (field duplicates)
- Background sampling
- Correlation of XRF field screening and laboratory results
- Data validation

8.0 Deviations from the Work Plan

The procedures within this work plan are set up to avoid problems and provide good results. All team members are responsible for making sure any problems found are reported and dealt with appropriately. If any problem is found in the field it will be dealt with immediately. Any problems within the field will be documented in the field log book. If any major problems are found that may prevent sampling are discovered they will be reported to the BLM immediately. A written report of the problem as well as the solution taken and the effectiveness of the solution. This will help with data evaluation in the future.

If no solution is found for a problem without damaging the samples taken BLM will be notified promptly. If undesirable site conditions are encountered the BLM will be notified. At a minimum site conditions will be reported in the field log. If any changes to the work plan happen at the site they will be evaluated for impact to sampling quality and will be documented. From this corrective measure will be taken to ensure that there is not differing from the work plan.

9.0 PA/FSI Reporting

Following completion of the site investigation, a draft PA/SI report will be prepared and submitted for the BLM's review. The PA/SI will contain the following:

- Executive Summary
- Introduction
- Site Background
- Field Activates and Analytical Protocol
- Quality Assurance / Quality Control
- Migration / Exposure Pathways and Targets
- Conclusions
- Recommendations

The PA/SI will also contain any relevant data. Following comments from the BLM a Final PA/SI will be submitted.

10.0 Project Schedule and Deliverables

A schedule for the project is illustrated in the form of a Gantt chart (Appendix C). The Gantt chart will include the start and end dates of the milestones and tasks. There are five main tasks, which the successful completion of the project depends on. The critical paths for this project (shown in blue) includes the completion of the work plan, which encompasses the health and safety plan, sampling and analysis plan, sample testing and analysis, and the PA/SI. The schedule will be updated monthly to show progress and will be submitted to the BLM PM with the scheduled monthly progress report deliverables.

Table 10.1 Anticipated Implementation Schedule

Task	Date
Draft Planning Documents (Task 3)	January 21, 2015
Final Planning Documents (Task 3)	January 21, 2015
Field Activities (Task 4)	March 6, 2015
Draft PA/SI Report (Task 5.1, 5.2)	April 6, 2015
Final PA/SI Report (Task 5.5)	May 1, 2015

11.0 References

Figure 3.3. Appendix G. Sonoran Desert National Monument Recreational Target Shooting Analysis (n.d.): n. pag. Lower Sonoran/sdnm Draft, and 1183. *Blm.gov*. Web.

Appendix A Health and Safety Plan

LEVEL 2 NON-INTRUSIVE WARN
HEALTH AND SAFETY PLAN
GMS Project #

This HASP is intended to provide health and safety guidelines for project field work meeting the following criteria:

- Short-duration work not exceeding 30 consecutive days without approval
- "Buddy System" in use
- Some likelihood of chemical and/or physical hazard exposure
- Limited number of job tasks (5 or less)
- No confined space entry or supplied-air respirator use
- Limited number of subcontractors involved (2 or less)

Administrative Information This document is valid for a maximum time period of one year after initial completion. A minimum of two persons with appropriate training and medical surveillance must be onsite. A mix of ERM and other personnel can satisfy this requirement.	Site Name and Location Sonoran Desert National Monument, Arizona	
	Client Contact and Phone BLM - Bill Harris 602-417-9348/cell 480-650-1262 or Matt Plis 623-580-5518/cell 602-478-5332	
	Project Name Sonoran Desert National Monument Recreational Shooting Site Project	
	Health & Safety Plan Date 1-13-2015	Revision Number and Date
	Field Work Start Date 1-30-2015	Anticipated Field Work End Date
	Project Manager (responsible for implementing site health and safety program on this project) Matt Plis	Partner In Charge (responsible for overall site health and safety performance on this project) Matt Plis
H&S Team Review	Review Date:	Signature

Project Background and Scope of Work Include bullet list of tasks to be completed by ASK Haz Waste personnel during this project, and a separate list of tasks to be completed by any subcontractors at the site.	• Field Investigation (Data & Sample Collection) • Sample & Data Analysis • Documentation
Site/Project General Information An asterisk (*) indicates that a completed Risk Assessment checklist must be completed and attached to this document.	Site Type (check all applicable boxes) ☐ Active Facility* ☐ Remote Facility* ☐ Inactive Facility* ☐ Inactive Facility* ☐ Mine ☐ Railroad ☐ Industrial ☐ Residential ☐ Secured ☒ Uncontrolled ☐ Chemical Mixing** ☐ Other (specify)

A double asterisk (**) indicates that a Risk Review must take place prior to beginning fieldwork on the project.

Main Site Hazards (check all applicable boxes)

☐ Heat Stress	☐ Cold Stress	☐ Explosion/Fire	☐ Oxygen Deficiency
☐ Biological	☐ Organic Chemicals	☒ Inorganic Chemicals	☐ Heavy Equipment in Use
☐ Compressed Gas	☐ Asbestos	☐ High Noise	☐ Respirable Particles
☐ Work Over 6' High	☐ Extreme Weather	☐ Hand/Portable Power Tools	☐ Non-Ionizing Radiation
☐ Blasting Agents	☐ Confined Spaces	☐ ASTs/USTs	☐ Buried/Overhead Utilities
☒ Slip/Trip/Fall	☐ Forklift Use	☐ Manlift/Cherry Picker Use	☐ Heavy Equipment Use
☐ Scaffold Use	☐ Portable Ladders	☐ Welding or Hot Work	☐ Construction
☐ Excavations	☐ Extreme Weather	☐ Hand/Portable Power Tools	☐ Strip/Underground Mines
☐ Lockout/Tagout	☐ Commercial Vehicle	☐ Other (specify)	☐ Other (specify)

Personal Protective Equipment Req=Required Rec=Recommended	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
	Steel Toe Boots	☐	☒	☐	Hard Hat	☐	☐	☒
	Long Sleeve Shirt & Pants	☒	☐	☐	Safety Glasses Shields	☒	☐	☐
	Outer Disposable Boots	☐	☐	☒	Indirect Vented Goggles	☐	☐	☒
	Tyvek Suit	☐	☐	☒	Poly-Coated Tyvek	☐	☐	☒
	Fully Encapsulated Chemical Suit	☐	☐	☒	Full-Face Respirator	☐	☐	☒
	Hearing Protection	☐	☐	☒	Half-Face Respirator	☐	☐	☒
	Leather Gloves	☐	☒	☐	Inner Chemical Gloves	☐	☐	☒
	Outer Chemical Gloves	☒	☐	☐	Other (specify)	☐	☐	☐
Training and Medical Surveillance Req=Required Rec=Recommended	Training	Req	Rec	NA	Medical Surveillance	Req	Rec	NA
	40 Hour HAZWOPER	☒	☐	☐	Medical Clearance	☐	☐	☐
	Current 8 Hour HAZWOPER	☐	☐	☒	Respirator Clearance	☐	☐	☒
	8 Hour HAZWOPER Supervisor*	☐	☐	☒	Blood Lead and ZPP	☐	☐	☒
	Current CPR and First Aid*	☐	☐	☒	Other (specify)	☐	☐	☒
	10 Hour Construction	☐	☐	☒	Other (specify)	☐	☐	☒
	ERM H&S Management System	☐	☐	☒				
	ERM Site Safety Officer*	☐	☐	☒				
	Other (specify)	☐	☐	☒				
	Other (specify)	☐	☐	☒				
Safety Supplies Req=Required Rec=Recommended	Supplies	Req	Rec	NA	Supplies	Req	Rec	NA
	First Aid Kit	☒	☐	☐	Fire Extinguisher	☐	☐	☒
	Eyewash Solution	☐	☐	☒	Water/Sports Drink	☒	☐	☐
	Air Horn	☐	☐	☒	Oral Thermometer	☐	☐	☒
	Noise Meter (Dosimeter)	☐	☐	☒	Decontamination Supplies	☐	☐	☒

Chemical products ASK Haz Waste will store on site

For each chemical product identified, an MSDS must be attached to this WARN HASP

- ☐ Alconox or Liquinox
- ☐ Hydrochloric acid (HCl)*
- ☐ Nitric acid (HNO_3)*
- ☐ Sodium hydroxide (NaOH)*
- ☐ Calibration gas (Methane)
- ☐ Calibration gas (Isobutylene)
- ☐ Calibration gas (Pentane)
- ☐ Calibration gas (4-gas mixture)
- ☐ Other (specify)
- ☐ Isopropyl Alcohol
- ☐ Household bleach (NaOCl)*
- ☐ Sulfuric acid (H_2SO_4)*
- ☐ Hexane
- ☐ Other (specify)

*NOTE: Eyewash solution shall be readily available on ALL projects where corrosive materials are used or stored, including sample preservatives.

Safe Work Practices

Place a checkmark by applicable SWPs and attach to this document

For hazards not covered by SWPs listed in this section, list the task name and complete a Job Hazard Analysis sheet (JHA) for each

SWPs Applicable To This Project (check all applicable boxes)

☐ 1-Hazard Communication	☐ 3-Medical Services and First Aid	☐ 4-Airborne Contaminants	☐ 5-Heat Stress
☐ 6-Cold Stress	☒ 7-Natural Hazards	☒ 8-Personal Protective Equipment	☐ 9-Respiratory Protection
☐ 10-Confined Space Entry	☐ 11-Drum Handling	☐ 13-Excavation	☐ 14-Fall Protection and Prevention
☐ 16-Forklift and Truck Operations	☐ 17-Hand Tools	☐ 19-Heavy and Material Handling Equipment	☐ 20-Ladder Safety
☒ Other Task (specify) Hand sampling	☐ Other Task (specify)	☐ Other Task (specify)	☐ Other Task (specify)
☐ Other Task (specify)	☐ Other Task (specify)	☐ Other Task (specify)	☐ Other Task (specify)

Levels of Protection Required for each Task

Signature of the H&S Team on page 1 of this document signifies certification of PPE Hazard Assessment

Task Description	Level A	Level B	Level C	Level D
XRF survey	☐	☐	☐	☒
Collection of surface samples	☐	☐	☐	☒
GPS sample locations	☐	☐	☐	☒
	☐	☐	☐	☐
	☐	☐	☐	☐

Personal Protective Equipment Req=Required Rec=Recommended	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
	Steel Toe Boots	☐	☒	☐	Hard Hat	☐	☐	☒
	Long Sleeve Shirt & Pants	☒	☐	☐	Safety Glasses Shields	☒	☐	☐
	Outer Disposable Boots	☐	☐	☒	Indirect Vented Goggles	☐	☐	☒
	Tyvek Suit	☐	☐	☒	Poly-Coated Tyvek	☐	☐	☒
	Fully Encapsulated Chemical Suit	☐	☐	☒	Full-Face Respirator	☐	☐	☒
	Hearing Protection	☐	☐	☒	Half-Face Respirator	☐	☐	☒
	Leather Gloves	☐	☒	☐	Inner Chemical Gloves	☐	☐	☒
	Outer Chemical Gloves	☒	☐	☐	Other (specify)	☐	☐	☐
Training and Medical Surveillance Req=Required Rec=Recommended	Training	Req	Rec	NA	Medical Surveillance	Req	Rec	NA
	40 Hour HAZWOPER	☒	☐	☐	Medical Clearance	☒	☐	☐
	Current 8 Hour HAZWOPER	☐	☐	☒	Respirator Clearance	☐	☐	☒
	8 Hour HAZWOPER Supervisor*	☐	☐	☒	Blood Lead and ZPP	☐	☐	☒
	Current CPR and First Aid*	☐	☐	☒	Other (specify)	☐	☐	☒
	10 Hour Construction	☐	☐	☒	Other (specify)	☐	☐	☒
	ERM H&S Management System	☐	☐	☒				
	ERM Site Safety Officer*	☐	☐	☒				
	Other (specify)	☐	☐	☒				
	Other (specify)	☐	☐	☒				
Safety Supplies Req=Required Rec=Recommended	Supplies	Req	Rec	NA	Supplies	Req	Rec	NA
	First Aid Kit	☒	☐	☐	Fire Extinguisher	☒	☐	☐
	Eyewash Solution	☒	☐	☐	Water/Sports Drink	☒	☐	☐
	Air Horn	☐	☐	☒	Oral Thermometer	☐	☐	☒
	Noise Meter (Dosimeter)	☐	☐	☒	Decontamination Supplies	☐	☐	☒

Work Zones If exclusion zones are necessary because of chemical OR equipment hazards, describe the plan	Exclusion Zone: Not Applicable
	Contamination Reduction Zone: Not Applicable
	Support Zone: Vehicle will be used to carry all necessary equipment.

Site Access/Control How do we limit unauthorized entry to the site itself?	Access Control Procedures: Access to site cannot be controlled. Open desert land.
DECON Procedures	Decontamination Procedures: Surface samples will be collected using trowels, sample containers and nitrile gloved hand. Gloves will be replaced during each sampling event.

Chemicals of Concern

In the section to the right, check any chemicals present onsite in any media (air, soil water).

In the table below, list chemicals suspected or confirmed to be onsite, and provide requested information.

- ☐ Friable Asbestos
- ☐ 3,3'-Dichlorobenzidine
- ☐ Benzidine
- ☐ beta-Propiolactone
- ☐ N-Nitrosomethylamine
- ☒ Lead
- ☐ Benzene
- ☐ Acrylonitrile
- ☐ Methylenedianiline
- ☐ alpha-Napthylamine
- ☐ bis-Chloromethyl ether
- ☐ 4-Aminodiphenyl
- ☐ 2-Acetylaminoflourene
- ☐ Vinyl chloride
- ☐ Chromium (VI)
- ☐ Coke oven emissions
- ☐ Ethylene oxide
- ☐ 1,3-Butadiene
- ☐ No ERM exposure to these
- ☐ Methyl chromoethyl ether
- ☐ beta-Napthylamine
- ☐ Ethyleneimine
- ☐ 4-Dimethylaminoazobenzene
- ☐ Inorganic arsenic
- ☐ Cadmium
- ☐ 1,2-Dibromo-3-chloropropane
- ☐ Formaldehyde
- ☐ Methylene chloride

Materials Present or Suspected at Site	Highest Reported Concentration (specify units and sample medium)	Exposure Limit (specify ppm or mg/m^3)	IDLH Level (specify ppm or mg/m^3)	Primary Hazards of the Material (explosive, flammable, corrosive, toxic, volatile, radioactive, biohazard, oxidizer, or other)	Symptoms and Effects of Acute Exposure	Ionization Potential (eV)
Arsenic	unknown	PEL = 0.010 REL = 0.002 TLV = Skin Hazard ☒	5 mg/m3	strong oxidizer, explosive in dust form	respiratory irritation, ulcers of nasal septum, dermatitis, gastrointestinbal disturbances	N/A
Lead	unknown	PEL = 0.4mg/m3 REL = 0.4mg/m3 TLV = 0.4mg/m3 Skin Hazard ☐	100mg/m3	Strong reducing agents	Nervous system, ataxia, coma , convulsions, death , weakness	N/A
		PEL = REL = TLV = Skin Hazard ☐				
		PEL = REL = TLV = Skin Hazard ☐				

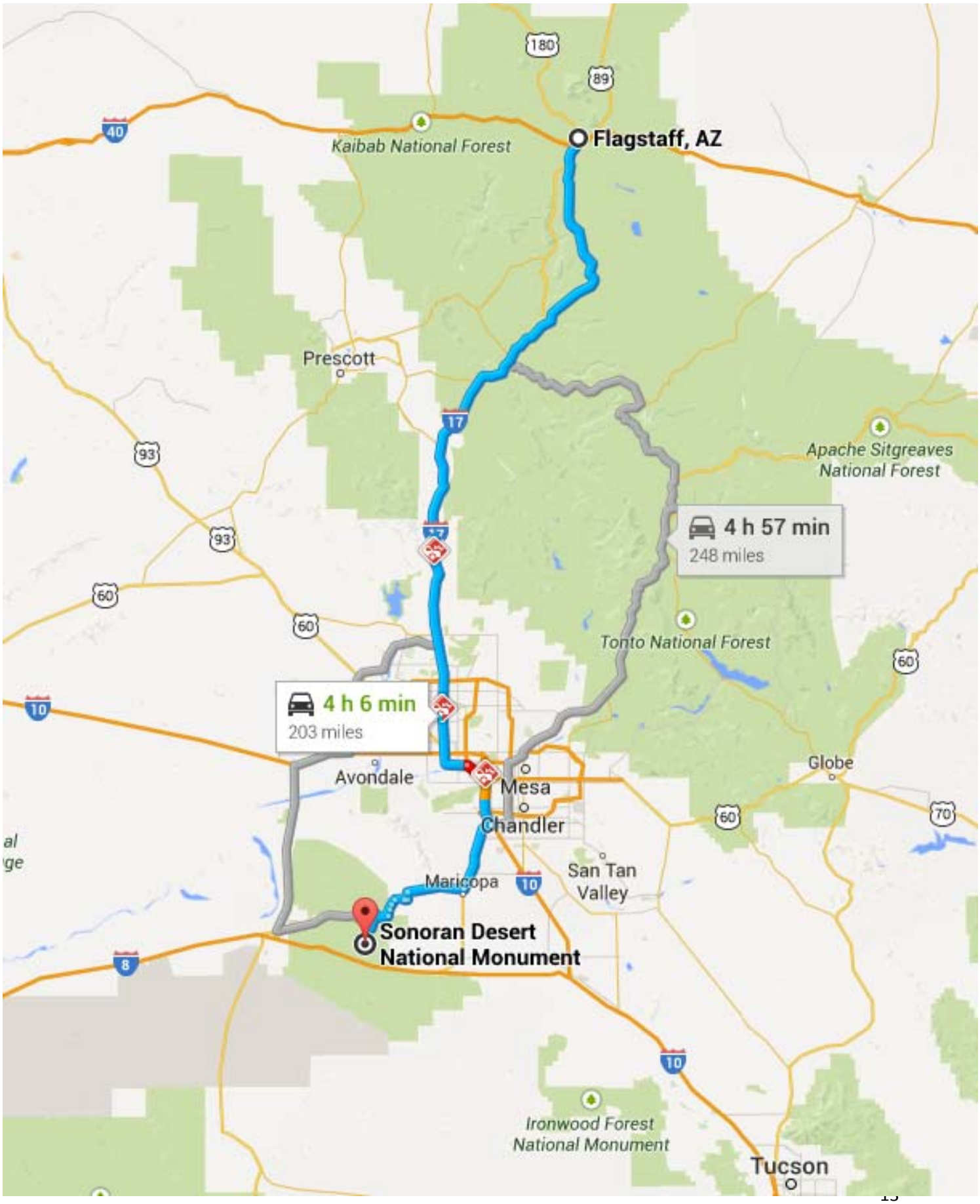
PEL = OSHA Permissible Exposure Limit
REL = NIOSH Recommended Exposure Limit
TLV = ACGIH Threshold Limit Value
IDLH = Immediately Dangerous to Life or Health

Monitoring Equipment: All monitoring equipment on site must be calibrated before and after each use and results recorded				
Instrument (Check all required)	Task	Instrument Reading	Action Guideline	Comments
☐ Combustible gas indicator model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	0 to 10% LEL 10 to 25% LEL >25% LEL	Monitor; evacuate if confined space Potential explosion hazard Explosion hazard; interrupt task; evacuate site	
☐ Oxygen meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	>23.5% Oxygen 23.5 to 19.5% Oxygen <19.5% Oxygen	Potential fire hazard; evacuate site Oxygen level normal Oxyten deficiency; interrupt task; evacuate site	
☐ Radiation survey meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Normal background Two to three times background >Three times background	Proceed Notify SSC Radiological hazard; interrupt task; evacuate site	Annual exposure not to exceed 1,250 mrem per quarter Background reading must be taken in an area known to be free of radiation sources.
☐ Photoionization detector model: ☐ 11.7 eV ☐ 10.6 eV ☐ 10.2 eV ☐ 9.8 eV ☐ ____ eV	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background >5 to 500 ppm above background >500 ppm above background	Level C is acceptable Level B is recommended Level B Level A	These action levels are for unknown gases or vapors. After the contaminants are identified, action levels should be based on the specific contaminants involved.
☐ Flame ionization detector model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background >5 to 500 ppm above background >500 above background	Level C is acceptable Level B is recommended Level B Level A	These action levels are for unknown gases or vapors. After the contaminants are identified, action levels should be based on the specific contaminants involved.
☐ Detector tube models:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify: < 1/2 the PEL > 1/2 the PEL	Specify:	The action level for upgrading the level of protection is one-half of the contaminant's PEL. If the PEL is reched, evacuate the site and notify a safety specialist.
☐ Other (specify):	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify:	Specify:	

Acknowledgement	I have read, understood, and agree with the information set forth in this Health & Safety Plan, and will follow guidance in the plan and in the ERM North America Health and Safety manual. I understand the training and medical monitoring requirements for conducting activities covered by this WARN and have met these requirements. ERM has prepared this plan solely for the purpose of protecting the health and safety of ERM employees. Subcontractors, visitors, and others at the site are required to follow provisions in this document at a minimum, but must refer to their organization's health and safety program for their protection.		
Printed Name	Signature	Organization	Date
Approval Signatures Signatures in this section indicate the signing employee will comply with and enforce this WARN HASP, as well as procedures and guidelines established in the ERM NA H&S. Signatures in this section also indicate that any subcontractors performing work under contract to ERM have met the minimum safety standards in the ERM Subcontractor Prequalification Process.	Project Manager:		Date:
	Partner in Charge:		Date:

Emergency Response Planning	
In the pre-work briefing and daily tailgate safety meetings, all onsite employees will be trained in the provisions of emergency response planning, site communication systems, and site evacuation routes. Signal a site emergency or medical emergency with three blasts of a loud horn (car horn, fog horn, or similar device). To complete this section, attach a hospital route map to the HASP.	All work-related incidents must be reported. For all medical emergencies, call 911 or the local emergency number. For non-emergency incidents, you must: • Give appropriate first aid care to the injured or ill individual and secure the scene. • Immediately call Incident Intervention at (888) 449-7787 (available 24 hours/7 days per week). • Notify the Project Manager and/or H&S Officer after calling Incident Intervention. • Enter the safety event into the ECS within 48 hours. In the event of an emergency that necessitates evacuation of the work task area or the site as a whole, the following procedures shall occur: • The site safety contact will contact all nearby personnel using the onsite communications system to advise of the emergency. • Personnel will proceed along site roads to a safe distance upwind from the hazard source. • Personnel will remain in that area until the site safety contact or other authorized individual provides further instruction. In the event of severe weather, site personnel will follow the procedures listed below: • Site work shall not be conducted during severe weather, including high winds and lightning. • In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.

Emergency Contacts	Name	Location	Phone	Cell Phone
Hospital (attach map)	West Valley Hospital	13677 West McDowell Road	623.882.1500	
Police	Goodyear PD	1111 South Litchfield Road	911	
Fire	Goodyear FD	14455 W. Van Buren St.	911	
Project Manager	Matt Plis	Phoenix District	623.580.5518	602.478.5332
Field Manager (if not PM)	Matt Plis	Phoenix District	623.580.5518	602.478.5332
Field Safety Officer (if not PM)	Matt Plis	Phoenix District	623.580.5518	602.478.5332
H&S Contact	Bridget Bero	Northern Arizona University	928.523.2051	


Flagstaff, AZ
Kaibab National Forest
Prescott
Apache Sitgreaves National Forest
4 h 57 min
248 miles
Tonto National Forest
4 h 6 min
203 miles
Avondale
Mesa
Chandler
Globe
Maricopa
San Tan Valley
Sonoran Desert National Monument
Ironwood Forest National Monument
Tucson

Flagstaff, AZ

Continue to **I-17 S**

2.0 mi / 5 min

1. Head **west** on **Historic Rte 66/I-40BUS W/US-180 W** toward **N Humphreys St**
   Continue to follow Historic Rte 66/I-40BUS W

0.6 mi

2. Continue onto **Milton Rd**

1.3 mi

Follow **I-17 S** to **AZ-347 S/N John Wayne Pkwy/E Queen Creek Rd** in Maricopa County. Take exit **164** from **I-10 E**

160 mi / 2 h 17 min

3. Continue onto **I-17 S**

145 mi

4. Merge onto **I-10 E**

4.9 mi

5. Keep **left** at the fork to stay on **I-10 E**

9.8 mi

6. Take exit **164** for **Arizona 347 S/Queen Creek Rd**

0.3 mi

Continue on **AZ-347 S/N John Wayne Pkwy** to your destination

8. Turn **right** onto **AZ-238 W/W Smith Enke Rd**
   Continue to follow AZ-238 W

11.4 mi

9. Turn **left** onto **S 83rd Ave**

1.4 mi

10. Turn **right** onto **Nahalia Rd**

0.7 mi

11. Slight **right** onto **Gas Pipeline Rd**

138 ft

12. Slight **left** onto **Nahalia Rd**

1.7 mi

13. Continue onto **E Smoke Tree Dr**

1.5 mi

14. Continue onto **S Connely Well Rd**

1.0 mi

15. Continue onto **E Smoke Tree Dr**

1.6 mi

16. Turn **right**

6.8 mi

Sonoran Desert National Monument

Maricopa, AZ 85239

Working on Undeveloped/Remote/ or Inactive Site

No.	Issues	These Issues Have Been Considered Before Work (Initial each box considered)	What Additional Actions are Necessary Before Beginning Work? (State Them)
Personnel Management			
1	Has an effort been made to secure at least a two-person team for this field work? If only one person is making the field visit has that decision been approved by the project Principal or Partner?	Yes	
2	Has someone been designated as the field crew leader to supervise the field activity?	Yes	
3	Does the team have instructions on where to park safely and is the most appropriate location for site entry determined?	No	
4	Has ERM notified the site that an ERM representative will be on site so that entry and security issues are addressed and a site map is provided, if available?	Yes	
5	Is there a system in place to ensure that ERM is informed of any unique hazards of this site, to supplement the types of risks mentioned in ERM's Task Hazards Analysis Sheet	Yes	
Field Communications			
1	Do team members have a reliable means of contacting another ERM team member in event of an emergency? (such as cell phone, two-way radio)	Yes	
2	Is there a system in place to ensure that the team leader contacts each field team member at least at mid-day and communicate that all team members have safely left the site at the end of the day?	Yes	
3	Has a plan been developed on how to address or deal with any unauthorized people encountered on or near the site?	Yes	

Working on Undeveloped/Remote/ or Inactive Site

No.	Issues	These Issues Have Been Considered Before Work (Initial each box considered)	What Additional Actions are Necessary Before Beginning Work? (State Them)
Field Safety			
1	Are the required PPE determined and their use planned? At least: - Sturdy Work Boot (Steel toed shoes if crushing or puncture wound potential) - Long pants; (Long sleeves to combat poison ivy or pest bite/ sunburn) - Safety glasses (if potential for physical damage or windblown particulate); - Chemical resistant gloves if specifically required - Hard hat, when working on an industrial site or if any head injury from falling objects or other agents is possible.	Not Required Required Required Nitrile gloves required Not required	
2	Is there a process in place to ensure awareness of need for foul weather gear?	Yes	
3	Have plans been made to have extra water available while on site?	Yes	
4	Have you considered and addressed the need for a first aid kit? If the site is remote from available medical support, then a first aid kit should be taken in the car or personal backpack.	Yes	
5	Is the team aware of any local plants or pests that could carry disease or cause harm? Have applicable repellents, netting, clothing, and other protections been acquired?	No	

6	If a field person is allergic to any natural agents does he/she have the appropriate antidotes with them?	Yes	
7	Has the team addressed the need for periodic clothing and body inspection to note the presence of poisonous or disease-bearing insects, worms, etc.	Yes	

Task Hazard Analysis Worksheet

In assessing the potential hazards, determine if one task description/ analysis is sufficient. If not, then develop additional task assessments with their own steps.

Task Description (Sequence of Steps):

1. Set up soil sample grid
2. Scan locations using XRF
3. Collect soil samples based on XRF field screen data
4.
5.
6.

Check Applicable Task Hazard	Check the Planned or Recommended Hazard Control (write in others)
☐ Asphyxiation	☐ Ventilation ☐ Supplied Air ☐ Air monitoring
✱Chemical Exposure	☐ Isolation, Lockout/~~Tagout~~ ✱ PPE Nitrile gloves ☐ Respiratory Protection ☐ Decontamination- eyewash
✱ Plant, Insect, Animal Hazards	✱ Knowledge of particular local issues ☐ Repellant sprays and coatings ☐ Netting, clothing covering ☐ Self-inspection schedule ✱ First aid kit
☐ Thermal Burns ☐ Hot Surface	☐ Splash Guard ☐ Isolation, Lockout/~~Tagout~~ ☐ PPE ☐ Equipment Covers ☐ Barricades
✱ Slips and Trips	☐ Ensure clean and dry surface ☐ Barricade ✱ Walk Carefully/ Eyes on Path ✱ Use alternate route if wet or unstable situation ☐ Relocate the trip hazards
☐ Falls ☐ More than 4 feet	☐ Fall restraint, guardrails, barricades, short lanyard
☐ Electrical shock	☐ Isolation, LOTO ☐ Testing ☐ Grounding ☐ Shielding on equipment ☐ PPE ☐ Ground Fault Interruption on cords ☐ Electrical expertise on project team
☐ Airborne/Flying material	☐ Cover/Shield source ☐ PPE, Eye & Face ☐ PPE, Arms & Body ☐ Positioning
Fire/ Explosion	☐ Isolation/LOTO ☐ Air testing/monitoring ☐ Control sources of ignition ☐ Implement a "Hot Work" process ☐ PPE ☐ The correct fire extinguisher is available
✱ Heat/Cold Stress	☐ Ventilation ☐ Cooling vests, etc. ✱ Task rotation, Shared tasks ✱ Work/Rest regimen ☐ Planned place for sheltering
☐ High Noise	☐ Hearing Protection ☐ Relocate Work ☐ Muffle Source
☐ Poor Visibility	☐ Illumination is adequate for task ☐ Nighttime considerations if the job could extend past daylight hours
☐ Lifting, pulling, pushing	☐ A plan is in place (people, devices, carts) ☐ Handling equipment is designed for the job ☐ Proper technique known/ discussed ☐ Smaller, lighter loads?
✱ Repetitive motion	✱ Proper technique known/ discussed ☐ Proper tools, rather than manual ✱ Get help, take breaks
☐ Rotating equipment/ Pinch Points	☐ Isolation, LOTO ☐ Guarding, Barricading ☐ No loose clothing ☐ Positioning
☐ Sharp objects	☐ Guarding ☐ Gloves, safety shoes or boots ☐ Substitute safe cutter for blade
☐ Falling objects	☐ Secure objects ☐ Guarding, covers ☐ Hard Hat ☐ Barricading
☐ Hazards from others working in vicinity (particularly heavy equipment)	☐ Communication ☐ Barricading ☐ Shielding
☐ Hazards to other working in vicinity	☐ Communication ☐ Barricading ☐ Shielding
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste Containers ☐ Other
☐ Chemical Storage	☐ Container labeling and MSDSs ☐ Incompatibles (acids/bases, flammables/oxidizers) considered ☐ Control physical damage to containers
☐ Drowning	☐ Personal Floatation Device ☐ Barricading ☐ Working with a partner ☐ Alerting Devices
☐ Ionizing Radiation	☐ Exposure Monitoring ☐ PPE ☐ Distance and/or shielding
☐ Nearby Road Traffic	☐ Bright colored work vests ☐ Planned avoidance of traffic areas ☐ Signs and lights to alert drivers
☐ Contact with underground utilities	☐ Local Utility "One Call" service ☐ Access to site maps/ experience ☐ Utility Line Locating Devices ☐ Utility Company Knowledge: ☐ Hand Auguring before mechanical
Hazards not listed	List Hazard Controls

	YES	NO	N/A
Is a permit (Hot Work, Confined Space Entry, Process Line Breaking, and LOTO) required for this ERM work task?			X
If so is the client's procedure/policy ~~supplied~~?			X
Do you have the proper tools and/or equipment in good condition	X		
Have you planned an escape route?			X
Was this Hazard Analysis reviewed with ~~the~~ project team performing this task?	X		

	STANDARD OPERATING PROCEDURE	
askohaz WASTE	SOP #:	7
	Title:	Natural Hazards
	Last Rev.:	12/12/14
	Page:	1 of 4

SCOPE

This procedure provides guidance for determining appropriate means for handling natural hazards that may be encountered while conducting fieldwork.

DEFINITIONS

None.

PROCEDURE

Potential exposure natural hazards during performance of this project is believed to be minimal. However since the work is performed outside some precautions should be taken to guard against the following hazards. Keep in mind that the hazards may vary depending on the time of year or geographical region. Infrequent hard freezes may allow insects and snakes to be active all year round in some parts of the United States. Refer to Attachments 1 through 3 for photos and more thorough descriptions of the more common natural hazards, which might be encountered.

A. Identify type of natural hazard present.

B. When a natural hazard (such as poisonous plants, feral animals, insects and snakes) is encountered, back away and evaluate the situation.

C. Develop a plan which may include any of the following:

1. Remove the natural hazard if it can be done safely.
2. Avoid the natural hazard if it cannot be removed. Additionally, use appropriate PPE or outer clothing for protection from the hazard. Refer to SOP – 8, Personal Protective Equipment.
3. Get assistance in removing or working around the natural hazard. In some instances, this may require professional help from animal control or an insect expert.

D. In the event there is contact with the natural hazard, if it appears to be a life threatening situation, such as anaphylactic shock or a snake bite, seek medical attention immediately.

- OR -

A. POISONOUS PLANTS

1. Poison ivy is in the form of a vine, while oak and sumac are bush-like.
2. All produce a delayed allergic hypersensitivity.
3. The plant tissues have an oleoresin, which is active in live, dead, and dried parts and may be carried through dust, contaminated articles, and the hair of animals.
4. Symptoms usually occur 24 to 48 hours after exposure resulting in burning or stinging, and weeping and/or crusted blisters.
5. The best antidote for poisonous plants is recognition and avoidance.
6. Should exposure to any of these plants occur, notify the Site Safety Officer and wash the affected area with a mild soap and water, but do not scrub the area.

B. TICKS

1. Ticks attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission.
2. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites.
3. Periodically during the workday employees should inspect themselves for the presence of ticks.
4. Notify the Site Safety Officer of any tick bites as soon as possible, medical attention may be required.

C. SPIDERS

1. Black Widow
    a. The black widow is a common venomous spider found in vacant rodent burrows, under stones, logs and long grass, and in hollow stumps and brush piles.
    b. If disturbed, they typically will retreat to a corner of their web but can be induced to bite only if pressed against the skin.
    c. Notify the Site Safety Officer if bitten, because neurotoxins are injected, it is important to seek immediate medical attention.
2. Brown Recluse
    a. The brown recluse or Fiddle Back Spider is another common venomous spider.

b. It hides in dark niches and corners, where it may spin a poorly organized, irregular web.

c. It is shy and will try to run from a threatening situation but will bite if cornered.

d. Check boots and protective clothing for spiders prior to putting them.

e. The bite of the brown recluse is usually painless until 3 to 8 hours later when it may become red, swollen, and tender. Notify the Site Safety Officer if bitten.

f. Prompt medical attention can reduce the extent of ulceration and alleviate other complications that may develop.

D. FIRE ANTS

1. One sure sign of the presence of fire ants is their conical mounds, which are a result of the digging of their chambers.

2. The sting of a fire ant results in localized reddening of the bite area, accompanied by sharp burning sensations.

3. The first ant sting releases a chemical substance that triggers other ants of the colony to sting.

4. Anyone seeing fire ant mounds present at the work site should notify the Site Safety Officer, who will then notify the rest of the crew so the mounds may be avoided if possible.

E. CHIGGERS

1. Chiggers, also known as "red-bugs" or "harvest mites", are the immature stages of a tiny red mite.

2. They inhabit areas of tall grass, associated with low, wet spots, ponds and stream banks, wild berry patches, and forest underbrush.

3. The larvae attach themselves to the clothing of people or to the fur of passing animals.

4. Wear loose-fitting clothing (if possible) when working outdoors. Apply a repellent containing DEET (N,N-diethyl-meta-toluamide), to shoes, socks, and trousers before entering chigger-infested areas. Caution: some individuals may be sensitive to DEET – always read and follow label directions

5. Vehicles should be frequently vacuumed to reduce the number of chiggers that may have been deposited.

6. Flowers of sulfur is another repellant of chiggers. Sulfur may be more benign to use than DEET on some body parts. Avoid breathing dust during application.

F. FLYING INSECTS

1. Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while site activities occur.
2. Wear long-sleeved clothes and long pants treated with repellent. Do not treat unexposed skin. Use the repellent according to the manufacturer's recommendations provided on the container.
3. Personnel should report flu-like symptoms to the Site Safety Officer, medical attention may be needed.

G. SNAKES

1. The most effective way to prevent snakebites is to avoid snakes.
2. Personnel should avoid walking in high grass and underbrush.
3. Visual inspection of work areas should be performed prior to activities taking place.
4. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg.
5. No attempts at killing snakes should be made; many people are bitten in such an attempt.

6. If a snake bites someone, Notify the Site Safety Officer and seek medical services.

I. FERAL ANIMALS

1. Feral animals such as rats or other wildlife may be encountered during fieldwork.
2. If an animal is diseased, injured or tending a nest, they may become aggressive.
3. Notify the Site Safety Officer or Construction Manager if feral animals are at the site, who will then notify the rest of the employees and local wildlife personnel.

Appendix B Sampling and Analysis Plan

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1.0 Introduction

ASK Haz Waste has produced a Sampling and Analysis Plan (SAP) for the Bureau of Land Management (BLM) in order to conduct surface soil samples from the Sonoran Desert National Monument. The findings from these soil samples will assist in the Preliminary Assessment/ Site Investigation (PA/SI). The SAP provides guidelines that will be followed when collecting soil samples and during the analysis.

SAP Structure:

- Sampling rational
- Request for analysis
- Field methods and Procedures
- Investigation derived waste management
- Sample containers, preservation, and storage
- Sample documentation and shipment
- Quality Assurance / Quality Control (QA/QC) procedures

1.1 Project Objectives

The project objectives, in order to obtain the necessary data for the SDNM project, are as follows:

- Examine and assess the risks that accompany the migration of lead
- Produce a Preliminary Assessment/Site Inspection (PA/SI) following the CERCLA process
- Use results to determine if the BLM should proceed with further CERCLA actions

2.0 Sample Selection Rationale

This section describes the soil sampling that will occur at the SDNM site. Sampling locations, selection of samples for the laboratory analysis, and selection of target metals.

2.1 Selection of Sampling Locations

Approximately 150 soil samples will be collected from the 15 sites, and the X- ray Florescence (XRF) will be used to determine metal concentrations found in the soil. All soil samples will be placed into gallon re-sealable plastic bags and brought back to the

laboratory. Once back in the lab the gallon re-sealable plastic bag will be divided into 9 sections and the XRF will be used to take readings in each of the 9 sections. The highest and lowest readings will be disregarded and the remaining 7 readings from each bag will be used to determine the average concentrations. The XRF will be used at the site only for ground readings in order to have an approximation of the contaminants found in the soil.

Soil Samples will be collected as followed:

- Soil samples will be collected using a grid method. To types of samples are to be collected, these are background grid samples and a hotspot samples.
- The background grid will vary depending on the size of the site. This variance is based on a .8 acre cut off. Sites smaller then .8 acres will be sampled with a background grid measuring 280'x280'. This grid is shaped in such a way that 5 samples are taken. Sites that are larger than .8 acres will be sampled using a background grid measuring 400'x400'. The grid shape associated with these large sites will allow for 9 total samples will be taken.
- Hotspot sampling will be accomplished by, visually examining the site, and then determining where makeshift firing lines are present. The presence of empty shell casings will be the primary way of determining these makeshift firing lines. XRF readings and soil samples will then be taken at the firing line, range floor, and primary impact berms; with emphasis being on locations where shooters are present the most (i.e. firing line and range floor).

The following pages include all sites included in the project, along with their associated grid type. Note, that the hotspot grids are not included as they will be determined in the field.

For Site Maps

Refer to Attachment A

2.2 Selection of Samples for Laboratory Analysis

Twenty percent of soil samples will be sent to the lab for analysis. The determination of samples to be sent for lab testing will be done in the following manner:

- Two samples from each grid type will be selected at random and sent for lab testing. This includes the large background grid and each individual hotspot grid.
- All 15 composite samples will be sent for lab analysis.

2.3 Selection of Target Metals

The XRF reads multiple different analytes, but ASK Haz Waste will only focus on 6, with the most emphasis on lead.

Table B2.3-1

Analytes XRF detects	Analytes sub set for Vulture Mine site
Antimony (Sb)	x
Arsenic (As)	x
Barium (Ba)	
Cadmium (Cd)	
Chromium (Cr)	
Cobalt (Co)	
Copper (Cu)	x
Lead (Pb)	x
Mercury (Hg)	
Nickel (Ni)	
Selenium (Se)	
Silver (Ag)	
Thallium (Tl)	
Tin (Sn)	x
Zinc (Zn)	x

The XRF will be used at the site for collecting readings for hotspots along with random samples. The collected samples will then be sent to the NAU lab in order to determine the target metals. The target metals will be compared with the Arizona soil remediation levels.

3.0 Request for Analysis

This section will exhibit a summary of the analytical procedures for the soil samples taken at SDNM.

3.1 Analysis Narrative

Laboratory samples will be placed into labeled, gallon-sized re-sealable plastic bags and taken to the Northern Arizona University Environmental Analysis Laboratory by a ASK Haz Waste staff member.

3.1.1 Required Analysis

There will be roughly 150 samples analyzed by XRF. To ensure quality of these readings, 20 percent of these samples will be taken to the laboratory for further analysis.

This includes samples regarding a large overlaying grind on the sites that will be used to determine background lead concentrations. In addition samples are to be taken at hotspots. These hotspots include areas, which indicate makeshift firing lines, range floors, and primary impact berms.

3.2 Analytical Laboratory

All soil samples will be packed and preserved as described in Section 6.0, and submitted to Northern Arizona University Environmental Analysis Laboratory in Flagstaff, Arizona.

4.0 Field Methods and Procedures

This section will describe the procedures and methods that will be used for collecting and processing soil samples, field equipment and calibration, and equipment decontamination.

4.1 Team Briefing

Before sampling begins, a designated ASK Haz Waste engineer will conduct a team meeting with the sampling personnel. The meeting will run through the following topics:

- Sampling locations
- Number of samples to be collected
- Identify target metals
- Sampling procedures
- Health and safety procedures
- Documentation

- Sampling equipment documentation

4.2 Field Equipment

This section lists the equipment that will be used during soil sampling. The calibration process will also be discussed in detail.

4.2.1 List of Field Equipment

The following equipment will be used throughout the sampling process:

- Olympus Handheld XRF Delta Series
- Global Positioning System (GPS) with spare batteries
- Latex gloves
- Digital camera with spare batteries
- Small trowels with simple design
- Hand sieves (#40)
- Re-sealable gallon size plastic bags
- Plastic garbage bags
- Logbook
- Black ink pens
- Tape measure
- Stakes
- Hammer
- Shovel
- Work gloves
- Distilled water
- Paper towels
- Two 5 gallon buckets
- Wash brushed
- Cooler
- Custody seals

4.2.2 Calibration of Field Equipment

The XRF handheld device will be calibrated before sampling commences and will be checked periodically throughout the sample analysis. In accordance with the manufacturer's recommendations, a pre-measurement calibration and a post-measurement verification will be done using reference standards. A field form is provided in Appendix A of this SAP, and will be used to record these procedures.

The XRF handheld device will be calibrated every 20 samples. These calibrations take 2 minutes and will use a National Institute of Standards

and Technology standard that will be placed on the analyzer window. Calibration blanks will also be performed to ensure there is no contamination on the analyzer window. Blanks will be obtained by using a silicon dioxide blank. Blank calibrations will be done every 20 samples. Calibrations must be within 20 percent or less between a XRF result for an element and the standard value. These calibration readings will be recorded on the data collection form found in Appendix A.

4.3 Soil Sample Collection and Preparation

Soil samples will be screened using an XRF handheld device. Samples will be collected based on rational described in Section 2 of this SAP.

Samples will be collected using a stainless steel trowel. These samples will be taken from the grid-based method described in section 2.1. The soil samples will then be placed in re-sealable gallon-sized plastic bags already marked and labeled according to the section of the grid the sample was taken. The collected sample bags and trowel will be decontaminated as described in section 4.5. ASK Haz Waste will only be taking surface samples, collecting the first 1-2 cm of soil and filling a gallon-sized plastic bag half way full. No samples will be collected at depth as BLM is only concerned with the exposure risk emanated by surface contaminants. Rocks will be removed in order to achieve sample homogeneity. After collection, all soil samples that were placed in gallon-sized re-sealable plastic bags will be taken back to NAU. The XRF handheld device will then be used to screen the soil samples through the plastic bags.

4.4 Soil Sample Location Identification and Measurement

The location of the soil samples will be clearly marked with surveying stakes. Each stake will contain the following:

- Sample identification name
- Date
- Sample location

The sample location will be photographed and the GPS coordinates will be taken using the GPS System and the coordinates will be recorded in the logbook.

4.5 Decontamination

Decontamination of the equipment is vital to the quality of data collected. All the equipment used to collect samples will be decontaminated between uses.

The garden shovel will be washed with a laboratory grade detergent and rinsed with tap water. The disposable sampling equipment such as gloves and contaminated re-sealable gallon-size plastic bags are to be disposed of after each sample collection. They are to be thrown into plastic trash bags and disposed of at permissible solid waste collection points.

5.0 Investigation-Derived Waste Management

Decontamination will produce both contaminated water and solid waste. Below are the criteria by which the waste created will be disposed of.

5.1 Water

The tools used to collect the samples must be cleaned between soil sample collections. The tap water used to clean off the samples will be discharged back into the contaminated soil.

5.2 Solid Waste

Disposal of any non-reusable sampling equipment such as gloves, re-sealable plastic bags, and other waste products produced on site during sample collection will be placed into a plastic garbage bag and disposed of at an allowable designated location.

5.3 Sampling Site Restoration Procedures

All soil samples will be placed in gallon re-sealable plastic bags and taken back to the laboratory. None of the wholes dug for surface soil samples will be refilled.

6.0 Sample Containers, Preservation, and Storage

This section discusses sample containers, preservation, and storage of all samples collected during field activities.

6.1 Sample Containers and Preservation

Soil samples and mine tailings will be stored and labeled in re-sealable plastic bags. The size of these plastic bags will be gallon-size and will be used throughout the duration of the XRF sampling.

Any soil sample that is not submitted for analysis will be removed from the plastic bags and spread onsite. There will be no need for preservation of these samples.

6.2 Holding Times

Holding time is the period of time samples may be held before extraction and analysis. All samples will be hand-delivered to the analytical laboratory at the end of field activities. This is anticipated to persist less than one week, such that

holding times will not be exceeded. Depending on the types of metals being analyzed, holding times can range from 28- to 180-days [1].

7.0 Sample Documentation and Shipment

7.1 Field Notes

Data collected from the SDNM site will be documented in a field notebook using black ink.

7.1.1 Field Logs

ASK Haz Waste will have one field notebook that will be used by all team members. The field notebook will be bound and water resistant. All data entries made must be as detailed as possible and written in black ink. Each entry must be dated and signed. Any mistakes made must be crossed out with a single line.

7.1.2 Photographs

A photograph must be taken at every soil sample location. The photographs taken while sampling at the SDNM site will later be used in the PA/SI.

7.2 Sample Labels

Each individual gallon re-sealable plastic bag will be labeled with the following information:

- Time and date of collection
- Samplers initials
- Location
- Sample ID

A numbering system will be used in order to easily identify the soil samples and the location that they were taken from. An example of the numbering system is as followed:

SDNM XXX-Y-A

SDNM: Sonoran Desert National Monument

XXX: Day/Month/Year

Y: Sample number (#1, 2, 3, etc.)

A: S=grid soil sample, H=hotspot sample

7.3 Sample Chain-of-Custody Procedures

Sample chain-of-custody procedures require that possession and handling of all samples be documented from the moment of collection through the time of completion of laboratory analyses. A member of ASK Haz Waste will always be in possession and within eye view of the soil samples, so there will be no need for chain-of-custody procedures.

7.4 Transfer of Custody and Shipment

Soil samples will not leave the custody of ASK Haz Waste. A member of ASK Haz Waste will hand deliver these samples to the NAU Environmental Analysis Laboratory and the samples will not leave the sight of the member. The member will also be involved in the soil analysis process in the Environmental Analysis Laboratory. When field soil sampling has concluded, all samples will be placed into a cooler and sealed with custody seals that are signed and dated by a member of ASK Haz Waste.

8.0 Quality Control

The overall objective of quality control is to develop and utilize procedures that will monitor and assure quality in every aspect of the work, sampling, and analysis that is done for this project. Quality control will also be used in the following aspects of this project to ensure these aspects reach their full potential of value: assessment of field preservation, assessment of field variability, correlation between XRF and grab samples, and data validation.

8.1 Assessment of Field Preservation

Field samples will be collected and submitted to the Northern Arizona University Environmental Analysis Laboratory to monitor and evaluate the data quality resulting from field activities. Temperature differences throughout the field day will also be noted and recorded. High temperatures can cause erroneous results within the XRF device. It is important to stop all XRF screening when temperatures reach readings greater than 100 degrees Fahrenheit to prevent erroneous data [2].

8.2 Assessment of Field Variability (Field Duplicate)

Duplicate samples will be collected at the same time of the original sample. These duplicates will consist of a homogenized sample and, from there, will be divided into two separate samples. The duplicate sample will be treated independently from its counterpart. This is done so that a laboratory performance assessment can compare the results. Duplicate samples will be collected from areas with known or suspected contamination. One duplicate sample will be collected for every 10 original samples. Duplicates will also be taken on XRF spot screenings.

8.3 Background Samples

Background lead levels will be determined through the use of composite samples. This will be done by collecting additional mass of sample at the nodes of the large overlaying grind, then mixing a predetermined amount of sample from each of these nodes in a single gallon bag. This bag will then be analyzed using the XRF, as well as, being sent to the NAU lab for a wet chemistry analysis.

8.4 Correlation Between XRF Field Screening and Laboratory Results

The results from XRF field screening and the results from laboratory analysis will be compared to determine the accuracy of the XRF field screening methodology. The correlation method to be used will include a linear correlation coefficient, the coefficient of determination, and the median sample value [1]. The results of these analyses will be compared to EPA Soil Remediation Levels.

8.5 Data Validation

As part of the data validation process, a review will be completed on all soil samples collected during the field activities portion of this project. This review will look for compliance with QA/QC and method-prescribed criteria.

9.0 References

[1] (March, 2010). ERM. *Final Preliminary Assessment and Focused Site Inspection Work Plan*. Date Accessed: November 2014.

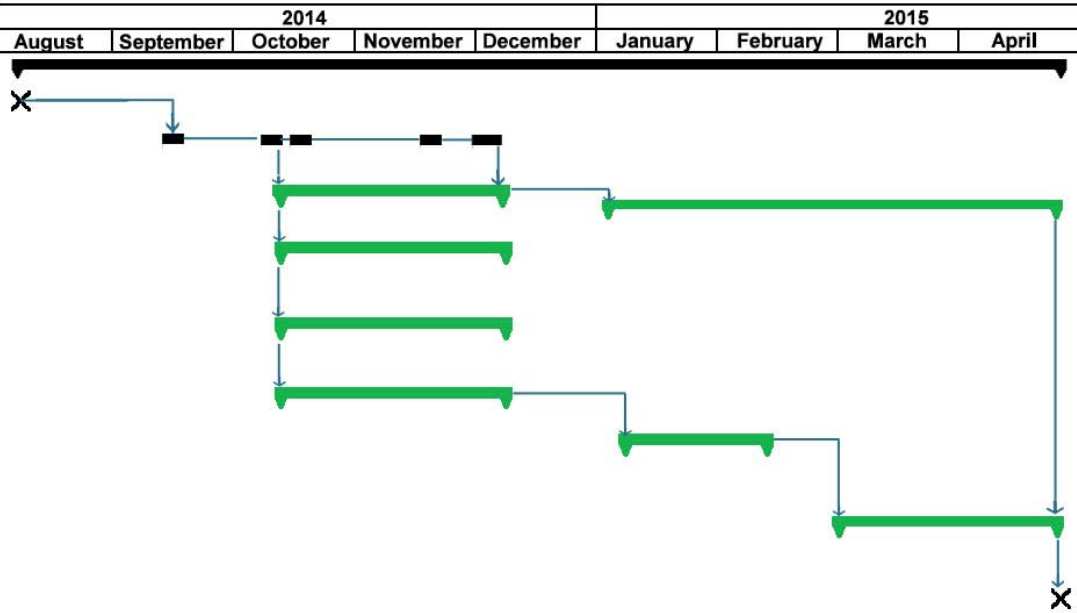
[2] Harris, Bill and Frels, Jason. XRF Training. Thursday, January 15, 2015. 8:00 am.

Appendix C Master Project Schedule

Preliminary Assessment/Site Inspection Sonoran Mountain Desert Monument

ASK Haz Waste

ID	Task Name	Duration	Start	Finish
1	SDNM PA / SI Schedule	243 Days	Aug. 5 2014	Apr. 23 2015
2	Notice of Award	1 Day	Aug. 1 2014	
3	Task 1 - Project Management	243 Days	Aug. 5 2014	Apr. 23 2015
4	Task 2 - Background Research	52 Days 143 Days	Oct. 13 2014 Jan. 12 2014	Dec. 4 2014 May 24 2014
5	Task 3 - Health & Safety Plan	52 Days	Oct. 13 2014	Dec. 4 2014
6	Task 3 - Sampling & Analysis Plan	52 Days	Oct. 13 2014	Dec. 4 2014
7	Task 3 - Work Plan	52 Days	Oct. 13 2014	Dec. 4 2014
8	Task 4 - Field Work	58 Days	Jan. 1 2015	Feb. 28 2015
9	Task 5 - PA/SI Report	83 Days	Mar. 2 2015	May. 1 2015
10	End of Period of Performance	1 Day	Apr. 23 2015	May. 1 2015



ASK Haz Waste Flagstaff Field Office
Flagstaff, Arizona

Time Line — Critical Path

Date: October 10, 2014