

**Technical Memorandum  
for Oversight of the Phase 1A-B Remedial Investigation  
in PRI Areas 1 and 3 through 7 and Background**

**US Magnesium NPL Site  
EPA Site ID. NO. UTN000802704  
Tooele County, Utah**

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**Prepared for:**



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## ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
COPC	Contaminant of potential concern
EPA	U.S. Environmental Protection Agency
ERM	ERM-West, Inc.
GPS	Global Positioning System
HASP	Health and Safety Plan
HCl	hydrogen chloride (gas)
IDW	Investigation-derived waste
MS/MSD	Matrix spike /Matrix spike duplicate
OS	Oversight
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
PPE	Personal protective equipment
ppm	Parts per million
PRI	Preliminary remedial investigation
PWT	Pacific Western Technologies
QAPP	Quality Assurance Project Plan
QC	Quality control
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
Site	US Magnesium Site
SOP	Standard operating procedure
SVOC	Semi-volatile organic compound
VOC	Volatile organic compound

## 1.0 INTRODUCTION

This Technical Memorandum for Oversight of the Phase 1A-B Remedial Investigation (Technical Memorandum) summarizes the U.S. Environmental Protection Agency, Region 8 (EPA), and EPA's contractor, Pacific Western Technologies, Ltd. (PWT), split sampling and field oversight activities conducted during Phase 1A-B of the Remedial Investigation (RI) at the US Magnesium National Priority List Site in Tooele County, Utah (Site) (Figure 1). The oversight activities were conducted to ensure that the Responsible Party, US Magnesium, and US Magnesium's contractor, ERM-West, Inc. (ERM), were implementing the Phase 1A-B RI in accordance with the *Phase 1A-B Remedial Investigation Sampling and Analysis Plan for: 1) Chemicals of Potential Concern in Soil, Sediment, and Solid Wastes in PRI Areas 1 and 3 through 7; 2) Preliminary Site Characterization Mapping of PRI Areas 1 and 3 through 7; and 3) Background Chemical Assessment of Biotic Reference Areas for Sitewide Ecological Risk Assessment* (Phase 1A-B RI SAP) (ERM 2015).

The Phase 1A-B RI SAP presents the objectives, approach, evaluation criteria, and scope of work to be conducted by US Magnesium/ERM for Phase 1A-B of the RI for the Site. Phase 1A-B of the RI includes the sampling of solid and aqueous media to fully characterize contaminant types in order to select contaminants of potential concern (COPC) and evaluate the nature and extent of contaminants in the Inner preliminary remedial investigation (PRI) areas, and to obtain preliminary data to support initial risk characterization. The Phase 1A-B of the RI also includes a background study to collect data beyond the RI Study Area to compare naturally occurring chemicals of concern to contaminants within the RI Study Area, and to identify non-impacted areas suitable for biota sampling.

The Phase 1A-B RI field activities were completed by ERM between September and December 2015. Field activities conducted during the Phase 1A-B RI included surface and subsurface solids sampling in PRI Areas 1, 3, 4, 5, 6, and 7, and background areas. PWT conducted oversight of all sampling activities and accepted split samples of solid media for independent laboratory analysis. Conduct of the EPA's oversight was performed by PWT (with support from PWT's subcontractor, EarthFax Engineering Group, LLC), under EPA Contract No. EP-W-06-006, Work Assignment No. 130-RDSB-08PU.

The analysis of the split samples, verification/validation of the split sample data, and management of the data/documentation are not discussed in this Technical Memorandum. This Technical Memorandum is limited to observations and findings made during field activities and is not intended to address the reproducibility of analytical results and/or limitations in analytical and data management protocol-related objectives stated in the *Phase 1 Remedial Investigation Oversight Quality Assurance Project Plan* (Phase 1 OS QAPP) (EPA 2015). If directed by the EPA, PWT will prepare a separate oversight split sampling report to include analytical data from split samples, address the reproducibility of analytical results, and discuss limitations in analytical and data management protocols regarding the objectives stated in the Phase 1 OS QAPP.

### 1.1 PHASE 1A-B RI GENERAL SPLIT SAMPLING AND OVERSIGHT APPROACH

Split sampling and oversight of US Magnesium/ERM's field activities during the Phase 1A-B RI was conducted by EPA/PWT in accordance with the Phase 1 OS QAPP. The overall objectives for the Phase 1A-B RI oversight and split sampling program were to substantively oversee US Magnesium/ERM's field activities and collect splits of the solids samples collected by US Magnesium/ERM. The objective of the EPA/PWT field oversight program was to confirm that US Magnesium/ERM implemented the field activities pursuant to the EPA-approved plans. The objective of the EPA/PWT split sampling program is to confirm that the US Magnesium/ERM sample analytical results are reproducible. In order to produce results that can be used to evaluate reproducibility, the EPA/PWT oversight verified the sampling strategy performed by US Magnesium/ERM was conducted so that:

- Samples were collected from specified media and sampling horizons at required sampling locations using EPA-approved Standard Operating Procedures (SOPs);
- Sufficient sample volume was collected such that investigative, quality control (QC), and split samples were obtained from each location;
- Sample processing in the field provides representative samples; and
- Split samples provided to the EPA/PWT are representative of US Magnesium/ERM samples.

The following is a list of oversight tasks conducted by PWT during the Phase 1A-B RI:

- Oversee field activities for adherence to EPA-approved project planning documents;
- Approve any minor modifications of the sampling locations;
- Observe and document ERM sample collection and processing activities;
- Oversee drilling and borehole logging activities;
- Accept split samples of surface and subsurface solids;
- Oversee sample labeling and sample location documentation;
- Collect oversight photographic documentation;
- Consult with ERM field staff regarding potential field modifications that ERM may seek from the EPA/PWT, in order for PWT to advise the EPA regarding actions on such requests;
- Consult with and advise the EPA regarding field/Site situations that may warrant the EPA considerations for issuing appropriate Phase 1A-B RI SAP and/or Phase 1 OS QAPP modification(s);
- Conduct chemical analysis of split samples;
- Verify and validate split sample analytical data; and
- Manage split sample data and the associated documentation.

The analysis of the split samples, verification/validation of the split sample data, and management of the data/documentation are not discussed in this Technical Memorandum.

## **1.2 SUMMARY OF FIELD OVERSIGHT ACTIVITIES AND SPLIT SAMPLE COLLECTION**

During the Phase 1A-B RI, ERM collected 159 surface solids samples from 159 locations and 61 subsurface solids samples from 18 locations; however, as discussed in Section 2.0, only 46 subsurface solids samples collected were analyzed. Phase 1A-B RI field activities were conducted in 6 of the 17 PRI areas and in each of the background areas:

- PRI Area 1 – Ditches
- PRI Area 3 – Sanitary Lagoon
- PRI Area 4 – Gypsum Pile
- PRI Area 5 – Southeast Poned Waste Lagoon
- PRI Area 6 – Northwest Poned Waste Lagoon
- PRI Area 7 – Northeast Poned Waste Lagoon
- Background Sampling Areas:
  - Upland North
  - Upland South
  - Upland Southeast
  - Lakebed North
  - Lakebed Southeast
  - Lakebed Southeast at Badger Island
  - Bear River Migratory Bird Refuge

ERM completed the Phase 1A-B RI field activities each day with one field team. The ERM field team generally consisted of two to three ERM personnel. During Phase 1A-B of the RI, PWT had one oversight person on site every day of sampling and provided oversight for as much of the field activities as practical. Mr. Aaron Baird, PWT Field Team Leader, performed the EPA field oversight with support from Mr. Tim Jimenez of EarthFax Engineering Group, LLC. The specific oversight activities conducted by PWT during the Phase 1A-B RI are summarized below.

PWT accepted a minimum of two split samples of surface solids from each PRI area and background area to assess reproducibility, with the exception of the Bear River Migratory Bird Refuge background area where a reduced number of samples were collected and only one split sample was accepted. PWT also accepted one subsurface solids split sample from each subsurface boring. This resulted in 33 split samples of surface solids and 19 split samples of subsurface solids; however, as discussed in Section 2.0, only 15 subsurface solids split samples were analyzed. Table 1 details information regarding each sample and split sample accepted; including location identification, media, number of samples, rationale, split sample number and date of sample collection. Table 2 provides the tally and percent calculations for the split and QC samples analyzed and reported by PWT. Figures 2 and 3 present the locations of the split samples accepted by PWT: Figure 2 – Solids Split Sample Locations - PRI Areas 1 and 3 through 7; and Figure 3 – Solids Split Sample Locations - Background. The field activities specific to each sample location, PRI area, or background area are discussed in Section 2.0 and the common field activities are discussed below.

PWT primarily selected locations for surface solids split samples randomly; however, used professional judgment considering one or more of the following factors in certain cases: (1) target sample locations in analytical groups that have the most analyses; (2) target sample locations in different areas or surface soil types within the PRI/background area; and (3) obtain split samples from the high or low end of the concentration range using whatever information was available to suggest the level of contamination. For subsurface solids split samples, the specific sampling interval within each boring was primarily selected randomly; however, anomalous layers were targeted in some instances. Field duplicate locations were selected randomly. One matrix spike/matrix spike duplicate (MS/MSD) volume was collected for each analysis for each matrix, and one trip blank was included in each volatile organic compound (VOC) analysis sample shipment container. The location identification numbers were assigned based on the PRI/background area and the sample matrix type (ERM 2015).

Surface solids samples in PRI areas were collected from 0 to 6 inches from typically 5 grab sample aliquots using a hand auger with a 6-inch by 3.5-inch auger bucket; however, a Ponar sampler was used at sample locations with access issues. Subsurface solids samples in PRI areas were collected using a sonic drill rig to collect samples of 2-foot maximum sample intervals from 6 inches below ground surface (bgs) to 2 feet below the waste/native soil interface; however, Lexan™ tube coring was used at sample locations where sonic drilling was not successful. Surface solids samples in background areas were collected from 0 to 2 inches from typically 5 grab sample aliquots using a 4-inch by 4-inch flat-bottom scoop. Subsurface solids samples in background areas were collected from 2 inches to 3 feet bgs in a single borehole using a hand auger with a 6-inch by 3.5-inch auger bucket; however, at one location a post hole digger was used. PWT concurred with ERM on the lithologic interpretations of the subsurface cores and the selection of sample intervals. PWT reviewed the majority of ERM's boring logs in the field.

Solids samples witnessed by PWT were sieved, homogenized, and processed by ERM in accordance with the procedures identified in the Phase 1A-B RI SAP and SOP USM-01. ERM submitted Field Modification No. 7 requesting to modify the procedure in SOP USM-09 for sieving subsurface solids samples to make consistent with the procedure used for surface solids samples in SOP USM-01, which was approved by EPA on 4 November 2015. In accordance with the Data Quality Objectives, split solids samples were obtained by providing a sample container to ERM and having them fill the container after

all field sample processing had been completed. PWT accepted split solids samples in the field from the post-processed sample volume; however, the split solids samples for VOCs were collected by ERM at the point of sample collection. ERM and EPA-split sample aliquots were generally filled concurrently to the extent possible. PWT classified and logged all split solids samples according to the Unified Soil Classification System.

In PRI areas where waste was present in the surface solids sample aliquots, the thickness of the waste layer was measured using a hand auger, with the exception of location 1-06 which was measured using a Lexan<sup>TM</sup> tube. The hand auger was advanced at 6-inch intervals to the bottom of the waste layer or to 5 feet bgs, whichever was shallower, in accordance with SOP USM-01.

PWT used field log books (Appendix A), split sampling data sheets (Appendix B), photographs (Appendix C), and Site maps to document sample and split sample locations, field observations, air monitoring results, events that occurred during field activities, and deviations from the Phase 1A-B RI SAP. A split sampling field data sheet was completed for each sample collected by PWT (Appendix B). Numerous photographs and videos were taken by PWT to document Phase 1A-B RI field activities and observations. Only photographs pertinent to this report are presented in Appendix C; additional photographs and/or videos will be provided upon request. Sampling Field Data Sheets, photographs, chains-of-custody, and log book entries were managed according to the Phase 1 OS QAPP. A Scribe database project was established to track sample collection, generate chains-of-custody, and receive data from the laboratories.

The ERM samples were shipped to the TestAmerica laboratory located in Sacramento, California. The EPA split samples were submitted to ALS Environmental laboratory located in Salt Lake City, Utah, with polychlorinated biphenyls (PCBs) and dioxins/furans analyses sent to the ALS Environmental laboratory located in Houston, Texas. Analyses performed by the laboratories included the full suites of target analytes by the standard methods that were identified for the Phase 1A-B RI.

### **1.3 DEVIATIONS FROM GOVERNING DOCUMENTS**

During the Phase 1A-B RI, ten field modifications (No. 1 through 10) and three Record of SAP Modifications (No. 01, 02, and 03) were proposed by ERM, EPA, or PWT and approved by the EPA. Both the field and SAP modifications are summarized in Table 3 and the Record of SAP Modifications are included in Attachment 17B of the Phase 1A-B RI SAP. During Phase 1A-B, no Phase 1 OS QAPP modifications were proposed. The field and SAP modifications are discussed where applicable throughout this Technical Memorandum, with the exception of Record of SAP Modification No. 01, which was not associated with the field oversight or split sampling. ERM requested Record of SAP Modification No. 01 to include correct control limits for VOCs, semi-volatile organic compounds (SVOCs), and polynuclear aromatic hydrocarbons (PAHs) in Worksheet #24 of the Phase 1A-B RI SAP, which was approved by EPA on 26 October 2015.

## **2.0 PHASE 1A-B REMEDIAL INVESTIGATION FIELD OBSERVATIONS**

During oversight of the Phase 1A-B RI sampling activities, observations were made regarding the plant stack emissions, wildlife, and other field activities. These observations are summarized in the following sections.

### **2.1 WIND AND STACK EMISSIONS OBSERVATIONS**

Wind conditions at the Site were highly variable; it was not uncommon for the wind direction to fluctuate 360 degrees throughout the day. The stack behavior changed significantly based on wind and weather



conditions. Visible dissipation of the stack plume was observed to range from approximately one mile downwind under windy conditions to over 20 miles under calm conditions. During easterly winds, the stack plume was also observed spreading out and settling into the valleys of the Lakeside Mountains (Photo 1, Appendix C). Chlorine gas readings from the stack plume were encountered on the gypsum pile. At times, the stack plume exhibited “looping” behavior whereby the plume reaches the ground relatively near the stack (Photo 2, Appendix C) and on occasion, chlorine gas was observed falling straight down from the stack (Photo 3, Appendix C).

## **2.2 WILDLIFE OBSERVATIONS**

Different wildlife species were observed in and around the US Magnesium facility as well as signs such as tracks, scat, burrows, nests, etc. Significant observations are described here. Golden Eagles were observed regularly perched on top of the electrical poles that parallel Rowley Road south of the plant. On 19 October 2015 a coyote was observed walking in the northwest area of the Gypsum Pile where standing water was present (Photo 4, Appendix C) and a pelican carcass was observed on the Gypsum Pile approximately 100 feet southeast of sample location 4-01 (Photo 5, Appendix C). Animal burrows were observed in the gypsum waste on the southeast side of the Gypsum Pile (Photo 6, Appendix C). Animal tracks were observed in the saturated waste material in the former wastewater diversion ditch. Cattle and antelope were observed grazing in PRI Areas 15 and 16. A cow carcass was observed in PRI Area 16, on the west side of the road at the base of the Lakeside Mountains.

## **2.3 FIELD INSTRUMENT CALIBRATION**

The only field instrument used by ERM during the Phase 1A-B sampling activities that required calibration in the field was a photoionization detector (PID). Calibration of the PID was to be performed daily prior to use in accordance with Worksheet #22 of the Phase 1A-B RI SAP. PWT did not observe ERM calibrating the PID but it was reportedly performed as required.

## **2.4 FIELD SAMPLING EQUIPMENT DECONTAMINATION**

Field sampling equipment and drilling equipment witnessed by PWT was decontaminated in general accordance with SOP USM-03. ERM set up a decontamination station in the lavatory facilities of the on-site office trailer. The lavatory facilities were dedicated for decontamination purposes only and not used for personal sanitation. In general, all non-disposable sampling equipment was decontaminated at the office trailer before and after sampling at each field location. A pressure washer was frequently used at or near the sampling location to remove solids from the sampling equipment prior to transporting to the office trailer. Down-hole metal drilling equipment was steam cleaned with a pressure washer and hot tap water. Sampling tools were decontaminated by scrubbing in a solution of potable water and non-phosphate detergent (Liquinox®). The tools were then rinsed with potable water, rinsed with isopropyl alcohol, and finally rinsed with deionized water. Sampling tools not used immediately after decontamination were allowed to air dry on metal racks in the office trailer. Clean equipment was then placed in plastic bags. No sampling supplies/equipment was dedicated at any of the sampling locations.

On 6 November 2015, PWT witnessed the collection of an equipment blank from a sample processing equipment set (stainless steel spoon, sieve, and tray). The decontaminated stainless steel spoon and sieve was placed on the tray and deionized water was poured over all the equipment at the same time and a plastic funnel was used to capture the water dripping from the corner of the tray to fill the sample bottles. The equipment blank collection procedures witnessed by PWT were conducted in accordance with SOP USM-03. The frequency of equipment blank collection was not verified.

## **2.5 MANAGEMENT OF INVESTIGATION-DERIVED WASTE**

Investigation-derived waste (IDW), both solids and liquid, was generated during the Phase 1A-B activities. IDW witnessed by PWT was handled in accordance with Section 14.1.7 of the Phase 1A-B RI SAP and applicable SOPs. IDW was handled as follows:

- Used personal protective equipment (PPE) was disposed of in dumpsters at the US Magnesium facility;
- Excess soil from surface soil sample collection was left at the sample location;
- Excess soil from sonic drilling cores was placed in 55-gallon steel drums and left at the sample location; and
- Decontamination water was temporarily containerized in 5-gallon buckets and transferred to the Central Ditch.

## **2.6 FIELD DOCUMENTATION AND REPORTING**

In accordance with Worksheet #14 of the Phase 1A-B RI SAP and SOP USM-06, ERM used field data sheets and log books to document field activities such as sample locations, sampling information, field observations, and significant events that occur during field activities. ERM provided daily progress reports at the end of each field day in accordance with Worksheet #33 of the Phase 1A-B RI SAP.

ERM collected sample location coordinates in the field using a Trimble Pro XH Global Positioning System (GPS). PWT did not witness all field GPS activities; however, the GPS field data collection procedures appear to have been conducted in accordance with SOP USM-11.

## **2.7 HEALTH AND SAFETY CONSIDERATIONS**

### **2.7.1 General Health and Safety Approach**

Health and safety considerations were taken into account at each sampling location and PRI-specific details are described in the sections below. The ERM field team held tailgate health and safety meetings at the start of each new task. PPE was worn at all sampling locations in accordance with the appropriate health and safety plans for each contractor. The minimum level of PPE donned was modified Level D and was frequently upgraded to Level C. All PWT site work was conducted in general accordance with PWT's and US Magnesium's respiratory protection programs.

For health and safety considerations, PWT field personnel kept a safe distance from low pH wastewater and ditch banks. Observations of sampling were sometimes made from the nearest and best observation point rather than accompanying ERM at the sample collection point.

Throughout the Phase 1A-B RI field activities, PWT field personnel conducted ambient air monitoring for VOCs, dust, chlorine gas, and hydrogen chloride (HCl) gas using a direct-reading real-time instrument. PWT used an Industrial Scientific iBRiD MX6 multi-gas meter with a PID and oxygen, carbon monoxide, HCl, and chlorine gas sensors and a DustTRACK2 monitor. Respiratory protection was upgraded as necessary depending on the presence of chlorine and/or HCl gas in the ambient air.

### **2.7.2 Health and Safety Issues Encountered**

Weather conditions and facility process operations can significantly influence the potential for chlorine and other air borne contaminants to accumulate in the ambient air. Still air created air quality concerns because the chlorine and/or HCl gas would settle around the facility.

During the Phase 1A-B RI field activities, chlorine gas was measured with PWT field instruments in ambient air at concentrations up to 6.3 parts per million (ppm) and HCl gas was measured at concentrations up to 2.7 ppm. Elevated VOCs were not detected with the PID which measured VOCs in the ppm range. Respiratory protection was donned regularly due to the presence of chlorine gas and/or HCl gas.

Chlorine gas plumes originating from locations other than the facility stack were observed on multiple occasions. On 28 October 2015 a low-lying white haze (chlorine gas) was observed extending from the facility north into PRI Area 8 (Photo 7, Appendix C). The highest chlorine gas concentrations were encountered on the morning of 2 December 2015, when concentrations were sustained above 5 ppm while mobilizing to subsurface sample location 1-08 near the confluence of the Chlorine Ditch and Main Ditch. ERM's drilling subcontractor arrived at the location prior to the ERM/PWT field team and recorded chlorine concentrations up to 13 ppm with a personal gas meter. These were the highest chlorine readings ever recorded by the PWT or ERM field teams. For reference, the NIOSH Immediately Dangerous to Life or Health (IDLH) concentration for chlorine gas is 10 ppm. The response actions listed in ERM and PWT Health and Safety Plans were followed. The field team left the area and returned two hours later when chlorine gas was detected at less than 1 ppm; therefore, the field team donned respirators and completed the sampling at location 1-08. On 2 December 2015, the air was relatively still and additional discharge of chlorine gas was evident; there was a dense white haze encompassing the entire facility (Photo 8, Appendix C).

During the Phase 1A-B field activities, fugitive dust was not visible and the dust monitor did not detect significant levels of particulates in the air. However, dust was often generated while driving on dirt roads in and around the facility. PWT field vehicle windows were kept closed while driving to mitigate the dust inhalation hazard.

### **3.0 SPECIFIC FIELD ACTIVITIES AND OBSERVATIONS AT EACH PRI AREA**

Field activities were conducted in PRI Areas 1, 3, 4, 5, 6, and 7. The PWT PRI area-specific observations for the field activities during the Phase 1A-B RI are reported below. PWT field notes and field data sheets are provided in Appendices A and B, respectively, and photographic documentation is provided in Appendix C. The following sections summarize observations of the Phase 1A-B RI field activities with sampling summaries and observations provided separately for surface and subsurface solids.

ERM contracted Cascade Drilling to provide the necessary equipment and personnel to drill the borings. The soil borings were advanced using a track-mounted, Roto Sonic drilling rig. Sonic drilling employs the use of high-frequency, resonant energy to advance a core barrel or casing into the subsurface; no air, mud, or water is used in the coring process. During drilling, each borehole was continuously cored for logging of subsurface lithology. The core barrel produces a continuous, relatively undisturbed core sample in a plastic liner. Core samples were extracted in 5-foot sections. After reaching total depth, each borehole was backfilled with dry 3/8-inch bentonite chips.

Figure 1 provides a general site location and features map, including identification of the PRI areas and US Magnesium facility features. Figures 2 and 3 show the locations of the split samples accepted by EPA/PWT: Figure 2 – Solids Split Sample Locations - PRI Areas 1 and 3 through 7; and Figure 3 – Solids Split Sample Locations - Background.

### **3.1 PRI AREA 1 – DITCHES**

#### **3.1.1 Sampling Requirement**

The Phase 1A-B RI SAP identified collection of 14 surface solids samples (1-01 through 1-14) and subsurface solids samples from 5 locations (1-03, 1-07, 1-08, 1-13, and 1-14). The Phase 1 OS QAPP identified split samples from 2 of the 14 surface solids sample locations and 1 split sample from each of the 5 subsurface solids sample locations.

#### **3.1.2 Surface Solids Sample Collection**

The majority of the surface solids samples from PRI Area 1 were collected between 19 and 24 November 2015. The surface solids samples obtained using the Ponar sampler (1-03, 1-06, 1-07, and 1-08) were collected on 3 December 2015. PWT oversaw the collection of all surface solids samples in PRI Area 1 and accepted three split samples (1-04-SS-01-112415-ES01, 1-11-SS-01-112315-ES01, and 1-13-SS-01-112315-ES01). All sampling witnessed by PWT was conducted in general accordance with SOP USM-01, with the exception of the Ponar sampling discussed below. All split samples were collected from 5 to 7 grab sample aliquots using a hand auger, with the exception of location 1-04 which required 11 aliquots to accommodate for the split sample (this was the highest number of aliquots required for any sampling location during the Phase 1A-B RI).

Off-gassing or reactivity was not observed during sample collection or homogenization. ERM performed methanol testing at some of the locations where reactivity might be expected and no reactivity was observed in the methanol vials. All VOC analysis was performed using the En Core® samples.

The Phase 1A-B RI SAP locations for biased sample locations 1-04 and 1-12 were modified due to access limitations. The modified locations were in accordance with the rationale specified in Worksheet #18 of the Phase 1A-B RI SAP for the sample locations. ERM submitted Field Modification No. 9 for the change in sample locations, which was approved by EPA on 24 November 2015.

Due to access and health and safety issues, ERM submitted Record of SAP Modification No. 03, proposing an excavator-deployed Ponar sampler be used at locations 1-03, 1-06, 1-07, and 1-08 and EPA approved on 24 November 2015. The surface solids sampling at locations 1-03, 1-06, 1-07, and 1-08 using an excavator-deployed Ponar sampler (Photo 9, Appendix C) was completed on 3 December 2015. The Ponar sampler easily penetrated into the soft waste material and full or near full recovery in the Ponar bucket was achieved at each sample location (Photo 10, Appendix C); therefore, only one Ponar sample aliquot was required for each sample. The Ponar sampling witnessed by PWT was conducted in general accordance with SOP USM-12, with the exception of the Ponar deployment by excavator rather than helicopter.

#### **3.1.3 Subsurface Solids Sample Collection**

The subsurface solids samples obtained using the sonic drilling method were collected on 4, 5, and 10 November 2015 and the 1-08 samples obtained using the Lexan™ core method were collected on 2 December 2015. PWT oversaw all borehole drilling and subsurface solids sample collection in PRI Area 1 and accepted one split sample from each of the borings. All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 (as modified to include core sampling devices per Record of SAP Modification Number 03). Subsurface sampling details for the subsurface borings in PRI Area 1 are discussed below.

### **Subsurface Solids Sampling at 1-03:**

On 4 November 2015, the 1-03 boring was advanced to a depth of approximately 5.5 feet using a sonic drill rig with a 6-inch diameter core barrel. The boring was advanced at a 52 degree angle from the south bank of the east end of the Western Ditch just west of the road crossing. Following inspection of the core, ERM collected three samples:

- 0.5 to 1.5 feet at 52° angle / 0.39 to 1.2 feet bgs – 1-03-SB-01-0.5-1.5-110415
- 1.5 to 3.5 feet at 52° angle / 1.2 to 2.8 feet bgs – 1-03-SB-01-1.5-3.5-110415
- 3.5 to 5.5 feet at 52° angle / 2.8 to 4.3 feet bgs – 1-03-SB-01-3.5-5.5-110415

The native soil interface, observed to be dark gray sand, was encountered at approximately 3.5 feet bgs.

PWT accepted a split sample of native sand from:

- 3.5 to 5.5 feet at 52° angle / 2.8 to 4.3 feet bgs – 1-03-SB-01-3.5-5.5-110415-ES01

### **Subsurface Solids Sampling at 1-07:**

On 4 November 2015, the 1-07 boring was advanced to a depth of approximately 7 feet using a sonic drill rig with a 6-inch diameter core barrel. The boring was advanced at a 45 degree angle from the east bank of the Chlorine Ditch just south of the road crossing. Following inspection of the core, ERM collected four samples:

- 0.5 to 1.5 feet at 45° angle / 0.35 to 1.1 feet bgs – 1-07-SB-01-0.5-1.5-110415
- 1.5 to 3 feet at 45° angle / 1.1 to 2.1 feet bgs – 1-07-SB-01-1.5-3-110415
- 3 to 5 feet at 45° angle / 2.1 to 3.5 feet bgs – 1-07-SB-01-3-5-110415 (*not analyzed*)
- 5 to 7 feet at 45° angle / 3.5 to 4.9 feet bgs – 1-07-SB-01-5-7-110415 (*not analyzed*)

PWT accepted a split sample of waste material from:

- 0.5 to 1.5 feet at 45° angle / 0.35 to 1.1 feet bgs – 1-07-SB-01-0.5-1.5-110415-ES01

During drilling the native soil interface, observed to be gray clay, was thought to be encountered at approximately 5 feet bgs; however, following sample collection ERM audited the subsurface samples submitted to the lab versus the lithology observed in the boring and determined that the sample from 1.5 to 3 feet bgs is native soil. ERM determined that the 3 to 5 feet bgs and 5 to 7 feet bgs samples were collected below the first native soil interval and canceled the analyses of those two samples.

### **Subsurface Solids Sampling at 1-08:**

On 5 November 2015, the 1-08 boring was advanced to a depth of approximately 10 feet using a sonic drill rig with a 6-inch diameter core barrel. The boring was advanced at a 45 degree angle adjacent to the Main Ditch culvert on the west side of the road crossing (Photo 11, Appendix C), approximately 30 feet from the SAP location (SAP location was located on the southern bank of the ditch and was not accessible due to facility wastewater discharge piping). Sample recovery from within the upper zone was low due to compaction of the very soft and saturated materials encountered; 1 foot of material was recovered from 0.5 to 7 feet. Below 7 feet bgs, recovery was near 100 percent. Native sand was encountered below the waste material at approximately 6.0 feet bgs. Following inspection of the core, ERM collected three samples from the first core:

- 0.5 to 7 feet at 45° angle / 0.35 to 4.9 feet bgs – 1-08-SB-01-0.5-7-110515 (*not analyzed*)
- 7 to 8.5 feet at 45° angle / 4.9 to 6.0 feet bgs – 1-08-SB-01-7-8.5-110515 (*not analyzed*)
- 8.5 to 10 feet at 45° angle / 6.0 to 7.1 feet bgs – 1-08-SB-01-8.5-10-110515

EPA accepted a split sample from:

- 7 to 8.5 feet bgs – 1-08-SB-01-7-8.5-110515-ES01 (*not analyzed*)

Because sonic drilling did not produce a continuous core from 0.5 to 7 feet bgs, a Lexan™ tube coring method was used. On 2 December 2015, a 9-foot section of 4-inch diameter Lexan™ tube attached to the bucket of a long-reach excavator was advanced adjacent to the sonic boring location. The Lexan™ tubes were equipped with plastic liners, a suction ball at the top, and soil catchers at the bottom of the tube. The core was advanced to about 7 feet bgs and there was about 4 feet of recovery. ERM's coring subcontractor suspected that the loose saturated material near the surface fell down into the lower part of the core.

Since there was not full recovery in the first core, a second core was advanced in the center of the Main Ditch, approximately 15 feet west of the first core (Photo 12, Appendix C). The second core was advanced to 7 feet bgs and there was about 3 feet of recovery. What appeared to be black smut was observed in the bottom of the second core. A third core was advanced adjacent to the second core location, this time with no liner or soil catcher. The third core was advanced to 7 feet bgs and there was 6 feet of recovery. Black sandy gravel with a hydrocarbon odor was encountered from 5 to 6 feet bgs which was considered anomalous and therefore separated into its own sample interval. The top 1 foot of material in the core was stuck to the side of the Lexan™ tube and ERM was unable to recover it for sampling. Following inspection of the core, ERM collected three samples from the core:

- 1 to 3 feet bgs – 1-08-SB-01-1-3-120215
- 3 to 5 feet bgs – 1-08-SB-01-3-5-120215
- 5 to 6 feet bgs – 1-08-SB-01-5-6-120215

PWT did not accept any split samples from the 1-08 cores on 2 December 2015. ERM later notified EPA that the waste samples collected from 0.5 to 7 feet and 7 to 8.5 feet on 5 November 2015 would not be analyzed; therefore, PWT cancelled all analyses for split sample 1-08-SB-01-7-8.5-110515-ES01. ERM submitted Field Modification No. 10 proposing to analyze the waste samples from the Lexan™ core and to only analyze the native material sample from the sonic drilling on 5 November 2015, which EPA approved on 7 December 2015. All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 (as modified to include core sampling devices per Record of SAP Modification Number 03).

### **Subsurface Solids Sampling at 1-13:**

On 10 November 2015, the 1-13 boring was advanced to a depth of approximately 17 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. The boring was advanced between the PRI Areas 5 and 7 wastewater ponds in the former wastewater diversion ditch. Following inspection of the core, ERM collected eight samples from the core:

- 0.5 to 4 feet bgs – 1-13-SB-01-0.5-4-111015
- 4 to 6 feet bgs – 1-13-SB-01-0.5-4-111015
- 6 to 8 feet bgs – 1-13-SB-01-0.5-4-111015
- 8 to 9 feet bgs – 1-13-SB-01-0.5-4-111015
- 9 to 11 feet bgs – 1-13-SB-01-0.5-4-111015
- 11 to 13 feet bgs – 1-13-SB-01-0.5-4-111015 (*not analyzed*)
- 13 to 15 feet bgs – 1-13-SB-01-15-17-111015 (*not analyzed*)
- 15 to 17 feet bgs – 1-13-SB-01-15-17-111015 (*not analyzed*)

EPA accepted a split sample from:

- 13 to 15 feet bgs – 1-13-SB-01-13-15-111015-ES01 (*not analyzed*)

At the time of drilling, there was some uncertainty as to the starting depth of native soil in the boring and therefore the boring was conservatively advanced to greater depths to ensure that native soil was sampled. Upon review of the boring logs from this location and other (historic) borings and test pits completed in the area, ERM determined that native soil was encountered at 9 feet bgs at location 1-13. Therefore, ERM did not analyze the 11 to 13 feet bgs, 13 to 15 feet bgs, and 15 to 17 feet bgs samples.

A zone of olive green silt was observed in the 1-13 boring at a depth of 13 to 15 feet bgs, and because this interval appeared anomalous (based on color), samples were collected from these specific intervals. This olive-green interval was observed in the 1-13/7-04SB area during the 1970 Dames & Moore test pit programs and therefore appears to be associated with the lake deposits and is not an “anomalous waste/sediment layer” that requires sampling. Therefore, ERM did not analyze samples from 13 to 15 feet bgs because the olive-green layer is from deeper than 2 feet below the waste/native soil interface and is associated with lake deposits that pre-date magnesium plant operations. Since the EPA split sample from the 1-13 boring was collected from the 13 to 15 feet bgs interval, all analyses that had not already been run were cancelled, including PCBs, dioxins/furans, SVOCs, PAHs, and total metals.

#### **Subsurface Solids Sampling at 1-14:**

On 3 November 2015, the 1-14 boring was advanced to a depth of approximately 11 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. The boring was advanced between the Chlorine Ditch and Landfill in the Former Boron Ditch. At the time of drilling, there was some uncertainty as to the starting depth of native soil in the boring, however, due to time constraints for sample shipment, the boring was not advanced further and the drill rig was left on the hole. On 4 November 2015, the 1-14 boring was advanced to 17 feet bgs. There was approximately 2 feet of recovery from 11 to 15 feet bgs and a solid core recovery from 15 to 17 feet bgs; however, the plastic sample sleeve broke and the sample from 11 to 15 feet bgs was lost. A hydrocarbon odor was noted during the processing of the 15 to 17 feet bgs sample. Following inspection of the core, ERM collected eight samples:

- 0.5 to 2 feet bgs – 1-14-SB-01-0.5-2-110315
- 2 to 4 feet bgs – 1-14-SB-01-2-4-110315
- 4 to 6 feet bgs – 1-14-SB-01-4-6-110315
- 6 to 7 feet bgs – 1-14-SB-01-6-7-110315
- 7 to 8.5 feet bgs – 1-14-SB-01-7-8.5-110315
- 8.5 to 10 feet bgs – 1-14-SB-01-8.5-10-110315
- 10 to 11 feet bgs – 1-14-SB-01-10-11-110315 (*not analyzed*)
- 15 to 17 feet bgs – 1-14-SB-01-15-17-110415 (*not analyzed*)

EPA accepted a split sample of native sand from:

- 7 to 8.5 feet bgs – 1-14-SB-01-7-8.5-110315-ES01

Upon review of the boring logs from this location and other (historic) borings completed in the area, ERM determined that the sample from 8.5 to 10 feet bgs is native soil. Therefore, ERM did not analyze the 10 to 11 feet bgs and 15 to 17 feet bgs samples.

### **3.1.4 General Observations and Waste Thickness**

The surface solids sample locations appear to be representative of the different areas/ditches within PRI Area 1 and the subsurface sample locations appear to be representative of the Main Ditch, Chlorine Ditch, and Former Boron Ditch; no subsurface sampling was conducted in the Central Ditch or the north/south trending portion of the Western Ditch. The Ponar sampler was an effective means of surface solids sample collection in the ditch waste/sediment and the Lexan™ tube coring method was more effective

than sonic drilling in recovering the soft saturated waste material. The reddish brown waste material was often smeared to varying degrees on the outside of the native material sample core and the waste smear was homogenized with the native interval sample.

The thickness of the waste material in PRI Area 1 varies greatly between each ditch. Waste thickness measured in the ditches were as follows.

- Western Ditch. Two surface samples were collected and no waste was reported for either sample.
- Central Ditch. Two surface samples were collected with no waste recorded at one location and a waste thickness in excess of 5 feet reported for the other location. The thickness was based on a hand auger boring at that location.
- Chlorine Ditch. Two surface samples were collected and one boring was advanced in the location of one of the surface samples. Waste was reported in the surface sample adjacent to the boring, but not in the other surface sample. Waste was not reported at depth in the boring.
- Former Boron Ditch. One surface sample and one boring was advanced in the ditch. Waste was reported for the surface sample with a thickness of 3 inches. Waste was encountered from 7 feet bgs to 8.5 feet bgs resulting in a thickness of 1.5 feet.
- Main Ditch. Waste thicknesses ranged from 0.5 inch at one surface sampling location to 4 feet (1 foot bgs to 5 feet bgs) at one borehole location to 1 foot (8 feet bgs to 9 feet bgs) at another borehole location.

The waste material is reddish brown silt-like material throughout all of the ditches. Due to access limitations, waste thickness at location 1-06 was measured using an excavator-deployed Lexan™ tube.

### **3.1.5 PRI Area 3 – Sanitary Lagoon**

#### **3.1.5.1 Sampling Requirement**

The Phase 1A-B RI SAP identified collection of 14 surface solids samples (3-01 through 3-14) and subsurface samples from 1 location (3-14). The Phase 1 OS QAPP identified split samples from 3 of the 14 surface solids sample locations and 1 split sample from the subsurface solids sample location.

#### **3.1.5.2 Surface Solids Sample Collection**

The surface solids samples were collected on 16 through 19 November 2015. PWT oversaw the collection of all surface solids samples in PRI Area 3 and accepted three split samples (3-01-SS-01-111715-ES01, 3-04-SS-01-111715-ES01, and 3-14-SS-01-111715-ES01). All samples were collected from 5 to 6 grab sample aliquots using a hand auger. All sampling witnessed by PWT was conducted in general accordance with SOP USM-01. All surface solids samples were collected at the locations proposed in the Phase 1A-B RI SAP.

#### **3.1.5.3 Subsurface Solids Sample Collection**

##### **Subsurface Solids Sampling at 3-14:**

The borehole drilling and subsurface solids sampling in PRI Area 3 was conducted on 3 November 2015. PWT oversaw the drilling and subsurface sample collection from the 3-14 location and accepted one split subsurface solids sample. A ramp was constructed on the south side of the lagoon bank to allow drill rig access to the 3-14 location. The borehole was advanced to a depth of approximately 5 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. There was approximately 3 feet of recovery in the core and it appeared the top 3.5 feet of saturated organic waste material compressed to about 10 inches of recovery. Native clayey sand was encountered at approximately 3.5 feet bgs. Since only 1.5 feet of native



was encountered and the requirement is for 2 feet into native, a second core was advanced to a depth of 10 feet bgs and native clay and oolitic sand were encountered. The 5 to 10 foot core was not sampled. Following inspection of the core, ERM collected two samples from the first core:

- 0.5 to 3.5 feet bgs – 3-14-SB-01-0.5-3.5-110315
- 3.5 to 5 feet bgs – 3-14-SB-01-3.5-5-110315

EPA accepted a split sample from:

- 3.5 to 5 feet bgs – 3-14-SB-01-3.5-5-110315-ES01

All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 and the 3-14 samples were collected at the location proposed in the Phase 1A-B RI SAP.

#### **3.1.5.4 General Observations and Waste Thickness**

It appears that some of the material used to construct the banks of the Sanitary Lagoon is gypsum and the gypsum has eroded down into the lagoon. The wastewater outfall pipe was flowing continuously during the Phase 1A-B RI sampling in PRI Area 3 and there was surface water across the southern portion of the lagoon. The grid sample locations appear to represent each of the different areas within PRI Area 3.

The thickness of the waste material in PRI Area 3 varies from approximately 3 inches to 3.5 feet thick. The waste material is dark brown organic, clayey silt material.

### **3.1.6 PRI Area 4 – Gypsum Pile**

#### **3.1.6.1 Sampling Requirement**

The Phase 1A-B RI SAP identified collection of 14 surface solids samples (4-01 through 4-14) and subsurface samples from 1 location (4-05). The Phase 1 OS QAPP identified split samples from 3 of the 14 surface solids sample locations and 1 split sample from the subsurface solids sample location.

#### **3.1.6.2 Surface Solids Sample Collection**

The surface solids samples from PRI Area 4 were collected between 19 and 29 October 2015. PWT oversaw the collection of all surface solids samples in PRI Area 4 and accepted three split samples (4-01-SS-01-102015-ES01, 4-05-SS-01-102015-ES01, and 4-06-SS-01-102015-ES01). All samples were collected from 6 to 7 grab sample aliquots using a hand auger. All sampling witnessed by PWT was conducted in general accordance with SOP USM-01. All surface solids samples were collected at the locations proposed in the Phase 1A-B RI SAP.

#### **3.1.6.3 Subsurface Solids Sample Collection**

##### **Subsurface Solids Sampling at 4-05:**

The borehole drilling and subsurface solids sampling was conducted on 9 November 2015. PWT oversaw the drilling and subsurface sample collection from the PRI Area 4 boring location 4-05 and accepted one split subsurface solids sample. The borehole was advanced to a depth of approximately 11 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. There was approximately 6.5 feet of recovery in the core. Native sand and clayey silt was encountered below the gypsum waste at approximately 7 feet bgs. Since only 14 inches of native was encountered and the requirement is for 2 feet into native, a second core was advanced to a depth of 11 feet bgs. There was approximately 9.5 feet of recovery in the second core

and 4 feet of native material. Following inspection of the core, ERM collected four samples from the first core:

- 0.5 to 3 feet bgs – 4-05-SB-01-0.5-3-110915
- 3 to 5 feet bgs – 4-05-SB-01-3-5-110915
- 5 to 7 feet bgs – 4-05-SB-01-5-7-110915
- 7 to 9 feet bgs – 4-05-SB-01-7-9-110915

EPA accepted a split sample from:

- 7 to 9 feet bgs – 4-05-SB-01-7-9-110915-ES01

All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 and the 4-05 samples were collected at the location proposed in the Phase 1A-B RI SAP.

### **3.1.6.4 General Observations and Waste Thickness**

Gypsum slurry was discharged on the west-northwest side of the gypsum pile during the Phase 1A-B RI. Access across the saturated portions of the gypsum pile is challenging. The grid sample locations appear to represent each of the different areas within PRI Area 4. The thickness of the gypsum waste in PRI Area 4 ranged from 1 foot to 7 feet at the sample locations. The waste material is reddish brown gypsum; some thin layers of white material were also observed.

## **3.1.7 PRI Area 5 – Southeast Poned Waste Lagoon**

### **3.1.7.1 Sampling Requirement**

The Phase 1A-B RI SAP identified collection of 20 surface solids samples (5-01 through 5-20) and subsurface samples from 2 locations (5-14 and 5-16). The Phase 1 OS QAPP identified split samples from 4 of the 20 surface solids sample locations and 1 split sample from each of the subsurface solids sample locations.

### **3.1.7.2 Surface Solids Sample Collection**

The surface solids samples were collected between 17 and 25 September 2015 and on 15 and 27 October 2015. PWT oversaw the collection of all surface solids samples in PRI Area 5 and accepted four split samples (5-15-SS-01-091715-ES01, 5-17-SS-01-091815-ES01, 5-18-SS-01-091815-ES01, and 5-19-SS-01-091815-ES01). All sampling witnessed by PWT was conducted in general accordance with SOP USM-01, with the exception of the Ponar sampling discussed below. All surface solids samples were collected at the locations proposed in the Phase 1A-B RI SAP with the exception of 5-04 which was moved approximately 100 feet to the northeast due to SAP location being on the dirt road. ERM submitted Field Modification No. 1 for the change in sample location, which was approved by EPA on 25 September 2015.

Due to access and health and safety issues caused by the ponded wastewater, a helicopter-deployed Ponar sampler was used at locations 5-02, 5-07, 5-08, 5-11, 5-12, 5-13, and 5-14. The number of Ponar sample aliquots required for each sample ranged from one aliquot in the soft saturated waste material to four aliquots in the non-saturated sandy material, depending on depth of penetration (Photos 13 and 14, Appendix C). Locations 5-07, 5-08, and 5-12 did not get adequate penetration (greater than or equal to 4 inches bgs) with the Ponar sampler. ERM submitted Field Modification No. 5 for not meeting the penetration acceptability requirement and for compositing sample aliquots, which was approved verbally by EPA on 27 October 2015 and signed on 29 October 2015. A box core sampler was tested at 5-14 achieving 2 inches of penetration, compared to 6-inch penetration with the Ponar (Photos 15 and 16,

Appendix C). The Ponar sampling witnessed by PWT was conducted in general accordance with SOP USM-12.

### **3.1.7.3 Subsurface Solids Sample Collection**

The 5-16 subsurface solids samples obtained using the sonic drilling method were collected on 5 November 2015 and the 5-16 samples obtained using the Lexan™ core method were collected on 2 December 2015. The subsurface solids samples from 5-14 were collected on 1 December 2015. PWT oversaw the drilling/coring and subsurface sample collection from the PRI Area 5 boring locations and accepted one split subsurface solids sample from each boring location.

#### **Subsurface Solids Sampling at 5-14:**

The Phase 1A-B RI SAP location for 5-14 was modified due to access limitations caused by acidic wastewater and soft saturated sediment. The subsurface solids sample location was moved west-northwest of the SAP location to the nearest location an excavator could access from the gypsum pile. Since the use of a sonic drill rig was not practical at this location, ERM proposed to use a core sampler deployed from a long-reach excavator. ERM submitted Record of SAP Modification No. 03, proposing a revised location and sampling method for the 5-14 location. Since the 5-14 sample location was a collocated surface and subsurface sample location and the surface sample had already been collected, ERM referred to the subsurface sample location as 5-14SB.

The 5-14SB samples were collected with using a 15-foot section of 4-inch diameter Lexan™ tube attached to the bucket of a long-reach excavator (Photo 17, Appendix C). The sample core was collected approximately 30 feet from the shore of the gypsum pile. The Lexan™ tubes were equipped with plastic liners, a suction ball at the top, and soil catchers at the bottom of the tube. The first core was advanced to about 8.7 feet bgs and there was about 6 feet of recovery; however, ERM was unable to remove the core liners. A second core was advanced to 6 feet bgs with full recovery; however the bottom of the core was waste material. A third core was advanced to 8 feet bgs and there was about 6 feet of recovery with about 1 inch of native sand at the bottom. Following inspection of the core, ERM collected three samples from the third core:

- 0 to 2 feet bgs – 5-14SB-SB-01-0-2-120115
- 2 to 4 feet bgs – 5-14SB-SB-01-2-4-120115
- 4 to 6 feet bgs – 5-14SB-SB-01-4-6-120115

EPA accepted a split sample from:

- 4 to 6 feet bgs – 5-14SB-SB-01-4-6-120115-ES01

Because the requirement to sample two feet into native material was not met with the third core, a fourth core was advanced to collect the native material sample interval. A shorter, 11-foot section of Lexan™ core was advanced to 10 feet bgs and there was about 8 feet of recovery. Native sand was encountered below the waste material at approximately 8 feet bgs. ERM collected a sample from the fourth core:

- 8 to 10 feet bgs – 5-14SB-SB-01-8-10-120115

The 6 to 8 foot interval was not sampled due to poor recovery. All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 (as modified to include core sampling devices per Record of SAP Modification No. 03).

### **Subsurface Solids Sampling at 5-16:**

On 5 November 2015 the 5-16 borehole was advanced with a sonic drill rig to a depth of approximately 10 feet bgs using a 6-inch diameter core barrel. Sample recovery from within the upper zone was low due to compaction of the very soft and saturated materials encountered; 1.5 feet of material was recovered from 0.5 to 6.5 feet bgs. The entire 1.5-foot interval of recovered material was homogenized/processed and sampled. Below 6.5 feet bgs, recovery was 100 percent. Following inspection of the core, ERM collected three samples from the first core:

- 0.5 to 6.5 feet bgs – 5-16-SB-01-0.5-6.5-110515 (*not analyzed*)
- 6.5 to 8 feet bgs – 5-16-SB-01-6.5-8-110515

8 to 10 feet bgs – 5-16-SB-01-8-10-110515 (*not analyzed*) EPA accepted a split sample from:

- 8 to 10 feet bgs – 5-16-SB-01-8-10-110515-ES01 (*not analyzed*)

ERM later notified EPA that the 8 to 10 foot sample would not be analyzed; therefore, PWT cancelled all analyses for split sample 5-16-SB-01-8-10-110515-ES01.

On 2 December 2015, the 5-16 subsurface solids samples were collected using a 9-foot section of 4-inch diameter Lexan™ tube attached to the bucket of a long-reach excavator (Photo 18, Appendix C). The Lexan™ tubes were equipped with plastic liners, a suction ball at the top, and soil catchers at the bottom of the tube. The core was advanced to about 7 feet bgs and there was 100 percent recovery. Native clay was encountered below the waste material at approximately 5 feet bgs. Following inspection of the core, ERM collected three samples from the core:

- 0.5 to 2 feet bgs – 5-16-SB-01-0.5-2-120215
- 2 to 4 feet bgs – 5-16-SB-01-2-4-120215
- 4 to 5 feet bgs – 5-16-SB-01-4-5-120215

All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 (as modified to include core sampling devices per Record of SAP Modification Number 03).

#### ***3.1.7.4 General Observations and Waste Thickness***

The grid and biased sample locations appear to represent each of the different areas within PRI Area 5 with the exception of a rectangular area on the west side of PRI Area 5 where reddish brown solids had been stockpiled in the past. An earthen dam was constructed in the Skull Creek Diversion Ditch at the southeast corner of PRI Area 5 (Photo 19, Appendix C). The waste at the 5-14SB boring location, located at the outlet of the Main Ditch into the Southeast Poned Waste Lagoon, was approximately 8 feet thick. The waste in the former diversion ditch at the 5-16 boring location was approximately 5 feet thick. The waste material is reddish brown silt-like material.

### **3.1.8 PRI Area 6 – Northwest Poned Waste Lagoon**

#### ***3.1.8.1 Sampling Requirement***

The Phase 1A-B RI SAP identified collection of 16 surface solids samples (6-01 through 6-16) and subsurface samples from 1 location (6-16). The Phase 1 OS QAPP identified split samples from 3 of the 16 surface solids sample locations and 1 split sample from the subsurface solids sample location.

### **3.1.8.2 Surface Solids Sample Collection**

The surface solids samples obtained using the hand auger method were collected on 16 and 17 September 2015 and 16 October 2015. The surface solids samples obtained using the Ponar sampler were collected on 28 October 2015. PWT oversaw the collection of all surface solids samples in PRI Area 6 and accepted three split samples (6-06-SS-01-091715-ES01, 6-14-SS-01-091615-ES01, and 6-15-SS-01-091615-ES01). All surface solids samples were collected at the locations proposed in the Phase 1A-B RI SAP. All sampling witnessed by PWT was conducted in general accordance with SOP USM-01, with the exception of the Ponar sampling discussed below.

Due to access and health and safety issues caused by the ponded wastewater, a helicopter-deployed Ponar sampler was used at locations 6-02, 6-05, 6-08, 6-09, 6-10, 6-11, 6-12, and 6-13. The number of Ponar sample aliquots required for each sample ranged from one to three aliquots depending on depth of penetration. Locations 6-09, 6-11, and 6-13 did not get adequate penetration (greater than or equal to 4 inches bgs) with the Ponar sampler. ERM submitted Field Modification No. 5 for not meeting the penetration acceptability requirement and for compositing sample aliquots, which was approved verbally by EPA on 27 October 2015 and signed on 29 October 2015. The Ponar sampling witnessed by PWT was conducted in general accordance with SOP USM-12.

### **3.1.8.3 Subsurface Solids Sample Collection**

#### **Subsurface Solids Sampling at 6-16:**

The subsurface solids samples from the PRI Area 6 boring location, 6-16, were collected on 6 November 2015. PWT oversaw the drilling and subsurface sample collection from the 6-16 location and accepted one split subsurface solids sample. The 6-16 borehole was advanced at the location proposed in the Phase 1A-B RI SAP on the east side on the gypsum pile (Photo 20, Appendix C). The borehole was advanced to a depth of approximately 10 to 11 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. There was only about 4.5 feet of recovery in the first core so a second core was advanced. Since there was only about 3 feet of recovery in the second core, a third core was advanced. There was about 9 feet of recovery in the third core and more than 2 feet of native material. Native sand was encountered below the gypsum waste at approximately 4.5 feet bgs. Following inspection of the core, ERM collected three samples from the third core:

- 0.5 to 3.5 feet bgs – 6-16-SB-01-0.5-3.5-110615
- 3.5 to 4.5 feet bgs – 6-16-SB-01-3.5-4.5-110615
- 4.5 to 6.5 feet bgs – 6-16-SB-01-4.5-6.5-110615

EPA accepted a split sample from:

- 3.5 to 4.5 feet bgs – 6-16-SB-01-3.5-4.5-110615-ES01

All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09.

### **3.1.8.4 General Observations and Waste Thickness**

The grid and biased sample locations appear to represent each of the different areas within PRI Area 6. The gypsum waste at the 6-16 boring location was approximately 4.5 feet thick. The waste material is generally a reddish brown silt-like material though some white waste material was also observed (Photo 21, Appendix C). The wastewater from the Northwest Ponded Waste Lagoon continues to seep north through the berm road that separates PRI Area 6 from PRI Area 8.

### 3.1.9 PRI Area 7 – Northeast Poned Waste Lagoon

#### 3.1.9.1 Sampling Requirement

The Phase 1A-B RI SAP identified collection of 17 surface solids samples (7-01 through 7-17) and subsurface samples from 1 location (7-04). The Phase 1 OS QAPP identified split samples from 2 of the 17 surface solids sample locations and 1 split sample from the subsurface solids sample location.

#### 3.1.9.2 Surface Solids Sample Collection

The surface solids samples were collected between 21 and 29 September 2015. PWT oversaw the collection of all surface solids samples in PRI Area 7 and accepted four split samples (7-11-SS-01-092115-ES01, 7-13-SS-01-092215-ES01, 7-14-SS-01-092215-ES01, and 7-15-SS-01-092215-ES01). All surface solids samples were collected at the locations proposed in the Phase 1A-B RI SAP. All sampling witnessed by PWT was conducted in general accordance with SOP USM-01.

#### 3.1.9.3 Subsurface Solids Sample Collection

The subsurface solids samples obtained from location 7-04 using the sonic drilling method were collected on 10 November 2015 and the 7-04 samples obtained using the Lexan™ core method were collected on 10 December 2015. The Phase 1A-B RI SAP location for subsurface solids sampling at 7-04 was modified due to drill rig access limitations caused by the soft saturated sediment. The subsurface solids sample location was moved approximately 150 feet west-southwest of the SAP location to the nearest location the drill rig could access while meeting the objective for the samples. Since the 7-04 sample location was a collocated surface and subsurface sample location and the surface sample had already been collected, ERM referred to the subsurface sample location as 7-04SB. ERM submitted Field Modification No. 8 for the change in sample location and identification, which was approved verbally by EPA on 10 November 2015 and signed on 12 November 2015.

On 10 November 2015, the drillers constructed a plywood ramp out to the drilling location (Photo 22, Appendix C) and advanced the 7-04SB borehole to a depth of approximately 12.5 feet bgs using a sonic drill rig with a 6-inch diameter core barrel. There was no recovery from 0 to 2.5 feet bgs. Following inspection of the core, ERM collected five samples from the core:

- 2.5 to 4.5 feet bgs – 7-04-SB-01-2.5-4.5-111015
- 4.5 to 6.5 feet bgs – 7-04-SB-01-4.5-6.5-111015 (*not analyzed*)
- 6.5 to 8.5 feet bgs – 7-04-SB-01-6.5-8.5-111015 (*not analyzed*)
- 8.5 to 9.5 feet bgs – 7-04-SB-01-8.5-9.5-111015 (*not analyzed*)
- 9.5 to 11.5 feet bgs – 7-04-SB-01-9.5-11.5-111015 (*not analyzed*)

EPA accepted a split sample from:

- 8.5 to 9.5 feet bgs – 7-04-SB-01-8.5-9.5-111015-ES01 (*not analyzed*)

At the time of drilling there was some uncertainty as to the starting depth of native soil in the boring and therefore the boring was conservatively advanced to greater depths to ensure that native soil was sampled.

A zone of olive green silt was observed at 8.5 to 9.5 feet bgs at 7-04SB, and because this interval appeared anomalous (based on color), samples were collected from these specific intervals. This olive-green interval was observed in the 1-13/7-04SB area during the 1970 Dames & Moore test pit programs and therefore appears to be associated with the lake deposits and is not an “anomalous waste/sediment layer” that requires sampling. Therefore, ERM did not analyze samples from at 8.5 to 9.5 feet bgs at 7-04SB because the olive-green layer is from deeper than 2 feet below the waste/native soil interface and is

associated with lake deposits that pre-date magnesium plant operations. ERM determined that native soil was encountered at 2.5 feet bgs at location 7-04SB. Therefore, ERM only analyzed the 2.5 to 4.5 feet bgs sample. Since the EPA split sample from 7-04SB was collected from the 8.5 to 9.5 feet bgs interval, all analyses were cancelled.

Given that there was no recovery in the saturated waste material from 0.5 to 2.5 feet bgs, an alternate procedure was identified for obtaining a subsurface solids sample from the waste material at location 7-04SB. Pursuant to Record of SAP Modification No. 03, ERM used a 5-foot section of 4-inch diameter Lexan™ tube to collect one sample from the core (Photo 23, Appendix C):

- 0.5 to 2.5 feet bgs – 7-04-SB-01-0.5-2.5-121015

EPA accepted a split sample from:

- 0.5 to 2.5 feet bgs – 7-04-SB-01-0.5-2.5-121015-ES01

All subsurface solids sampling witnessed by PWT was conducted in general accordance with SOP USM-09 (as modified to include core sampling devices per Record of SAP Modification No. 03).

#### **3.1.9.4 General Observations and Waste Thickness**

The grid sample locations appear to represent each of the different areas within PRI Area 7. The wastewater from the Northwest and Southeast Poned Waste Lagoons continues to seep east through the isthmus road that separates PRI Area 7 from PRI Areas 5 and 6. The Lexan™ tube coring method was more effective than sonic drilling in recovering the soft saturated waste material. No waste was identified in the only subsurface boring in PRI Area 7. A reddish brown silt-like material was noted in the surface samples.

### **3.2 SPECIFIC FIELD ACTIVITIES AND OBSERVATIONS AT EACH BACKGROUND AREA**

The Phase 1A-B RI background sampling areas include three Upland areas (Upland North, Upland South and Upland Southeast), three Lakebed areas (Lakebed North, Lakebed Southeast, and Lakebed Southeast at Badger Island), and the Bear River Migratory Bird Refuge. The Phase 1A-B RI SAP identified collection of 65 background surface solids samples at 65 locations and one subsurface sample from each of the 7 background sampling areas (7 samples). The subsurface samples were collocated with a surface solids sample, near the center of each background sampling area (Photo 24, Appendix C). The Phase 1 OS QAPP identified split samples from 2 of the 10 surface solids sample locations in the Upland and Lakebed areas, from 1 of the 5 surface solids sample locations in the Bear River Migratory Bird Refuge area, and at least 1 split sample from each subsurface solids sample location, resulting in a total of 20 split samples.

The Phase 1A-B RI SAP (Section 11.3.7.5.2) states that the subsurface samples would be collected following SOP USM-09 using a portable flighted auger with soil sampling probe or a compressed-gas powered direct push corer. ERM brought a portable flighted auger with soil sampling probe on the first day of background sampling (1 October 2015); however, the portable flighted auger had a ½-inch diameter probe which could not produce the sample volume needed. Therefore, this equipment was not used and ERM collected subsurface samples with a hand auger. ERM submitted Record of SAP Modification No. 01 to modify the subsurface sample collection method for background areas and EPA approved on 7 October 2015. The SAP modification also addressed a minor revision to sample nomenclature. The Phase 1A-B RI SAP (Section 11.3.7.5.2) states that the sample identification depth interval will be in feet bgs; however, it was determined that inches would be used for the background area subsurface sample depth interval identifications (i.e. 2-36 rather than 0.17-3).

SOP USM-09, Section 6.5, states that boreholes will be abandoned using hydrated bentonite chips; however, ERM did not have bentonite chips on 1 October 2015. Therefore, ERM proposed to abandon boreholes in the background sampling areas with the remaining sample volume. ERM submitted Field Modification No. 2 for the change in borehole abandonment procedure, which was approved by EPA on 1 October 2015. This change was also documented in Record of SAP Modification No. 01.

All sampling witnessed by PWT was conducted in general accordance with the Phase 1A-B RI SAP (as modified per Record of SAP Modification Number 01). The PWT background sampling area-specific sampling summaries and observations for the field activities during the Phase 1A-B RI are reported below. Table 1 details information regarding each sample and split sample collected; including location identification, media, number of samples, rationale, split sample number and date of sample collection. Figure 3 shows the location of the split samples accepted by EPA/PWT from the background areas. PWT field notes and field data sheets are provided in Appendices A and B, respectively, and photographic documentation is provided in Appendix C.

### **3.2.1 Background Sampling Area Upland North**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (UPN-1 through UPN-10) and a subsurface sample from 1 location (UPN-6). The surface and subsurface solids samples were collected on 14 October 2015. PWT oversaw the collection of all samples in the Upland North area and accepted two surface solids split samples (UPN-2-SS-01-101415-ES01 and UPN-10-SS-01-101415-ES01) and one subsurface solids split sample (UPN-6-SB-01-02-36-101415-ES01). The surface soil observed in the Upland North area was predominantly clayey silt with varying fractions of vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within the Upland North area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP. More wildlife was observed in the Upland North area than the other background areas, with the exception of the Bear River Migratory Bird Refuge.

### **3.2.2 Background Sampling Area Upland South**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (UPS-1 through UPS-10) and subsurface samples from 1 location (UPS-6). The surface and subsurface solids samples were collected on 12 and 13 October 2015. PWT oversaw the collection of all samples in the Upland South area and accepted two surface solids split samples (UPS-1-SS-01-101215-ES01 and UPS-6-SS-01-101315-ES01) and one subsurface solids split sample (UPS-6-SB--02-36-01-101315-ES01). The surface soil observed in the Upland South area was predominantly clayey silt with varying fractions of vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within the Upland South area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP.

### **3.2.3 Background Sampling Area Upland Southeast**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (UPSE-1 through UPSE-10) and subsurface samples from 1 location (UPSE-5). The surface and subsurface solids samples were collected on 30 September and 1 October 2015. PWT oversaw the collection of all samples in the Upland Southeast area and accepted two surface solids split samples (UPSE-1-SS-01-100115-ES01 and UPSE-3-SS-01-100115-ES01) and one subsurface solids split sample (UPSE-5-SB-01-02-36-100115-ES01). The surface soil observed in the Upland Southeast area was predominantly sandy silt with varying fractions of vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within



the Upland Southeast area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP.

### **3.2.4 Background Sampling Area Lakebed North**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (LBN-1 through LBN-10) and subsurface samples from 1 location (LBN-6). The surface and subsurface solids samples were collected on 2 and 5 October 2015. PWT oversaw the collection of all samples in the Lakebed North area and accepted two surface solids split samples (LBN-6-SS-01-100515-ES01 and LBN-7-SS-01-100515-ES01) and one subsurface solids split sample (LBN-6-SB-01-02-36-100515-ES01). The surface soil observed in the Lakebed North area was predominantly silty clay with little vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within the Lakebed North area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP.

### **3.2.5 Background Sampling Area Lakebed Southeast**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (LBSE-1 through LBSE-10) and subsurface samples from 1 location (LBSE-7). The surface and subsurface solids samples were collected on 6 and 7 October 2015. PWT oversaw the collection of all samples in the Lakebed Southeast area and accepted two surface solids split samples (LBSE-3-SS-01-100615-ES01 and LBSE-5-SS-01-100615-ES01) and one subsurface solids split sample (LBSE-7-SB-01-02-36-100715-ES01). The surface soil observed in the Lakebed Southeast area was primarily sand with varying fractions of silt, clay, and vegetation.

All samples were collected at the locations proposed in the Phase 1A-B RI SAP, with the exception of the location for sample LBSE-10. The surface material at the SAP location for LBSE-10 was firm salt; therefore, ERM requested to move the location 25 feet to the north into soil. ERM submitted Field Modification No. 3 for the change in the LBSE-10 sample location, which was approved verbally by EPA on 7 October 2015 and signed on 9 October 2015. The grid sample locations appear to represent each of the different areas and different surface solids types within the Lakebed Southeast area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP.

### **3.2.6 Background Sampling Area Lakebed Southeast at Badger Island**

The Phase 1A-B RI SAP identified collection of 10 surface solids samples (LBB-1 through LBB-10) and subsurface samples from 1 location (LBB-7). The surface and subsurface solids samples were collected on 8 and 9 October 2015. PWT oversaw the collection of all samples in the Lakebed Southeast at Badger Island area and accepted two surface solids split samples (LBB-9-SS-01-100815-ES01 and LBB-10-SS-01-100815-ES01) and one subsurface solids split sample (LBB-7-SB-01-02-36-100815-ES01). The surface soil observed in the Lakebed Southeast at Badger Island area was predominantly sand and silty sand with varying fractions of surface gravel and vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within the Lakebed Southeast at Badger Island area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP. The area is heavily traversed by brine shrimps.

### **3.2.7 Background Sampling Area Bear River Migratory Bird Refuge**

The Phase 1A-B RI SAP identified collection of 5 surface solids samples (BR-1 through BR-5) and subsurface samples from 1 location (BR-3). The surface and subsurface solids samples were collected on 22 October 2015. PWT oversaw the collection of all samples in the Bear River Migratory Bird Refuge area and accepted one surface solids split sample (BR-3-SS-01-102215-ES01) and one subsurface solids split sample (BR-3-SB-01-02-36-102215-ES01). Subsurface solids samples were to be collected using a hand auger; however, a hand auger was not available to collect the subsurface sample at location BR-3. Therefore, ERM requested to use a post hole digger in place of a hand auger. ERM submitted Field Modification No. 4 for the change in subsurface solids sampling equipment and EPA approved on 23 October 2015. The surface soil observed in the Bear River Migratory Bird Refuge area was predominantly sand and silty sand with varying fractions of surface gravel and vegetation. All samples were collected at the locations proposed in the Phase 1A-B RI SAP. The grid sample locations appear to represent each of the different areas and different surface solids types within the Bear River Migratory Bird Refuge area. Observations were consistent with those described in Attachment 11 of the Phase 1A-B RI SAP.

## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

During the Phase 1A-B RI, ERM collected 159 surface solids samples from 159 locations and 61 subsurface solids samples from 18 locations. PWT provided oversight of the field activities and collected a total of 52 split samples; 4 of which were either not analyzed or only analyzed for some of the analytes. Split samples were collected from 33 of the surface solids samples and one subsurface solids sample was collected from each subsurface boring location, resulting in a total of 19 subsurface solids split samples of which only 15 were analyzed. Based on PWT field observations, ERM satisfactorily implemented the field activities pursuant to the EPA-approved plans. Overall there was consistency in the application of sampling protocols and documentation. The SOPs used during the Phase 1A-B RI were sufficient. Implementation of the Phase 1A-B RI solids sampling indicates the sampling methods used may be appropriate and successful for use during future phases of the RI.

## REFERENCES

- ERM-West, Inc. (ERM). 2015. *Phase 1A-B Remedial Investigation Sampling and Analysis Plan for: 1) Chemicals of Potential Concern in Soil, Sediment, and Solid Waste in PRI Areas 1 and 3 through 7; 2) Preliminary Site Characterization Mapping of PRI Area 1 and 3 through 7; and background Chemical Assessment of Biotic Reference Areas for Sitewide Ecological Risk Assessment*. September.
- U.S. Environmental Protection Agency (EPA). 2015. *Phase 1 Remedial Investigation Oversight Quality Assurance Project Plan; Revision 1*. September.

## **TABLES**

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>PRI Area 1 – Ditches</b>							
1-01	Surface Solid	1	Near head of Western Ditch	No	0		19 Nov 2015
1-02	Surface Solid	1	Approx. midpoint of N-S segment of Western Ditch.	No	0		19 Nov 2015
1-03	Surface Solid / Subsurface Solid	1 / 3	W of bridge at confluence of Western and Main ditches.	No / Yes	0 / 1	1-03-SB-01-3.5-5.5-110415-ES01	3 Dec 2015 / 4 Nov 2015
1-04	Surface Solid	1	Near head of Central Ditch	Yes	1 (1)	1-04-SS-01-112415-ES01 and MS/MSD and replicate 1-04-SS-01-112415-ES02	24 Nov 2015
1-05	Surface Solid	1	Central Ditch downstream of Sanitary Lagoon.	No	0		19 Nov 2015
1-06	Surface Solid	1	Near head of Chlorine Ditch	No	0		3 Dec 2015
1-07	Surface Solid / Subsurface Solid	1 / 2	Chlorine Ditch downstream of Boron Plant discharge and S of bridge.	No / Yes	0 / 1	1-07-SB-01-0.5-1.5-110415-ES01	3 Dec 2015 / 4 Nov 2015
1-08	Surface Solid / Subsurface Solid	1 / 4	Main Ditch after confluence with Chlorine Ditch and E of bridge.	No / No	0 / 0	1-08-SB-01-7-8.5-110515-ES01 Collected, partially analyzed, NOT to be reported	3 Dec 2015 / 5 Nov 2015 and 2 Dec 2015
1-09	Surface Solid	1	Main Ditch adjacent to Landfill	No	0		23 Nov 2015
1-10	Surface Solid	1	Main Ditch below Landfill	No	0		23 Nov 2015
1-11	Surface Solid	1	Main Ditch near current outlet to PRI Area 5 waste pond.	Yes	1	1-11-SS-01-112315-ES01	23 Nov 2015
1-12	Surface Solid	1	Main Ditch alignment adjacent to PRI Area 5 waste pond.	No	0		24 Nov 2015
1-13	Surface Solid / Subsurface Solid	1 / 5	Former Main Ditch near historical outlet to PRI Area 7 waste pond.	Yes / No	1 / 0	1-13-SS-01-112315-ES01 and 1-13-SB-01-13-15-111015-ES01 Collected - not analyzed	23 Nov 2015 / 10 Nov 2015
1-14	Surface Solid / Subsurface Solid	1 / 6	Former Boron Ditch.	No / Yes	0 / 1	1-14-SB-01-7-8.5-110315-ES01	19 Nov 2015 / 3 Nov 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

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Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>PRI Area 3 – Sanitary Lagoon</b>							
3-01	Surface Solid	1	Grid	Yes	1	3-01-SS-01-111715-ES01	17 Nov 2015
3-02	Surface Solid	1	Grid	No	0		16 Nov 2015
3-03	Surface Solid	1	Grid	No	0		16 Nov 2015
3-04	Surface Solid	1	Grid	Yes	1 (1)	3-04-SS-01-111715-ES01 and replicate 3-04-SS-01-111715-ES02	17 Nov 2015
3-05	Surface Solid	1	Grid	No	0		17 Nov 2015
3-06	Surface Solid	1	Grid	No	0		17 Nov 2015
3-07	Surface Solid	1	Grid	No	0		18 Nov 2015
3-08	Surface Solid	1	Grid	No	0		18 Nov 2015
3-09	Surface Solid	1	Grid	No	0		18 Nov 2015
3-10	Surface Solid	1	Grid	No	0		18 Nov 2015
3-11	Surface Solid	1	Grid	No	0		19 Nov 2015
3-12	Surface Solid	1	Grid	No	0		19 Nov 2015
3-13	Surface Solid	1	Grid	No	0		19 Nov 2015
3-14	Surface Solid / Subsurface Solid	1 / 2	Presumed inlet to lagoon	Yes / Yes	1 / 1	3-14-SS-01-111715-ES01 and 3-14-SB-01-3.5-5-110315- ES01	17 Nov 2015 / 3 Nov 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

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Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>PRI Area 4 – Gypsum Pile</b>							
4-01	Surface Solid	1	Grid	No	0		19 Oct 2015
4-02	Surface Solid	1	Grid	No	0		19 Oct 2015
4-03	Surface Solid	1	Grid	Yes	1	4-03-SS-01-102015-ES01	20 Oct 2015
4-04	Surface Solid	1	Grid	No	0		23 Oct 2015
4-05	Surface Solid / Subsurface Solid	1 / 4	Grid	Yes / Yes	1 / 1	4-05-SS-01-102015-ES01 and 4-05-SB-01-7-9-110915-ES01	20 Oct 2015 / 9 Nov 2015
4-06	Surface Solid	1	Grid	Yes	1 (1)	4-06-SS-01-102015-ES01 and replicate 4-06-SS-01-102015-ES02	20 Oct 2015
4-07	Surface Solid	1	Grid	No	0		20 Oct 2015
4-08	Surface Solid	1	Grid	No	0		23 Oct 2015
4-09	Surface Solid	1	Grid	No	0		23 Oct 2015
4-10	Surface Solid	1	Grid	No	0		21 Oct 2015
4-11	Surface Solid	1	Grid	No	0		21 Oct 2015
4-12	Surface Solid	1	Grid	No	0		29 Oct 2015
4-13	Surface Solid	1	Grid	No	0		29 Oct 2015
4-14	Surface Solid	1	Grid	No	0		29 Oct 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>PRI Area 5 – Southeast Poned Waste Lagoon</b>							
5-01	Surface Solid	1	Grid	No	0		15 Oct 2015
5-02	Surface Solid	1	Grid	No	0		27 Oct 2015
5-03	Surface Solid	1	Grid	No	0		25 Sept 2015
5-04	Surface Solid	1	Grid	No	0		25 Sept 2015
5-05	Surface Solid	1	Grid	No	0		25 Sept 2015
5-06	Surface Solid	1	Grid	No	0		15 Oct 2015
5-07	Surface Solid	1	Grid	No	0		27 Oct 2015
5-08	Surface Solid	1	Grid	No	0		27 Oct 2015
5-09	Surface Solid	1	Grid	No	0		17 Sept 2015
5-10	Surface Solid	1	Grid	No	0		15 Oct 2015
5-11	Surface Solid	1	Grid	No	0		27 Oct 2015
5-12	Surface Solid	1	Grid	No	0		27 Oct 2015
5-13	Surface Solid	1	Grid	No	0		27 Oct 2015
5-14	Surface Solid / Subsurface Solid	1 / 4	Grid	No / Yes	0 / 1	5-14SB-SB-01-4-6-120115	27 Oct 2015 / 1 Dec 2015
5-15	Surface Solid	1	Grid	Yes	1	5-15-SS-01-091715-ES01 and MS/MSD	17 Sept 2015
5-16	Surface Solid / Subsurface Solid	1 / 4	Former Diversion Ditch near/at an inlet of the ditch into the PRI Area 5 waste lagoon.	No / No	0 / 0	5-16-SB-01-8-10-110515-ES01 Collected, partially analyzed, NOT to be reported	15 Oct 2015 / 5 Nov 2015 and 2 Dec 2015
5-17	Surface Solid	1	Lower reach of the Former Diversion Ditch (representing the eastward leg draining into the PRI Area 5 waste lagoon).	Yes	1 (1)	5-17-SS-01-091815-ES01 and replicate 5-17-SS-01-091815-ES02	18 Sept 2015
5-18	Surface Solid	1	Star Pond Ditch downgradient of the discharge point from the Star Pond.	Yes	1	5-18-SS-01-091815-ES01	18 Sept 2015



**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
5-19	Surface Solid	1	Skull Valley Diversion at area of influent seepage.	Yes	1	5-19-SS-01-091815-ES01	18 Sept 2015
5-20	Surface Solid	1	Star Pond Ditch at downstream (east) reach where Star Pond discharges appear to have comingled with Former Diversion Ditch and PRI Area 5 waste lagoon waters.	No	0		18 Sept 2015
<b>PRI Area 6 - Northwest Poned Waste Lagoon</b>							
6-01	Surface Solid	1	Grid	No	0		16 Oct 2015
6-02	Surface Solid	1	Grid	No	0		28 Oct 2015
6-03	Surface Solid	1	Grid	No	0		17 Sept 2015
6-04	Surface Solid	1	Grid	No	0		16 Oct 2015
6-05	Surface Solid	1	Grid	No	0		28 Oct 2015
6-06	Surface Solid	1	Grid	Yes	1 (1)	6-06-SS-01-091715-ES01 and replicate 6-06-SS-01-091715-ES02	17 Sept 2015
6-07	Surface Solid	1	Grid	No	0		16 Oct 2015
6-08	Surface Solid	1	Grid	No	0		28 Oct 2015
6-09	Surface Solid	1	Grid	No	0		28 Oct 2015
6-10	Surface Solid	1	Grid	No	0		28 Oct 2015
6-11	Surface Solid	1	Grid	No	0		28 Oct 2015
6-12	Surface Solid	1	Grid	No	0		28 Oct 2015
6-13	Surface Solid	1	Grid	No	0		28 Oct 2015
6-14	Surface Solid	1	Grid	Yes	1	6-14-SS-01-091615-ES01	16 Sept 2015
6-15	Surface Solid	1	Grid	Yes	1	6-15-SS-01-091615-ES01	16 Sept 2015
6-16	Subsurface Solid	3	Within the historical inlet of the PRI Area 6 waste lagoon, co-located with surface solids sampling location 4-11 in PRI Area 4.	Yes	1	6-16-SB-01-3.5-4.5-110615-ES01	6 Nov 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>PRI Area 7 - Northeast Poned Waste Lagoon</b>							
7-01	Surface Solid	1	Grid	No	0		23 Sept 2015
7-02	Surface Solid	1	Grid	No	0		24 Sept 2015
7-03	Surface Solid	1	Grid	No	0		24 Sept 2015
7-04	Surface Solid / Subsurface Solid	1 / 2	Grid	No / Yes	0 / 1	7-04-SB-01-8.5-9.5-111015-ES01 Collected - not analyzed 7-04-SB-01-0.5-2.5-121015-ES01	29 Sept 2015 / 10 Nov 2015 / 10 Dec 2015
7-05	Surface Solid	1	Grid	No	0		24 Sept 2015
7-06	Surface Solid	1	Grid	No	0		28 Sept 2015
7-07	Surface Solid	1	Grid	No	0		23 Sept 2015
7-08	Surface Solid	1	Grid	No	0		23 Sept 2015
7-09	Surface Solid	1	Grid	No	0		28 Sept 2015
7-10	Surface Solid	1	Grid	No	0		28 Sept 2015
7-11	Surface Solid	1	Grid	Yes	1 (1)	7-11-SS-01-092115-ES01 and replicate 7-11-SS-01-092115-ES02	21 Sept 2015
7-12	Surface Solid	1	Grid	No	0		21 Sept 2015
7-13	Surface Solid	1	Grid	Yes	1	7-13-SS-01-092215-ES01	22 Sept 2015
7-14	Surface Solid	1	Grid	Yes	1	7-14-SS-01-092215-ES01	22 Sept 2015
7-15	Surface Solid	1	Grid	Yes	1	7-15-SS-01-092215-ES01 and MS/MSD	22 Sept 2015
7-16	Surface Solid	1	Barrow ditch N of the OWP due to the potential for ecological receptor exposures	No	0		29 Sept 2015
7-17	Surface Solid	1	Barrow ditch N of the OWP due to the potential for ecological receptor exposures	No	0		29 Sept 2015

**Table 1**  
**Sample and Split Sample Summary**  
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Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
<b>Background – Upland North (SA010)</b>							
UPN-1	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-2	Surface Solid	1	Grid	Yes	1	UPN-2-SS-01-101415-ES01	14 Oct 2015
UPN-3	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-4	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-5	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-6	Surface Solid / Subsurface Solid	1 / 1	Grid	No / Yes	0 / 1	UPN-06-SB-01-02-36-101415-ES01 and MS/MSD	14 Oct 2015 / 14 Oct 2015
UPN-7	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-8	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-9	Surface Solid	1	Grid	No	0		14 Oct 2015
UPN-10	Surface Solid	1	Grid	Yes	1	UPN-10-SS-01-101415-ES01	14 Oct 2015
<b>Background – Upland South (SA007)</b>							
UPS-1	Surface Solid	1	Grid	Yes	1	UPS-1-SS-01-101215-ES01	12 Oct 2015
UPS-2	Surface Solid	1	Grid	No	0		12 Oct 2015
UPS-3	Surface Solid	1	Grid	No	0		12 Oct 2015
UPS-4	Surface Solid	1	Grid	No	0		12 Oct 2015
UPS-5	Surface Solid	1	Grid	No	0		12 Oct 2015
UPS-6	Surface Solid / Subsurface Solid	1 / 1	Grid	Yes / Yes	1 / 1	UPS-6-SS-01-101315-ES01 and UPS-6-SB-02-36-01-101315-ES01	13 Oct 2015 / 13 Oct 2015
UPS-7	Surface Solid	1	Grid	No	0		13 Oct 2015
UPS-8	Surface Solid	1	Grid	No	0		13 Oct 2015
UPS-9	Surface Solid	1	Grid	No	0		13 Oct 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
UPS-10	Surface Solid	1	Grid	No	0		13 Oct 2015
<b>Background – Upland Southeast (SA015)</b>							
UPSE-1	Surface Solid	1	Grid	Yes	1	UPSE-1-SS-01-100115-ES01	01 Oct 2015
UPSE-2	Surface Solid	1	Grid	No	0		01 Oct 2015
UPSE-3	Surface Solid	1	Grid	Yes	1 (1)	UPSE-3-SS-01-100115-ES01 and replicate UPSE-3-SS-01-092115-ES02	01 Oct 2015
UPSE-4	Surface Solid	1	Grid	No	0		01 Oct 2015
UPSE-5	Surface Solid / Subsurface Solid	1 / 1	Grid	No / Yes	0 / 1	UPSE-5-SB-01-02-36- 100115-ES01	01 Oct 2015 / 01 Oct 2015
UPSE-6	Surface Solid	1	Grid	No	0		30 Sept 2015
UPSE-7	Surface Solid	1	Grid	No	0		30 Sept 2015
UPSE-8	Surface Solid	1	Grid	No	0		30 Sept 2015
UPSE-9	Surface Solid	1	Grid	No	0		30 Sept 2015
UPSE-10	Surface Solid	1	Grid	No	0		30 Sept 2015
<b>Background – Lakebed North (SA011)</b>							
LBN-1	Surface Solid	1	Grid	No	0		02 Oct 2015
LBN-2	Surface Solid	1	Grid	No	0		02 Oct 2015
LBN-3	Surface Solid	1	Grid	No	0		02 Oct 2015
LBN-4	Surface Solid	1	Grid	No	0		02 Oct 2015
LBN-5	Surface Solid	1	Grid	No	0		02 Oct 2015
LBN-6	Surface Solid / Subsurface Solid	1 / 1	Grid	Yes / Yes	1 / 1	LBN-06-SS-01-100515-ES01 and MS/MSD LBN-06-SB-02-36-100515- ES01	05 Oct 2015 / 05 Oct 2015
LBN-7	Surface Solid	1	Grid	Yes	1	LBN-07-SS-01-100515-ES01	05 Oct 2015
LBN-8	Surface Solid	1	Grid	No	0		05 Oct 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
LBN-9	Surface Solid	1	Grid	No	0		05 Oct 2015
LBN-10	Surface Solid	1	Grid	No	0		05 Oct 2015
<b>Background – Lakebed Southeast (SA013)</b>							
LBSE-1	Surface Solid	1	Grid	No	0		06 Oct 2015
LBSE-2	Surface Solid	1	Grid	No	0		06 Oct 2015
LBSE-3	Surface Solid	1	Grid	Yes	1 (1)	LBSE-3-SS-01-100615-ES01 and replicate LBSE-3-SS-01-100615-ES02	06 Oct 2015
LBSE-4	Surface Solid	1	Grid	No	0		06 Oct 2015
LBSE-5	Surface Solid	1	Grid	Yes	1	LBSE-5-SS-01-100615-ES01	06 Oct 2015
LBSE-6	Surface Solid	1	Grid	No	0		07 Oct 2015
LBSE-7	Surface Solid / Subsurface Solid	1 / 1	Grid	No / Yes	0 / 1	LBSE-7-SB-02-36-01-100715- ES01	07 Oct 2015 / 07 Oct 2015
LBSE-8	Surface Solid	1	Grid	No	0		07 Oct 2015
LBSE-9	Surface Solid	1	Grid	No	0		07 Oct 2015
LBSE-10	Surface Solid	1	Grid	No	0		07 Oct 2015
<b>Background – Lakebed Southeast at Badger Island (SA014)</b>							
LBB-1	Surface Solid	1	Grid	No	0		09 Oct 2015
LBB-2	Surface Solid	1	Grid	No	0		09 Oct 2015
LBB-3	Surface Solid	1	Grid	No	0		09 Oct 2015
LBB-4	Surface Solid	1	Grid	No	0		09 Oct 2015
LBB-5	Surface Solid	1	Grid	No	0		09 Oct 2015
LBB-6	Surface Solid	1	Grid	No	0		08 Oct 2015
LBB-7	Surface Solid / Subsurface Solid	1 / 1	Grid	No / Yes	0 / 1	LBB-7-SB-01-02-36-100815- ES01	08 Oct 2015 / 08 Oct 2015
LBB-8	Surface Solid	1	Grid	No	0		08 Oct 2015

**Table 1**  
**Sample and Split Sample Summary**  
**US Magnesium NPL Site**

Black Font: Surface Soil Samples

Brown Font: Subsurface Soil Samples

Sample Location ID	Sample Media and Location	Number of Field Samples	Rationale for Sampling Location	EPA Split Sampling Location	Number of Split Samples	EPA Split Sample Number	Date of Sample (and Split if applicable) Collection
LBB-9	Surface Solid	1	Grid	Yes	1	LBB-9-SS-01-100815-ES01	08 Oct 2015
LBB-10	Surface Solid	1	Grid	Yes	1 (1)	LBB-10-SS-01-100815-ES01 and replicate LBB-10-SS-01-100815-ES02	08 Oct 2015
<b>Background – Bear River Migratory Bird Refuge (SA003)</b>							
BR-1	Surface Solid	1	Grid	No	0		22 Oct 2015
BR-2	Surface Solid	1	Grid	No	0		22 Oct 2015
BR-3	Surface Solid / Subsurface Solid	1 / 1	Grid	Yes / Yes	1 / 1	BR-3-SS-01-102215-ES01 and BR-3-SB-02-36-01-102215-ES01	22 Oct 2015 / 22 Oct 2015
BR-4	Surface Solid	1	Grid	No	0		22 Oct 2015
BR-5	Surface Solid	1	Grid	No	0		22 Oct 2015

Notes:

- EPA U.S. Environmental Protection Agency
- ID Identification
- NPL National Priorities List
- OWP Old waste pond
- PRI Preliminary remediation investigation

**Table 2**  
**Split Sample and QC Sample Summary**  
**US Magnesium NPL Site**

<b>Media</b>	<b>Number of Field Samples</b>	<b>Number of Split Samples</b>	<b>Percentage of Split Samples</b>	<b>Number of Split QC Samples</b>	<b>Percentage of Split QC Samples</b>
Surface Solids	159	33	21	9	19
Subsurface Solids	46	15*	33**		

**Notes:**

\* Split samples were accepted at locations 1-08, 1-13, 5-16, and 7-04; however, were not analyzed.

\*\* A minimum of one solid split sample was accepted from each of the subsurface borings.

QC = quality control

**Table 3**  
**Summary of 2015 Phase 1A-B RI Field and SAP Modifications**  
**US Magnesium NPL Site**

Document Tracking Number	Brief Description of Modification	Date Prepared	Date Approved
Field Modifications			
14C-1-1	Authorized adjustment to the location of PRI5-04 off the road into native material.	25 Sep 2015	12 Oct 2015
14C-1-2	Authorized borehole abandonment due to hand augering in background locations with left over soil in lieu of bentonite chips.	1 Oct 2015	1 Oct 2015
14C-1-3	Authorized adjustment to the location of LBSE-10 off a salt hardpan into soil material.	7 Oct 2015	9 Oct 2015
14C-1-4	Authorize use of post hole digger instead of hand auger at location BR-3.	23 Oct 2015	23 Oct 2015
14C-1-5	Authorized composite of multiple aliquots for sample collection at locations 5-07, 5-08, 5-12, 6-09, 6-11 and 6-13 in order to meet acceptable volume criteria defined in SOP USM-12.	27, 28 Oct 2015	29 Oct 2015
14C-1-6	Authorized adjustment of the location of PRI4-14 due to location being inundated with waste water.	29 Oct 2015	30 Oct 2015
14C-1-7	Authorize sample processing during subsurface sampling.	4 Nov 2015	4 Nov 2015
14C-1-8	Authorize adjustment of the location of PRI7-04 (subsurface only) due to drill rig access limitations.	10 Nov 2015	12 Nov 2015
14C-1-9	Authorize adjustment of the location of PRI1-04 and PRI 1-12 due to the SAP locations not being accessible by foot.	24 Nov 2015	24 Nov 2015
14C-1-10	Authorize characterization of shallow/waste and native material intervals for PRI1-08 and PRI5-16 on two separate dates (11/5/2015 and 12/2/2015).	7 Dec 2015	7 Dec 2015
SAP Modifications			
14C-2-1	<p>Worksheet 11, Section 11.3.7.5.2, Subsurface Soil Sampling and Analysis—Specifies sample depth.</p> <p>Worksheet 14, Section 14.1.614.1.6, Subsurface Solids Sampling—Outlines how samples are to be collected and processed, and borehole backfilling.</p> <p>Worksheet 18, Notes—Outlines how samples are to be collected.</p> <p>Worksheet 27, Section 27.2—Footnote added specifying starting depth and ending depth of sample interval so as to provide adequate sample volume for analysis.</p>	1 Oct 2015	7 Oct 2015



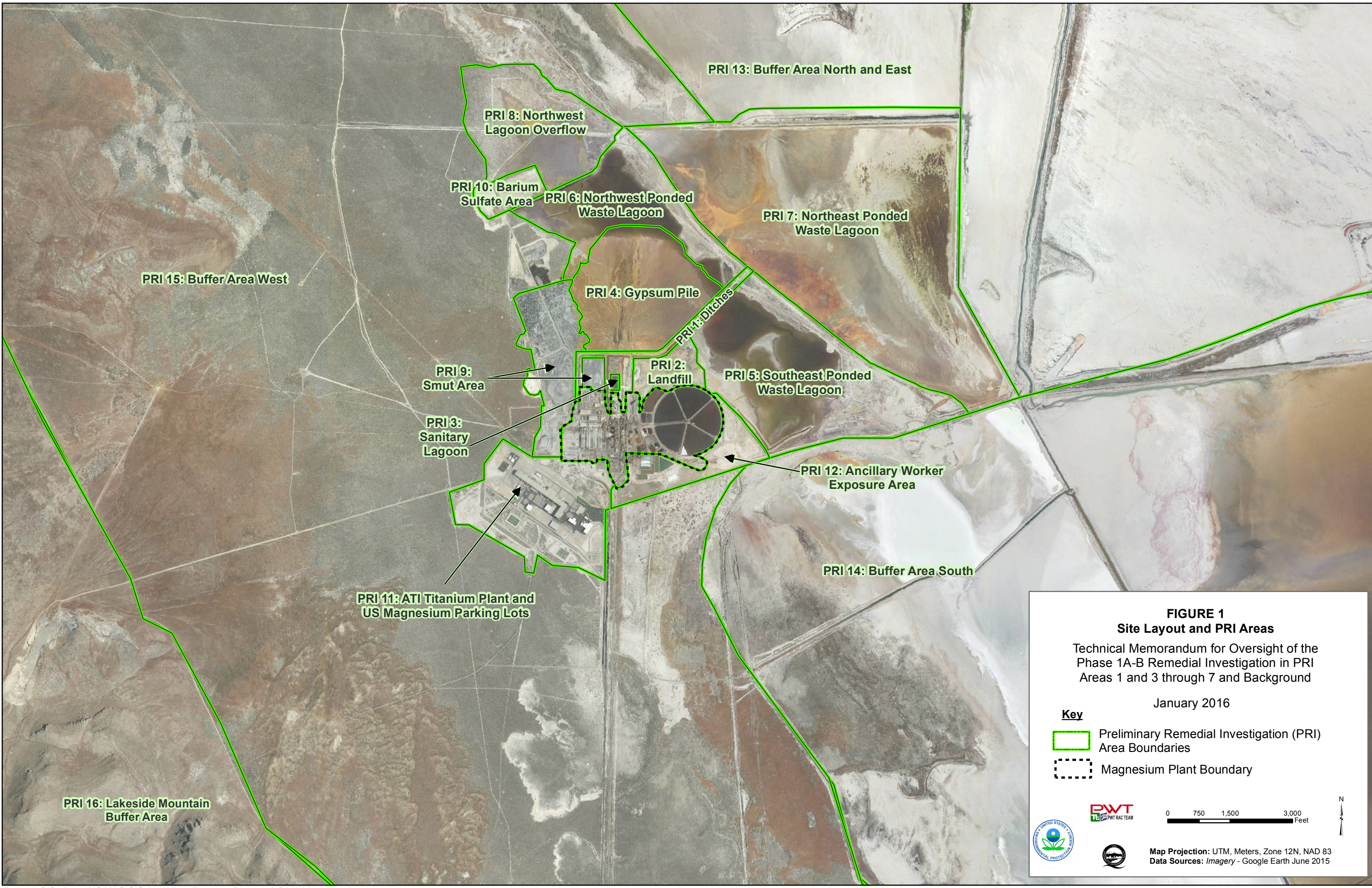
**Table 3 (Cont.)**  
**Summary of 2015 Phase 1A-B RI Field and SAP Modifications**  
**US Magnesium NPL Site**

Document Tracking Number	Brief Description of Modification	Date Prepared	Date Approved
14C-2-2	Worksheet 24—Specifies correct control limits for VOCs, SVOCs, and PAHs	23 Oct 2015	26 Oct 2015
14C-2-3	<p>Worksheet 11, Sections 11.2.4.1, 11.2.7.1, 11.2.7.2 and 11.2.7.3            Worksheet 14, Sections 14.1.5 and 14.1.6            Worksheet 18            Figures 5-1 and 11.5            Attachment 21, SOP USM-09</p> <p>Re-locate the subsurface sampling location in the inlet area of PRI Area 5 closer to the Main Ditch outlet where a subsurface waste/sediment core can be obtained using a core sampler deployed from a long-reach excavator from the gypsum pile. The subsurface sampling SOP USM-09 has been modified to include core sampling devices, including vibracorer and core tub methods.</p> <p>This SAP modification also provides for the collection of surface samples from within active wastewater ditches using a Ponar or box corer sampler deployed by excavator, per SOP USM-12.</p>	18 Nov 2015	24 Nov 2015

Notes:

- NPL National Priorities List
- PAH Polynuclear aromatic hydrocarbon
- RI Remedial investigation
- SAP Sampling and Analysis Plan
- SOP Standard operating procedure
- SVOC Semi-volatile organic compound
- VOC Volatile organic compound

## **FIGURES**



**FIGURE 1**  
**Site Layout and PRI Areas**

Technical Memorandum for Oversight of the  
Phase 1A-B Remedial Investigation in PRI  
Areas 1 and 3 through 7 and Background

January 2016

**Key**

- Preliminary Remedial Investigation (PRI) Area Boundaries
- Magnesium Plant Boundary




Map Projection: UTM, Meters, Zone 12N, NAD 83  
Data Sources: Imagery - Google Earth June 2015






**FIGURE 2**  
**Solids Split Sample Locations**  
**PRI Areas 1 and 3 through 7**


Technical Memorandum for Oversight  
of the Phase 1A-B Remedial Investigation  
in PRI Areas 1 and 3 through 7 and Background

January 2016

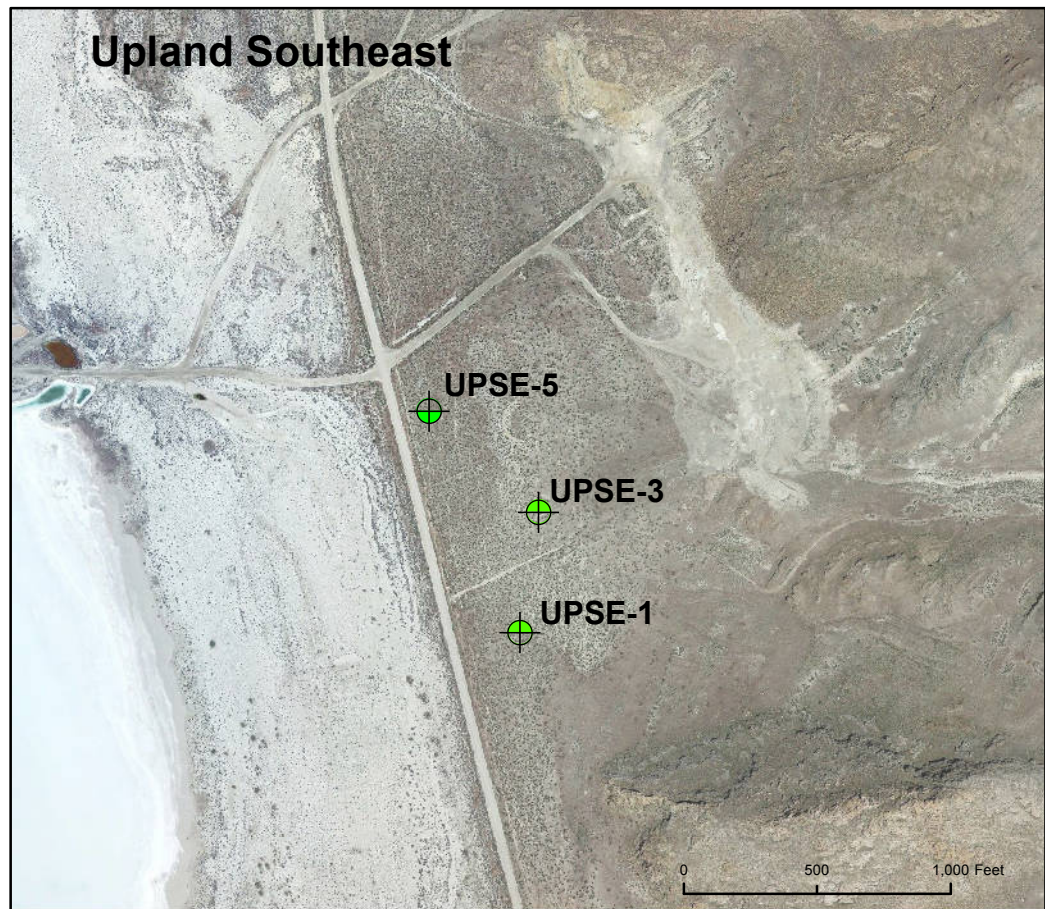
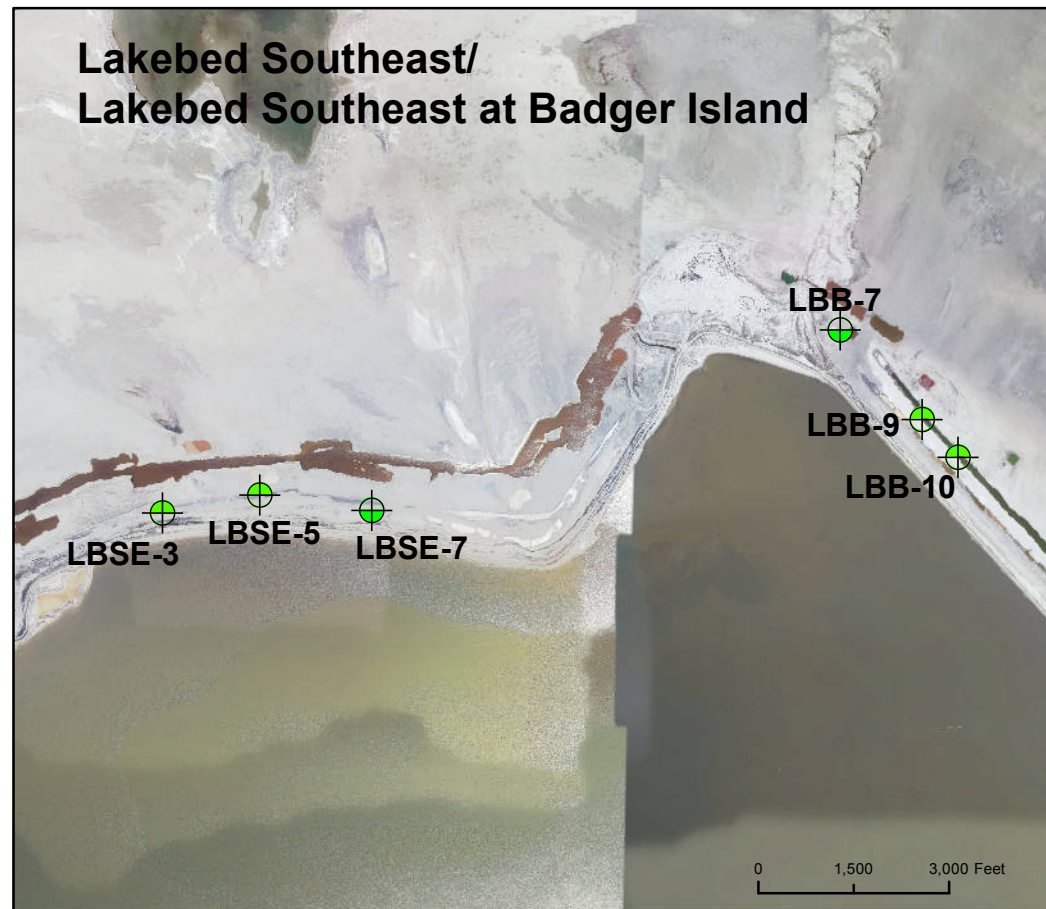
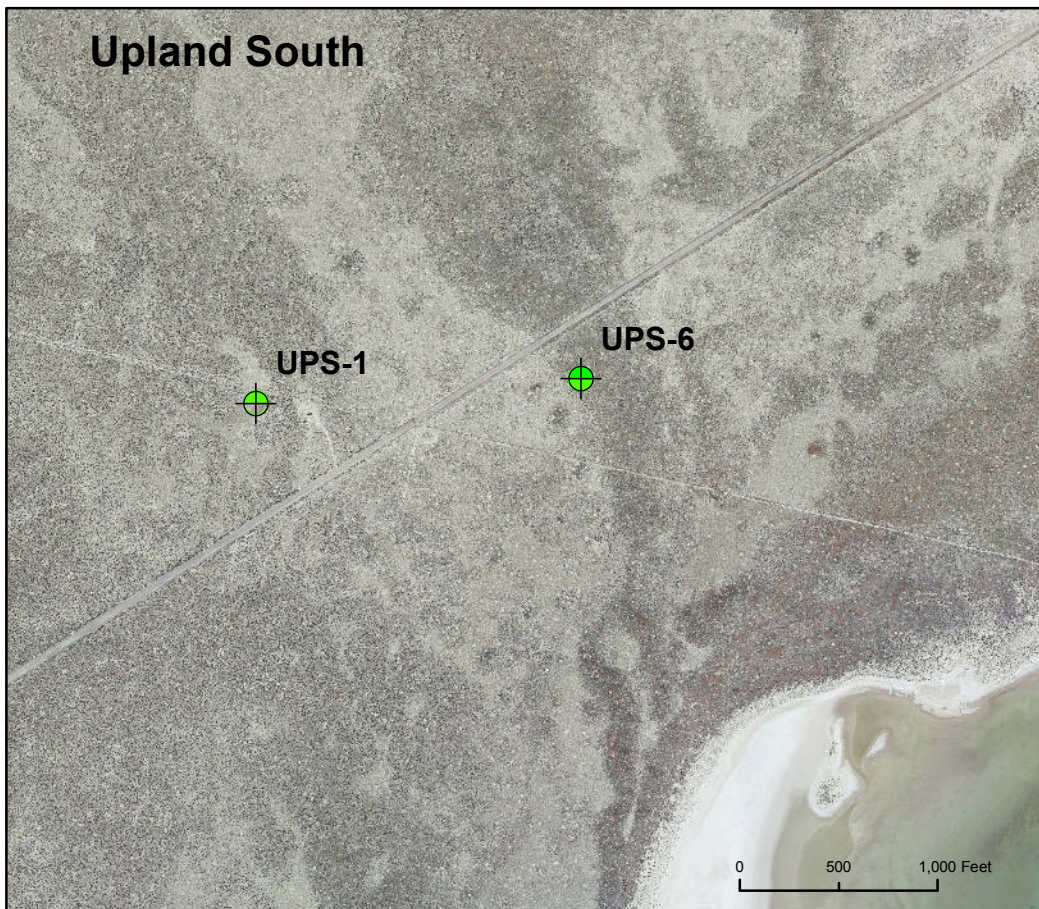
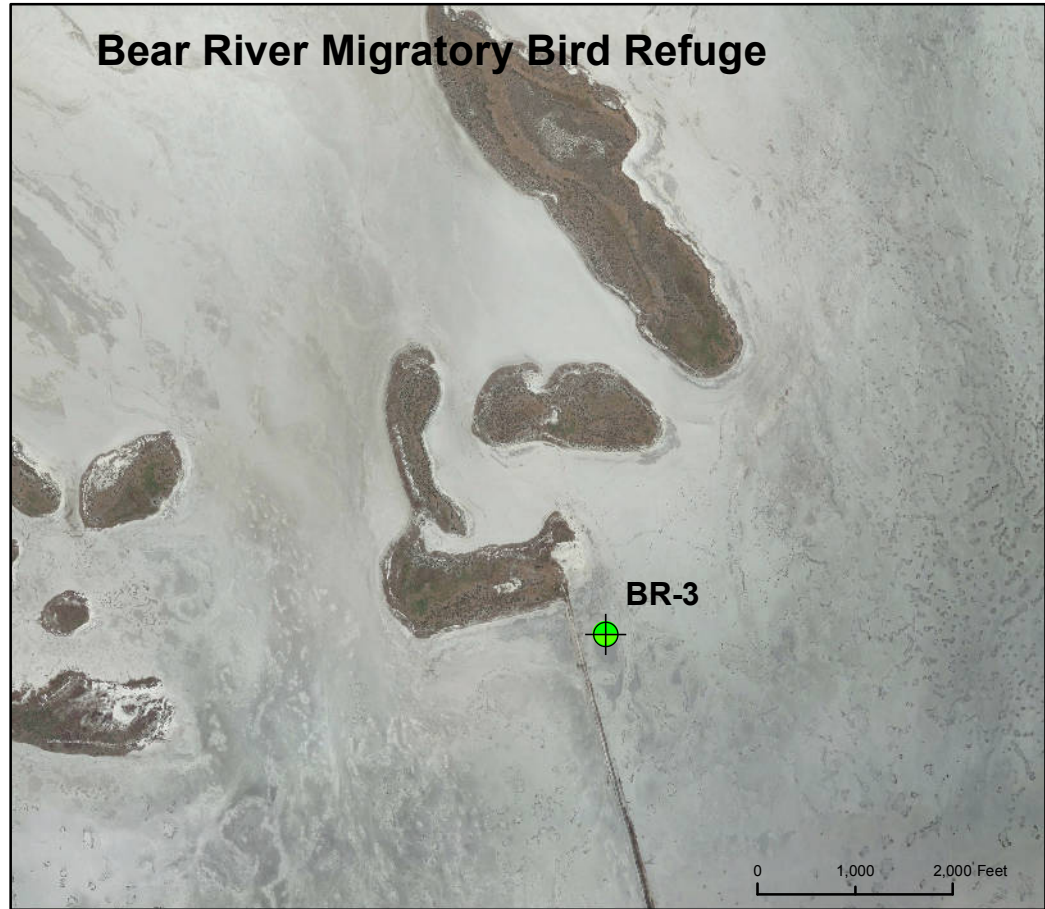
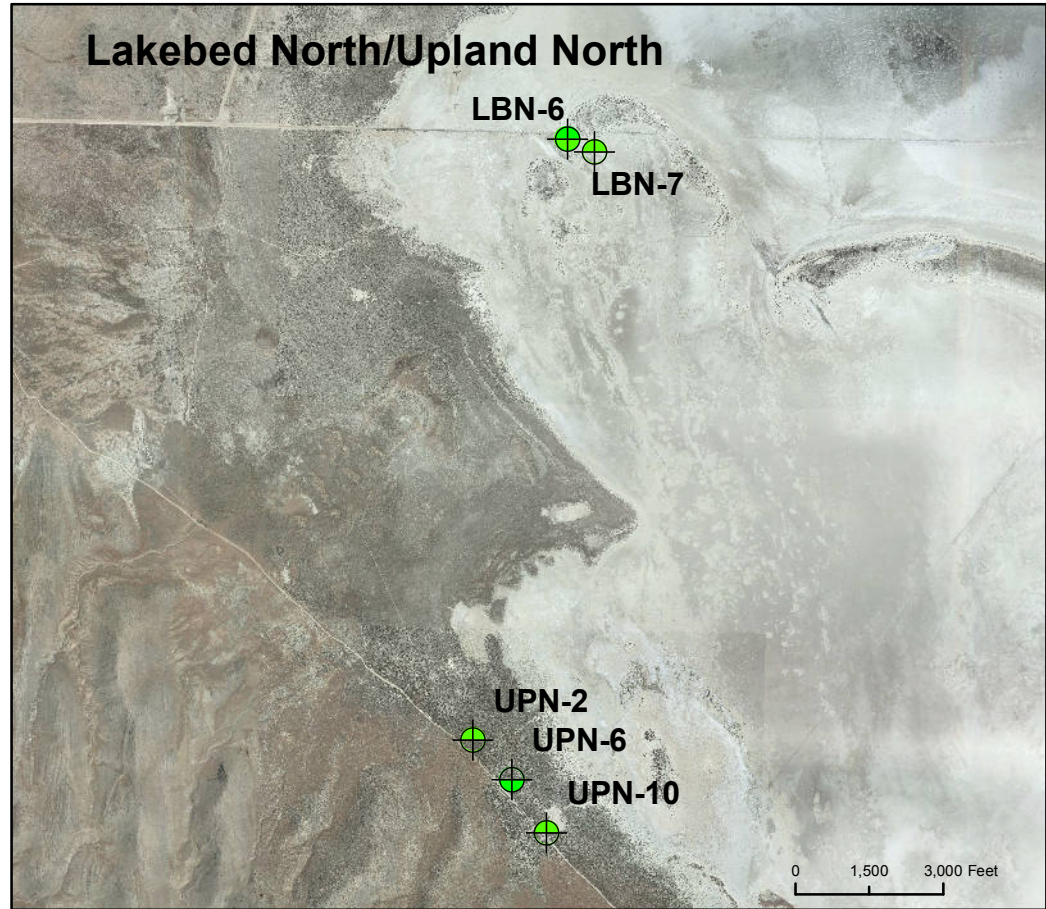
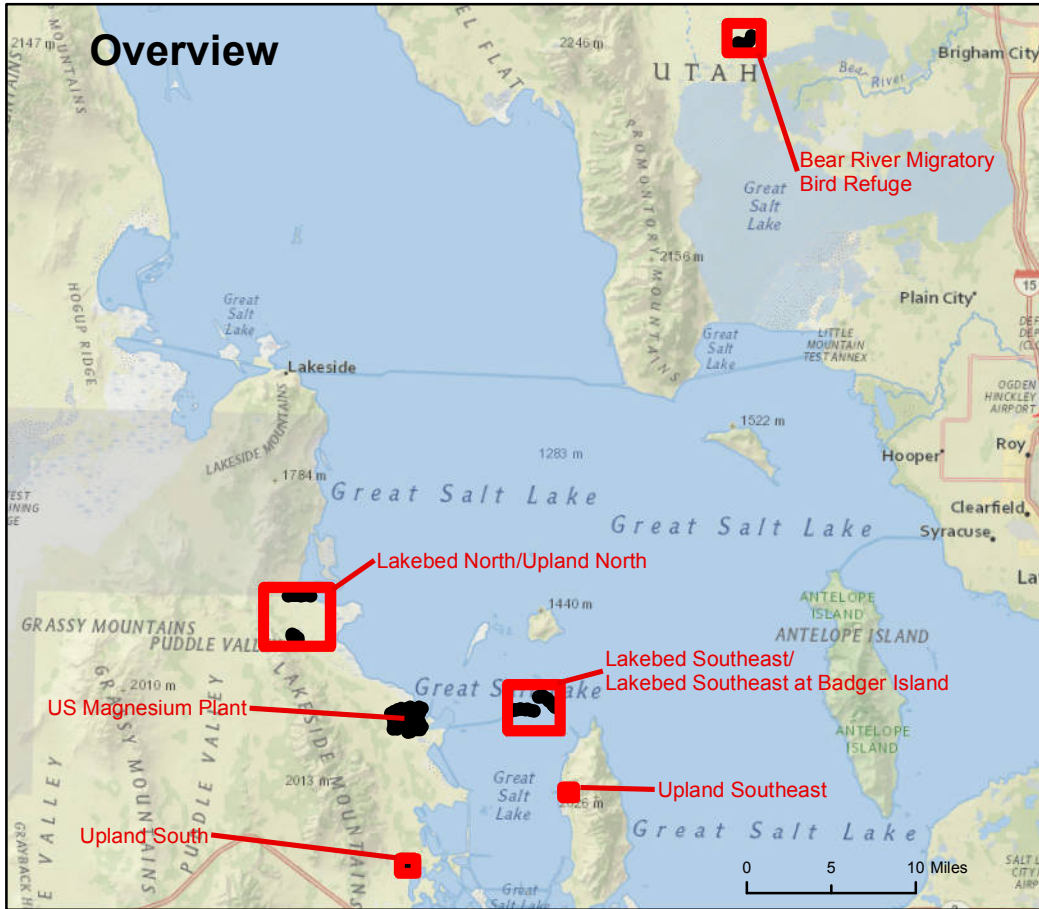
- Key**
-  Split Surface Solids Sample Location
  -  Split Subsurface Solids Sample Location
  -  Preliminary Remedial Investigation (PRI) Area Boundaries





Map Projection: UTM, Meters, Zone 12N, NAD 83  
Data Sources: Imagery Google Earth June 2015



**Figure 3**  
Solids Split Sample Locations  
Background

Technical Memorandum for Oversight  
of the Phase 1A-B Remedial Investigation  
in PRI Areas 1 and 3 through 7 and Background

January 2015

- Key**
- Split Surface Solids Sample Location
  - Split Subsurface Solids Sample Location

Map Projection: UTM, Meters, Zone 12N, NAD 83  
Data Sources: Imagery -Google Earth June 27, 2015



**APPENDIX A**  
**FIELD NOTES (SCANNED LOG BOOKS)**  
**(provided as a separate file)**

**U.S. Magnesium**  
**Split Sampling Field Logbook**

Tim Jiminez.....page 2

Aaron Baird.....page 51

**U.S. Magnesium  
Split Sampling Field Logbook**

Tim Jiminez

July 10, 2015

thru

November 23, 2015



US Mag 7/10/2015 RI/FS-1A/B

Tim Jimenez of EarthFax Engineering

Notes for 7/10/2015 sampling event

comprise pages 2-3 of this book.

07:15 site arrival

Sampling personnel Lonnie Mercer of ERM

Adam Nagle of ERM

Site conditions at arrival Partly Cloudy

with no breeze, approximately 60°F

Health and Safety meeting 07:50

PRIG-008-SW01-071015

PRIG-008-SW11-071015 09:30 for duplicate

Gentle breeze from east, Sunny, 65°F

Sample time 08:45. HCL 0.0-0.5 ppm

water depth at sample location 1 foot.

Sample collected at 6 inches from surface,

water had light green color, Tygon was

used in pump. This is in SAP, however,

most locations were modified to use

silicon during this week. Adam Nagle collected

samples and Lonnie Mercer did chemistry

and documentation.

US Mag 7/10/2015 RI/FS-1A/B continued

PRIG-002-SW01-071015

wind from SE, Sunny, 70°F, water depth

at location 6 inches. Sample collected

at 3 inches, sample time 10:45, water

was light green. Tygon was used in pump.

This is in SAP. However, most locations were

modified to use silicon during sampling

this week. Adam Nagle collected

samples and Lonnie Mercer did chemistry

and documentation, HCL 0.8-1.1 ppm

in air during sampling

PRIG-006-SW01-071015

strong wind from south, Sunny, 65°F, water

depth at location 6 inches, sample collected

at 3 inches, sample time 12:40, water was

light green. Tygon was used in pump. This is

in SAP. However, most locations were modified

to use silicon during sampling this week. Adam

Nagle collected samples and Lonnie Mercer did

chemistry and documentation, HCL 0.9-1.8 ppm

in air during sampling. After sample collected

HCL spiked 2.3 ppm and respirators were

worn.

US Mag RI/FS 1A/B 7/13/15

Tim Jimenez of EarthFax Engineering  
Notes for 7/13/15 sampling event  
Comprise pages 4-5 of this book.

07:10 ERM personnel arrive on-site.

07:30 EarthFax personnel arrive on-site.

ERM personnel and samplers:

Lonnie Mercer

Adam Nagle

EarthFax personnel and observer:

Tim Jimenez

Health and Safety meeting. Weather when  
arrived sunny, gentle breeze from North,  
65°F

-PRIS-010-SW01-071315

PRIS-010-SW11-071315 Duplicate time 10:00

Sample time 09:30. No breeze at sample  
time. Sunny and 70°F. water was light  
green. HCL 0.0-0.3 ppm. water depth at  
sample location 3 inches. Sample collected  
at 1.5 inches. Tygon tubing used in pump.  
prior week of sampling some sites had  
been modified to use silicon. Respirators  
worn for safety. Adam Nagle collected  
sample. Lonnie Mercer did chemistry and  
documentation.

US Mag RI/FS 1A/B 7/13/15 continued

-PRIS-017-SW01-071315

Sample time 11:00. Gentle breeze changing  
direction. partial cloud cover, 70°F.

water was light green. HCL 0.5-3.8 ppm

water depth 6 inches at sample

location. Sample depth 3 inches.

Tygon tubing used in pump. Prior week of  
sampling some sites had been modified  
to use silicon. Adam Nagle collected

sample. Lonnie Mercer did chemistry and  
documentation. Respirators worn after

sample collected during chemistry  
and documentation due to 3.8 ppm HCL  
spike.

-PRI 2-010-SW01-071315

Sample time 13:00. Gentle breeze  
changing direction. Partial cloud cover 80°F.

water depth 4 feet at sample

location. Sample depth 2 feet. Tygon

tubing used in pump. Prior week of

sampling some sites had been modified

to use silicon. Adam Nagle collected

sample. Lonnie Mercer did chemistry and

documentation. Respirators worn.

HCL 16-50 ppm. water slightly turbid.  
light green. *Note on the train.*

US Mag. RI/FS 1A/B 7/14/2015

Tim Jimenez of EarthFax Engineering

Notes for 7/14/2015 sampling event comprise pages 6-7 of this book.

07:10 ERM personnel arrive on-site

07:30 EarthFax personnel arrive on-site.

ERM personnel and samples:

Lonnie Mercer and Adam Nagle.

EarthFax personnel and observer; Tim Jimenez  
Health and safety meeting. 70°F, partly cloudy  
with wind from North at time of arrival.

-PRI 2-006-sw01-071415

Sample time 09:00. strong gusts from north.

Sunny and 75°F. water was very light green.

HCL <sup>not recorded</sup> ppm. water depth at sample  
location 6 inches. Sample collected at 3 inches.

Tygon tubing was used in pump. <sup>(personal)</sup> CL<sub>2</sub> meters  
would alarm when water surface was

disturbed. Adam Nagle collected sample.

Lonnie Mercer did chemistry and documentation

-PRI 2-014-sw01-071415

Sample time 10:15, wind from north. Sunny.

water was very light green. water depth

at sample location 6 inches. Sample  
collected at 3 inches. HCL 2.0-2.5 ppm.

US Mag. RI/FS 1A/B 7/14/2015 continued

~~TS 7/14/15~~ <sup>(personal)</sup> CL<sub>2</sub> alarms sounded during sampling.

Respirators worn during sampling. Tygon  
tubing used in pump. Adam Nagle  
collected sample. Lonnie Mercer did  
chemistry and documentation.

-PRI 2-007-sw01-071415

Sample time 11:35. wind from north, Sunny  
and 80°F. HCL 0.2-0.4 ppm. water  
depth at sample location 2 inches.

Sample collected at 2 inch. Tygon  
tubing used in pump. Adam Nagle  
collected sample. Lonnie Mercer  
did chemistry and documentation.

-PRI 2-008-sw01-071415

Sample time 12:50. wind from east. Sunny.

HCL 0.0-0.4 ppm. CL<sub>2</sub> personal monitors  
sounded several times. Respirators worn.

water depth at sample location 6 inches.

Sample collected at 3 inches. Tygon  
tubing used in pump. Adam Nagle  
collected sample. Lonnie Mercer did  
chemistry and documentation.

US Mag RI/FS 1A/B 7/15/15

Tim Jimenez of EarthFax Engineering

ERM personnel arrived on-site at 07:00

EarthFax personnel arrived on-site at 07:30

ERM personnel and samples:

Lonnie Mercer and Adam Nagle

EarthFax personnel and observer:

Tim Jimenez

Health and safety meeting. Gentle breeze from north, partly cloudy and 70°F at time of arrival.

-PRI 7-009-SW01-071515

MS/MSD location, Sample time 08:15.

wind from North, 70°F. Cloudy, water depth at sample location was 4 feet, sample collected at 2 feet, MCL 0.0-0.2 ppm.

Tygon tubing was used in pump.

Adam Nagle collected. Lonnie Mercer did chemistry and documentation.

US Mag RI/FS 1A/B 7/15/15 Continued

GPS Locations: ~~NAD83, UTM coordinates~~ <sup>State plane coordinates</sup> 7/15/15

~~PRI 7-009-SW01-071515~~ TS 7/15/15

GPS locations: State Plane, Zone 12N, NAD83

-PRI 1-011-SW01-070715

4531237.53N, 353751.79E, ±17cm

-PRI 1-020-SW01-071315

4531377.47N, 353757.42E, ±10cm

-PRI 7-009-SW01-071515

4531408.27N, 353862.40E, ±10cm

-PRI 2-003-SW01-070915

4531403.57N, 354306.65E, ±15cm

-PRI 1-013-SW01-070615

4531157.55N, 353973.86E, ±18cm

-PRI 3-003-SW01-070715

4531158.41N, 353995.60E, ±10cm

-PRI 1-008-SW01-072415

4531342.88N, 353978.37E, ±17cm

-PRI 1-007-SW01-071415

4531390.78N, 353985.64E, ±10cm

-PRI 2-006-SW01-071415

4531338.56N, 354069.37E, ±16cm

-PRI 3-009-SW01-070715

4531188.87N, 354040.73E, ±10cm

*Rite in the Rain.*

US Mag RE/FS 2A/13 7/15/15 continued

-PRI 2-014-SW01-072015

4531158.45 N, 354070.27 E,  $\pm 10$  cm

-PRI 7-010-SW01-071315

4531028.39 N, 355079.69 E,  $\pm 10$  cm

-PRI 5-017-SW01-071315

4531008.04 N, 354935.25 E,  $\pm 10$  cm

-PRI 5-008-SW01-070915

4531432.98 N, 355596.41 E,  $\pm 10$  cm

-PRI 5-002-SW01-070915

4531816.39 N, 355010.04 E,  $\pm 18$  cm

-PRI 6-006-SW01-071015

4532649.61 N, 354217.42 E,  $\pm 10$  cm

-PRI 6-002-SW01-071015

4532860.62 N, 353939.67 E,  $\pm 10$  cm

-PRI 6-004-SW01-070815

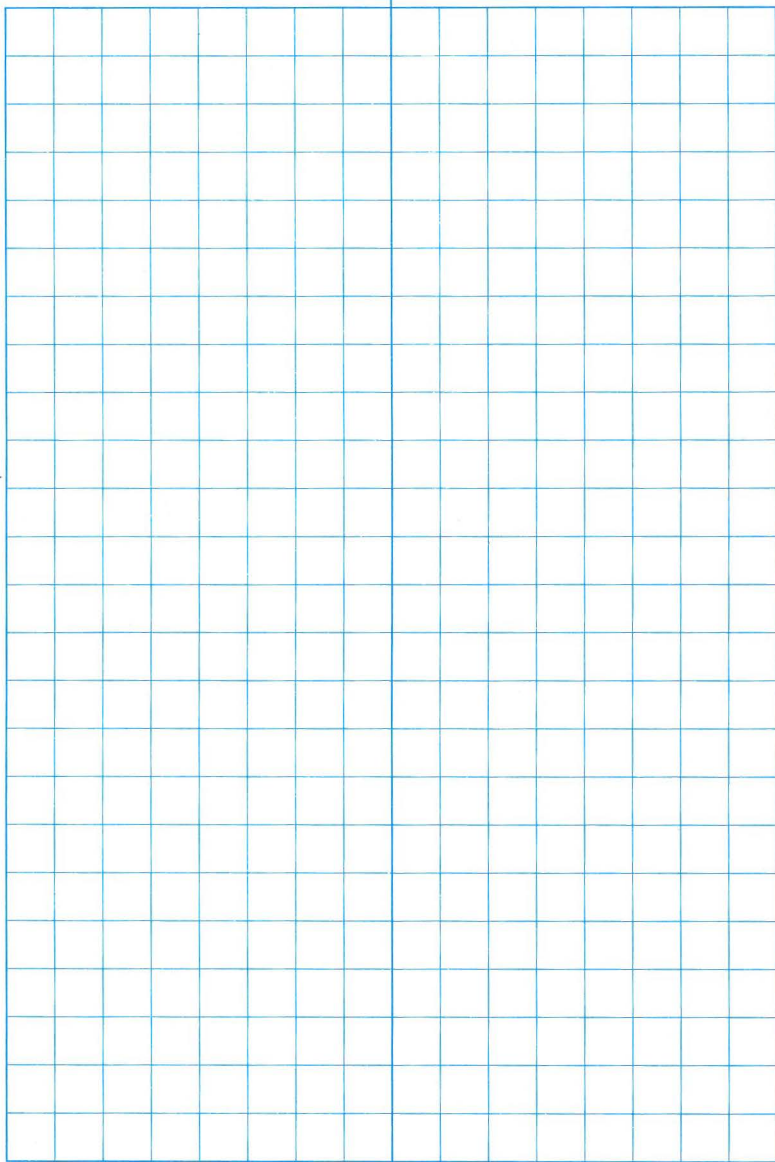
4532687.39 N, 353739.93 E,  $\pm 15$  cm

-PRI 6-008-SW01-071015

4532562.81 N, 353475.15 E,  $\pm 14$  cm

-PRI 6-017-SW01-070815

4532080.35 N, 354788.91 E,  $\pm 10$  cm



US Mag. RI/ES 1A/B 9/16/2015

Tim Jimenez of EarthFax Engineering

Garrett Rigard of ERM

Kristopher Bensen of ERM

ERM personnel arrived on-site around 09:00

EarthFax personnel arrived on-site around 08:30

ERM personnel sampled

EarthFax personnel observe

Health and safety meeting at 09:00

discuss shower location and slippery weather.

weather: rain and 60's, gentle breeze

This days notes comprise page 12-13  
of this book.

PRIG-15-~~01~~-01-091615-ES01

Split sample time 11:30. Rain, 60's,  
Gentle breeze. Sample collected from

7 aliquots 0"-6" depth, Garrett

Rigard composited/collected. One

auger load passed clean through sieve.

Remaining auger loads not sieved.

HCL reading during sampling 0.0ppm

CL<sub>2</sub> reading during sampling 0.0-0.1ppm

US Mag. RI/ES 1A/B 9/16/2015 continued

PRIG-14-SS-01-091615-ES01

Split sample time 12:40, Rain, 60's,

Gentle breeze. Sample collected

from 8 aliquots 0"-6" depth,

Garrett Rigard composited/collected.

All material passed through

Sieve. HCL reading during sample 0.0ppm

CL<sub>2</sub> reading during sample 0.0ppm

US Mag RI/FS 1A/B 9/17/2015

Tim Jimenez of EarthFax Engineering

Lonnice Mercer of ERM

Garret Rigard of ERM

ERM personnel arrived onsite at

EarthFax personnel arrived onsite at 08:45

ERM personnel sample

EarthFax personnel observe

Health and Safety tailgate meeting 08:45

discuss slick roads and walking.

weather: partly cloudy, 60's.

This days notes comprise pages 14-16  
of this book

~~PRI~~ PRI 6-06 location 10:15

6-06-SS-01-091715-ES01

6-06-SS01-091715-ES02 (duplicate)

Partly cloudy and 60's with gentle breeze.

8 aliquots 0"-6" depth. Garrett Rigard

collected/composited. All material was

passed through sieve. HCL/Cl<sub>2</sub> meter

was re-calibrated after sample take

due to high readings.

US Mag RI/FS 1A/B 9/17/2015 continued

-6-03-SS-01-091715 10:55

Partly Cloudy, 60's, Gentle breeze

5 aliquots 0"-6" depth, Lonnice

Mercer collected, Garrett Rigard

Composited. All material passed

through sieve.

HCL during sample read 0.2-0.5 ppm

Cl<sub>2</sub> during sample read 0.0 ppm

-PRI 6-11 / PRI 6-2 were

under water. Therefore, no

sample was collected.

-5-15-SS-01-091715-ES01 11:40

~~5-15-SS-01-091715-ES03 (MS/MSO)~~

Sunny, 60's, Gentle breeze. 8

8 aliquots 0"-6" depth, Lonnice

Mercer sieved. Garrett Rigard

collected/composited. All material

passed through sieve.

HCL/Cl<sub>2</sub> meter was zeroed

due to High HCL readings

above 2.2 ppm.

Not  
taken  
TS  
9/17/15

US Mag. RF/ES IAB 9/17/2015 continued  
5-09-SS-01-091715 12:20 am sample

Sunny, 60's, gentle breeze, Lonnie  
Mercer collected auger sample.

Garrett Rigard sieved and composited.  
Garrett Rigard filled jars. HCL/cl<sub>2</sub>  
meter shut off due to increasing  
HCL readings as high as 2.8 ppm.



US Mag. RI/FS 1A/13 9/18/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Suzy Smith of ERM

ERM personnel arrived onsite 08:45

EarthFax personnel arrived onsite 08:30

Health and safety meeting discussing

sun and warm weather.

ERM personnel sample.

EarthFax personnel observe.

This days notes comprise 17-19 of this book

-S-17-SS-01-091815-ES01/ES02 10:20

Suzy Smith and Kristopher Benson

collected aliquots. Kristopher

Benson homogenized and filled

jars. Sunny, 60's, Gentle breeze.

Red material on surface had

varying depths. Gray clay under

red material. Site was 6 feet

from pH=0 "water".

HCL reading during sampling 0.0-0.2 ppm

Cl<sub>2</sub> reading during sampling 0.0 ppm

US Mag. RI/FS 2A/13 9/18/2015 continued

- S-18-SS-01-091815-ES01 11:35

Sunny, Breeze from ~~east~~ <sup>east</sup> 60'S.

⊙ Suzy Smith and Kristopher Benson collected aliquots, sieved material, and composited. Suzy Smith filled jars. Sample was 5 feet from water on the side of bank. HCL/CL<sub>2</sub> meter shut off. HCL reading above 3.5 ppm and increasing. Breeze from east would suggest HCL should be near 0.0 ppm.

- S-19-SS-01-091815-ES01 12:40

Sunny, breeze from South east, 60'S. Suzy Smith sieved, composited, and filled jars. Kristopher Benson collected sample with hand auger. Sample was collected with brace to get seep interface along bank of Skull valley Diversion. Samples were collected from 5 aliquots approx. 6"-12" apart along interface.

US Mag. RI/FS 2A/13 9/18/2015 continued

- S-20-SS-01-091815 13:10 ERMS-ple

Sunny, wind from North, 60'S. Suzy Smith and Kristopher Benson hand augered, sieved, and composited. Kristopher Benson filled jars. Sample was collected in flat vegetated area. 6 aliquots taken around stake.

US Mag. RI/FS 1A/B 9/21/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Trent Hatada of ERM

ERM personnel arrived onsite at 08:40

EarthFax personnel arrived onsite at 08:20

Health and safety meeting at 08:40

discuss heat and sun

S gas meter with HCL/Cl<sub>2</sub> zeroed at

07:50. Has been having issues HCL

readings. They climb during the

day despite wind direction or location

this days sampling comprises

pages 20-21 of this book

-7-11-SS-01-092115-ES01/ES02 10:30

Trent and Kristopher hand auger;

Kristopher composited and collected and

filled jars. First aliquot passed sieve

other aliquots not sieved. Sunny, 70's,

no breeze. Cl<sub>2</sub> read 0.0 ppm.

HCL read 0.5-0.9 ppm and continues  
to climb.

US Mag. RI/FS 1A/B 9/21/2015 continued

-7-12-SS-01-092115 ERM sample

Sunny, 70's, gentle breeze,

Red waste material in top

1-2" of auger hole(s). No odor.

Cl<sub>2</sub> read 0.0-0.1 ppm.

HCL read 1.0-1.5 ppm

ERM duplicate collected.

HCL/Cl<sub>2</sub> meter turned off as

HCL readings went 4.1 ppm

~~was~~ PRI 7 Northeast of

plant with gentle breeze

from North. No or little HCL/

Cl<sub>2</sub> should be present. Cl<sub>2</sub>

readings still 0.0-0.1 ppm.

meter zeroed. 12:45.

US Mgs. RI/FS 1A/B 8/22/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Trent Hamada of ERM

ERM/EarthFax personnel arrived  
onsite at 09:00

Health and safety discuss. heart,

5 gas (HCL/Cl<sub>2</sub>) meter had

O, R, error on HCL sensor,

could not be re-set.

7-13-SS-01-092215-ES01 09:45

Sunny, 70's, no Breeze,

All aliquots were passed through sieve

No HCL/Cl<sub>2</sub> readings due to

HCL sensor errors.

7-14-SS-01-092215-ES01 11:15

Sunny, 70's, no Breeze. All aliquots

were passed through sieve due to

salt crystals. No HCL/Cl<sub>2</sub> readings

due to HCL sensor error

7-15-SS-01-092215-ES01 MS/MSD

Sunny, 70's, gentle breeze from

north. All material passed through

sieve.

USMag. RI/FS 1A/B 9/23/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Suzy Smith of ERM

EarthFax personnel arrived on-site 08:30

ERM personnel arrived on-site 08:45

Health and safety discuss moving

heavy materials through ponds areas

HCl/Cl<sub>2</sub> 5 gas meter has been

returned to rental company due to

HCl sensor failure.

-7-08-SS-01-092315 ERM sample

Flat area in pond, Sunny, 70's, no  
breeze. Thin salt crust.

First aliquot 100% pass through sieve.

Remaining aliquots not sieved.

Suzy collected aliquots, Kristopher composited  
and filled jars.

-7-07-SS-01-092315 ERM sample

Flat area in pond, Sunny, 70's, Gentle

breeze from east. Red waste material

on surface. All aliquots passed through

sieve. Suzy collected aliquots. Kristopher

composited and filled jars.

US Mag RI/FS 1A/B 9/23/2015 (continued)

7-01-SS-01-092315 ERM Sample

Sunny, 80's, breeze from east.

Suzy collected aliquots, first aliquot passed 100%. Remaining aliquots not sieved, Red waste material through out with some Gray/Black clay.

Kristopher compacted and Filled jars.

US Mag RI/FS 1A/13 9/24/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Trent Hamada of ERM

EarthFax personnel arrived on-site 08:40

ERM personnel arrived on-site 08:55

Health and Safety meeting 08:45

Discuss heat and water.

Sunny, 70's, Gentle breeze with  
no distinct direction.

Today's notes comprise pages 25-26  
of this book.

7-02-SS-01-092415 ERM sample

Sunny, 70's, no breeze. Sample  
is located in an inch of standing  
water with pH = 6.  $\frac{1}{2}$ " - 1" of  
red waste material. First aliquot  
passed 100% through sieve. Remaining  
aliquots not sieved. Trent collected  
aliquots, Kristopher composited and  
filled jars.

US Navy. RI/ES 1A/13 9/24/2015 continued

7-05-SS-01-092415 ERM sample

Sunny, 70's, Gentle breeze from North,  
 $\frac{1}{2}$ " - 1" of red waste material on  
surface. 100% pass of first aliquot.

Remaining aliquots not sieved. Christopher  
collected aliquots. Trent composited and  
filled jars.

7-03-SS-01-092415 ERM sample

Sunny, 80's, wind from east. 1" red  
waste material on surface. All material  
passed through sieve due to salt  
crystals. Trent collected aliquots.

Christopher sieved, Trent composited and  
filled jars.



US Mag RI/FS 1A/B 9/25/2015

Tim Jimenez of EarthFax Engineering

Suzy Smith of ERM

Trent Hamada

EarthFax personnel arrived on-site 08:30

ERM personnel arrived on-site 08:40

Health and Safety discuss heat 08:40

Sunny, 70's, no breeze.

Today's note comprise pages 27-28  
of this book

5-05-SS-01-092515 ERM sample

Sunny, 70's, no breeze. Flat area  
above skull valley diversion with heavy  
vegetation. Trent collected aliquots,  
composited, and filled jars. <sup>All material</sup> passed through sieve.

5-03-SS-01-092515 ERM sample

Sunny, 70's, no breeze. Flat area  
with little vegetation. All material  
was passed through sieve. Trent  
collected aliquots, composited, and filled  
jars.

US Mag. RI/FS 1A/B 9/25/2015 Continued

5-04-SS-01-092515 ERM sample

Field modification. Sample was in  
Roadway with new road base.

Sample moved 100 feet Northeast.

Flat area with no vegetation and  
thin salt crust. All material was

passed through sieve, Suzy collected  
aliquots, composited, and filled jars

US Mag. RI/ES 2M13 9/28/2015

Tim Simenez of Earth Fax Engineering

Trent Hamada of ERM

Kristopher Benson of ERM

Earth Fax personnel arrived onsite 08:45

ERM personnel arrived onsite 09:05

Health and Safety 08:45 discuss heat  
and sun. Today's notes comprise page 29 of book.

Sunny, 70's, gentle breeze at  
time of arrival.

7-09-SS-01-092815 ERM Sample

Sunny, 70's, wind from east.

top few inches red waste material.

1 inch plus salt crystals on surface.

first aliquot 100% passed sieve. ~~Remaining~~

Remaining aliquots not sieved.

Trent collected aliquots, Kristopher

composited. Trent filled jars

7-10-SS-01-092815 ERM Sample.

Sunny, 70's, wind from east, few inches  
of red waste material on surface. Salt

crystals larger than 1 inch. Kristopher

collected aliquots. Some water on surface

~~All material passed through sieve.~~ <sup>to 9/28/15</sup> All aliquots

passed through sieve due to salt crystals.

continue on next page

*Rite in the Rain.*

US Mag. RT/FS 1A/B @/28/2015 continued  
sample was not staked. GPS was used to  
locate. A more accurate Tremble device  
will be used to get a better coordinate.

7-06-55-01-092815 ERP Sample

Sunny, 70's, wind from northeast. Red  
waste material on surface with salt  
crystals smaller than 1 inch. Kristopher  
collected aliquots. First aliquot passed  
sieve 100%. Remaining aliquots not  
sieved.

usmag, KI/FS IA/13 9/29/2015

Tim Jimenez of EarthFax Engineering

Trent Hamada of ERM

Kristopher Benson of ERM

EarthFax personnel arrived on-site 08:30.

ERM Personnel arrived on-site 08:45

Sunny, 70's, with no wind at time of arrival.

Health and safety meeting about heat and driving on soft ground at 08:45.

Notes for today's sampling are on pages 31 - of this book.

7-17-SS-01-092915 ERM sample

Sunny, 70's, no wind. Sample

collected next to standing water.

No waste material appeared to be present. All material was sieved.

7-16-SS-01-092915 ERM sample.

Sunny, 70's, gentle breeze from north.

Thin salt crust on surface. Flat area

adjacent to canal. All material was sieved.

No waste material.

Continue on next page

US Mag RE/FS 2A/B 9/29/2015 continued

7-04-SS-01-092915 ERM Sample

Sunny, 70's gentle breeze from north.

Very little material passed through sieve. Sample was mostly red waste material in form of a salt crust with  $\frac{1}{2}$  to 1 inch of standing water.

USMag RI/FS 1A/B 10/05/2015

Tim Jimenez of EarthFax Engineering

Trent Hamada of ERM

Kristopher Benson of ERM

EarthFax and ERM personnel arrived  
on site at 08:50.

Partly cloudy, 50's, gentle breeze  
from south at time of arrival.

Health and Safety tailgate discussing  
possible lightning. Today's notes  
comprise pages 33 of this book

-LBN-06-SS-01-100515-ES01 MS/MSD

-LBN-06-SB-01-100515-ES01 MS/MSD

Sunny, 60's, wind from west.

Sample became wet at bottom  
of 36" depth.

-LBN-07-SS-01-100515-ES01

Sunny, 60's, wind from west.

Surface sample only. First aliquot  
passed 100% through sieve. Remaining  
aliquots not sieved. Little salt on surface

-LBN-08-SS-01-100515 ERM sample

Sunny, 60's, wind from east. First aliquot  
passed sieve 100%. Remaining aliquots not  
sieved. Little salt on surface.

US Mag. RI/FS 1A/B 10/05/2015 continued

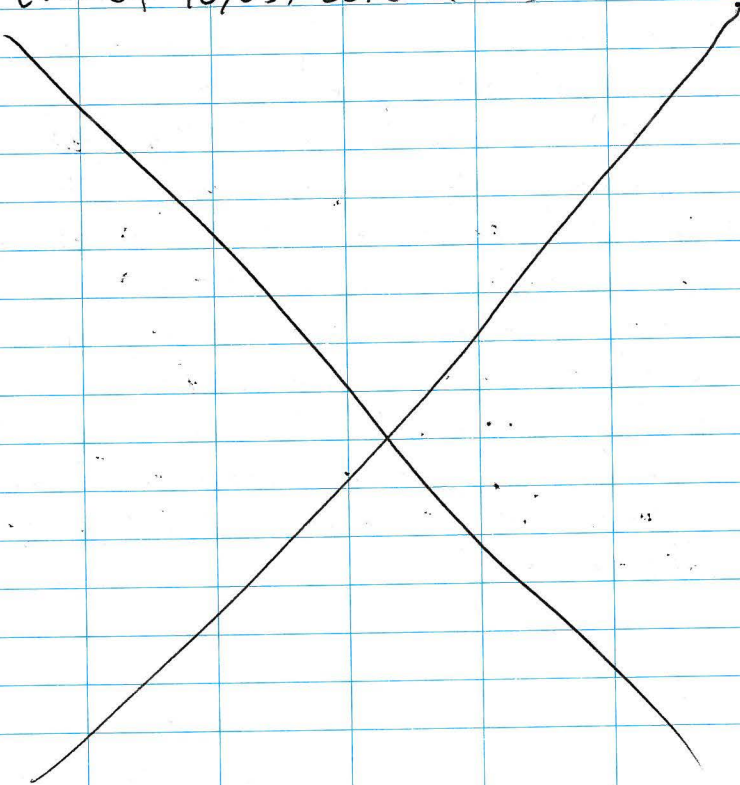
-LBN-09-SS-01-100515 ERM sample

Sunny, 70's, no wind. First aliquot  
passed sieve at 100%. Remaining  
aliquots not sieved. Little salt on surface

-LBN-10-SS-01-100515 ERM sample.

Sunny, 70's, wind from west. First aliquot  
passed sieve 100%. Remaining aliquots  
not sieved, little salt on surface

End of 10/05/2015 notes





US Mag REFS 2A/B 10/06/2015

Tim Jimenez of EarthFax Engineering

Lonnie Mercer of ERM

Kristopher Benson of ERM

EarthFax personnel arrived onsite at 08:30 and had health and safety tailgate on thunder and lightning

ERM personnel arrived onsite at 08:45

Mixture of rain and sunny with temperatures in the 60's at times of arrival

~~LIBSE-1-SS-01-100615~~

ERM sample only. 5 aliquots collected with spoon/towel. little short vegetation. All material was passed through sieve due to salt chunks. Top 1/2" of material was wet due to rain. Material under 1/2" was dry.

Materials appeared to be natural formation

~~Notes for 10/06/2015 (continue on next page)~~

US Mag RI/FS 2A/B 10/06/2015 (continued)  
 -LBSE-2-SS-01-100615

ERM sample only. Sunny, 60's, no wind,  
 Broken crust of <sup>Calcium (TS 10/06/2015)</sup> Carbonate salts on surface.  
 All 5 aliquots were passed through sieve  
 due to broken crust. No vegetation in  
 sample. Moist all through the sample.  
 Sample location near standing water  
 on a shore/bank line. Clay under  
 top layer of broken crust. All material  
 appeared to be natural.

-LBSE-3-SS-01-100615

ERM sample. PWT split and duplicate  
 LBSE-3-SS-01-100615-ES01 and  
 LBSE-3-SS-01-100615-ES02

Broken crust of <sup>Calcium (TS 10/06/2015)</sup> Carbonate salts on surface.  
 All 6 aliquots passed through sieve due to  
 broken crust. Sunny, 60's, gentle breeze  
 from south. Little vegetation on moist  
 bank near open water. Silty sand and  
 broken crust appear to be natural.

Notes from 10/06/2015 continue on  
 next page →

US Mag RI/FS 2A/B 10/06/2015 (continued)

-LBSE-4-SS-01-100615

ERM sample only. Sunny, 60's, no  
 breeze. Near open water on a  
 non-vegetated shore/bank. Sample  
 location appears to have been under  
 water recently. Saturated clay  
 with a fine calcium carbonate  
 broken crust on surface. All material  
 appears to be native. First aliquot  
 passed 100% through sieve. Remaining  
 4 aliquots not sieved.

-LBSE-5-SS-01-100615

ERM sample. PWT split was labeled  
 LBSE-5-SS-01-100615-ES01.

Thin broken crust of Calcium Carbonate  
 on surface. Layers of gray/brown  
 sand and black/gray clay. Material  
 was wet and appears to have  
 been under water recently. No  
 vegetation was present. First of  
 5 aliquots passed sieve 100%. Remaining  
 aliquots not sieved. Sunny, 60's,  
 no wind.

US Mag REFS 2A/B 10/07/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Suzy Smith of ERM

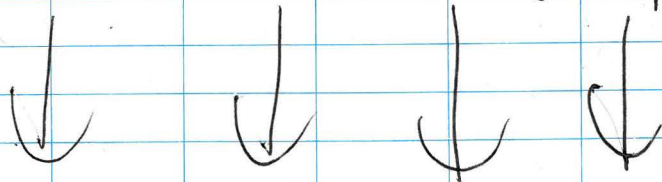
EarthFax personnel arrived onsite at 08:30 and had a health and safety tailgate about slick roads and traffic from wine shrimp fishers.

ERM personnel arrived onsite at 08:40 weather at arrival was sunny, SO'S, with occasional wind.

- LIBSE-6-SS-01-100715

ERM sample. Sunny, SO'S, wind from South. Flat area that appears to have been underwater recently. Gray clay with a thin layer of Calcium carbonate salts on surface. First of five aliquots passed sieve 100%. Remaining four aliquots not sieved. Some dead vegetation around sample location. All material appeared to be native.

10/07/2015 notes continue on next page



US Mag REFS 2A/B 10/07/2015 continued

- LIBSE-7-SS-01-100715

ERM sample. Sunny, SO'S, wind from South west. Thin layer of Calcium carbonate on surface with a black/gray clay underneath. Area appears to have been under water recently. Some dead vegetation in area sample was collected. All material appeared to be native. First of five aliquots passed sieve at 100%. Remaining aliquots not sieved.

- LIBSE-7-SB-02-36-01-100715 and

LIBSE-7-SB-02-36-01-100715-ES01

ERM sample and Dist split. Sunny SO'S, wind from South west. Location same as LIBSE-7-SS-01-100715. Gray to dark gray clay. Water was <sup>10/10/15</sup> ~~10/10/15~~ in container approximately 12" down.

Some sand approximately 30" down.

After sample was collected water rose to within 8" of top of hole. 10/07/2015 notes continue on next page

US Mag RI/FS 1A/B 10/07/2015 continued  
 -LBSE-8-SS-01-100715

ERM sample, Sunny, 60's, wind from south.  
 Thin calcium carbonate crust on surface, 1"  
 layer of brown clay on top, black/gray  
 clay under 1". Some dead vegetation  
 in area around sample. Area appears to  
 have been under water recently. All  
 material appeared to be native. First  
 of five aliquots passed sieve at 100%.  
 Remaining aliquots not sieved.

-LBSE-9-SS-01-100715

ERM sample, Sunny, 60's, wind from south  
 east. Thin layer of calcium carbonate on  
 surface with some broken chunks of calcium  
 carbonate. Black silty-sand under thin  
 layer of calcium carbonate. All material  
 was sieved due to broken chunks. Sample  
 location was approximately 10' from  
 salt bed with water. Sample location  
 appears to have been under water recently.  
 A little dead vegetation around sample  
 location. Dead bird near sample location.  
 All material appeared to be native  
 10/07/2015 notes continue on next page

US Mag RI/FS 1A/B 10/07/2015 continued  
 -LBSE-10-SS-01-100715

ERM sample, Sunny, 60's, wind from  
 south. Approved field modifications.  
 Sample was moved 20 feet north  
 to avoid wet salt bed where the  
 original location was. Modified area  
 had thin calcium carbonate layer on  
 surface. Under surface 1/2"-1" layer  
 of ~~oolitic~~ <sup>10/07/2015</sup> oolitic sand. Under  
 sand a layer of black/gray clay.  
 Material appeared to be native.  
 Sample location appeared to be  
 under water recently.  
 End of 10/07/2015 notes

US Mag. RI/ES 2A/B 10/12/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Kevin Lundmark of ERM

EarthFax personnel arrived at 09:00

ERM personnel arrived at 09:30

Health and Safety meeting at 09:00 <sup>TJ 10/12/15</sup> ~~discussed~~

discussed sun and warm weather.

-UPS-1-SS-01-101215 an ERM sample. PWT

split UPS-1-SS-01-101215-ES01. Sunny, 60's,

gentle breeze from southeast. Dry, clayey-

silt with trace vegetation. Medium

vegetation in sample area. Thin dry

crust on surface with fine dry powder

underneath. All material appears to be native.

-UPS-4-SS-01-101215 ERM Sample. Sunny, 60's,

no breeze. Medium vegetative area. lots of

rabbit scat in sample area. Thin dry

crust on surface with calcium evaporative

chunks. Dry powder soil under crust. All

aliquots sieved due to calcium chunks. Soil

was a native <sup>TJ 10/12/15</sup> silty-clayey-silt. Shotgun

casings in the area around the sample.

However, no BB's in sample.

Notes for 10/12/2015 continue on next page →

US Mag RI/ES 1A/B 10/12/2015 continued

-UPS-2-SS-01-101215 ERM sample

Sunny, 60's, gentle breeze from southeast.

Flat area with vegetation of medium

cover. Thin dry crust on surface and

dry powder underneath. Very small

amount of calcium evaporative chunks.

All material sieved due to calcium

chunks. Rabbit scat in area of sample.

All material appears native. Some

crypto-biotic soils.

-UPS-3-SS-01-101215 ERM sample

Sunny, 60's, gentle breeze from southeast.

Sample location was in material dug up

when an animal built a burrow. Thin

dry crust on surface with calcium

evaporative chunks and dry powder

underneath. All material was sieved

due to calcium chunks. Rabbit Scat and

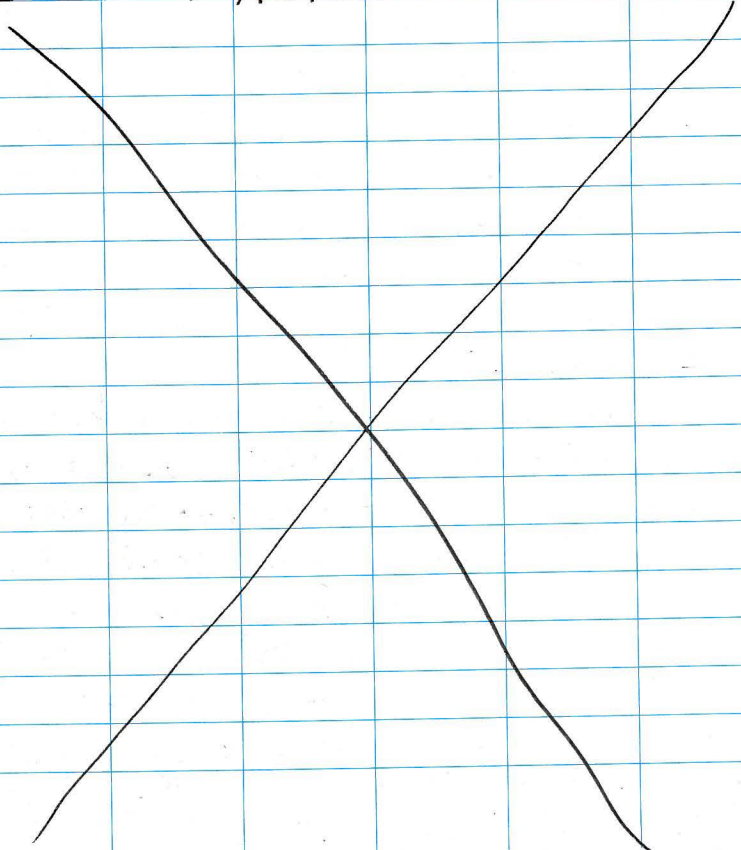
crypto-biotic soils in sample area. All

material appeared to be native.

Notes for 10/12/2015 continue on next page

US Mag RE/FS 1A/13 10/12/2015 continued.  
-UPS-5-SS-01-101215 ERM sample, Sunny, 60's,  
gentle breeze from south, medium vegetative  
area. Thin dry crust with calcium evaporative  
chunks and dry powder underneath. All material  
was sieved due to calcium chunks, some  
cryptobiotic-soils, no rabbit scat. All  
material appeared to be native.

End of 10/12/2015 notes



US Mag RE/FS 1A/B 10/13/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Suzie Smith of ERM

EarthFax personnel arrived on site at 08:25

ERM personnel arrived on site at 08:40

Health and Safety hailgate at 08:25

discussed sunlight avoidance using  
hats and sunscreen and UV even  
ground in UPS.

weather at arrival was sunny, 50's

and windy. MX 6 was zeroed

at PWT shed 20 miles south

of the ~~fac~~<sup>TS 10/13/15</sup> US Mag at 07:45.

All sensors passed. O<sub>2</sub> read 20.9

CO read 0, PID read -0.1, HCL read 0.0,

Cl<sub>2</sub> read 0.0.

-UPS-6-SS-01-101315 ERM sample and PWT

split UPS-6-SS-01-101315-ES01. Sunny, 60's,

wind from south. Crypto-biotic soils, rabbit

scat in sample area. Thin dry crust with

dry powder underneath. Soil is a dry

clayey silt with out calcium evaporative

chunks. heavily vegetated area. All soil

appears native. UPS-6-SB-02-36-01-101315

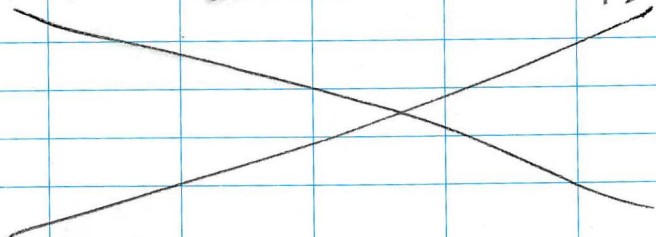
ERM and UPS-6-SB-02-36-01-101315-ES01 PWT split

at same location. 10/13/15 continue <sup>Site in the Rain</sup>

US Mag RI/FS IA/B 10/13/2015 cont.  
 -UPS-7-SS-01-101315 ERM Sample, Sunny,  
 60's, No wind, medium vegetation in  
 sample area. Thin dry crust with dry  
 powder underneath. No Calcium evaporate  
 chunks. First aliquot passed sieve at 100%.  
 Remaining aliquots not sieved. Same  
 crypto-biotic soils and rabbit scat in sample  
 area. Some woody debris in sample area.  
 Soil was clayey-silt. All soils appeared  
 to be native.

-UPS-8-SS-01-101315 ERM sample, Sunny, 60's,  
 wind from south, medium vegetative area with  
 some rabbit scat and cow scat. Thin dry  
 crust on surface with dry powder underneath.  
 All material passed through sieve to help  
 composite. 100% material passed sieve.  
 Some vegetation such as roots and woody  
 debris in sample. All soil appeared to be  
 native.

10/13/2015 notes continue on next page →



US Mag RI/FS IA/B 10/13/2015 continued  
 -UPS-9-SS-01-101315 ERM Sample, Sunny, 60's,  
 no wind. Thin dry crust on surface and dry  
 powder underneath. medium vegetation  
 with woody debris. clayey-silt. Sample  
 had root material and woody debris.  
 All material was passed through sieve  
 to help composite. All material passed  
 sieve at 100%. No Calcium evaporate  
 chunks in area. Same crypto-biotic-  
 soils. No rabbit scat. All soil appeared  
 to be native.

-UPS-10-SS-01-101315 ERM Sample, Sunny, 60's,  
 wind from south. Thin dry crust on surface  
 and dry powder underneath. No Calcium  
 evaporate chunks. Medium vegetation and  
 woody debris. <sup>10/13/15</sup> Some root material  
 and vegetation in sample. Crypto-biotic  
 soil in sample area. No rabbit scat. All  
 material passed through sieve to help  
 composite. All material passed sieve 100%.  
 All soil appeared native.  
 All samples on 10/13/2015 collected  
 according to approved SAP.  
 END notes for 10/13/2015



US Mag RE/FS 2A/B 10/16/2015

Tim Jimenez of EarthFax Engineering

Suzy Smith of ERM

Adam Neale of ERM

EarthFax personnel arrived onsite at 08:30

ERM personnel arrived onsite at 08:45

Tailgate health and safety meeting

at 09:00 discuss slippery conditions

in PRI-6. Mx6 monitor was zeroed

at 08:00 in Grantsville, VT.

Weather at arrival was sunny, 50's, with gentle breeze from east.

-6-04-SS-01-101615 ERM sample, sunny, 50's,

no wind. Flat area approx. 150 feet from

open water. Area appears to have been wet

or submerged recently. Dead vegetation.

Thin salt crust on surface. Layers of clay

and silty-clay. ~~Brown and red waste~~ <sup>TS 10/16/15</sup>

Dark brown clay and red waste material in

top 1". Brown clay and silty-clay under

1". Moist to saturated. Brown clay and

silty-clay appear native. Some rabbit scat

at sample location. HCL reading 0.0-0.2 ppm,

Cl<sub>2</sub> reading 0.0 ppm. First aliquot passed sieve at

100%. Remaining aliquots not sieved. However, some

rocks or calcium chunks were encountered.

10/16/2015 Notes continue on next page

US Mag RE/FS 2A/B 10/16/2015 continued

-6-01-SS-01-101615 ERM sample, sunny,

60's, no wind. Flat area approx. 20 feet

from open water. Dead vegetation in sample

area and some rabbit scat. Trace vegetation

in sample. All aliquots sieved due to thin

crust on surface. clayey-silt with sand and

some gravel. Material appeared native.

No layers have holes appeared <sup>TS 10/16/15</sup>

homogeneous. Live vegetation immediately

upland of sample. Soil was dry and

powdery under thin crust. HCL read

0.2-0.5 ppm, Cl<sub>2</sub> read 0.0 ppm during

sampling

-6-07-SS-01-101615 ERM sample, sunny, 60's

no wind. Flat area approx. 100 feet from

open water. Area appears to have been

submerged recently. Dead vegetation

in sample area. 1/4" - 1/2" inch of dark

brown clay on surface. 1/4" - 1/2" of red

waste material under dark brown clay.

Remaining 5" is light gray clay. First

aliquot passed sieve. Remaining aliquots not

sieved. light gray clay appeared native

HCL read 0.7-0.9 and Cl<sub>2</sub> read 0.0 during

sampling. All samples were compliant to SAP.

END of 10/16/2015 notes <sup>Note in the Rain</sup>

US Mag RI/FS 1A/B 10/21/2015

Tim Jimenez of EarthFax Engineering

Kristopher Benson of ERM

Garret Rigard of ERM

EarthFax personnel arrived onsite at 08:00

to have a tailgate health and safety about

slippery and ~~sk~~ sinking potential on Gypsum

pile (RR1-4) and to review The QAPP.

ERM personnel arrived onsite at 08:30.

The Mx6 monitor was zeroed in

Grantsville, Utah at 07:30. All sensors

passed test and were reading 0.0ppm

except O<sub>2</sub> which was reading 20.8%.

-4-10-SS-01-102115 ERM sample

cloudy, 50's, wind from east. Red waste

material throughout bore hole, saturated

material. Flat area approx. 150 feet

from open water to the north and

east of sample location. First aliquot

passed sieve at 100%. Remaining aliquots

not sieved. Material is homogeneous. HCL

and Cl<sub>2</sub> readings during sampling 0.0ppm.

Bore hole became gray clayey sand at approx.

3.5 feet.

Notes for 10/21/2015 continue on next page

US Mag RI/FS 1A/B 10/21/2015 continued

-4-10-SS-01-102115 ERM sample, sunny,

50's, wind from east. First aliquot

passed sieve 100%. Remaining aliquots

not sieve. Saturated material, Homogeneous

Red waste material. Sample location is a

flat area approx. 300 feet from open

water to the north. Sample time 10:20.

Bore hole to 5 feet without reaching

non-waste material. Bore hole contained

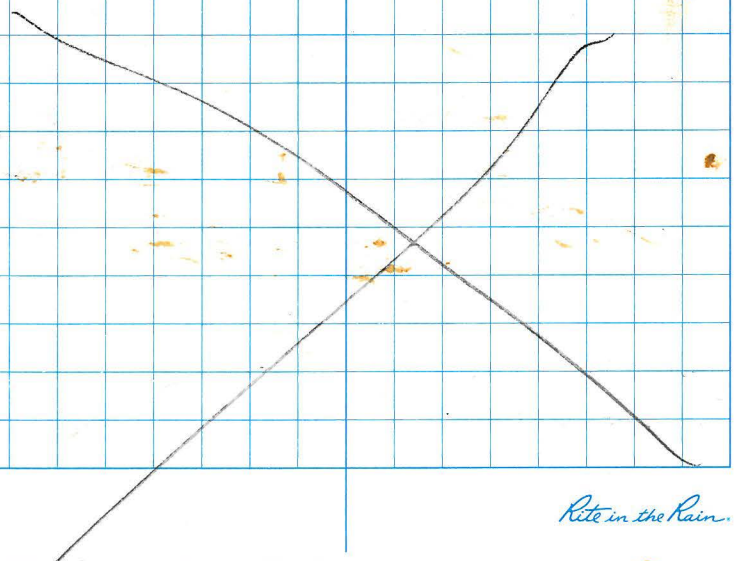
red waste material and some white

material that did not appear native.

HCL readings during sampling 0.0-0.2ppm.

Cl<sub>2</sub> readings during sampling 0.0ppm

End notes 10/21/2015



US Mag, RI/FS IA/B 10/21/2015

Tim Jimenez of EarthFax Engineering

Suzie Smith of ERM

Kristopher Benson of ERM

Howard Browers of U.S. Fish & Wildlife  
EarthFax and ERM personnel arrived

on site at 08:50. Health and safety  
tailgate on slippery conditions. Sunny,  
50's, gentle breeze. (warmest at time  
of arrival). 102215 TJ 10/22/2015

-BR-5-SS-01-102115 ERM Sample, sunny,  
60's, no breeze. First aliquot passed sieve  
at 100%. Remaining aliquots not sieved.  
Sample area is located in a flat, non-  
vegetative area that is flooding during  
portions of the year. Soil has no  
distinct layers and appears native.

Sample time 10:30. Silty-clay.

Sara ~~passing~~ of U.S. Fish & Wildlife arrived  
at 10:40. Sample BR-5 was wet/moist.

-BR-4-SS-01-102115 ERM Sample, sunny,  
60's, no breeze. Flat area, non-vegetative, that  
appears to be flooded during parts of the  
year. no distinct layer in soil. All soil  
appears to be native. Notes continue  
on next page

US Mag RI/FS IA/B 10/21/2015 continued

First aliquot passed sieve at 100%.

Remaining aliquots not sieved. Soil  
was moist/dry. Dry surface and  
moist about 1/2 inch down.  
Silty clay. Sample time 10:55.

Howard Browers left at 11:30

-BR-1-SS-01-102115 ERM Sample

Sunny, 60's, No breeze. First aliquot  
passed sieve at 100%. Remaining aliquots  
not sieved. Flat area with no vegetation.  
Area appears to be flooded during  
part of the year. Dry surface and moist  
approx. 1/2 inch down. Soil appeared  
native. Silty-clay. Sample time 11:55.

-BR-2-SS-01-102115 ERM Sample, sunny,  
60's, no breeze. Sample time 12:15.

First aliquot passed sieve at 100%.

Remaining aliquots not sieved. Flat  
area with no vegetation. Area appears to  
be flooded during parts of the year.  
wet to moist through at sample  
silty-clay soil appears to be native,  
no distinct layers.

Notes continue on next page

8 US Mag RI/ES 1A/B 10/22/2015 continued  
TS 10/22/2015

- BR-3-SS-01-~~102115~~<sup>102215</sup> ERM sample and PWT  
split BR-3-SS-01-102115-ES01, sunny, 60's,  
breeze from north. Moist/wet silty-  
Clay. Moist/wet throughout. First  
aliquot passed 100%. Remaining aliquots  
NOT sieved. No distinct layers.

- BR-3-SB-02-36-01-~~102115~~<sup>102215</sup> ERM Sample  
BR-3-SB-02-36-01-~~102115~~<sup>102215</sup> PWT split.

Sunny, 60's, breeze from north. Moist/wet  
silty clay. Sample was collected using  
a decontaminated post hole digger due  
to ERM not having a hand auger at  
the site. 2"-30" silty-clay, 30"-36" silt  
sand. Sample time 13:50 and for SS  
sample 13:05. No field modification  
approval for subsurface sample due  
to inability to do equipment rinse blank.  
Sample was submitted to ALS for PWT  
but Tim Jimenez removed the  
sample and modified the LOC. ~~at~~  
USM-PH1AB-005 to reflect this change.  
Additionally 10/21/2015 dates were  
changed to 10/22/2015 the correct  
date. End notes for 10/22/2015.

10/23/2015 BR-3-SB sample approved for delivery to  
lab. for analysis. TS 10/23/2015

US Mag RI/ES 1A/13 10/23/2015

Tim Jimenez of EarthFax Engineering

Lannie Mercer of ERM

Garret Rigard of ERM

ERM and EarthFax personnel arrived on-site at 08:30. Health and Safety tailgate on slippery conditions in PRI-4. Sunny, 40's, wind from north. MX6 was zeroed at 07:45 in Tooele City approx. 40 miles southeast of site

MX6 read HCL=0.0ppm, Cl2=0.0ppm, CO=0.0ppm, PID=0.0ppm, O2=21.0%

4-8-SS-01-102345 ERM sample, Sunny, 40's, no wind. Homogenous red waste material. Flat area immediately adjacent to water. Dead vegetation around sample. First aliquot passed sieve 100%. Remaining aliquots not sieved. Sample time 09:45. Vegetation appears to be partially buried under 4"-8" of red waste material. Material was saturated. Gray silty-clay with fine gravel or coarse sand and trace vegetation at approx. 12". HCL read 0.0ppm-0.2ppm during sampling. Cl2 read 0.0ppm during sampling. Note for 10/23/2015 continue on next page

US Mag RI/FS IA/B 10/23/2015 continued  
 4-04-SS-01-102315 ERM sample, sunny, 50's,  
 no wind. Flat area immediately adjacent to  
 flowing water. No vegetation in area. Sample  
 location was approx. 2" higher than flowing  
 water. First aliquot passed sieve at 100%.

Remaining aliquots not sieved. Homogeneous  
 red waste material. Gray silty clay appears  
 to be native at approx. 24" down borehole.  
 red waste material was saturated. HCL  
 read 0.0ppm to 0.2ppm during sampling.

Cl<sub>2</sub> read 0.0ppm during sampling. 10:45

4-09-SS-01-102315 ERM sample, sunny, 60's,  
 no wind. Flat area approx. 400' from open  
 water. Sample area was in this waste  
 water flow recently. Some dead  
 vegetation approx. 30' feet north.

Red waste material with some gray material  
 intermixed. First aliquot passed at 100%.

Remaining aliquots not sieved. Some natural  
 woody debris is scattered around 24"

Native gray silty clay with trace vegetation  
 at approx. 24". HCL read 0.1 to 0.3ppm during  
 sampling. Cl<sub>2</sub> read 0.0ppm during sampling.

Sample time 11:45. End of 10/23/2015 notes  
 No modifications from approved plan.

USMag RI/FS 2A/B 10/29/2015

Tim Jimenez of EarthFax Engineering  
Trent Hamada of ERM

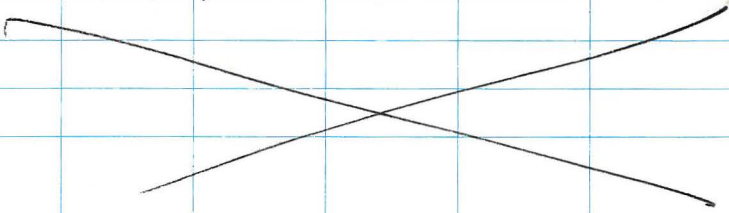
Erzy Smith of ERM

EarthFax arrived onsite at 08:30  
had health and safety tailgate on  
slippery conditions. ERM personnel  
arrived onsite at 09:00. Mx6 5<sup>ss</sup>  
monitor was zeroed at 08:00 in  
Grantsville. All sensors read 0 except  
O<sub>2</sub> which read 20.9%.

-4-12-ss-01-102915 ERM sample, Rain, 40's wind  
from west, First aliquot passed sieve 100%.  
Remaining aliquots not sieved. Sample area  
is flat with no vegetation approx. 50'  
from open water to the north. Material  
is red waste material, homogeneous, saturated,  
very soft. Gray sandy-silt with vegetation  
approx 2' below top of waste. Gray soil  
appears to be native. Sample time 11:02  
HCl and Cl<sub>2</sub> read 0.0 ppm during sample.  
Notes for 10/29/2015 (continued next page)

*Rite in the Rain*

USMag RI/ES 1A/B 10/29/2015 continued  
-4-13-SS-102915 ER17 sample, cloudy, 40's wind  
from west. Flat area approx. 70' from open  
water to north. Homogenous red waste  
material. First aliquot passed sieve 100 $\mu$ .  
Remaining aliquots not sieved. Material  
was saturated and soft. Native gray  
sandy silt encountered at 2'. Sample  
time 11:49. HCl and Cl<sub>2</sub> read 0.0ppm during sample.  
-4-14-SS-01-102915 ER12 sample, cloudy, 40's,  
wind from west. Field modification for  
moving location to UTM 4532195.50m N,  
354421.79 m E, approx. 50' south of  
open water, south of sample location  
prior to field modification. Original  
location was in water. Field modification  
was approved prior to sampling. Flat  
area with homogenous saturated red  
waste material. Native gray sandy silt  
encountered at approx. 3'. HCl and Cl<sub>2</sub> read  
0.0ppm during sampling. Sample time 12:33  
End of 10/29/2015 notes





US Mag RI/FS ← 2A/13  
11/16/2015

Tim Jimenez of EarthFax

Kristopher Benson of ERM

Kevin Lundmark of ERM

EarthFax arrived on-site at 08:30 and had health and safety on cold weather and slick conditions.

Weather was strong wind from west and snow. Snow was not sticking at time of arrival.

ERM arrived on-site at 09:00

Mx6 monitor zeroed at 07:15 in Tooele City. All sensors read 0.0ppm, O<sub>2</sub> read 20.9%

Mx6 monitor was shipped from Industrial Scientific 11/12/15. Mx6 was sent calibrated, scouted and marked sample locations in PRT-2 and 3 in morning.

-3-02-55-01-111615 ERM Sample 30's.

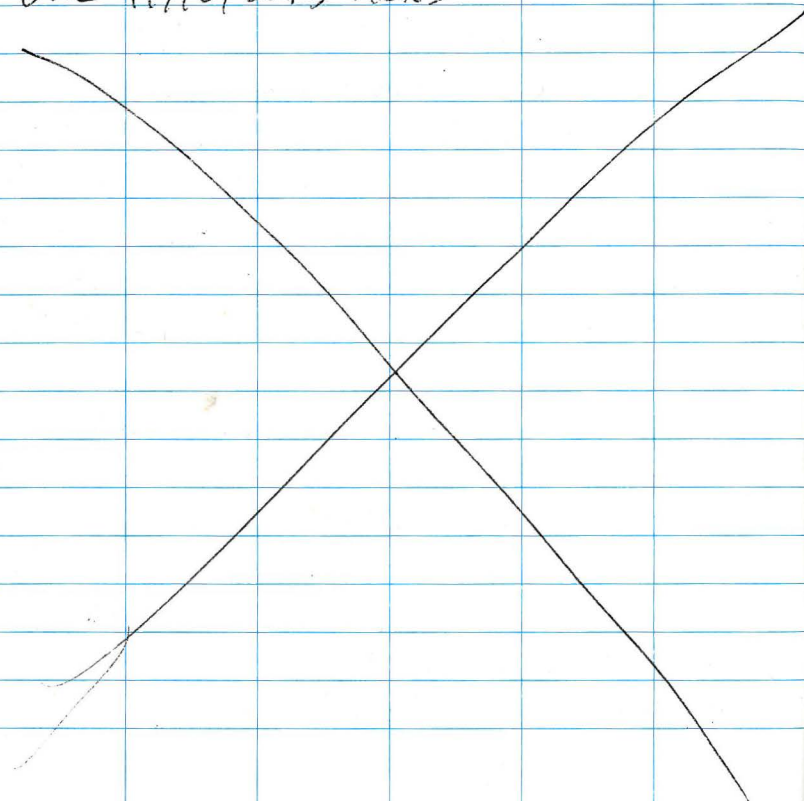
Cloudy, strong wind from west. Heavily vegetated area in Sanitary Lagoon. All aliquots served due to vegetation. Dark brown clay with lots of vegetation. Saturated soil. Aliquot holes filled with water to 2" bgs. HCL read 0.0ppm.

Cl<sub>2</sub> read 0.0ppm. Sample time 12:50

Native material at bottom of aliquots.

11/16/2015 notes continue on next ~~page~~ *page in the book*

US Map RT/ES 2A/B 11/16/2015 continued  
3-03-SS-01-11/16/15 ERM sample, 30s, cloudy, strong  
wind from west. Top 1" organic material, rest  
of aliquot red waste material. Saturated.  
no water appeared in aliquot holes. Heavily vegetated  
area. All aliquots sieved due to vegetation.  
Sample time 13:30. hand auger to native  
material a gray clay at approx 12" depth.  
MCL read 0.0-0.3ppm and  $Cl_2$  read 0.0ppm.  
End 11/16/2015 notes



USMag RE/F's 2A/B 11/18/2015

Tim Jimenez of EarthFax Engineering

Kristopher Pearson of ERM

Kevin Lundmark of ERM

EarthFax arrived on-site at 08:00 and had a safety tailgate about cold weather. Weather at time of arrival 30's, wind from west, cloudy

ERM arrived on-site at 08:45, 17x6

monitors zeroed at 09:15, in Tooele City.

O<sub>2</sub> read 21.0%, other sensors read 0.0ppm.

-3-07-ss-01-111815 ERM sample, 40's,

cloudy, wind from west. Approx. 2" of organic material on surface. Remaining 4" tight gray clay that appeared native. Material here moist. Some red material located within native

clay. However, red material was in fine threads and appeared to be root routes that were left after root matter had decayed. First

aliquot passed sieve 100%. Remaining aliquots not sieved. HCL read 0.0-0.1ppm and Cl<sub>2</sub> read 0.0ppm during sampling. Sample time 10:05.

Notes for 11/18/2015 continue on next page

*Rite in the Rain*

US Mag RI/FS 2A/B 11/18/2015 continued  
 -3-08-SS-01-111815 ERM sample, 40's,  
 Partly cloudy, wind from west. Top 2" of  
 aliquot organic material. Bottom 4" of  
 aliquot light gray clay appeared to be  
 native. No red waste material or sign  
 of root decay present. wet clay. aliquot  
 holes filled to 4" bgs after aliquot  
 collected. First aliquot passed sieve 100%.  
 Remaining aliquots not sieved. HCL read  
 0.0-0.1 ppm and Cl<sub>2</sub> read 0.0 ppm during  
 sampling. Sample time 10:55

-3-09-SS-01-111815 ERM sample, 40's, partly  
 cloudy, wind from west. TOP 2" of aliquot  
 organic material. Bottom 4" of aliquot  
 light gray clay. Clay was wet. clay appears  
 to be native. some fine threads of red  
 material that appeared to be root decay.  
 First aliquot passed sieve 100%. Remaining  
 aliquots sieved. HCL read 0.3-0.9 ppm  
 during sampling. Resperator donned. Cl<sub>2</sub>  
 read 0.0 ppm. Sample time 11:50  
 due to odor TJ 11/18/2015

11/18/2015 notes continue on next page

US Mag RI/FS 2A/B 11/18/2015 continued  
 -3-10-SS-01-111815 ERM sample, 40's, Partly  
 cloudy, wind from west. Top 2" of  
 aliquot organic material. bottom 4" of  
 aliquot light gray clay. clay was moist.  
 clay appears to be native. Some fine  
 red threads that appear to be decay  
 from roots and not waste material.  
 Some gravel in aliquots. All aliquots  
 were sieved. HCL read 0.0-0.3 ppm and  
 Cl<sub>2</sub> read 0.0 ppm during sample. Sample  
 time 12:45  
 No variation from SAP. End of 11/18/2015  
 notes

USING RT/FS 2A/B 11/19/2015 continued  
 3-12-SS-01-111915 ERM sample, 40's, partly clady, now ind. Top 3" organic material. Bottom 3" Brown sand and silt appears to be native material used to build the north sampling lagoon between sand and silt in forest. Sample location was in forest and shrubs. HCL and  $Cl_2$  read 0.0 during sample. Sample time 10:10.  
 3-11-SS-01-111915 ERM sample, 40's, clady, now ind. Top 2" organic material. Bottom 4" red waste material. HCL read 0.0-0.1 ppm during sampling. However, respirators were donned during sampling due to  $Cl_2$  0.1-0.7 ppm. Sample was dry. Native sand and silt was incanted at 8" bgs. The sand and silt appeared to be native material used to build north sampling lagoon beam sample time 10:35.  
 Notes for 11/19/2015 continue on next page

Back on the floor

USING RT/FS 2A/B 11/19/2015  
 Tim Dimmetz of EarthFax Engineering  
 Kristopher Benson of ERM  
 Suzy Smith of ERM  
 Trent Hamada of ERM  
 EarthFax arrived on-site 08:15 had Kathy Tolgate on cold weather, water was 40's, partly cloudy, wind changing direction. Mx 6 monitor was zeroed in Middle UT at 07:15.  $O_2$  read 20.9%, all other sensors read 0.0 ppm. ERM arrived on-site at 08:15  
 3-13-SS-01-111915 ERM sample, 40's, clady, now ind. Top 3" organic material. Bottom 3" brown/red sand and silt. material was moist with some gravel. Sand and silt did <sup>11/19/15</sup> could be waste or impact material. Sample location was on edge of lagoon under trees and shrubs. All aliquots saved due to gravel. HCL read 0.0 ppm during sample.  $Cl_2$  read 0.0-0.1 ppm during sample. Sample time 09:45. The sand and silt appears to be native material used to create the north beam of the sampling lagoon. 11/19/2015 notes continue on next page

- US Mag RI/FS 1A/B 11/19/2015 continued
- 1-14-SS-01-111915 ERM sample, 40's, cloudy, no wind, top" brown sand and clay with some road base. Bottom 3" red waste material, Dry sample. Due to loose nature of material Each hole took two aliquots, 5 holes took ten aliquots, the VOC's (encores) were collected from the bottom of a second aliquot representing to bottom of a hole to be consistent with how other VOC (encore) samples were collected. All aliquots were sieved due to gravel in road base material. Respirators were donned due to Cl<sub>2</sub> Del - 0.7 ppm, HCL read 0.0 - 0.1 ppm. Sample time 11:15.
- 1-01-SS-01-111915 ERM Sample, 40's, cloudy, no wind. Sample was ditch bottom next flowing water. Sand, clay, and gravel appeared to be native. Material was saturated. HCL read 0.0 - 0.3 ppm. Cl<sub>2</sub> read 0.0 - 0.1 ppm. All aliquots sieved due to gravel. Sample time 11:50
- 11/19/2015 notes continue on next page
- 

- US Mag RI/FS 1A/B 11/19/2015 continued
- 1-02-SS-01-111915 ERM sample, 40's, cloudy, no wind. Sample was taken in approx. 1" of water. Material was saturated and difficult to recover. Clay, sand, gravel with heavy vegetation. Some silver sheen when sediment disturbed. Sheen reformed after being disturbed and is likely oil based and not natural. HCL read 0.0 - 0.3 ppm and Cl<sub>2</sub> read 0.0 ppm. Sample time 12:40. Clay was at bottom of aliquots and likely native. All aliquots sieved due to gravel and vegetation.
- 1-05-SS-01-111915 ERM sample, 30's, cloudy, no wind. Sample was taken in approx. 1" of water. Red waste material with a little gray clay at bottom of aliquot. Clay appeared native. VOC's were collected with both Encores and methanol VOA (EPA 5035). All <sup>aliquots (TS 11/19/15)</sup> ~~material~~ sieved due to some gravel. Respirators held to face but not fully donned. Cl<sub>2</sub> read 0.6 ppm for few seconds and remained under 0.4 ppm for rest of sampling. HCL read 0.0 - 0.1 ppm. Sample time 13:25. Material was saturated. End of 11/19/2015 notes
- Rite in the Rain*

US Mag RI/FS 2A/B 11/23/2015

Tim Jimenez of EarthFax Engineering

Lonic Mucci of ERM

Trent Hamada of ERM

EarthFax arrived onsite at 08:15 and

had safety tailgate on cold weather.

Weather at time of arrival, sunny, cold,

no wind. ERM arrived onsite 08:45.

MX6 monitor zeroed at 08:00 at USFS

Muskat station. O<sub>2</sub> read 20.8% all other

sensors read 0.0ppm.

1-13-SS-01-112315 ERM sample and a split

1-13-SS-01-112315-ESOL. Sample time 09:30.

Sunny, cold, no wind. Flat lightly vegetated

area. Near roadway. Material was sandy

silt with gravel. Moist, with no trace

vegetation or foreign material. Material

appeared native. All aliquots sieved due

to gravel. 5 aliquots collected. TB-21

was labeled at sample location. HCL and

Cl<sub>2</sub> read 0.0ppm during sampling.

1-11-SS-01-112315 ERM sample and EPA split

1-11-SS-01-112315-ESOL. Sunny, cold, no wind

east end of ditch approx. 3' from shore

in approx. 2" of water. Sample was red

waste material. HCL read 0.0-0.4ppm

notes continue next page →

US Mag RI/FS 2A/B 11/23/2015 continued

Cl<sub>2</sub> read 0.1-6.0ppm. during

sample Cl<sub>2</sub> read 0.1-0.8ppm. when

waste material depth was being

established Cl<sub>2</sub> started to climb.

ERM/EarthFax backed away from

site and did not continue hand

augering to find depth, 6ppm is

well above 2.0ppm action level.

Crews did not stay in area when

2.0ppm was reached. Cl<sub>2</sub> levels

rose faster than crews could move

out of area. once Cl<sub>2</sub> levels were

below 0.5ppm crews finished

putting samples in jars. Sample

time was 11:00. Respirators worn

the entire time.

1-10-SS-01-112315 ERM sample and ERM dup.

Sunny, no wind, cold. In ditch, along a

flat area that appears to have been

flooded in past. Approx 5' from banked

sides and approx. 20' from water.

Sample location appeared to be approx. 2"

above water. Red waste material. Sample

time 11:55. Respirators worn as precaution

notes continue on next page →

US Mag RE/ES 1A/B 11/23/2015 continued

Gray clay encountered at 5'. HCL read 0.0-0.6 ppm and LL read 0.0-0.3 ppm during sampling. Gray clay appeared to be native. All of first aliquot passed sieve. Remaining aliquots not sieved.

-109-55-01-112315 ERM sample, partly cloudy, no wind, cold. South side of ditch approx 6' from bank. Approx 4' from water in flat shore area that appears to be flooded some parts of year. First aliquot passed sieve 100%. Remaining aliquots not sieved, red waste material with intermixed white waste material.

No modification or variations from SAPP. End of 11/23/2015 notes



**U.S. Magnesium**  
**Split Sampling Field Logbook**

Aaron Baird

September 30, 2015

thru

December 10, 2015

Phase IA-B Background Sampling 9/30/15

Went to office trailer to pick up sampling supplies.

Arrived onsite at ERM trailer at 0830.

Kris and Trent from ERM arrived at 0900.

ELM utility locating services also onsite.

ERM conducting utility clearance of sub-surface soil sampling / boring locations UPN-6 and UPS-6.

Drove to Upland North boring location UPN-6. High pressure gas line nearby but location was clear of utilities.

Cow carcass observed in PRI-16 and tarantula observed near UPN-6 - see photos.

Drove to Upland South boring location UPS-6. Location was clear of utilities.

1100 - returned to ERM trailer to prep. for surface soil sampling.

Drove to Stansburry Island, Upland Southeast, to collect background soil samples.

Many shrimpers observed on drive.

ERM collected 5 surface soil samples:

- UPSE-7-SS-01-093015
- UPSE-10-SS-01-093015
- UPSE-8-SS-01-093015
- UPSE-9-SS-01-093015
- UPSE-6-SS-01-093015

All sampling procedures conducted according to SAP, and SOP VSM-01 using flat-bottom scoop.

Sandy silt encountered at all locations.

Recovery was 98%+ and material easily passed

9/30/15

through the  $\frac{1}{4}$ " sieve. Soil was very dry.  
ERM returning to trailer to decon sampling  
equip.

Departed site at 1350.

Super  
Boring

Phase 1A-B Background Sampling 10/1/15  
Went to office trailer to pick up sampling  
supplies.

Arrived on site at 0830.

Weather is partly cloudy, temp.  $\sim 70^{\circ}\text{F}$ , no wind.  
Met ERM at office trailer at 0900. Trent  
and Suzie onsite for ERM.

Drove to Stansbury Island, Upland Southeast,  
to collect remaining background soil  
samples.

ERM collected surface soil sample at UPSE-S  
then collected subsurface soil sample  
(UPSE-S-SS-01<sup>-02-36-AB</sup> 100115 and UPSE-S-SB-01<sup>-02-36-</sup> 100115).

I collected split sample from the subsurface  
sample - UPSE-S-SB-01<sup>-02-36-</sup> 100115-ES01.

SAP WS#11, Sec. 11.3.7.5.2 states that  
subsurface soil samples will be collected  
using a portable flighted auger with soil sampling  
probe or a compressed-gas powered direct push  
corer. The portable flighted auger ERM had  
came with a very small diameter probe -  $\frac{1}{2}$ "  
which could not produce the sample volume  
needed. Therefore, ERM requested to use  
a hand auger. I contacted Ken W. and  
he verbally approved SAP mod. ERM to  
prepare SAP mod. when they return to the  
office.

USM-09 Subsurface sampling SOP, Sec. 6.5,  
calls for borehole abandonment using hydrated  
bentonite chips. ERM did not have bentonite  
therefore, they requested to backfill borehole

10/1/15

using remaining soil sample volume. I NM prepared a field mod. for this change and I signed it.

ERM collected soil sample UPSE-4-SS-01-100115.

ERM collected soil sample UPSE-3-SS-01-100115 and I collected split sample with dup. - UPSE-3-SS-01-100115-ES01 & ES02.

ERM collected soil sample UPSE-2-SS-01-100115.

ERM collected soil sample UPSE-1-SS-01-100115 and I collected split sample - UPSE-1-SS-01-100115-ES01. See field data sheet.

All background soil sampling in Upland SE area now complete.

Similar areas and soil type were encountered at all UPSE locations.

Wild life encountered included lizards, ants, beetles, flies, and mosquitos.

Dropped split samples off at ALS-SLT for Metals, SVOCs, TOC, and pH analyses and shipped samples to ALS-Houston for PCBs and PCDD/PCDF analyses.

Spoke to K. Landmark and confirmed that CN was not included in metals analysis for background samples, but Hg and Mo were.

## Phase 1A-B Background Sampling

10/2/15

Arrived on site at 0830.

I NM, Kris and Suzie, arrived at 0845.

Weather is cloudy with scattered rain and NW wind with temps in mid 60°F.

I NM planning to collect surface soil samples in the Lakebed North background sample area.

Drove to Lakebed North area.

ERM collected 5 surface soil samples:

- LBN-1-SS-01-100215

- LBN-2-SS-01-100215

- LBN-3-SS-01-100215

- LBN-4-SS-01-100215

- LBN-5-SS-01-100215

All sampling procedures conducted according to SAP and SOP USM-1 using flat bottom scoop.

Silty clay encountered at all locations.

Soil was very moist at all locations but -5 which was much more dry. Little vegetation.

Recovery was 100% at all locations.

ERM returning to trailer to decon sampling equip.

Departed Lakebed North area at 1120.

10/8/15 Phase 1A-B Background Sampling.

Arrived on site at 8:30 am.

Weather is partly cloudy, temp. ~60°F, light NE wind.

US Mag stack plume settling in Lakeside Mountains - PRI 16.

ERM arrived on site at office trailer at 0900. Trent and Kris onsite for ERM.

ERM planning to collect soil samples at the Lakebed Southeast at Badger Island area.

Drove to Badger Island to LBB-10 location.

ERM collected surface soil sample LBB-10-SS-01-100815 at 10:15.

I collected split sample LBB-10-SS-01-100815-ES01 and duplicate - ES02 - see field data sheet.

ERM collected surface soil sample LBB-09-SS-01-100815 at 10:30.

I collected split sample LBB-09-SS-01-100815-ES01. See field data sheet.

ERM collected surface soil sample LBB-08-SS-01-100815.

ERM collected surface soil sample LBB-07-SS-01-100815 then cleared top 2" at center of LBB-07-SS aliquots and used hand auger to collect subsurface soil sample LBB-7-SB-01-02-36-100815 at 11:10.

I collected split sample LBB-7-SB-01-02-36-100815-ES01. See field data sheet.

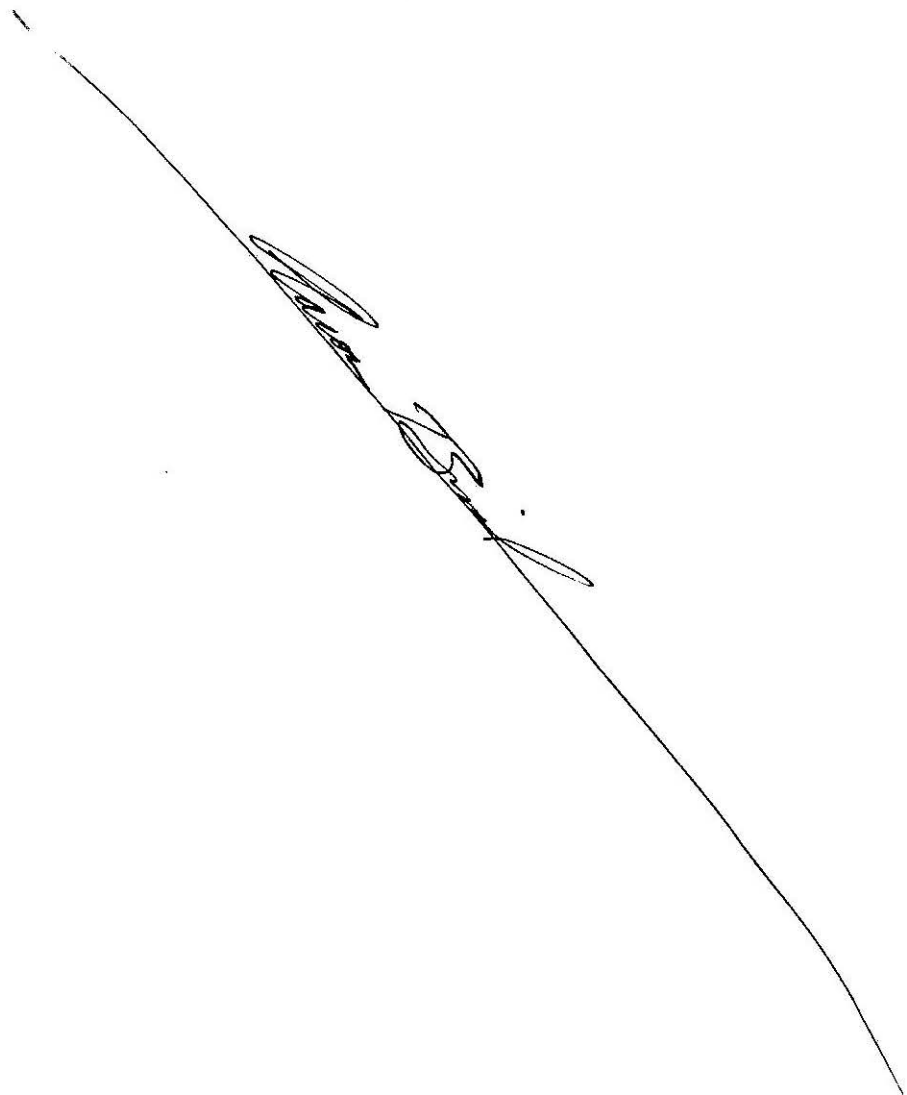
ERM returning to trailer to decon sampling equip. Departed sampling area at 1200.

10/8/15

All sampling procedures conducted according to SAP and SOP USM-01.

No wildlife encountered in sampling area.

Prepped split samples off at ALS-SLC for metals, SVOCs, TOC, and pH analyses, and shipped samples to ALS-Houston for PCBs and PCDD/PCDF analyses.



## 10/9/15 Phase 1A-B Background Sampling

Arrived on site at 8:30.

Weather is clear with light E wind and temp.  $\sim 60^{\circ}\text{F}$ .

There is an inversion and the stack plume is thick towards the Lakeside Mountains.

ERM arrived on site around 9:00.

ERM, Trent and Suzie, planning to finish surface soil sampling in Lakebed Southeast at Badger Island area.

ERM collected: LBB-5-SS-01-100915 at 0957

LBB-4-SS-01-100915 at 1010

LBB-3-SS-01-100915 at 1022

LBB-2-SS-01-100915 at 1035

LBB-2-SS-11-100915 (Dup)

LBB-1-SS-01-100915 at 1044

All areas were similar with silty sand, dry, and varying degrees of vegetation and surface gravel. Approx. 98% of material passing through  $\frac{1}{4}$ " sieve. All samples were 5 aliquots from 0-2". All locations were as stated in SAP and all sampling procedures were conducted in accordance with SAP and SOP USM-01.

Signed Field Mod. from 10/7/15 to move

LBSE-10 sample loc. 25' to the north.

Departed LBB area at 1110. No split samples collected.

## SCAT Pond Inspection

10/12/15

Arrived on site at 0830.

Lonnie with ERM on site at 0845

Weather is clear with light S wind and temp.  $\sim 55^{\circ}\text{F}$ .

Visible haze around facility. Strong odor at ERM trailer - HCl at 0.2 ppm Cl<sub>2</sub> at 0.1 ppm.

Kris and Kevin with ERM conducting background sampling in Upland South area.

Tim with Earthfax on site to oversee background sampling.

I went with Lonnie to oversee SCAT pond inspection (post evaporative season).

Lonnie reporting that last brine pumping into SCAT occurred in early August.

HCl up to 0.7 ppm and Cl<sub>2</sub> at 0.1 ppm at SCAT pond.

There is no brine in pond - completely dry. There are salt spires formed on the perimeter and mounds in center.

ERM drove stake in center of pond near topographical low then used slide hammer to core.  $\sim 25\%$  recovery in 1<sup>st</sup> core, all salt.  $\sim 50\%$  recovery in 2<sup>nd</sup> core.

Salt is brittle and full core appears challenging. Serrated core with twisting motion attempted but was unsuccessful and could not effectively penetrate firm salt cap.

$\frac{1}{2}$ " diameter core also attempted but had

10/14/15 Phase IA-B Background Sampling  
Arrived on site at 0840.

Kris and Adam on site for ERM.

Weather is clear, no wind, and temp ~60°F.  
ERM planning to conduct background soil  
sampling in the Upland North area.

ERM collected: UPN-1-SS-01-101415 at 0945

UPN-2-SS-01-101415 at 1010

UPN-2-SS-11-101415 (Dup)

UPN-3-SS-01-101415 at 1030

UPN-4-SS-01-101415 at 1045

UPN-5-SS-01-101415 at 1100

UPN-6-SS-01-101415 at 1120

UPN-6-SB-01-02-36-101415 at 1130

UPN-7-SS-01-101415 at 1155

UPN-8-SS-01-101415 at 1205

UPN-9-SS-01-101415 at 1220

UPN-10-SS-01-101415 at 1235

I collected split samples at:

UPN-2-SS-01-101415-ES01

UPN-6-SB-01-02-36-101415-ES01

UPN-10-SS-01-101415-ES01

MS/MSD volume collected at UPN-6 loc.

See field data sheets for sample info.

All areas were similar with clayey silt, dry,  
and varying degrees of vegetation. All samples  
were 5 aliquots from 0-2". All loc. were as  
stated in SAP and all sampling procedures were  
conducted in accordance with SAP and SOP USM-01.

Departed site at 1320.

Dropped samples of at ALS-SLC.

Phase IA-B Sampling - PRI 5 10/15/15

Arrived on site at 0845.

Adam and Suzie on site for ERM.

Weather is clear, light E wind, temp. ~60°F.

1 RM planning to finish accessible surface  
soil sampling locations in PRI Area 5.

ERM collected soil sample S-01-SS-01-101515  
at 1005. Soil is a moist sandy clay with  
iron modeling in top 1-2". Wastewater  
shoreline is ~100' E of location. In area  
previously inundated with wastewater.

ERM collected soil sample S-16-SS-01-101515  
at 1040. Soil is a saturated silty clay to 3"  
and gravelly sand 3-6". Due to the high  
saturation, ERM collected an additional,  
6<sup>th</sup>, aliquot. No standing water in this  
portion of the former Wastewater Div. Ditch.

HCl reading between 1.5 and 1.7 ppm. No Cl<sup>2</sup>

ERM collected soil sample S-06-SS-01-101515 at  
1110. Soil is a moist sandy clay with iron  
modeling in top 2". Wastewater shoreline is  
~150' E of location. In area previously  
inundated with wastewater.

Went to look at S-11 location and it is in  
wastewater.

HCl up to 2.6 and Cl<sup>2</sup> up to 0.5 while accessing  
S-11 location - field team in respirators.

ERM collected soil sample S-10-SS-01-101515 at 1300.

Soil is a dry silty sand. PRI-7 former wastewater  
shoreline is ~50' E. Dry vegetation at location.

Also collected dup. S-10-SS-11-101515. 6 aliquots collected.

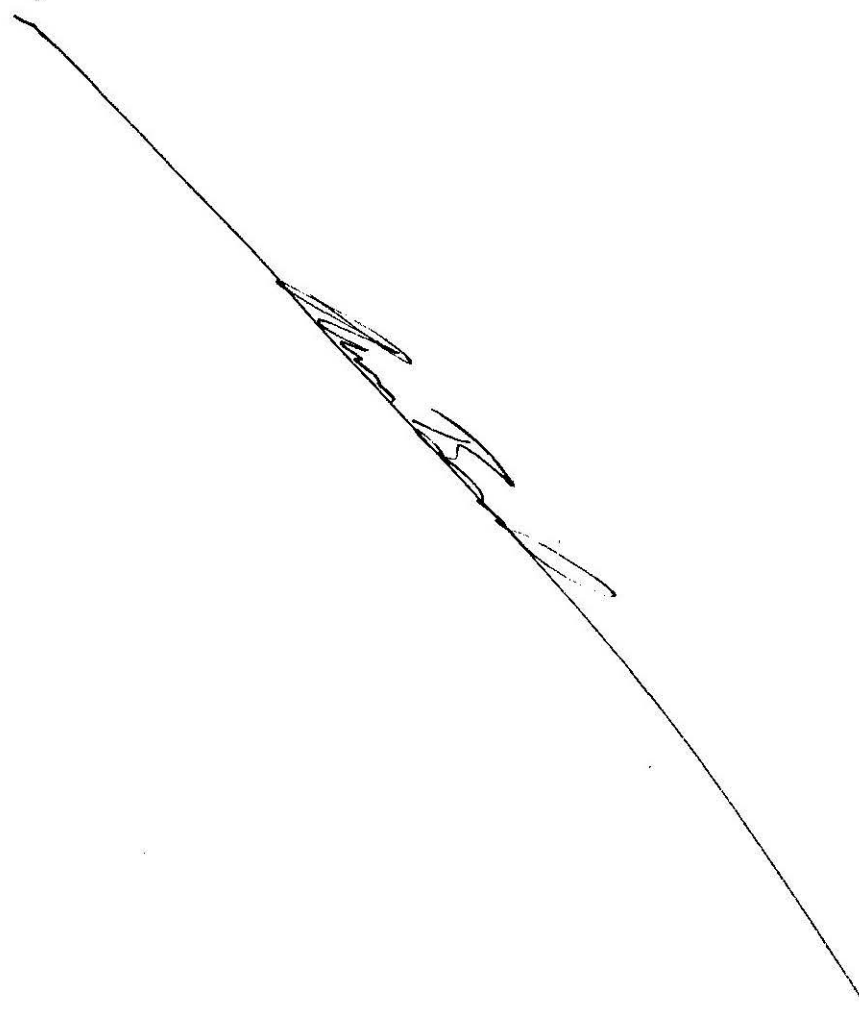
10/15/15

Surface soil sampling in PRI 5 is now complete with the exception of the samples in wastewater to be collected by helicopter.

ERM returning to trailer to decon. equip. and process samples.

No split samples collected today.

Departed site at 1340.



Phase 1A-B Sampling - PRI 4

10/19/15

Arrived on site at 0845.

Trii and Garrett onsite for ERM.

ERM planning to collect surface soil samples from the Gypsum Pile, PRI 4.

Weather is partly cloudy, light SW wind and temp is ~58°F.

ERM collected surface soil sample 4-01-SS-01-101915 at 1020. 7 hand auger aliquots collected. Collected duplicate sample 4-01-SS-11-101915.

I suggested that top of auger soil was broken up and volatilized so ERM decided to collect VOCs aliquots from bottom of 7<sup>th</sup> auger.

Dead bird, looked like pelican, was observed on Gyp. Pile approx. 100 SE of 4-01 location.

ERM collected surface soil sample 4-02-SS-01-101915 at 1100. Also collected dup. 4-02-SS-11-101915. 6 aliquots collected. Location is on bank of current slurry canal.

Coyote observed walking on NW area of Gyp. Pile where standing water was present.

Cl<sup>2</sup> readings up to 0.1 ppm and HCl up to 0.7 ppm.

Gypsum waste thickness measured at 15" at 4-01.

Smut encountered at base of gypsum. ~2" lense of smut. Continue augering and gypsum waste was greater than 5' deep (length of auger).

Gypsum waste thickness at 4-02 measured at >5'.

4-02 is located on raised portion of Gypsum pile.

ERM returning to trailer to decon. equip. and process samples.

No split samples collected today. Departed site at 1230.

*[Handwritten signature]*



10/20/15 Phase 1A-B Sampling - PRI 4

Arrived on site at 0840.

Kris and Trent on site for ERM

ERM planning to combine surface soil samples

in the Gypsum pile, PRI 4.

Weather is partly cloudy with scattered

showers, NW wind ~ 8 mph, and temps in 50's

ERM collected sample 4-03-SS-01-102015

and I collected split sample 4-03-SS-01-

102015-ES01 at 1010 - see field data sheet.

ERM collected sample 4-05-SS-01-102015

and I collected split sample 4-05-SS-

01-102015-ES01 at 1050 - see field data sheet.

ERM collected sample 4-06-SS01-102015

and I collected split sample 4-06-SS-01-

102015-ES01 at 1145 and duplicate sample

4-06-SS-01-102015-ES02 at 1155 - see

field data sheet.

ERM collected sample 4-07-SS-01-102015.

Sample was saturated. Waste thickness

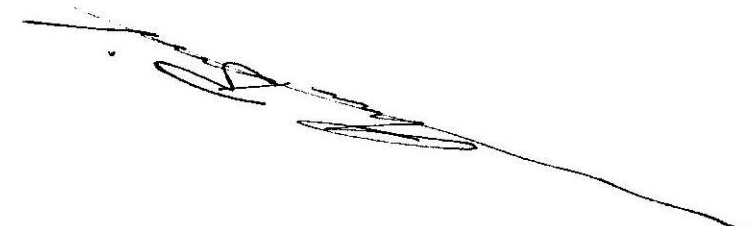
> 5".

Cl<sub>2</sub> readings at 0.1 ppm and HCl up to 0.8 ppm.

ERM returning to trailer to decon equip.

Went to office trailer to process samples.

Dropped samples off at ALS-SLC.



Phase 1A-B Sampling - Helicopter 10/27/15

Arrived on site at 0810.

Linné and Chris on site for ERM.

Ken W. of EPA and Michael S. of UDEQ

on site at 0830.

ERM planning to conduct surface solids

sampling with a helicopter in PRI 5

wastewater pond.

1030 ERM collected first aliquot at loc.

5-02 using the Ponar sampler. There

was sufficient sample volume in first

aliquot however ERM decided to collect

an additional aliquot. Sample material

is homogeneous waste material, saturated

silty sand. Depth of penetration ~ 4"

on both aliquots. Standing water in

and Ponar sampler aliquot.

1055 ERM collected first aliquot at loc.

5-07. Depth of penetration ~ 1-2"

5-07 is located on island in middle of

waste pond. Material was moist but not

saturated. Similar results for 2nd. 3rd & 4th

aliquots had only ~ 1" penetration and

much less volume than 1st & 2nd. Material

is same as that encountered on W shore of

PRI 5.

1130 ERM collected first aliquot at loc. 5-08.

Depth of penetration 3" and aliquot penetration

was 2.5". 3rd aliquot penetration was 3"

Sample material appears to be native sand!

no waste.

10/27/15

1218 ERM collected first aliquot at loc. 5-11. 2.5" recovery/penetration. Material is saturated sand with ~0.1" of waste material on surface. Evidence of washout. 5-11 is located near shoreline. 4" penetration on 2<sup>nd</sup> aliquot. Trace waste on surface.

1315 ERM collected aliquot at loc. 5-14. 6" (full Ponar) recovery/penetration. Material is saturated waste with small portion of gray sediment that could be native. Some off-gassing observed following homogenization. ERM used/tested Box Core sampler at 5-14. ~2" depth penetration. Depositional layering observed in cross section.

1350 ERM collected aliquot at loc. 5-13. 4+" of penetration. Material is native sand with some waste on surface.

ERM collected aliquot at loc. 5-12. 3 total aliquots collected. Depth of penetration was 2-2.5"

Went to gypsum pile to take a look at sample locations 4-12, 4-13, and 4-14. David A. (ERM) and Ken agreed to sample 4-12 & 4-13 at SAP location and to move 4-14 out of wastewater at a distance from the shore comparable to 4-13.

Went to PRI 1 to look at 1-12 sample loc. which is in wastewater. Ken agreed to allow ERM to move it to the nearest shoreline to the N.

10/27/15

1111 readings up to 1.0 ppm and C12 readings up to 0.5. Had to don respirator in short period of time in the morning when a chlorine cloud blew through PRI 5. Dust readings up to 0.05 mg/m<sup>3</sup>.

1 KM collected the following samples today:

- 5-02-SS-01-102715
- 5-07-SS-01-102715
- 5-08-SS-01-102715
- 5-11-SS-01-102715
- 5-14-SS-01-102715
- 5-13-SS-01-102715
- 5-12-SS-01-102715

All procedures conducted in accordance with SAP and SOP USM-12 with the exception of 5-02 and 5-08 and 5-12 samples which did not get sampler penetration greater than or equal to 4 inches. Ken verbally approved field mod.

Departed site at 1710.

*[Handwritten signature]*

10/28/15 Phase IA-B Sampling - Helicopter

Arrived on site at 0845.

Lonnie, Kris, and Garrett on site for ERM  
ERM planning to collect surface solids  
samples from PRI 6 pond using a helicopter.  
Staging/sample receiving area set up  
on northern point of PRI 6 wastewater  
pond.

Thick chlorine plume extending N from  
facility into N end of PRI 8.

Weather is partly cloudy, now ind, temp. 38°.  
0930 ERM collected first aliquot at loc. 6-02.  
Depth of penetration was 4". Material is  
sand; no waste. Some standing water in Ponar.  
Collected sample 6-02-SS-01-102815.

0950 ERM collected first aliquot at loc. 6-05.  
Depth of penetration was 3.5". Material is  
~90% waste, some sand. 3.5" penetration on  
2nd aliquot. 4" penetration on 3rd. 3rd  
aliquot used for sample. Collected sample  
6-05-SS-01-102815.

1020 ERM collected first aliquot at loc. 6-08.  
Depth of penetration was 2.5". 2nd aliquot  
had 5.5" penetration so that was used for  
sample 6-08-SS-01-102815. Sample was ~2"  
of waste and 3.5" sand.

1040 ERM collected first aliquot at loc. 6-09  
but Ponar did not deploy. 1115 second attempt  
the Ponar deployed and penetration was 1-2".  
2nd aliquot appeared to get 4" penetration  
but there was a lot of washout and only 2-3"

10/28/15

ii. Ponar. 3rd aliquot had 3" penetration.  
6-11 will need to be added to field mod. for  
lack of 4" penetration.

6-11 material was mostly sand with thin waste  
layer on surface. ERM collected sample  
6-11-SS-01-102815 from all 3 aliquots.

ERM aliquots being collected from last sample aliquot.  
6-10 first aliquot had 4" penetration. Material  
was sand with thin waste layer on surface.  
ERM collected 6-10-SS-01-102815 sample.

1115 ERM collected first aliquot at loc. 6-11.  
Depth of penetration was 3". 2nd & 3rd aliquots  
also had 3" penetration. 6-11 will need to be  
added to field mod. for lack of 4" penetration.  
Material was sand with no waste. ERM collected  
sample 6-11-SS-01-102815.

1220 ERM collected first aliquot at loc. 6-12.  
Depth of penetration was 4". Material  
was sand, trace waste. ERM collected  
sample 6-12-SS-01-102815. EnCores filled  
by small scrapes across surface of soil and  
using finger rather than a vertical plug.

1235 ERM collected first aliquot at loc. 6-13.  
Depth of penetration was 3". 2nd aliquot had  
2" penetration and 3rd had 1-2" penetration.  
6-13 will need to be added to field mod. for  
lack of 4" penetration. Material was sand,  
no waste.

1300 ERM done sampling and decon. equipment.

1320 Departed site. No split samplers today.

Phase 1A-B

11/3/15 Subsurface Solids Sampling

Arrived onsite at 7:30am.

Met with Jason and Suzie of ERM

Cascade Drilling on site with track-mounted sonic drill rig.

Had H&S tailgate meeting.

Went to the Sanitary Lagoon, PRI 3, to drill boring loc. 3-14.

Weather is cool, windy, with scattered rain.

ERM drilled 3-14 boring and collected 2 soil samples: 3-14-SB-01-D.S-3.S-110315

3-14-SB-01-3.S-S-110315

I collected split sample from 3.5-5' interval 3-14-SB-01-3.S-S-110315-ES01 - see field data sheet.

Went with Ken and Jason to take a look at proposed loc. for 1-08. ERM proposing to angle drill from northern bank on west side of road crossing. Ken approved change to location.

1130 ERM began drilling boring 1-14. ERM drilled to 11' and native soil not confirmed. Cascade left drill rig on the hole and will advance deeper tomorrow.

I collected split sample from 7-8.5' interval, which is first sign of waste material.

1-14-SB-01-7-8.5-110315-ES01 - see field data sheet. Strong hydrocarbon odor.

Dropped samples off at lab at 4:45pm.

Phase 1A-B

Subsurface Solids Sampling

11/4/15

Arrived on site 0715. Ken with EPA on site.

Met with Jason and Suzie of ERM.

Cascade Drilling on site for sonic drilling.

Borehole depth tagged at 10.5' bgs.

Weather is cold, windy, with scattered rain.

Advanced 1-14 to 17', about 2' of recovery from 11-15' but bag broke and sample fell on ground. Solid core from 15-17'.

Water flowing out of casing. 15-17' interval is sand varying from white oolitic to black fine-grained sand. Sand at 15' is native and boring not advanced further. ERM homogenizing and sampling 15-17' interval. Sample is saturated. Strong hydrocarbon odor.

1030 Held meeting to discuss 1-8 drilling access. ERM planning to angle drill from ditch road crossing.

1045 ERM setting up at 1-3 drilling location. Boring being angled into ditch from SAP location. Boring advanced to 5.5' bgs, native encountered at 3.5'.

I collected split sample from 3.5-5.5' 1-3-SB-01-3.S-S-110415-ES01. See field data sheet.

1330 ERM setting up at 1-7 drilling location. Boring being angled into ditch from SAP location. ERM having to evac. area due to sustained C12 readings > 2ppm. Field team in respirators. 1-7 boring advanced to 7' bgs, native encountered around 5' bgs.

11/4/15

Cl<sup>2</sup> readings varying between 0.0 and 0.6 ppm.  
HCl readings up to 0.3 ppm.  
I collected split sample from 0.5 to 1.5-ft interval  
1-07-SB-01-0.5-1.5-110415-ES01. - see field  
data sheet.  
Departed site at 4:25 pm.  
Dropped samples off at ALS-SLC.

### Phase 1A B

#### Surface Area Solids Sampling

11/5/15

Arrived on site at 0800.  
Lynn and Kris on site for ERM along  
with drilling sub. Cascade Drilling.  
IRM planning to start subsurface solids  
at boring loc. 1-08.

Weather is mostly cloudy, temps in high 30's F,  
wind is W at ~5 mph.

Mobilized to 1-08 boring loc. and Cl<sup>2</sup>  
readings were sustained between 2 - 6 ppm.  
Due to H<sub>2</sub>S concern, ERM decided to move  
to different loc., 5-16.

Ramp into  
ditch constructed on west side. Drilled  
boring 5-16 to 10' bgs, native encountered at 6.5' bgs.  
ERM collected samples from 0.5-6.5', 6.5-8', 8-10'.  
I accepted split sample from 8-10' bgs:

5-16-SB-01-8-10-110515-ES01 - see field data sheet.

5-16 0-6.5' is very soft and resulted in a ft

of recovery. ERM to prepare field mod. for  
having 0.5-6.5 interval represented by one  
sample. Driller said there was no way to get  
full core in that interval so no add. attempt were made.  
Material appeared to be waste that was homogeneous,  
however, there were some black sediments, darker

rust-colored sediments, and thin sand stringers  
in bottom portion of interval, just above native clay.  
Slow flow of water out of borehole when done  
drilling, indicating confining conditions.

Mobilized to 1-08 boring loc. Cl<sup>2</sup> readings spiking  
to 6+ ppm. Field team in respirators.

11/5/15

Drilled boring 1-08 approx. 20' NE of SAP loc.

Note that on SAP Figure 11-2 loc. 1-08 appears to be on E side of road crossing; however, I NM staked the loc. on W side of road crossing.

First push for boring 1-08 was advanced at 4.5" angle 12 feet below the surface (12' of casing, not 12' of soil). Some sediment fell out of casing during retraction and was estimated by ERM to be ~2' of sand. So bottom of 4.5' of recovery determined to be 10' with 1.5' native sand at bottom, which didn't meet spec. for min. 2' into native.

Second push advanced 17' of casing below grade and used a soil catcher tip. ~6'-5' of recovery in second core, all native sand. Since 1.5' of native sand in 1st core, decided not to sample second core.

Encountered similar conditions at 1-08 to that at 5-16, in that very soft material on top was compacted - 0-7' resulted in ~1.5' of recovery. ERM to include 1-08 in field mod.

ERM collected samples from 0.5-7', 7-8.5', 8.5-10' foot intervals. Note that depths are at 45° angle and recovery/compaction makes depths uncertain.

I collected split samples from 7-8.5' interval - 1-08-SB-01-7-8.5-110515-ES01. See field data sheet.

Dropped samples off at ALS-SLC.

Phase 1A-B

Subsurface Solids Sampling

11/6/15

Arrived on site at 0715.

Arrived, Kris, and Suzie on site for ERM, along with drilling sub. Cascade Drilling. I NM planning to start subsurface solids sampling at loc. 6-16, loc. on Gypsum Pile.

Weather is partly cloudy, temps in high 30's F, wind is SW at ~5 mph.

Mobilized to Gypsum Pile and boring 6-16.

First push advanced to 10' bgs with 4.5' recovery and 2' of native sand at bottom. Water table is ~6" below grade.

Second push advanced to 10' bgs with flapper tip and ~3' recovery with 1' native sand at bottom.

Third push advanced to 11' bgs with ~9' recovery. Third push core used for sample.

6-16 sample intervals set at 0.5-3.5 (2' recovery), gypsum, 3.5-4.5, native interface with layers of white (salts?), dark brown, and tan, and 4.5-6.5' which includes native sand, ~6", sand with organics, ~6", and clay, 1'. Oolitic sand below clay.

Collected split sample from 3.5-4.5' interval. - 6-16-SB-01-3.5-4.5-110615-ES01 - see field data sheet.

1215 Mobilized back to ERM trailer.

1300 Went with ERM and drillers to look at boring locations 1-13 and 7-04. Drillers said they could not access 7-04. Surface is saturated and too soft, drill rig would get stuck.

Returned to ERM trailer and observed

11/6/15

collection of an equipment blank from sieve pan, and spoon (soil sample process equip.).

Departed site at 1340.

Dropped samples off at ALS-SLC at 1520.

Phase 1A-B

Subsurface Solids Sampling

11/9/15

Arrived on site at 0730.

Lonnie and Kris onsite for ERM along with drilling subcontractor Cascade Drilling. Weather is mostly cloudy, temp. 49°F, and with wind at ~7 mph.

1 RMI planning to conduct subsurface solids sampling on the Gypsum Pile at loc. 4-05.

0830 Mobilized to Gypsum Pile.

Drilled boring 4-05 to 11'. Native soil encountered at ~7' bgs. Sample intervals set at 0.5-3, 3-5, 5-7, and 7-9'. I collected split sample from the native interval, 7-9':

4-05-SB-01-7-9-110915-ES01-see field data sheet.

11' core from 4-05 boring resulted in ~9.5' of recovery. Compaction assumed in top interval so top interval extended beyond 2', to 0.5-3'. Depth of water table not obvious in core but most saturated portion of core was in gypsum waste just above the gypsum/native interface at ~6.5-7'.

1315 Drillers unable to start & drill rig to mob. to boring loc. 1-13 - dead battery.

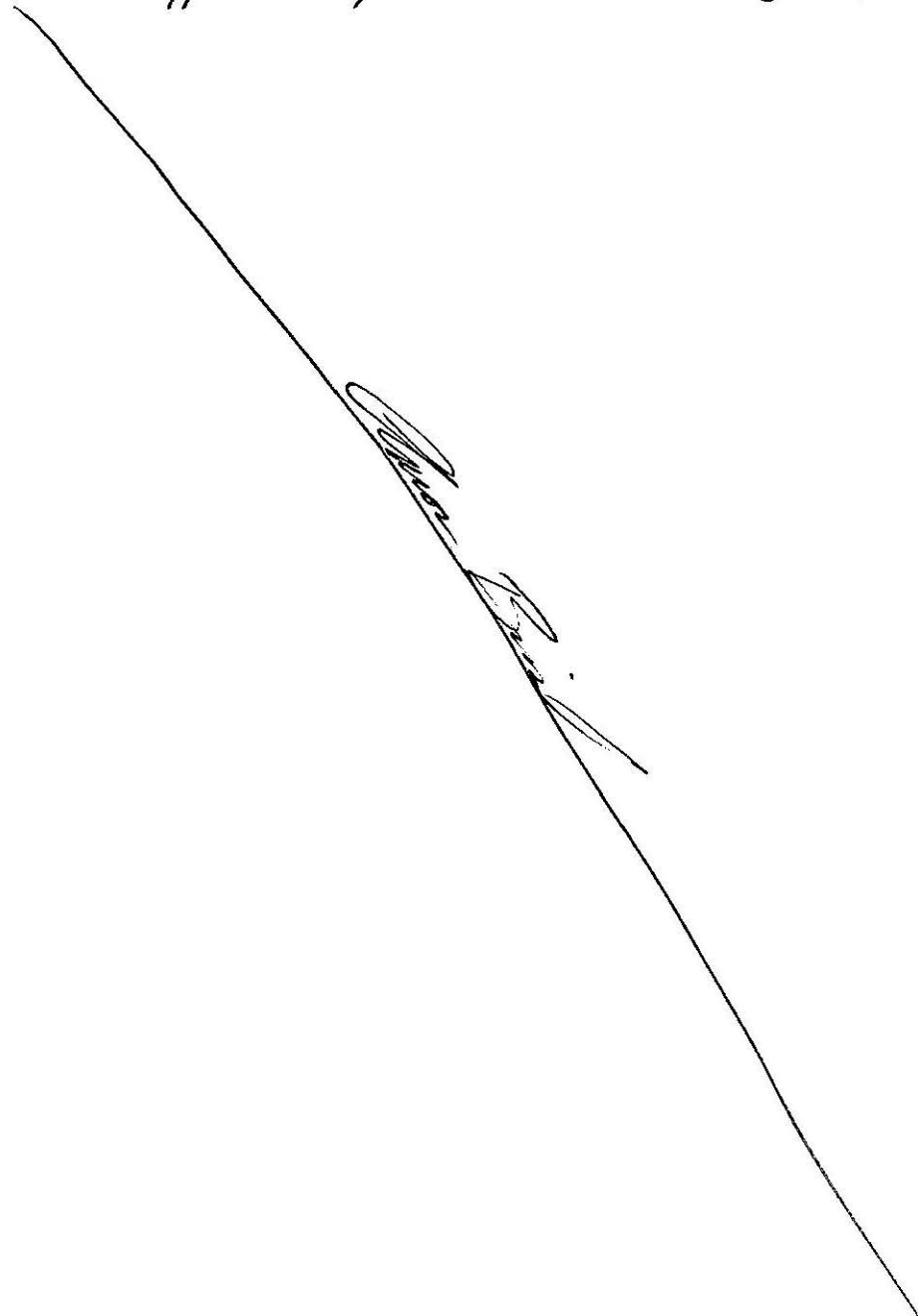
Went with Lonnie to boring loc. 7-04.

Lonnie hand augered 3 holes to ~3' bgs to confirm depth to native. Iron crust top ~6", ~6"-2.5' very soft, saturated silt; ~2.5' native oolitic sand. Likely that 5' boring would accomplish sampling objective - 2' into native.

11/9/15

1420 Departed site.

1530 Dropped samples off at ALS-SLC.



Phase 1A-B.

Subsurface Solids Sampling

11/10/15

Arrived on site at 0730.

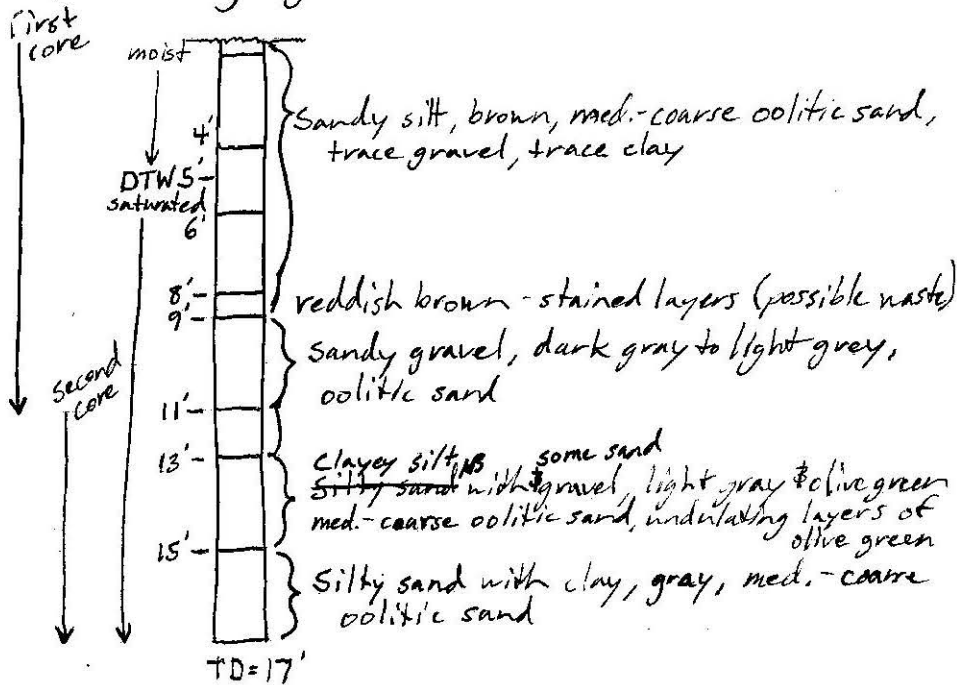
Timmie and Suzie on site for ERM along with drilling sub. Cascade Drilling.

Site mobilized to boring loc. 1-13.

Milled boring 1-13 to 17' bgs. Native encountered at ~15'. Sample intervals set at 0.5-4, 4-6, 6-8, 8-9, 9-11, 11-13, 13-15, and 15-17'. 0-4' interval either compressed in 2' or got 50% recovery. 8-9' interval broken out due to iron staining (possible waste). Unique layer with olive green layering observed just above native, from ~13-15'.

1 collected split sample from the 13-15' interval: 1-13-SB-01-13-15-110015-ES01 - see field data sheet.

1-13 boring log:





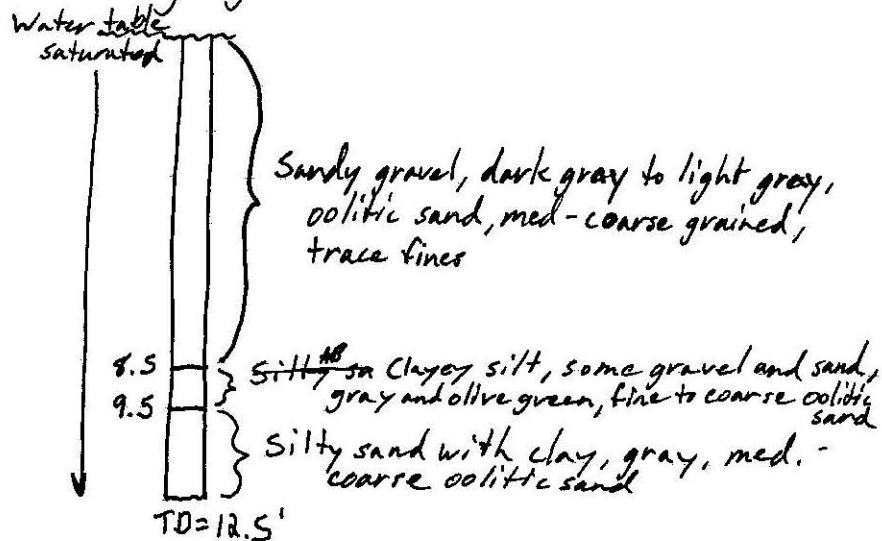
11/10/15

Drillers using plywood sheets to access 7-04 boring loc. Ran out of plywood approx. 100 ft from shoreline of former waste lagoon, which leaves at least another 160 ft to 7-04 SAI location.

1330 Spoke to Ken W. about moving 7-04 loc. and he agreed to allow ERM to move the location and gave me permission to approve a field modification.

Drilled boring 7-04 to 12.5' bgs. Native encountered at ~9.5' bgs. Sample intervals set at 2.5-4.5, 4.5-6.5, 6.5-8.5, 8.5-9.5, and 9.5-11.5'. No recovery of saturated fines in upper 2.5' of boring. Similar lithology to 1-13, same olive green layer just above native, from 8.5-9.5'. I collected split from 8.5-9.5' layer/interval - 7-04-SB-01-8.5-9.5-111015-ES01 - see field data sheet.

7-04 boring log:



11/10/15

ERM did not have Trimble GPS unit so they are planning to return at a later date to survey 7-04 location.

ERM planning to submit field mod. for 7-04 location tomorrow.

HL readings up to .2 ppm and Cl<sup>-</sup> up to 0.1 ppm

1610 Departed site.

1115 Dropped samples off at ALS-SLC

11/17/15 Phase 1A-B Sampling - PRI 3

Arrived on site at 8:45 am.

Kris, Suzie, and Trent on site for ERM.

ERM planning to continue surface solids sampling in PRI Area 3, the Sanitary Lagoon.

Weather is mostly cloudy, south wind, temp is 38°F

ERM collected surface solids sample 3-01-SS-

01-111715 at 0945 and I collected split sample 3-01-SS-01-111715-ES01 - see field data sheet.

Waste thickness measured at 14" below grade.

Waste was reddish brown/rust color and clay was encountered below the waste.

ERM collected surface solids sample 3-14-SS-

01-111715 at 1020 and I collected split sample 3-14-SS-01-111715-ES01 - see field data sheet.

Waste thickness measured at 10" below grade.

Waste material is dark brown organic matter. Clay encountered below waste.

ERM collected surface solids sample 3-04-SS-

01-111715 at 1058 and I collected split sample 3-04-SS-01-111715-ES01 and duplicate - ES02.

Waste thickness measured at 3" below grade.

Waste material is dark brown organic matter. Clay was encountered below waste.

ERM collected surface solids sample 3-05-SS-

01-111715 at 1145. Top 1" was dark brown organic matter (waste thickness = 1"), 1-6" was clay. Surface water pond north of sample loc.

ERM collected surface solids sample 3-06-SS-

01-111715 at 1230. Sample material was clayey silt,

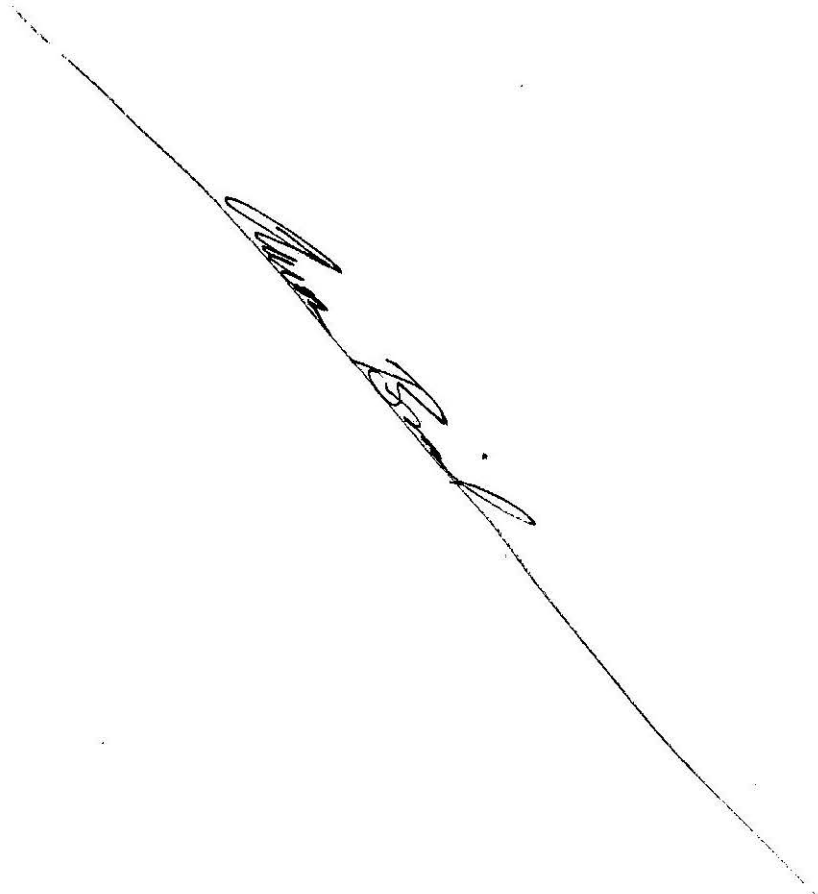
11/17/15

reddish brown material; no dark brown organic matter at 3-06 loc. Waste thickness measured at 12" below grade. Clay encountered below reddish brown waste.

Loc is ~ 6' E of lagoon bank and bank/beam is constructed of same reddish brown material.

ERM done sampling for the day.

Departed site and dropped samples off at ALS-SLC.



11/24/15 Phase IA-B Sampling - PRI 1

Arrived on site at 0845.

Trent and Lonnie on site for ERM.

Weather is mostly cloudy, light N wind, and temps in the 30s F.

ERM planning to conduct surface solids sampling in PRI 1, the Ditches.

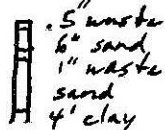
Mobilized to sample loc. PRI1-12 at the E end of the Main Ditch.

N4531751 E354707 - coords. of actual PRI1-12 sample location. SAP loc. is in PRI 5 wastewater lagoon so ERM requested to move it to the ditch/gyp pile shoreline. The shoreline closest to 1-12 SAP location had 2-3 bank and ERM was concerned about access and H<sub>2</sub>S, plus the location appeared set back, farther N, than the orig. Main Ditch, so ERM proposed loc. further W where access was better and where the bank stuck out further into Main Ditch. I approved revised loc. and ERM will prepare a field mod. for the change in loc.

ERM collected sample 1-12-SS-01-112415 at 1000.

Top ~.5" of sample was waste material, the rest was gray sand (likely eroded bank sediments).

Hand auger waste profile:



Cl<sup>-</sup> readings at 0.1 ppm, HCl at 0.2 ppm.

Mobilized to sample loc. PRI1-04 at the head of the Central Ditch.

The banks of the ditch at the 1-04 SAP

11/24/15

location are 6+ high and steep with loose material so ERM did not feel comfortable accessing 1-4 at SAP loc. ERM proposed to move ~50' north to accessible loc. I approved revised loc. and ERM will prepare a field mod. for the change in loc.

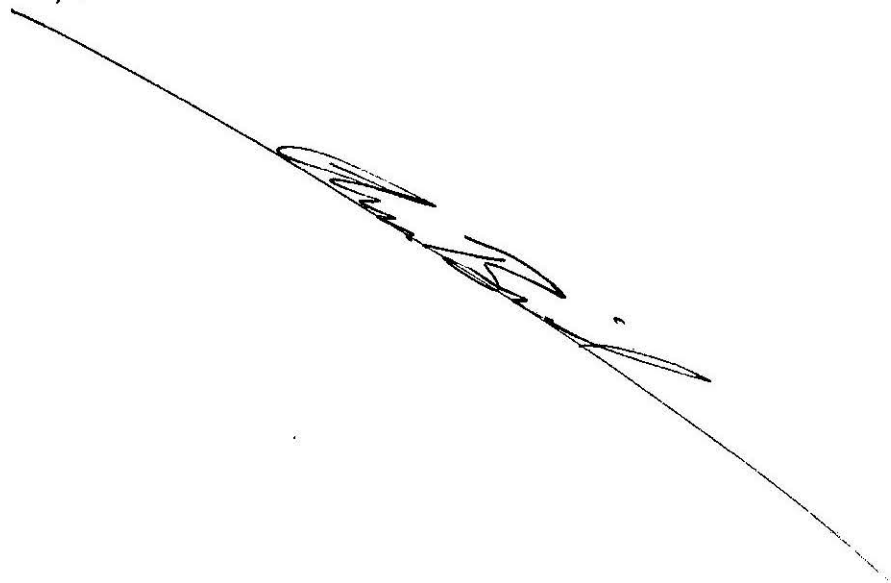
ERM collected sample 1-04-SS-01-112415 at 1130 and I collected split sample 1-04-SS-01-112415-ESD1 plus MS/MSD volume and duplicate sample 1-04-SS-01-112415-ESD2 - see field data sheet.

Waste thickness at 1-04 is > 5'.

ERM prepared field mod. for change in location for 1-12 and 1-04 sample locs., and I signed.

Departed site at 1330.

Dropped samples off at ALS-SLC.



Phase 1A-B

12/1/15 Subsurface Solids Sampling - PRI 5

0945 Arrived on site

Met with Lonnie and Suzie of ERM ERM sub., DPS, on site to operate excavator and Gravity Consultants on site to conduct the core sampling.

1000 Ken with EPA on site.

1015 Mobilized to S-14SB sample loc.

1045 Long-reach excavator delivered to the gypsum pile.

Weather is clear, temp is 16°F and light wind HCl readings at 0.3 ppm and Cl<sup>-2</sup> at 0.0 ppm.

S-14SB loc. is ~50 W of revised loc. PRI 1-12.

ERM using 4" dia, 15' long, Lexan tubes with plastic liner and soil catcher. Suction ball at top.

Long-reach excavator has 40' reach.

1<sup>st</sup> attempt to collect subsurface solids samples

at S-14SB the core was advanced to ~8.7' (mud line on tube) and there was ~6' recovery.

ERM unable to remove core liner. Bottom ~3' was native colitic sand and above that was interbedded gray sand and reddish-brown waste.

Core collected ~30' S of shoreline.

2<sup>nd</sup> attempt with 4" Lexan core advanced 6' below grade. Full recovery. Bottom of core is waste.

Wastewater depth is ~6" at sample loc.

3<sup>rd</sup> attempt with 4" Lexan core advanced 8' below grade to top of native interface, so waste thickness is ~8' below grade. 6' of recovery. Bottom 1" is native sand. ERM planning to sample 3<sup>rd</sup> core. Sample intervals set at 0-2', 2-4', and 4-6'.

12/1/15

ERM collected the following samples:

1. 1448 SB-01-Q-2-120115

2. 1448 SB-01-2-4-120115

3. 1448 SB-01-4-6-120115

Note that 8' core produced 6' of recovery, so sample intervals may not represent actual depth below grade.

1 accepted split sample from 4-6' interval:

3. 145B-SB-01-4-6-120115-ES01 at 1400. See field data sheet.

Sample intervals were all waste material.

4<sup>th</sup> attempt with 4" Lexan core used at 11' section to try to advance 2' into native (others used 15' section).

Core advanced 10' below grade. Soil catcher broke off into core barrel at native interface. Core liner would not pull out. Gray native material in bottom of barrel measured at 1.4'. 8' of recovery.

6-8' interval not sampled due to poor recovery.

8-10 interval of native sampled:

5-14SB-SB-01-8-10-120115

Cl<sup>-2</sup> readings up to 0.7 ppm during sampling on ERM meters, field team in and out of respirators all day at S-14SB loc.

1600 Departed site.

1700 Dropped sample off at ALS-SLC.

## Phase IA-B

### 12/2/15 Subsurface Solids Sampling

0800 Arrived on site. Met with Lonnie and Suzie of ERM. ERM sub. DPS on site to operate excavator and Gravity Consult on site to conduct core sampling.

0900 Went to ditch boring loc. 1-08.

Area was hazy and  $Cl_2$  concentrations were high. I did not exit my vehicle.

ERM sub. Gravity reported  $Cl_2$  concentration as high as 13 ppm on personal gas meter.

0920 Field team left area and went to boring loc. 5-16.

Weather is clear, temp is 8°F, no wind.

0940 ERM used 9' section of 4" dia. Lexan core with plastic liner and soil catcher to core 5-16 borehole to ~7' below grade. Full recovery in core. Native clay encountered at 5' and at ~6.5 gray oolitic sand encountered. 0-5' was reddish brown waste material.

Sample intervals set at 0.5-2', 2-4', and 4-5'.

Note that during sonic drilling of 5-16 on 11/5/15 native clay was reported at 6.5' below grade.

ERM collected the following subsurface solids

samples: 5-16-SB-01-0.5-2-120215

5-16-SB-01-2-4-120215

5-16-SB-01-4-5-120215

HCl up to 0.3 ppm and no  $Cl_2$  at 5-16.

1100 Mobilized to ditch boring loc. 1-08.

ERM used 9' section of 4" dia. Lexan core with plastic liner and soil catcher to core 1-08 borehole to ~7' below grade in ~6" of water. Refusal at 7'.

12/2/15

4' of recovery in 1-08 core. Theory is loose undrained material near the surface is falling down into the lower part of the core.

1<sup>st</sup> core advanced at same loc. as 11/5/15 1-08 boring.

There was not full recovery in 1<sup>st</sup> core, a second core was advanced ~15' W of 1<sup>st</sup> core, in center of ditch that was not submerged. 2<sup>nd</sup> core was to 7' below grade. Refusal at 7'. Bottom of core material appears to be black smut with white specs. Soil catcher pushed up into core barrel but material in core held. ~3' of recovery. Smut material appears to have plugged core.

3<sup>rd</sup> core advanced at 2<sup>nd</sup> core loc. No liner or soil catcher used. Drove core to 7' and got 6' of recovery. Black sandy gravel encountered from 5-6' with hydrocarbon odor. 5-6' material considered anomalous so it was broken out for sampling. Top 1' was stuck to sides of core so not able to sample.

Sample intervals set from 1-3', 3-5', and 5-6'.

ERM collected the following subsurface solids samples:

1-08-SB-01-1-3-120215 - reddish brown waste

1-08-SB-01-3-5-120215 - reddish brown waste

1-08-SB-01-5-6-120215 - black sandy gravel

1400 Ken W. of EPA arrived on site

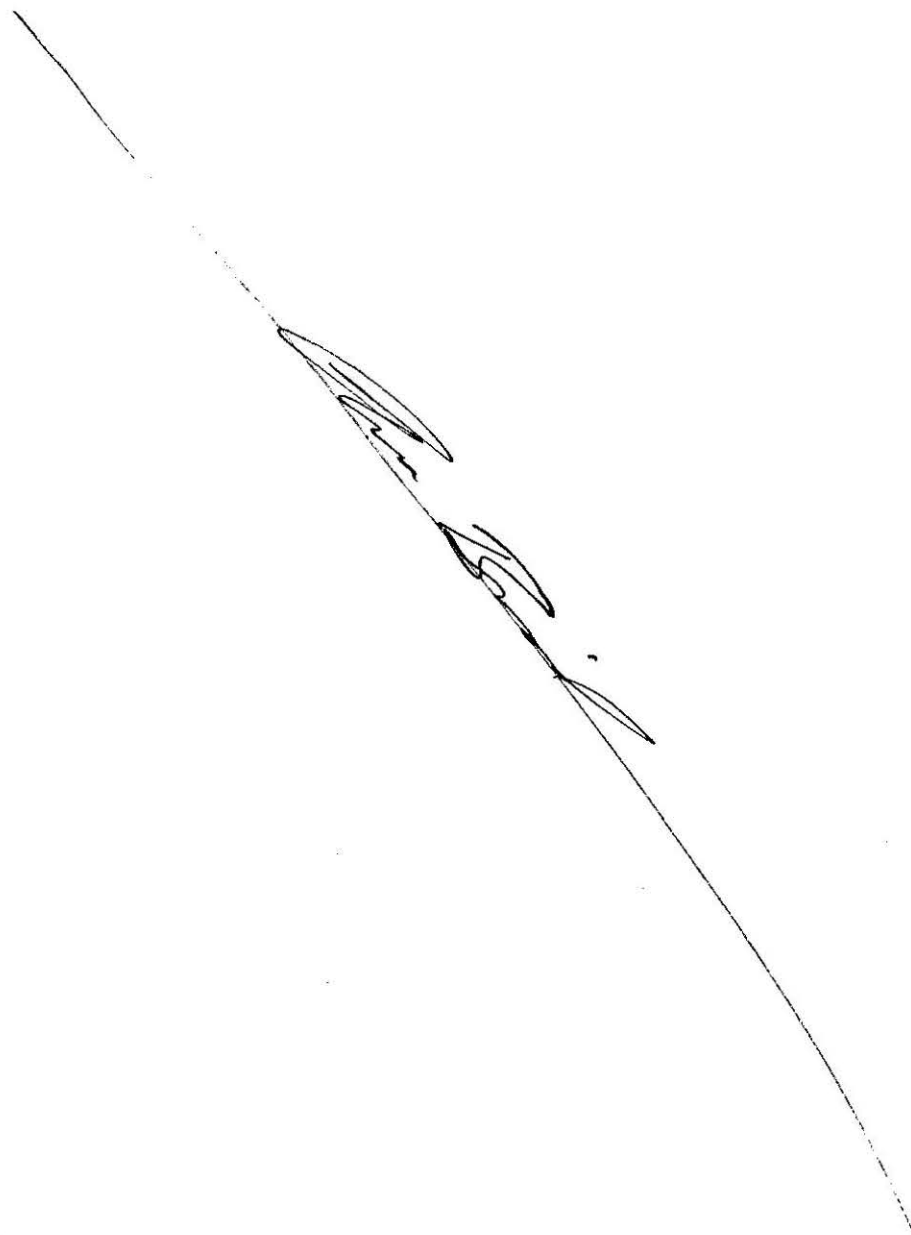
1415 Lonnie of ERM went with Gravity to look at 7-04 loc. ERM going to sample 7-04 by hand.

1530 Went to head of Chlorine Ditch to core for waste thickness at 1-06 surface solids sample

12/2/15

location. Core met refusal at ~2' below grade at 2 locations within 10' of each other. Mud line on core barrel measured at 2.5'.

1600 ERM finished for the day. Departed site.



### Phase IA B Surface Solids Sampling 12/3/15

11800 Arrived on site. Met with Kris, Suzie, and Barrett of ERM.

11810 Planning to conduct surface solids sampling in PRI Area 1, the Ditches, using a Ponar sampler deployed from an excavator.

11900 Mobilized to sample loc. 1-03.

Weather is partly cloudy, temp. is 17°F, and light N wind.

11930 Excavator scraped ice from surface and deployed Ponar at 1-03 loc. Full recovery in Ponar. Material is all reddish brown waste material.

ERM collected sample 1-03-SS-01-120315 and duplicate 1-03-SS-11-120315.

1015 ERM collected sample 1-08-SS-01-120315 adjacent to the subsurface sample loc. on 12-02-15. Full recovery in Ponar. Material is all reddish brown waste material.

1100 ERM collected sample 1-07-SS-01-120315 adjacent to the subsurface sample boring loc. Full recovery in Ponar but ~1/3 was water which poured out during removal. Material was primarily reddish brown waste but there was also some gray fine-grained sand and white medium-grained particles.

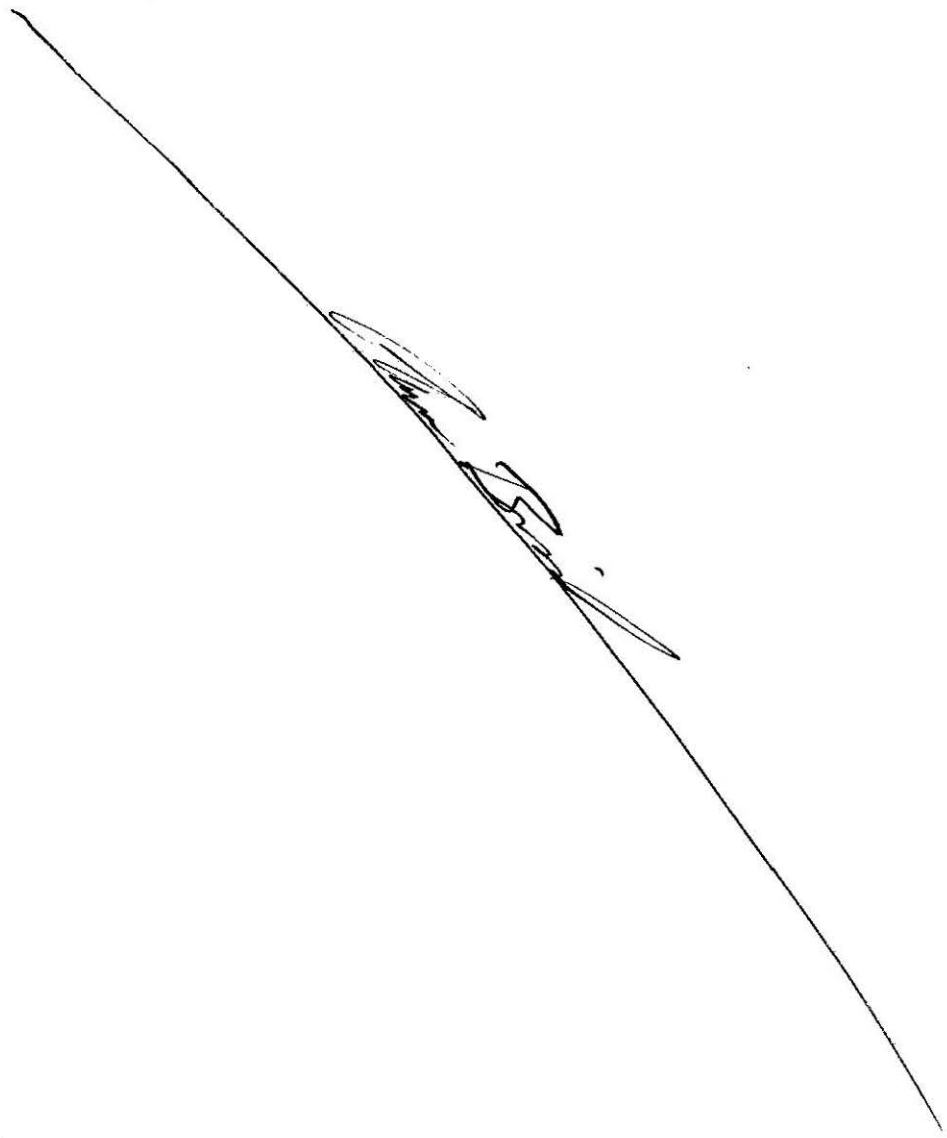
1120 ERM collected sample 1-06-SS-01-120315 from ~8 N of the end of the Chlorine Ditch. Full recovery in Ponar. Material is ~80% gray fine-grained sand and ~20% reddish brown waste.

12/3/15

All VOC samples collected today were collected in EnCore samplers, not methanol preserved vials. No reactivity observed.

Low (<0.3) HCl readings at all locations and Cl<sup>-</sup> up to 0.1 ppm.

1145 Departed site.



Phase 1A-B

Subsurface Solids Sampling

12/10/15

10:00 Arrived on site.

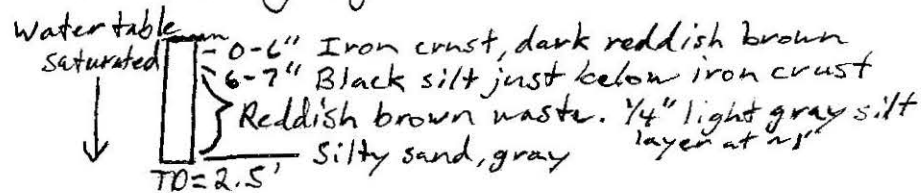
Weather is partly cloudy with high winds, variable wind direction, and temp at 35°F.

11:00 ERM personnel, Kris and Trent, arrived on site.

11:30 Mobilized to subsurface solids sampling location 7-04SB.

1 ERM used 5-ft section of 4" dia. Lexan tube to core sample from 0.5-2.5'. Flat-bottom scoop used to clear top 6" of iron crust sediment. Core advanced to 2.5' and capped before extracting. Full recovery in core. ~1" of native gray sand at bottom of core.

7-04SB boring log:



ERM collected sample 7-04-SB-01-0.5-2.5-121015 and I accepted split sample 7-04-SB-01-0.5-2.5-121015-ES01. See field data sheet.

The Lexan core was driven by pounding with hammer, by hand. Note that the SAP Mod. 3 revision to SOP USM-09 does not specify this method - SOP calls for core to be driven with an excavator. All other procedures in general accordance

12/10/15

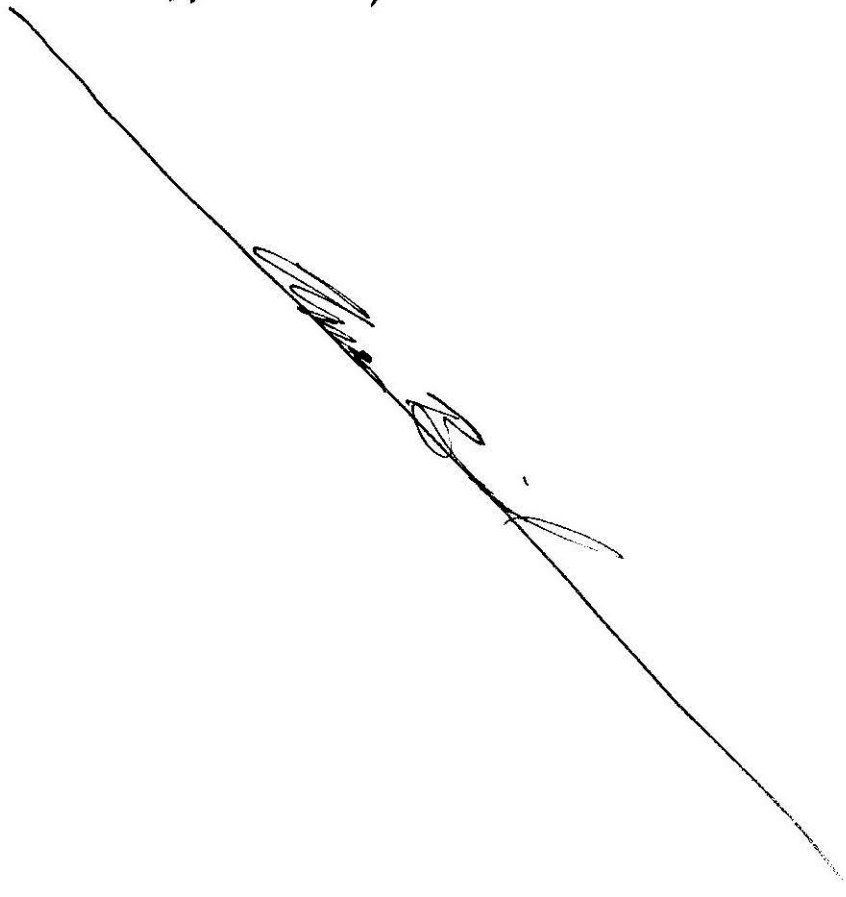
with revised SOP USM-09.

ERM has now completed all Phase I A-B-N1  
sampling.

1330 Departed site and went to office  
trailer to process sample. BLM did  
not include our lock in the daisy-chain,  
so unable to access trailer.

Downloaded data from MX6 iBrid and  
shipped it back along with the DustTrax.

1650 Dropped samples off at ALS-SLC.





**APPENDIX B**  
**SPLIT SAMPLE FIELD DATA SHEETS**  
**(provided as a separate file)**



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 103 Date: 11/4/15 Sample Time: 12:20

EPA Split Sample ID: 103-SB-01-3.5-5.5-110415-ES01

US Mag Paired Sample ID: 103-SB-01-3.5-5.5-110415 Sample Interval: 3.5-5.5'

Split Accepted By: Arnon Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: 4531398 N 353931 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Soil drilling at 52° angle w/ 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>sieve/strainer</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 5.5 Sample Intervals: 0.5-1.5, 1.5-3.5, 3.5-5.5

Sample Location Description: Ditches, PRI Area 1, eastern extent of Western Ditch, south bank

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: dark gray Foreign Material Present: None Other: None

Description: SAND, fine grained

Notes: 1<sup>st</sup> attempt advanced 5' core barrel to water surface and got 1-ft recovery 0.5-1.5  
Entering water from bank in ~4" of water. Drillers let 6" core barrel fall back  
into the hole on second attempt. 0-1.5 is clay (first core), 1.5-3.5 is sand (sec. core)  
Note is staying open. 3.5-5.5 is sand (3rd core)

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110415-154223-0034 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Arnon Baird Date: 11/4/15

Data Sheet QC Review Completion: Signature: Jason Hilker Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 1-04 Date: 11/24/15 Sample Time: 1130

EPA Split Sample ID: 1-04-SS-01-112415-E501

US Mag Paired Sample ID: 1-04-SS-01-112415 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Lonnie Mercer (ERM)

Sample GPS Coordinates: 4531037 N 353976 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/trawl</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 11 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Ditches, head of Central Ditch, ~50' N of SAP loc., ditch center, flowing water ~2-3" deep

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Reddish brown Foreign Material Present: None Other: None

Description: GRAVELLY SAND, some silty clay

Notes: Eroded sediment from west bank of ditch at sample loc.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers MS/MSD	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1 2	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1 2	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850			Y
Total Organic Carbon	EPA 9060	8 oz glass jar (leave ~ 1/2 headspace)	1 2	Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3 6	Y

QC Samples:  Field Duplicate: 1-04-SS-01-112415-E502  MS/MSD: NA <sup>MS</sup> 1-04-SS-01-112415-E501

Chain of Custody Number(s): 8-112415-125209-0040 <sup>1140</sup> Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/24/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 1-07 Date: 11/4/15 Sample Time: 1358

EPA Split Sample ID: 1-07-SB-01-0.5-1.5-110415-ES01

US Mag Paired Sample ID: 1-07-SB-01-0.5-1.5-110415 Sample Interval: 0.5-1.5'

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (CERM)

Sample GPS Coordinates: 4531158 N 354078 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel at 45° angle

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push <sup>Sonic</sup>  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  ¼-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 7' Sample Intervals: 0.5-1.5, 1.5-3, 3-5, 5-7

Sample Location Description: Ditches, center of Chlorine Ditch, east bank of ditch just south of road crossing, adjacent to 12" dia. outfall pipe

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Reddish brown Foreign Material Present: None Other: None

Description: SAND, fine to medium grained

Notes: Native interface at ~ 5' bgs. ~ 8" of waste material at surface.  
1.5' recovery in first core, 5.5' recovery in second core. 15' of core barrel driven below grade.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110415-154223-0034 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/4/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 1-08 Date: 11/5/15 Sample Time: 13:42

EPA Split Sample ID: 1-08-SB-01-7-8.5-110515-ES01

US Mag Paired Sample ID: 1-08-SB-01-7-8.5-110515 Sample Interval: 7-8.5

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: NA ~30' NE of SAP location

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel at 45° angle

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  ¼-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 10 Sample Intervals: 0.5-7, 7-8.5, 8.5-10

Sample Location Description: PRI Area 1, Ditches, Main Ditch, adjacent to culvert at road crossing, west side of road crossing, south of culvert pipe

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown, with mottled reddish brown & dark grey Foreign Material Present: None Other: 2 1-2" dia. rock

Description: SILT, trace sand, appears to be old waste material, trace gravel

Notes: 0.5-7' interval is very soft and compressed to 1 foot of recovery, so 0.5-7' interval is actually 1 foot of sample volume. Native interface at 8.5', so only 1.5' of native. Advanced second boring through same hole to 17' of casing bgs. 1<sup>st</sup> boring was 12 foot push below grade. ~4" water at surface Bottom ~2' of sandy sediment fell out btm of first boring. Second push not sampled.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110515-150625-0035 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/5/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRI-11 Date: 11/23/2015 Sample Time: 11:00

EPA Split Sample ID: 1-1-SS-01-112315-ES01

US Mag Paired Sample ID: 1-1-SS-112315 Sample Interval: 0"-6"

Split Accepted By: Tim Jimenez Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4531658 m N, 354634 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger to sieve and composite with spoon in tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Spoon/trowel  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 7 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Approx 3' from shore of ditch in approx. 2" water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Red waste Foreign Material Present: None Other: NA

Description: Saturated red gypsum waste material

Notes: During sampling  $Et_2$  climbed to 6.0ppm. Area was evacuated when 2.0ppm was reached. Crew re-entered and finished and  $Cl_2$  remained under 2.0ppm. Only variation from SAP 7 aliquots collected for volume to complete split.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH1AB-007 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/23/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 1-13 Date: 11/10/15 Sample Time: 1116

EPA Split Sample ID: 1-13-SB-01-13-15-111015-ES01

US Mag Paired Sample ID: 1-13-SB-01-13-15-111015 Sample Interval: 13-15'

Split Accepted By: Aaron Baird Split Accepted From: Lonnie Mercer (ERM)

Sample GPS Coordinates: 4531961 N 354947 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  <sup>Sonic</sup> Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tray</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 17 Sample Intervals: 0.5-4, 4-6, 6-8, 8-9, 9-11, 11-13, 13-15, 15-17

Sample Location Description: PRT 1 between PRT's 5 and 7, former wastewater diversion ditch, ~60' E of isthmus road, graded surface, little vegetation

Sample Observations: Sample Odor:  No Odor  Slight <sup>sulfur</sup> Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray with olive green Foreign Material Present: None Other: None

Description: Clayey silt, trace gravel, some medium to coarse oolitic sand

Notes: Location is on the southern side of the graded area that likely represents the former ditch. First core to 11' bgs, 7' recovery. Second core to 11' bgs, 7' recovery. Second core sampled. Top 1" of stuff not sampled. 8-9' interval broken out due to iron staining. 0-4' either compressed to 2' or got 50% recovery. DTW is ~5'.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	<input checked="" type="checkbox"/>
PCDDs/PCDFs	EPA 8290			<input checked="" type="checkbox"/>
SVOCs	EPA 8270C	8 oz glass jar	1	<input checked="" type="checkbox"/>
PAHs	EPA 8270C SIM			<input checked="" type="checkbox"/>
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			<input checked="" type="checkbox"/>
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	<input checked="" type="checkbox"/>
Total Organic Carbon	EPA 9060			<input checked="" type="checkbox"/>
pH	EPA 9045D	5 g EnCore sampler	3	<input checked="" type="checkbox"/>
VOCs	EPA 8260B			<input checked="" type="checkbox"/>

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-111015-150401-0038 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/10/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRI 1-13 Date: 11/23/2015 Sample Time: 09:30

EPA Split Sample ID: 1-13-SS-01-112315-ES01

US Mag Paired Sample ID: 1-13-SS-01-112315 Sample Interval: 0:6"

Split Accepted By: Tim Jimenez Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4531961 m N, 354947 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger and sieve all aliquots. Composit with spoon in tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Spoon/trowel  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 6 NA Sample Intervals: NA

Sample Location Description: Flat vegetated area near roadway. Area appears to be above water line and not prone to flooding.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: NA Other: NA

Description: Sandy silt with gravel

Notes: Material appears native. Sample location was also a site of a subsurface boring with a drill rig. No variation from SAP.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH1AB-007 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/23/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 1-14 Date: 11/3/15 Sample Time: 1346

EPA Split Sample ID: 1-14-SB-01-7-8.5-110315-E501

US Mag Paired Sample ID: 1-14-SB-01-7-8.5-110315 Sample Interval: 7-8.5'

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: 4531241 N 354122 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push <sup>Sonic</sup>  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronnel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 11 <sup>11/3/15 11/4/15</sup> Sample Intervals: 0.5-2, 2-4, 4-6, 6-7, 7-8.5, 8.5-10, 10-11, 15-17'

Sample Location Description: Ditches, Former Boreon Ditch, adjacent to road between chlorine Ditch and the Landfill

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor <sup>Hydrocarbon</sup> Moisture Content:  Dry  Moist  Wet

Sample Color: Mottled light & dark gray Foreign Material Present: None Other: None

Description: Waste material, clayey

Notes: Native soil not confirmed at 11' bgs. 7-8.5' interval is first sign of waste material. PID reading on 7-8.5' interval is 121 ppm. 0-4' interval appears to be gypsum.

Drilled on 11/4/15

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Perchlorate (and % moisture)	EPA 6850			Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110315-142843-0033 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/3/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 3-01 Date: 11/17/15 Sample Time: 0945

EPA Split Sample ID: 3-01-SS-01-111715-ES01

US Mag Paired Sample ID: 3-01-SS-01-111715 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4531162 N 353998 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tray</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Sanitary Lagoon, SW corner of lagoon, ~10' NE of wastewater outfall pipe, flowing water at sample loc., vegetated cover

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown, dark brown, reddish brown Foreign Material Present: Trash particles Other: NA

Description: SANDY SILT, some clay, organics

Notes:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	<input checked="" type="checkbox"/>
PCDDs/PCDFs	EPA 8290			<input checked="" type="checkbox"/>
SVOCs	EPA 8270C			<input checked="" type="checkbox"/>
PAHs	EPA 8270C SIM	8 oz glass jar	1	<input checked="" type="checkbox"/>
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			<input checked="" type="checkbox"/>
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	<input checked="" type="checkbox"/>
Total Organic Carbon	EPA 9060			<input checked="" type="checkbox"/>
pH	EPA 9045D			<input checked="" type="checkbox"/>
VOCs	EPA 8260B	5 g EnCore sampler	3	<input checked="" type="checkbox"/>

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-111715-113401-0039 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/17/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 3-04 Date: 11/17/15 Sample Time: 1058

EPA Split Sample ID: 3-04-SS-01-111715-ES01

US Mag Paired Sample ID: 3-04-SS-01-111715 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4531183 N 354010 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Sanitary Lagoon, near center of lagoon, standing water, vegetated cover

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: 0-3" Dark brown, 3-6" gray Foreign Material Present: None Other: None

Description: 0-3" CLAYEY SILT, organics, 3-6" CLAY

Notes:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: 3-04-SS-01-111715-ES02  MS/MSD: NA

Chain of Custody Number(s): 8-111715-113401-0039 <sup>1108</sup> Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 11/17/15

Data Sheet QC Review Completion: Signature: Trent Hamada Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 3-14 Date: 11/3/15 Sample Time: 09:18

EPA Split Sample ID: 3-14-SB-01-3.5-5-110315-ES01

US Mag Paired Sample ID: 3-14-SB-01-3.5-5-110315 Sample Interval: 3.5-5'

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: \_\_\_\_\_

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 5 Sample Intervals: 0.5-3.5' (10" recovery), 3.5-5'

Sample Location Description: Sanitary Lagoon, PRI Area 3, north central area of lagoon, vegetated surface, surface water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: 0-3.5' black, 3.5-5' gray w/mottled brown Foreign Material Present: roots Other: none

Description: 0-3.5' Organics w/CLAYEY SILT, Native at 3.5', 3.5'-4.5' CLAYEY SAND, 4.5-5' sand seam 4.25-4.5 CLAY trace sand

Notes: Drove 5' core barrel, ~3' of recovery, top 3.5' organics compressed to ~1-ft of recovery. Drove another core barrel to 10' to confirm native. 5-10' core not sampled. 4.5-7.5' CLAY, 7.5-10' SAND-Oolitic, saturated

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110315-142843-0033 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 11/03/15

Data Sheet QC Review Completion: Signature: Jason Hilker Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 3-14 Date: 11/17/15 Sample Time: 1020

EPA Split Sample ID: 3-14-SS-01-111715-ES01

US Mag Paired Sample ID: 3-14-SS-01-111715 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: NA - not SAP location

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/travel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Sanitary Lagoon, south central area of lagoon, base of ramp built for collocated subsurface sample boring, vegetated cover, standing water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Dark brown Foreign Material Present: None Other: None

Description: Clayey silt, organic matter

Notes:

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-111715-113401-0039 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 11/17/15

Data Sheet QC Review Completion: Signature: Trent Hamada Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 4-03 Date: 10/20/15 Sample Time: 1010

EPA Split Sample ID: 4-03-SS-01-102015-ES01

US Mag Paired Sample ID: 4-03-SS-01-102015 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Kris Benson (ERM)

Sample GPS Coordinates: 4531580 N 354291 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 7 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Gypsum Pile, PRI AREA 4, SE area of gyp. pile, flat

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Rust/reddish brown Foreign Material Present: None Other: None

Description: Gypsum

Notes: Waste thickness angering identified dry gypsum at ~2' and a white precipitate at ~2.5', a dry fine-grained (less clayey) lighter colored gypsum at 3.5' to 3.8' and another lense at ~4.5' to 4.9. Waste thickness > 5'.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: 4-03-SS-01-102015-ES02  MS/MSD: NA

Chain of Custody Number(s): 8-102015-134540-0032 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/20/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 4-05 Date: 11/9/15 Sample Time: 1005

EPA Split Sample ID: 4-05-SB-01-7-9-110915-ES01

US Mag Paired Sample ID: 4-05-SB-01-7-9-110915 Sample Interval: 7-9'

Split Accepted By: Aaron Baird Split Accepted From: Lonnie Mercer (ERM)

Sample GPS Coordinates: 4531803 N 354164 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/travel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 11' Sample Intervals: 0.5-3, 3-5, 5-7, 7-9

Sample Location Description: Gypsum Pile, top/center area of gypsum pile

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray & brownish gray Foreign Material Present: None Other: None

Description: 7-7.5 SAND, fine grained, 7.5-9 CLAYEY SILT, trace sand, 9-11 SILTY CLAY, high plasticity

Notes: Drilling became more firm at ~7.5'. First core to 11', 14" of native at bottom of core, 6.5' of recovery. Second core to 11', 9.5' recovery, 4' of native, depth to native is ~7', 0-7' is gypsum.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110915-125940-0037 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 11/9/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 4-05 Date: 10/20/15 Sample Time: 1050

EPA Split Sample ID: 4-05-SS-01-102015-ES01

US Mag Paired Sample ID: 4-05-SS-01-102015 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4531803 N 354164 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Gypsum Pile, PRI Area 4, central area of gyp. pile flat

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Rust/reddish brown Foreign Material Present: None Other: None

Description: Gypsum

Notes: Waste thickness > 5', homogeneous gypsum waste, reddish brown

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-102015-134540-0032 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/20/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 4-06 Date: 10/20/15 Sample Time: 1145

EPA Split Sample ID: 4-06-SS-01-102015-ES01

US Mag Paired Sample ID: 4-06-SS-01-102015 Sample Interval: 0-6"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4531802N 354421E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Gypsum Pile, PRI Area 4, eastern area of gyp. pile, flat

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Rust/reddish brown Foreign Material Present: None Other: None

Description: Gypsum

Notes: Waste thickness measured at 3.5', went 6" into native

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: 4-06-SS-01-102015-ES02  MS/MSD: NA

Chain of Custody Number(s): 8-102015-134540-0032 <sup>1155</sup> Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/20/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 5-14SB Date: 12/1/15 Sample Time: 1400

EPA Split Sample ID: 5-14SB-SB-01-4-6-120115-ES01

US Mag Paired Sample ID: 5-14SB-SB-01-4-6-120115 Sample Interval: 4-6'

Split Accepted By: Aaron Baird Split Accepted From: Lonnie Mercer (ERM)

Sample GPS Coordinates: NA

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: 4" diameter Lexan core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/tronel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 8' Sample Intervals: 0-2, 2-4, 4-6, 8-10

Sample Location Description: PRI 1, just E of Main Ditch outfall into PRI 5 waste lagoon, along historical ditch line to PRI 7, ~30' S of shoreline

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Reddish brown Foreign Material Present: None Other: None

Description: Waste, some gravel from S.S-6' (cemented sand with dark reddish brown color)

Notes: Poor recovery in 6-8 interval, no sample.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	<input checked="" type="checkbox"/>
PCDDs/PCDFs	EPA 8290			<input checked="" type="checkbox"/>
SVOCs	EPA 8270C	8 oz glass jar	1	<input checked="" type="checkbox"/>
PAHs	EPA 8270C SIM			<input checked="" type="checkbox"/>
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			<input checked="" type="checkbox"/>
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	<input checked="" type="checkbox"/>
Total Organic Carbon	EPA 9060			<input checked="" type="checkbox"/>
pH	EPA 9045D	5 g EnCore sampler	3	<input checked="" type="checkbox"/>
VOCs	EPA 8260B			<input checked="" type="checkbox"/>

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-120115-154328-0041 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 12/1/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRIS-15 Date: 9/17/2015 Sample Time: 11:40

EPA Split Sample ID: S-15-SS-01-091715-ES01

US Mag Paired Sample ID: S-15-SS-01-091715-~~TS~~ TS 9/17/2015 Sample Interval: 0-6"

Split Accepted By: Tim Jimenez Split Accepted From: Garrett Rigard

Sample GPS Coordinates: 4531748 m N, 355217 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger all material passed through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: 0 TS 10/08/2015 Sample Intervals: 1"-2" around stake TS 10/08/2015

Sample Location Description: Side of berm with vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: medium brown Foreign Material Present: trace veg. Other: NA

Description: Silty sand

Notes:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: S-15-SS-01-091715-ES01

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/17/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 5-16 Date: 11/5/15 Sample Time: 10:38

EPA Split Sample ID: 5-16-SB-01-8-10-110515-ES01

US Mag Paired Sample ID: 5-16-SB-01-8-10-110515-ES01<sup>AB</sup> Sample Interval: 8-10'

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: 4531049 N 354881 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>bowls/trays</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 10 Sample Intervals: 0.5-6.5, 6.5-8, 8-10

Sample Location Description: PRI Area 5, Former Wastewater Diversion Ditch, at T diversion that trends east toward the wastewater lagoon, ditch center

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray Foreign Material Present: None Other: None

Description: SAND, medium grained, trace silt, oolitic

Notes: Water table is at surface of ditch. 0.5-6.5' is very soft and compressed to 2 feet of recovery. 0.5-6.5' is saturated silt, trace sand, reddish brown (waste material). 6.5-8' is clay with mottling brown and dark grey.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110515-150625-0035 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/5/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15

# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PR15-17 Date: 9/18/2015 Sample Time: 10:20

EPA Split Sample ID: 5-17-SS-01-091815-ES01

US Mag Paired Sample ID: 5-17-SS-01-091815 Sample Interval: 0"-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4530728 m N, 355151 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, 100% of first aliquot passed sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 6" TJ 10/08/2015 Sample Intervals: 12"-24" TJ 10/08/2015 around stake

Sample Location Description: flat area near ditch with no vegetation, appears to be waste materials

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Red and Gray Foreign Material Present: None Other: NA

Description: Clay with sand

Notes: Red material on surface with gray clay under surface  
Red material depth varied, one aliquot passed sieve so  
no sieve used on remaining aliquots.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			
SVOCs	EPA 8270C			
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			
pH	EPA 9045D			
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: 5-17-SS-01-091815-ES02  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/18/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRE5-18 Date: 9/18/2015 Sample Time: 11:35

EPA Split Sample ID: 5-18-SS-01-091815-ES01

US Mag Paired Sample ID: 5-18-SS01-091815 Sample Interval: 0-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher <sup>TJ 9/18/2015</sup> ~~Bease~~ <sup>Suzysmith</sup>

Sample GPS Coordinates: 4530707 mN, 355736 mE TJ 9/18/2015

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger into sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 7 Sample Type:  Grab  Bulk  Composite TJ 10/08/2015

Subsurface Solids: Total Depth: 6 Sample Intervals: 12" 24" ground stake TJ 10/08/2015

Sample Location Description: side of bank 5 feet from water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Red and Gray Foreign Material Present: None Other: NA

Description: Red clay, gray clay

Notes: Red clay on surface with varying depths. gray clay under surface

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/18/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PR15-19 Date: 9/18/2015 Sample Time: 12:40

EPA Split Sample ID: 5-19-SS-01-091815-E501

US Mag Paired Sample ID: 5-19-SS-01-091815 Sample Interval: 0-6"

Split Accepted By: Tim Jimenez Split Accepted From: Suzy Smith

Sample GPS Coordinates: 4830711 m N, 355416 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger and sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: 6' TS 10/08/2015 Sample Intervals: 6"-12" along seep line 10/08/2015

Sample Location Description: # seep line along bank edge of skull valley TS 9/18/15 Diversion

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: medium brown Foreign Material Present: None Other: NA

Description: Sand with clay

Notes: taken in bank where seepage was present.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/18/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PR1606 Date: 9/17/2015 Sample Time: 10:15

EPA Split Sample ID: 6-06-SS-01-091715-ES02 / 6-06-SS-01-091715-ES02

US Mag Paired Sample ID: 6-06-SS-01-091715 Sample Interval: 0'-6"

Split Accepted By: Tim Jimenez Split Accepted From: Garrett Rigard

Sample GPS Coordinates: 4532274 m N, 354511 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, Pass all through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite TJ 10/08/2015

Subsurface Solids: Total Depth: 6" TJ 10/08/2015 Sample Intervals: 12"-24" around stake TJ 10/08/2015

Sample Location Description: Flat area with vegetation, PR16-06

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Medium brown Foreign Material Present: trace veg. Other: NA

Description: Silty sand

Notes:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			
SVOCs	EPA 8270C			
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			
pH	EPA 9045D			
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: 6-06-SS-01-091715-ES02  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/17/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRIG-24 Date: 9/16/2015 Sample Time: 12:40

EPA Split Sample ID: 6-14-SS-01-091615-ES01

US Mag Paired Sample ID: 6-14-SS-01-091615 Sample Interval: 0"-6"

Split Accepted By: Tim Jimenez Split Accepted From: Garrett Rigard

Sample GPS Coordinates: 4532679m N, 354280m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, composite in tray after passing through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: 6" TS 10/08/2015 Sample Intervals: 12"-24" around stake TS 10/08/2015

Sample Location Description: PRIG-24 surface soil, flat area with vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: light brown Foreign Material Present: trace veg. Other: NA

Description: Silty sand some angular gravel

Notes: Passed all Aliquots through sieve.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/16/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRIG-15 Date: 9/16/2015 Sample Time: 11:30

EPA Split Sample ID: 6-15-SS-01-091615-ES01

US Mag Paired Sample ID: 6-15-SS-01-091615 Sample Interval: 0-6" Garrett Rigard

Split Accepted By: Tim Jimenez Split Accepted From: Garrett Rigard

Sample GPS Coordinates: 4532882mN, 354165mE

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, composite in tray after sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 7 Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: TS 10/08/2015 Sample Intervals: 12" 24" around stake TS 10/08/2015

Sample Location Description: PRIG-15 surface soils, flat area with vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: medium brown Foreign Material Present: trace veg. Other: NA

Description: clay silt with fine grain sand

Notes: one auger full passed clean through sieve. Remaining Gauger loads were not passed through sieve.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): NA Not noted TS 10/08/2015 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/16/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 6-16 Date: 11/6/15 Sample Time: 10:09

EPA Split Sample ID: 6-16-SB-01-~~110615~~<sup>MB</sup> 3.5-4.5-110615-ES01

US Mag Paired Sample ID: 6-16-SB-01-3.5-4.5-110615 Sample Interval: 3.5-4.5'

Split Accepted By: Aaron Baird Split Accepted From: Jason Hilker (ERM)

Sample GPS Coordinates: 4532023 N 354551 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>sieves/trays</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 6.5 Sample Intervals: 0.5-3.5, 3.5-4.5, 4.5-6.5

Sample Location Description: Gypsum Pile, eastern area of PRI Area 4, within historical inlet of PRI Area 6 waste lagoon, ~100 W of lagoon

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Layered with varying colors white, reddish brown, dark brown, tan, grey Foreign Material Present: None Other: Salts

Description: Gypsum, some sand, thin layer (~1") of tan silty material, 2 ~1/4" white layers likely gypsum film

Notes: 3.5-4.5 interval broken out due to layering at native sand/gypsum interface.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-110615-114120-0036 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/6/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 7-045B Date: 11/10/15 Sample Time: 1440

EPA Split Sample ID: 7-04-SB-01-8.5-9.5-111015-ES01

US Mag Paired Sample ID: 7-04-SB-01-8.5-9.5-111015 Sample Interval: 8.5-9.5'

Split Accepted By: Aaron Baird Split Accepted From: Lonnie Mercer (ERM)

Sample GPS Coordinates: NA - ERM will GPS loc. at a later date

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Sonic drilling with 6" core barrel

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 12.5' Sample Intervals: 2.5-4.5, 4.5-6.5, 6.5-8.5, 8.5-9.5, 9.5-11.5

Sample Location Description: Old Waste Pond, ~150' WSW of SAP loc., ~100' from iron-stained shoreline, ~1-2" of water on surface, end of plywood ramp

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray to olive green Foreign Material Present: None Other: None

Description: CLAYEY SILT, some gravel and fine to coarse oolitic sand

Notes: First core was to 12.5' bgs. No recovery of saturated fines (waste) in upper 2.5' of borehole. Iron crust at surface is ~4-6" thick.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-111015-150401-0038 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 11/10/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: 7-045B Date: 12/10/15 Sample Time: 1224

EPA Split Sample ID: 7-04-SB-01-0.5-2.5-121015-ES01

US Mag Paired Sample ID: 7-04-SB-01-0.5-2.5-121015 Sample Interval: 0.5-2.5'

Split Accepted By: Aaron Baird Split Accepted From: Kris Benson (ERM)

Sample GPS Coordinates: NA ERM has not GPS'd loc. 4532068 N 355018 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: 4" diameter Lexan tube advanced by hand and capped at TD

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  <sup>Lexan</sup> Shelby tube  Box-core

Sample Homogenizing Equipment Used:  ¼-in. sieve  Steel bowls/trays  <sup>Spoon/tronel</sup> Steel bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 2.5' Sample Intervals: 0.5-2.5'

Sample Location Description: Old Waste Pond, ~150' WSW of SAP loc., ~100' from iron-stained shoreline, ~1-2" of water on surface

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Reddish brown Foreign Material Present: None Other: Iron crust

Description: Waste material (saturated fines)

Notes: Native material, a gray silty sand, encountered at 2.5' bgs.  
Borehole advanced at end of plywood ramp adjacent to 11/10/15  
borehole advanced with sonic rig.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012	8 oz glass jar (leave ~ ½ headspace)	1	Y
Perchlorate (and % moisture)	EPA 6850			Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-121015-100443-0042 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 12/10/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRE 7-11 Date: 9/21/2015 Sample Time: 10:30

EPA Split Sample ID: 7-11-SS-01-092115-ES01

US Mag Paired Sample ID: 7-11-SS-01-092115 Sample Interval: 0"-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532536 m N, 356285 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, one aliquot through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite TJ 10/08/2015

Subsurface Solids: Total Depth: 6" TJ 10/08/2015 Sample Intervals: 12" 24" around stake TJ 10/08/2015

Sample Location Description: flat area in pond, dead vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown/Grey Foreign Material Present: None Other: NA

Description: Clay Brown/Grey

Notes:

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			

QC Samples:  Field Duplicate: 7-11-SS-01-092115-ES-02  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/21/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: RR17-13 Date: 9/22/2015 Sample Time: 09:45

EPA Split Sample ID: 7-13-SS-01-092215-ES01

US Mag Paired Sample ID: 7-13-SS-01-092215 Sample Interval: 0-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532976 m N, 355039 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Handauger, all material passed through sieve No TS 9/22/15

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: 6" TS 10/08/2015 Sample Intervals: 12" 24" TS 19/08/2015 around sieve

Sample Location Description: Flat area in pond, no vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Black/Red/Gray Foreign Material Present: No Other: \_\_\_\_\_

Description: Clay with salt crystals

Notes:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/22/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 5/02/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRI 7-14 Date: 9/22/2015 Sample Time: 11:15

EPA Split Sample ID: 7-14-SS-01-092215-ES01

US Mag Paired Sample ID: 7-14-SS-01-092215 Sample Interval: 0"-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532973 m N, 355539 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger with all material passing through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite TJ 10/08/2015

Subsurface Solids: Total Depth: 6" TS 10/08/2015 Sample Intervals: 12" - 24" ground stake TJ 10/08/2015

Sample Location Description: Flat area in Pond with salt crystals present no vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Red/Black/Grey Foreign Material Present: None Other: NA

Description: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/22/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: PRI 7-15 Date: 9/22/2015 Sample Time: 12:25

EPA Split Sample ID: 7-15-SS-01-092215-ES01

US Mag Paired Sample ID: 7-15-SS-01-092215 Sample Interval: 0-6"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532970 m N, 356038 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger, all aliquots passed through sieve

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: not noted Sample Type:  Grab  Bulk  Composite TS 10/08/2015

Subsurface Solids: Total Depth: 6" TS 10/08/2015 Sample Intervals: 12"-24" around stake TS 10/08/2015

Sample Location Description: Flat area in Pond

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Red/gray/black/medium brown Foreign Material Present: \_\_\_\_\_ Other: \_\_\_\_\_

Description: medium brown sand at top with gray/black clay bottom

Notes: Red material intermixed

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			

QC Samples:  Field Duplicate: NA  MS/MSD: 7-15-SS-01-092215-ES01

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 9/22/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

10/22/2015 TS 10/22/2015

Sample Location ID: BR-3 Date: 10/21/2015 Sample Time: 13:50

EPA Split Sample ID: BR-3-SB-02-36-01-102215-ES01 <sup>102215 TS 10/22/2015</sup>

US Mag Paired Sample ID: BR-3-SB-02-36-01-102215 <sup>102215 TS 10/22/2015</sup> Sample Interval: 2"-36"

Split Accepted By: Tim Jimenez Split Accepted From: Suzy Smith

Sample GPS Coordinates: 4596193 m N, 387281 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Post hole digger and steel tray composite by hand

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core  Post hole digger

Sample Homogenizing Equipment Used:  1/4-in. sieve  Spoon/trowel  Steel bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2"-36"

Sample Location Description: Flat area with non-vegetative, appears to be flooded during part of the year. Location is Bear River

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: None Other: None

Description: 2"-30" silty-clay, 30"-36" silty-sand

Notes:  
Decontaminated post hole digger used not hand auger. Post hole digger was property of US Fish & Wildlife. No equipment blank collected due to no bottles to collect sample. Field mod. asked for. Sample originally turned into lab and then removed by Tim Jimenez to await field mod. approval. Field mod. approved 10/23/2015 and sample was submitted for analysis.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH1AB-006 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/22/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: BR-3 Date: 10/21/2015 Sample Time: 13:05  
10/22/2015 TS 10/22/2015

EPA Split Sample ID: BR-3-SS-01-102115-ES01

US Mag Paired Sample ID: BR-3-SS-01-102115 Sample Interval: 0"-2"  
10/22/2015 TS 10/22/2015

Split Accepted By: Tim Jimenez Split Accepted From: Suzy Smith

Sample GPS Coordinates: 4596193 m N, 387281 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop into steel pan and composited by hand

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Spoon/trowel  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Flat area with no vegetation, appears to be flooded during parts of the year. Bear River 3

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: None Other: None

Description: silty-clay

Notes: First sieve passed 100%. Remaining aliquots not sieved. Sample collected according to SAP/QAPP. No modifications

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y TS 10/21/15
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH1A13-005 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/22/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBB-7 Date: 10/8/15 Sample Time: 11:10

EPA Split Sample ID: LBB-7-SB-01-02-36-100815-ES01

US Mag Paired Sample ID: LBB-7-SB-01-02-36-100815 Sample Interval: 2-36"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4533740 N 368535 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2-36"

Sample Location Description: Lakebed Southeast of Badger Island, no vegetation, east of shrimp camp

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet  
*Surface → 1.5'+*

Sample Color: Grey sub, brown surface Foreign Material Present: None Other: None

Description: SAND, some silt, fine to coarse grained sand

Notes: Ground water encountered at ~1.5'. Surface was undisturbed.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B			N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-100815-091336-0029, 8-100815-091751-0030 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 10/8/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBB-9 Date: 10/8/15 Sample Time: 10:30

EPA Split Sample ID: LBB-9-SS-01-100815-ES01

US Mag Paired Sample ID: LBB-9-SS-01-100815 Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4533309 N 368929 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon + travel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Lake bed Southeast at Badger Island, at shoreline of ponded water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Dark grey Foreign Material Present: None Other: None

Description: SAND, medium to fine grained, trace silt

Notes: 100% of material passed through sieve. Surface was undisturbed.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-100815-091336-0029, 8-100815-091751-0030 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/8/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBB-10 Date: 10/8/15 Sample Time: 10:15

EPA Split Sample ID: LBB-10-SS-01-100815-ES01

US Mag Paired Sample ID: LBB-10-SS-01-100815 Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4533129 N 369101 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 8 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Lakebed Southeast at Badger Island, at shoreline of ponded water

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Dark grey Foreign Material Present: None Other: None

Description: SAND, medium to fine grained, trace silt

Notes: 100% of material passed through sieve. Surface was undisturbed.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: LBB-10-SS-01-100815-ES01  MS/MSD: NA

Chain of Custody Number(s): 8-100815-091336-0029, 8-100815-091751-0030 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/8/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBN-6 Date: 10/05/2015 Sample Time: 10:50

EPA Split Sample ID: LBN-6-SB-02-36-100515 ES01

US Mag Paired Sample ID: LBN-6-SB-02-36-01-100515 Sample Interval: 2"-36"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4543694 m N, 344783 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger and composite in steel tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 1/NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2"-36"

Sample Location Description: Flat area with no vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown/Gray Foreign Material Present: None Other: NA

Description: Silty clay

Notes: Sample was labeled LBN-6-SB-02-36-100515-ES01. However, it should have been labeled LBN-6-SB-02-36-10-100515-ES01. Sample became wet near bottom.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B			Y

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/05/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBN-6 Date: 10/05/2015 Sample Time: 10:26

EPA Split Sample ID: LBN-6-SS-01-100515-ES01

US Mag Paired Sample ID: LBN-6-SS-01-100515 Sample Interval: ~~0"-6"~~ 0'-2" <sup>TS</sup> 10/4/15

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4543694 m N, 344783 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop, sieve, composite in steel tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 7 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Flat area with no vegetation.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray Foreign Material Present: None Other: NA

Description: Silty sand

Notes: sample was moist from recent rain.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	Y
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: LBN-6-SS-01-100515-ES01

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/05/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBN-7 Date: 10/05/2015 Sample Time: 11:15

EPA Split Sample ID: LBN-7-SS-01-100515-ES01

US Mag Paired Sample ID: LBN-7-SS-01-100515 Sample Interval: 0"-2"

Split Accepted By: Tim Jimenez Split Accepted From: Trent Hamada

Sample GPS Coordinates: 4543616 m N, 344950 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop into pan for compositing

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Flat area with no vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: None Other: NA

Description: Silty clay

Notes: First aliquot passed through sieve at 100%. Remaining aliquots not sieved.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	N
PCDDs/PCDFs	EPA 8290			N
SVOCs	EPA 8270C			N
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): Not noted Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/05/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBSE-3 Date: 10/06/2015 Sample Time: 10:40

EPA Split Sample ID: LBSE-3-SS-01-100615-ES01

US Mag Paired Sample ID: LBSE-3-SS-01-100615 Sample Interval: 0-2"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532861 m N, 365281 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop, sieve, composite in steel tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 6 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Bank Flat bank near open water with a little vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray Foreign Material Present: trace vegetation Other: NA

Description: Silty Sand

Notes: All aliquots passed through sieve due to calcium carbonate salt chunks on surface.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: LBSE-3-SS-01-100615-ES02  MS/MSD: NA

Chain of Custody Number(s): USM - PHZ AB-001 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/06/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBSE-5 Date: 10/06/2015 Sample Time: 11:35

EPA Split Sample ID: LBSE-5-SS-01-100615-ES01

US Mag Paired Sample ID: LBSE-5-SS-01-100615 Sample Interval: 0"-2"

Split Accepted By: Tim Dimenez Split Accepted From: Kristopher Bensen

Sample GPS Coordinates: 4532947 m N, 365750 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop into steel tray for composting

Sampling Equipment Used:  Hand auger  <sup>copy of protocol 10/20/2015</sup> Flat bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Shore area, flat, no vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Gray Foreign Material Present: None Other: NA

Description: Sandy clay

Notes: First aliquot passed sieve. Remaining aliquots not sieved.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			N
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	Y
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH LAB-001 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/06/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: LBSE-7 Date: 10/07/2015 Sample Time: 10:15

EPA Split Sample ID: LBSE-7-SB-02-36-01-100715-ES01

US Mag Paired Sample ID: LBSE-7-SB-02-36-01-100715 Sample Interval: 2"-36"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4532874 m N, 366288 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger into steel tray for compositing.

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2"-36"

Sample Location Description: Flat area with dead vegetation

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: dark gray Foreign Material Present: None Other: NA

Description: Clay and sand

Notes: water at 12" down hole during sampling. Sand lense at 30". water filled hole to within 8" of top after the sample was collected

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B			N
		5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PMIAB-002 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/07/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPN-2 Date: 10/14/15 Sample Time: 10:10

EPA Split Sample ID: UPN-2-SS-01-101415-ES01

US Mag Paired Sample ID: UPN-2-SS-01-101415 ~~4539~~ NB Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Kris Benson (ERM)

Sample GPS Coordinates: 4539988 N 344201 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Upland North, east of access road, greasewood flatland, sparse dry grass, undisturbed

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: None Other: None

Description: CLAYEY SILT, some coarse sand and gravel, few cobbles on surface

Notes: ~95% of sample volume passed through 1/4" sieve, sparse grass on surface.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-101415-125658-0031 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/14/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPN-6 Date: 10/14/15 Sample Time: 11:30

EPA Split Sample ID: UPN-6-SB-01-02-36-101415-ES01

US Mag Paired Sample ID: UPN-6-SB-01-02-36-101415 Sample Interval: 2-36"

Split Accepted By: Aaron Baird Split Accepted From: Kris Benson (ERM)

Sample GPS Coordinates: 4539744 N 344439 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hang auger

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon labeled</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2-36"

Sample Location Description: Upland North, east side of access road, greasewood flatland, sparse dry grass, undisturbed

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Rust Brown Foreign Material Present: None Other: None

Description: CLAYEY SILT, clay content increases at 4" and decreases at 32"

Notes: 100% passed through 1/4" sieve.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers MS/MSD	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1 2	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1 2	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1 2	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: UPN-6-SB01-02-36-101415-ES01

Chain of Custody Number(s): 8-101415-125658-0031 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/14/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPN-10 Date: 10/14/15 Sample Time: 1235

EPA Split Sample ID: UPN-10-SS-01-101415-ES01

US Mag Paired Sample ID: UPN-10-SS-01-101415 Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Kris Benson (ERM)

Sample GPS Coordinates: 4539418 N 344653 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Upland North, east side of access road, greasewood flatland, undisturbed

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Brown Foreign Material Present: None Other: None

Description: CLAYEY SILT

Notes: 100% passed through 1/4" sieve

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-101415-125658-0031 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/14/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPS-1 Date: 10/12/2015 Sample Time: 10:40

EPA Split Sample ID: UPS-1-SS-01-101215-ES01

US Mag Paired Sample ID: UPS-1-SS-01-101215 Sample Interval: 0"-2"

Split Accepted By: Tim Jimenez Split Accepted From: Kristopher Benson

Sample GPS Coordinates: 4518159 m N, 354646 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop into a steel ~~bucket~~ tray for compositing <sup>TS 10/12/2015</sup>

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Flat area with medium vegetation.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: light brown Foreign Material Present: trace vegetation Other: NA

Description: Clayey-silt

Notes:  
some crypto-biotic-soils present. soil has a thin dry crust with some small calcium evaporative chunks, and a dry powder underneath. First aliquot passed 100% through sieve. Remaining aliquots not sieved

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): VSM-PH1AB-003 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/12/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015





# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPS-6 Date: 10/13/2015 Sample Time: 09:55

EPA Split Sample ID: UPS-6-SB-02-36-01-101315-ES01

US Mag Paired Sample ID: UPS-6-SB-02-36-01-101315 Sample Interval: 0"-36"

Split Accepted By: Tim Jimenez Split Accepted From: Suzanne Smith

Sample GPS Coordinates: 4518197 m N, 355148 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger and composite in steel tray

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 36" Sample Intervals: 2"-36"

Sample Location Description: Flat area with heavy vegetation, woody debris, South Upland area.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Not noted Foreign Material Present: Vegetation TS 10/13/15 Other: NA

Description: Clayey silt

Notes: Dry powdery clayey silt. Some root material and woody debris in sample. Sample collected in accordance to SAP.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B			N
		5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH2AB-004 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/13/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPS-6 Date: 10/13/2015 Sample Time: 09:35

EPA Split Sample ID: UPS-6-SS-01-101315-ES01

US Mag Paired Sample ID: UPS-6-SS-01-101315 Sample Interval: 0"-2"

Split Accepted By: Tim Jimenez Split Accepted From: Suzy Smith

Sample GPS Coordinates: 4518197 m N, 355148 m E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Flat bottom scoop into sieve and then into steel tray for Compositing

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Flat area with heavy vegetation. Woody debris in area. Upland south sample area.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: light brown Foreign Material Present: vegetation Other: NA

Description: Clayey-silt

Notes: This dry crust on surface with dry powder underneath. No calcium evaporative chunks in area. Some rabbit scat. Old burrow located in center of sample location. Sample collected in accordance to SAP. Some Crypto-biotic-soils present

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C	8 oz glass jar	1	Y
PAHs	EPA 8270C SIM			N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/2 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D	5 g EnCore sampler	3	Y
VOCs	EPA 8260B			N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): USM-PH7AB-004 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/13/2015

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/07/2015



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPSE-1 Date: 10/1/15 Sample Time: 1317

EPA Split Sample ID: UPSE-1-SS-01-100115-ES01

US Mag Paired Sample ID: UPSE-1-SS-01-100115 Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4524867 N 370357 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/trawl</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Upland Southeast, Stansbury Island, west side of island, greasewood flatland, sparse dry grass

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Light brown Foreign Material Present: None Other: None

Description: SANDY SILT, fine-grained sand, some organic matter at surface

Notes: Surface was undisturbed.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-100115-154913-0027, 8-100115-155840-0028 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 10/1/15

Data Sheet QC Review Completion: Signature: Trent Hamada Date: 12/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPSE-3 Date: 10/1/15 Sample Time: 1232

EPA Split Sample ID: UPSE-3-SS-01-100115-ES01

US Mag Paired Sample ID: UPSE-3-SS-01-100115 Sample Interval: 0-2"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4525005 N 370378 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Scoop

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/travel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: 5 Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: NA Sample Intervals: NA

Sample Location Description: Upland Southeast, Stansbury Island, west side of island, greasewood flatland, sparse dry grass

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Light brown Foreign Material Present: NA Other: NA

Description: Sandy Silt, fine-grained sand, some organic matter at surface

Notes: Surface was undisturbed.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			Y
pH	EPA 9045D			Y
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: UPSE-3-SS-01-100115-ES01 MS/MSD: NA

Chain of Custody Number(s): 8-100115-154913-0027, 8-100115-155740-0028 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: Aaron Baird Date: 10/5/15

Data Sheet QC Review Completion: Signature: Trent Hamada Date: 10/16/15



# SOLIDS SPLIT SAMPLE FIELD DATA SHEET

US Magnesium NPL Site  
Phase 1 Remedial Investigation

Sample Location ID: UPSE-5 Date: 10/1/15 Sample Time: 11:34

EPA Split Sample ID: UPSE-5-SB-01-02-36-100115-ES01

US Mag Paired Sample ID: UPSE-5-SB-01-02-36-100115 Sample Interval: 2-36"

Split Accepted By: Aaron Baird Split Accepted From: Trent Hamada (ERM)

Sample GPS Coordinates: 4525120 N 370253 E

Sample Matrix:  Surface soil  Surface sediment  Subsurface soil/sed.  Solid waste Saturated:  Yes  No

Sampling Method: Hand auger with 3" ID and 3 1/4" OD bucket

Sampling Equipment Used:  Hand auger  Flat-bottom scoop  Direct-push  Shelby tube  Box-core

Sample Homogenizing Equipment Used:  1/4-in. sieve  Steel bowls/trays  Steel <sup>spoon/trowel</sup> bowls/trays

Surface Solids: # of Grab Aliquots: NA Sample Type:  Grab  Bulk  Composite

Subsurface Solids: Total Depth: 3' Sample Intervals: 2-36"

Sample Location Description: Upland Southeast, Stansbury Island, west side of island, greasewood flatland, sparse dry grass, undisturbed.

Sample Observations: Sample Odor:  No Odor  Slight Odor  Strong Odor Moisture Content:  Dry  Moist  Wet

Sample Color: Light brown Foreign Material Present: NA Other: NA

Description: SANDY SILT, fine-grained sand, some organic matter near surface

Notes: One auger hole advanced in center of 5 aliquot surface soil sample. Top 2" cleared with trowel before advancing auger. No change in lithology in top 3'. Although SAP calls for sample ID depth interval to be in feet bgs, inches were used.

Analytical Group	Analytical Method	Sample Container Size/Type/Preservative	# of Sample Containers	Analyses Requested (Y/N)
PCBs	EPA 1668A	8 oz glass jar	1	Y
PCDDs/PCDFs	EPA 8290			Y
SVOCs	EPA 8270C			Y
PAHs	EPA 8270C SIM	8 oz glass jar	1	N
Total Metals + Hg, Cn, & Mo	EPA 6010/6020/7471/9012			Y
Perchlorate (and % moisture)	EPA 6850	8 oz glass jar (leave ~ 1/3 headspace)	1	N
Total Organic Carbon	EPA 9060			N
pH	EPA 9045D			N
VOCs	EPA 8260B	5 g EnCore sampler	3	N

QC Samples:  Field Duplicate: NA  MS/MSD: NA

Chain of Custody Number(s): 8-100115-154913-0027, 8-100115-155840-0028 Shipment Via:  FedEx  Hand Deliver

Data Sheet Completion Verification: Signature: [Signature] Date: 10/1/15

Data Sheet QC Review Completion: Signature: [Signature] Date: 12/16/15

**APPENDIX C**  
**PHOTOGRAPHIC DOCUMENTATION**

# Appendix C: Photographic Documentation



**Photo 1 | Lakebed SE at Badger Island | 10/09/15**  
Stack plume spreading out and settling into the valleys of the Lakeside Mountains



**Photo 2 | PRI Area 5 | 11/06/15**  
Stack plume exhibiting "looping" behavior



**Photo 3 | USM Parking Lot | 10/28/15**  
Chlorine gas falling from the stack



**Photo 4 | PRI Area 4 | 10/19/15**  
Coyote walking in the northwest area of the Gypsum Pile

# Appendix C: Photographic Documentation



Photo 5 | PRI Area 4 | 10/19/15  
Pelican carcass on the west side of the Gypsum Pile



Photo 6 | PRI Area 4 | 10/20/15  
Animal burrows in the gypsum stockpile on the southeast side of the Gypsum Pile



Photo 7 | PRI Area 6 | 10/28/15  
Low-lying white haze (chlorine gas) extending from the facility north into PRI Area 8



Photo 8 | PRI Area 1 | 12/02/15  
Dense white haze (chlorine gas) encompassing the entire facility



# Appendix C: Photographic Documentation



Photo 9 | PRI Area 1 | 12/03/15

Surface solids sampling at location 1-07 using an excavator-deployed Ponar sampler



Photo 10 | PRI Area 1 | 12/03/15

Surface solids sampling at location 1-03 using a Ponar sampler. 6+ inches of penetration and full recovery of soft waste material in the Ponar bucket



Photo 11 | PRI Area 1 | 11/05/15

Advancing 5-16 boring using a sonic drill rig with a 6-inch diameter core barrel at a 45 degree angle adjacent to the Main Ditch culvert



Photo 12 | PRI Area 1 | 11/02/15

Advancing 5-16 core in the center of the Main Ditch using a 4-inch diameter Lexan tube

# Appendix C: Photographic Documentation



Photo 13 | PRI Area 5 | 10/27/15

Example of Ponar sample recovery with greater than 4 inches of penetration where only one sample aliquot was required



Photo 14 | PRI Area 5 | 10/27/15

Example of Ponar sample recovery with less than 4 inches of penetration where multiple sample aliquots were required



Photo 15 | PRI Area 5 | 10/27/15

Sample recovery with box core sampler tested at 5-14 with about 2 inches of penetration



Photo 16 | PRI Area 5 | 10/27/15

Sample recovery with Ponar sampler at 5-14 with 6+ inches of penetration

# Appendix C: Photographic Documentation



Photo 17 | PRI Area 1/5 | 12/01/15  
Advancing 5-14 core from the gypsum pile using a 4-inch diameter Lexan tube

Photo 18 | PRI Area 1/5 | 12/02/15  
Advancing 5-16 core in the center of the former wastewater diversion ditch using a 4-inch diameter Lexan tube



Photo 19 | Skull Creek Diversion Ditch | 12/10/15  
New earthen dam constructed in the Skull Creek Diversion Ditch at the southeast corner of PRI Area 5



Photo 20 | PRI Area 4/6 | 11/06/15  
Advancing 6-16 boring on the east side on the gypsum pile using a sonic drill rig with a 6-inch diameter core barrel

# Appendix C: Photographic Documentation



Photo 21 | PRI Area 4/6 | 11/06/15

White waste material and depositional layering in the 6-16 core just above the native interface



Photo 22 | PRI Area 7 | 11/10/15

Advancing 7-04SB boring at the end of a plywood ramp using a sonic drill rig with a 6-inch diameter core barrel



Photo 23 | PRI Area 7 | 12/10/15

Advancing 7-04SB core by hand using a 4-inch diameter Lexan tube



Photo 24 | Lakebed SE at Badger Island | 10/08/15

Example of collocated surface and subsurface solids sample collection in a background area