# PHASE II
# FOCUSED FORMER SMELTER ASSESSMENT
# OF THE
# FORMER EAST LA HARPE SMELTER
# LA HARPE, KANSAS

JULY 2005

Burns & McDonnell Project No. 35833
Kansas Department of Health & Environment
State Water Plan Program
KDHE Project #C3-001-03005

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Kansas City, Missouri

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BER | Bureau of Environmental Remediation |
| bgs | Below ground surface |
| Burns & McDonnell | Burns & McDonnell Engineering Company, Inc. |
| CR | County Road |
| EPS | Environmental Priority Service, Inc. of Salina, Kansas |
| EPA | Environmental Protection Agency |
| ESC | Environmental Science Corporation of Mt. Juliet, Tennessee |
| °C | Degrees Celcius |
| FFSA | Focused Former Smelter Assessment |
| GPS | Global positioning system |
| HPLC | High performance liquid chromatography |
| IDW | Investigation derived waste |
| KDHE | Kansas Department of Health and Environment |
| mg/kg | Milligrams per kilogram |
| mg/l | Milligrams per liter |
| RSK | Kansas risk-based standards |
| Site | Former East La Harpe Smelter, La Harpe, Kansas |
| WP | Work Plan |
| XRF | X-ray fluorescence technology |

* * * * *

# 1.0 INTRODUCTION

The following report presents the results of Phase II Focused Former Smelter Assessment (FFSA) investigation activities conducted by Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) personnel from March 22 to April 8, 2005, at the former East La Harpe Smelter, located ½ mile south of the intersection of US Highway 54 and County Road (CR) 2800, La Harpe, Allen County, Kansas (Site). Burns & McDonnell submitted a Work Plan, dated March 2004, for Phase II Smelter Assessments (Group C) at thirteen former smelter sites in Cherokee, Girard, Pittsburg, Scammon, Weir, Iola, and La Harpe, Kansas, to the Kansas Department of Health of Environment (KDHE) Bureau of Environmental Remediation (BER). KDHE BER approved the Work Plan (WP) in a letter dated March 29, 2004. Figure 1-1 illustrates the general location of the Site.

This report provides a summary of the field activities, and associated field and laboratory analytical results obtained during the Phase II FFSA. The objectives of the Phase II FFSA were as follows:

1. Provide information regarding areas of *Recognized Environmental Conditions* and areas of concern that were identified during the Phase I FFSA.

These objectives were met by sampling soil, smelter waste, groundwater, surface water, and sediment at on-Site and off-Site locations. Soil, smelter waste, and sediment samples were analyzed using x-ray fluorescence (XRF) technology. The portable XRF provided arsenic, cadmium, lead, and zinc concentrations in the samples following United States Environmental Protection Agency (EPA) Method 6200. Select soil, smelter waste, groundwater, surface water, and sediment samples were submitted to Environmental Science Corporation (ESC) of Mt. Juliet, Tennessee, for laboratory analysis of arsenic, cadmium, lead, and zinc using EPA Method 6010B.

On April 1, 2005, Burns & McDonnell personnel and personnel from Environmental Priority Service, Inc. (EPS) of Salina, Kansas, mobilized to the Site to perform direct-push sampling activities. A total of four soil samples (including 1 duplicate sample) were collected by direct-push sampling techniques and submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc.

All field work was conducted in accordance with the KDHE approved Burns & McDonnell WP dated March 2004.

## 1.1 PERSONNEL

The following is a listing of project personnel and subcontractors:

Bridget Wilson, KDHE Project Manager

Pam Chaffee, KDHE Project Member

Jon Vopata, KDHE Project Member

Chris Conrad, KDHE Project Member

Randy Brown, KDHE Project Field Advisor

Steve Hoffine, Burns & McDonnell Project Manager

Keith Schutte, Burns & McDonnell Field Site Manager

EPS of Salina, Kansas, Direct-push Contractor

ESC of Mt. Juliet, Tennessee, Analytical Laboratory Contractor

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# 2.0 SITE INFORMATION

## 2.1 SITE LOCATION AND DESCRIPTION

The Site is located ½ mile south of the intersection of US Highway 54 and CR 2800, La Harpe, Allen County, Kansas. The Site encompasses 22.5 acres and the geographic description of the Site is the southeast ¼ of the northeast ¼ of Section 35, Township 24 South, Range 19 East. Based on field measurements using a Trimble® Pro-XRS global positioning system (GPS) backpack unit, the latitude and longitude of the central part of the Site is N 37° 16' 56.54", W 95° 16' 59.72". An area map depicting the Site location regionally is included as Figure 1-1.

## 2.2 BACKGROUND

Burns & McDonnell conducted a Phase I FFSA of the Site and a *Recognized Environmental Condition* was revealed. During the Phase I FFSA Site reconnaissance conducted in March 2005, slag piles and scattered slag were found across the Site and appeared to have impacted vegetation growth in the area of former smelter operations. The Phase I FFSA report, dated May 2005, summarizing the full Site history is on file with KDHE. The property is currently owned by Mr. John Womack, owner of the property since 1992.

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# 3.0 INVESTIGATION ACTIVITIES

The following sections provide a description of the field activities conducted as part of the Phase II FFSA from March 22 to April 8, 2005. Field activities included soil, smelter waste, groundwater, surface water, and sediment sampling, borehole abandonment, and investigation derived waste (IDW) management. Field activities were recorded in the field logbook, a copy of which is provided in Appendix A. Photographs of the Site and activities are provided in Appendix B.

## 3.1 UTILITY CLEARANCE

Prior to commencement of any direct-push sampling, representatives of the utilities were contacted through Kansas One-Call. An on-Site meeting between Burns & McDonnell personnel and utility representatives was arranged and utility representatives were questioned regarding utility locations.

## 3.2 FIELD SAMPLING

On March 22, KDHE and Burns & McDonnell personnel, mobilized to the Site to perform field sampling activities. KDHE personnel analyzed soil and smelter waste samples at the Site using XRF technology. KDHE personnel calibrated the portable XRF at the beginning of each day, during active sample analyses, and at the end of the day. Per EPA Method 6200 guidelines, the XRF was allowed to warm up for 15 to 30 minutes prior to use. The portable XRF provided arsenic, cadmium, lead, and zinc concentrations in the samples following EPA Method 6200. Select soil, smelter waste, groundwater, surface water, and sediment samples were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc using EPA Method 6010B.

Smelter waste samples were screened in-situ using the portable XRF. In-situ screening of surface soil did not take place at this Site due to one or both of the following reasons:

- Surface soil at the Site was wet (high moisture content in soil may obstruct proper XRF analysis).
- The portable XRF was not available to allow for in-situ screening.

Surface soil samples were collected and placed in clean zip lock bags, exposed to heat, and allowed to "dry" to damp conditions before being screened with the portable XRF. Subsurface soil and sediment samples were "prepared" before XRF analysis. The samples were "prepared" in the following manner:

- Approximately 8 ounces (375 grams) of sample was thoroughly mixed and homogenized prior to analysis.
- Approximately 20 to 50 grams of sample was then dried using an oven to a temperature not greater than 150 °C (degrees Celsius) for approximately 2 to 4 hours.
- Samples were then ground, using a mortar and pestle, and sieved using 60-mesh (0.25 millimeter) stainless steel, nylon or equivalent mesh prior to field XRF analysis, as specified in EPA Method 6200.
- A portion of the sample was then placed in a clean zip lock bag and analyzed using the portable XRF.

Field screening results were recorded on a field log sheet, with the sample name, date, time of reading, and metal concentration (See Appendix C). Field screening results are summarized in Table 3-1.

On April 1, 2005, Burns & McDonnell, EPS, and KDHE personnel mobilized to the Site to perform direct-push sampling activities. Recovered soil was field screened by KDHE personnel using the portable XRF. A total of four soil samples (including one duplicate) were collected by direct-push sampling techniques and submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Temporary piezometers were installed in the boreholes following soil sampling activities.

On April 8, 2005, Burns & McDonnell personnel remobilized to the Site and collected groundwater samples from the temporary piezometers. The groundwater samples were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc.

A Trimble® Pro-XRS GPS backpack unit was used to record sample locations in the field. All field work was conducted in accordance with the KDHE approved Burns & McDonnell WP dated March 2004.

### 3.2.1 On-Site Grid – Unbiased Surface Soil

An approximate 100-foot sampling grid was created at the Site and 36 surface soil sample locations (SS-1 through SS-36) were designated. Surface soil samples were analyzed using the portable XRF for arsenic, cadmium, lead, and zinc. In addition, Soil Samples SS-1, SS-11, and SS-15 were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc.

At each grid location three soil samples were collected over a 1- to 2-foot radius. Surface soil samples were placed in clean zip lock bags, exposed to heat, and allowed to "dry" to damp conditions before being screened with the portable XRF. Any large or non-representative debris was removed from the soil sample before analysis. Unbiased surface soil sample locations are illustrated on Figure 3-1.

### 3.2.2 On-Site Grid – Biased Subsurface Soil

After obtaining unbiased grid samples, biased shallow subsurface soil samples were collected at 8 locations (HS-1 and HS-8) in the vicinity of the highest metal concentrations observed during field screening. The biased soil samples were "prepared" for field XRF analysis. Soil Samples HS-1/SS-1, HS-1/SS-2, HS-2/SS-1, HS-3/SS-1, and HS-7/SS-1 were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Biased soil sample locations are illustrated on Figure 3-2.

The biased soil samples were collected by Burns & McDonnell personnel using a decontaminated, stainless steel Oakfield Probe. Shallow subsurface soil samples were collected using the Oakfield probe from depths of 0 to 3 feet below ground surface (bgs) at 1-foot intervals, with the exception of Boring HS-6 where refusal was encountered at 2 feet bgs.

### 3.2.3 Smelter Waste

Smelter waste samples were collected from 6 locations (Slag-1 through Slag-6) at the Site. Smelter waste samples were field screened in-situ using XRF technology and Smelter Waste Sample Slag-1 was submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Smelter waste sample locations are illustrated on Figure 3-2.

### 3.2.4 Surface Water

A total of 5 surface water samples were collected from on-Site and off-Site locations. Surface Water Samples SW-1 through SW-5 were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Surface water sample locations are illustrated on Figure 3-3.

### 3.2.5 Sediment

A total of 5 sediment samples (Sediment Samples SED-1 through SED-5) were collected, "prepared", and analyzed in the field using the portable XRF. In addition, Sediment Samples SED-1, SED-2, and

SED-3 were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Sediment sample locations are illustrated on Figure 3-3.

### 3.2.6 Off-Site Surface Soil

A total of 8 off-Site surface soil sample locations (PS-1 through PS-8) were designated for sampling. At each location three soil samples were collected over a 1- to 2-foot radius. The off-Site surface soil samples were collected and analyzed with the XRF in the same manner as the on-Site surface soil samples. No off-Site surface soil samples were collected for laboratory analysis. Off-Site surface soil sample locations are illustrated on Figure 3-4.

### 3.2.7 Direct-Push

A total of three direct-push borings (Borings GP-1 through GP-3) were completed at the Site. Each location was continuously sampled to bedrock refusal; bedrock was encountered from 7.6-8.5 feet bgs in the borings. One soil sample was collected approximately every 2 feet for field XRF analysis. The sample from each borehole exhibiting the highest concentration of metals based on field screening (Soil Samples GP-1/SS-1, GP-2/SS-1, and GP-3/SS-1) was collected for submittal to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc.

Groundwater samples were collected from Temporary Piezometers GP-1, GP-2 and GP-3, field filtered, and submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Boring logs of the direct-push sample locations are included in Appendix D and direct-push sample locations are illustrated on Figure 3-4.

### 3.2.8 Background

Background surface soil was screened in-situ using the portable XRF. Background subsurface soil and sediment samples (with the exception of Background Sediment Sample SED-3) were "prepared" and analyzed using the portable XRF. Background Sediment Sample SED-3 was collected on November 5, 2004, after the rented XRF was returned to the manufacturer. Background Sediment Sample SED-3 and Background Surface Water Samples BKG-1/SW-1 and BKG-2/SW-2 were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Background sample locations are illustrated on Figure 3-5.

### 3.2.9 Quality Control

Duplicate Sample DUP-1/SS-1 was collected as a split of Soil Sample GP-3/SS-1 and submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. Duplicate Sample Dup-2/GW-1, duplicate of Groundwater Sample GP-2/GW-1, was collected and submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. A rinsate blank sample was collected on April 1, 2005, during the direct-push sampling activities. High performance liquid chromatography (HPLC) grade water was used to rinse the decontaminated equipment and collect the rinsate blank. The rinsate blank was submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc.

## 3.3 BOREHOLE ABANDONMENT

Following completion of sample collection at the direct-push sample locations, the temporary piezometers were removed from the boreholes and the boreholes were abandoned by filling the hole with bentonite. The upper 6 inches of each borehole was returned to its original condition.

## 3.4 IDW MANAGEMENT

The minimal amounts of soil cuttings generated during the Phase II FFSA were spread on-Site and the purge and decontamination water generated was discharged to the ground surface. All other IDW generated, including personal protective equipment, paper towels, etc., was placed in trash bags and left in an appropriate solid waste receptacle.

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# 4.0 SAMPLE RESULTS

Analytical results for arsenic were compared to the KDHE Risk-Based Standards for Kansas (RSK) Residential Soil to Ground Water Protection Pathway. Because KDHE RSK Residential Soil to Ground Water Protection Pathway are not available for cadmium, lead, and zinc, KDHE RSK Residential Soil Pathway were used for comparison of cadmium, lead, and zinc concentrations. The applicable KDHE RSK for soil [in milligrams per kilogram (mg/kg)] and water [in milligrams per liter (mg/l)] for the Site follow:

| Analyte Name | KDHE RSK (soil) | KDHE RSK (water) |
|---|---|---|
| Arsenic | 5.84 mg/kg | 0.01 mg/l |
| Cadmium | 39 mg/kg | 0.005 mg/l |
| Lead | 400 mg/kg | 0.015 mg/l |
| Zinc | 23,000 mg/kg | 5 mg/l |

Section 4.1 discusses metals detected in samples collected from background locations. The remaining sections discuss arsenic and metals concentrations in samples that exceed KDHE RSK levels. Detection limits for arsenic and cadmium in the samples analyzed with the XRF were generally above KDHE RSK for arsenic and cadmium. Sample results obtained with the portable XRF are summarized in Table 3-1. Laboratory analytical results of soil samples are summarized in Table 4-1 and laboratory analytical results of water samples are summarized in Table 4-2. Field log sheets summarizing results obtained with the portable XRF are included in Appendix C and laboratory analytical reports are included in Appendix E.

## 4.1 BACKGROUND SAMPLES

### 4.1.1 XRF Results

Field XRF results indicate arsenic was not detected in background surface, subsurface, and sediment samples. Cadmium was detected at Background Surface Soil Sample Locations SS1 and SS2 at concentrations of 203 mg/kg and 54 mg/kg, respectively. Cadmium was detected in Background Subsurface Soil Samples BGS-1/SS-1 (118 mg/kg), BGS-1/SS-2 (122 mg/kg), and BGS-2/SS-1 (93 mg/kg). Cadmium was not detected in the background sediment samples. Lead was detected at Background Surface Soil Sample Location SS1 at concentration of 32 mg/kg. Lead was detected in the background subsurface soil samples at concentrations ranging from 30 mg/kg in Sample BGS-1/SS-2 to

52 mg/kg in Sample BGS-2/SS-2 to. Lead was detected in Background Sediment Samples BSED-1 and BSED-2 at concentrations of 72 mg/kg and 49 mg/kg, respectively. Zinc was detected in Background Surface Soil Sample Locations SS1 and SS2 at concentrations of 70 mg/kg and 88 mg/kg, respectively. Zinc was detected in the background subsurface soil samples at concentrations ranging from 50 mg/kg in Sample BGS-2/SS-2 to 108 mg/kg in Sample BGS-2/SS-1. Zinc was detected in Background Sediment Samples BSED-1 and BSED-2 at concentrations of 73 mg/kg and 125 mg/kg, respectively.

### 4.1.2 Laboratory Results

Laboratory analytical results of Background Surface Water Samples BKG-1/SW-1 and BKG-2/SW-2 indicate arsenic and cadmium were not detected above laboratory reporting limits. Lead was detected in Samples BKG-1/SW-1 and BKG-2/SW-2 at concentrations of 0.010 mg/l and 0.0070 mg/l, respectively. Zinc was detected in Sample BKG-2/SW-2 at a concentration of 0.042 mg/l. Zinc was not detected above laboratory reporting limits in Background Surface Water Sample BKG-1/SW-1.

## 4.2 ON-SITE GRID – UNBIASED SURFACE SOIL SAMPLES

### 4.2.1 XRF Results

Field screening results obtained using the portable XRF indicated arsenic was detected at concentrations exceeding KDHE RSK for arsenic at 18 unbiased surface soil sample locations with concentrations ranging from 107 mg/kg at Sample Location SS-34 to 615 mg/kg at Sample Location SS-13. Cadmium concentrations exceeded KDHE RSK for cadmium at 32 unbiased surface soil sample locations with concentrations ranging from 54.6 mg/kg at Sample Location SS-23 to 468 mg/kg at Sample Location SS-6. Lead concentrations exceeded KDHE RSK for lead at all 36 unbiased surface soil sample locations with concentrations ranging from 405 mg/kg at Sample Location SS-9 to 13,100 mg/kg at Sample Location SS-27. Zinc was detected at concentrations exceeding KDHE RSK for zinc at 12 of the unbiased surface soil sample locations with concentrations ranging from 23,500 mg/kg at Sample Location SS-2 to 93,400 mg/kg at Sample Location SS-11.

### 4.2.2 Laboratory Results

Laboratory analytical results of Soil Samples SS-1, SS-11, and SS-15 indicate arsenic was detected at concentrations of 340, 97, and 76 mg/kg, respectively, exceeding KDHE RSK for arsenic. Cadmium concentrations exceeded KDHE RSK for cadmium in Soil Samples SS-1 (94 mg/kg), SS-11 (110 mg/kg), and SS-15 (180 mg/kg). Lead was detected in Soil Samples SS-1, SS-11, and SS-15 at concentrations of 4,700; 8,800; and 2,200 mg/kg, respectively, exceeding KDHE RSK for lead. Zinc concentrations

exceeded KDHE RSK for zinc in Soil Samples SS-1 and SS-11 at concentrations of 30,000 and 48,000 mg/kg, respectively.

## 4.3 ON-SITE GRID – BIASED SUBSURFACE SOIL SAMPLES

### 4.3.1 XRF Results

Results of the biased shallow subsurface soil samples indicate the arsenic concentrations exceeded KDHE RSK for arsenic in 6 soil samples with concentrations ranging from 92.4 mg/kg in Soil Sample HS-1/SS-1 to 654 mg/kg in Soil Sample HS-3/SS-1. Cadmium concentrations exceeded KDHE RSK for cadmium in 10 biased soil samples with concentrations ranging from 63.8 mg/kg in Soil Sample HS-1/SS-3 to 224 mg/kg in Soil Sample HS-7/SS-2. Lead concentrations exceeded KDHE RSK for lead in 15 biased soil samples with concentrations ranging from 509 mg/kg in Soil Sample HS-5/SS-2 to 22,600 mg/kg in Soil Sample HS-7/SS-1. Zinc concentrations exceeded KDHE RSK for zinc in 5 biased soil sample locations with concentrations ranging from 55,300 mg/kg in Soil Sample HS-3/SS-1 to 98,100 mg/kg in Soil Sample HS-5/SS-1.

### 4.3.2 Laboratory Results

Laboratory analytical results of the "prepared" biased subsurface soil samples indicate arsenic was detected at concentrations exceeding KDHE RSK for arsenic in every sample with concentrations ranging from 12 mg/kg in Sample HS-1/SS-2 to 110 mg/kg in Sample HS-3/SS-1. Cadmium concentrations exceed KDHE RSK in Soil Samples HS-1/SS-1 (43 mg/kg), HS-3/SS-1 (55 mg/kg), and HS-7/SS-1 (55mg/kg). Lead concentrations were found to exceed KDHE RSK in 4 samples ranging from 1,200 mg/kg in Sample HS-2/SS-1 to 12,000 mg/kg in Sample HS-7/SS-1. Zinc concentrations in all of the biased subsurface samples were below KDHE RSKs.

## 4.4 SMELTER WASTE SAMPLES

### 4.4.1 XRF Results

Field screening results of the smelter waste samples obtained using the portable XRF indicate arsenic was detected at concentrations exceeding KDHE RSK for arsenic in 4 smelter waste samples at concentrations ranging from 291 mg/kg in Sample Slag-6 to 1,150 mg/kg in Sample Slag-1. Cadmium was detected in Samples Slag-2 at a concentration of 345 mg/kg and Slag-5 at a concentration of 172 mg/kg, exceeding the KDHE RSK for cadmium. Lead concentrations exceeded KDHE RSK for lead in every smelter waste sample with concentrations ranging from 589 mg/kg in Sample Slag-6 to 12,000

mg/kg in Sample Slag-1. Zinc was detected at concentrations exceeding KDHE RSK for zinc in Samples Slag-1 (30,800 mg/kg), Slag-2 (57,400 mg/kg), and Slag-3 (28,100 mg/kg).

### 4.4.2 Laboratory Results

Laboratory analytical results of Sample Slag-1 indicate arsenic (460 mg/kg), cadmium (130 mg/kg), lead (29,000 mg/kg), and zinc (44,000 mg/kg) were detected at concentrations exceeding their respective KDHE RSK.

## 4.5 SURFACE WATER SAMPLES

Laboratory analytical results of Surface Water Samples SW-2 and SW-3 indicate cadmium was detected at concentrations of 0.041 mg/l and 0.055 mg/l, respectively, exceeding KDHE RSK for cadmium. There were no other exceedences of KDHE RSK in any of the other surface water samples.

## 4.6 SEDIMENT SAMPLES

### 4.6.1 XRF Results

Field screening results of sediment samples indicate arsenic was detected in each sediment sample with concentrations ranging from 9 mg/kg in Sample SED-4 to 62 mg/kg in Sample SED-3. Cadmium was detected in Sediment Samples SED-1 and SED-2 at concentrations of 73 mg/kg and 102 mg/kg, respectively, exceeding KDHE RSK for cadmium. Lead was detected in Sediment Samples SED-2 and SED-3 at concentrations of 515 mg/kg and 2,731 mg/kg, respectively, exceeded KDHE RSK for lead. Zinc was detected in the sediment samples at concentrations below KDHE RSK.

### 4.6.2 Laboratory Results

Laboratory analytical results of Sediment Samples SED-1 through SED-3 indicate arsenic concentrations above KDHE RSK at all three sample locations, with concentrations of 5.9 mg/kg, 13 mg/kg, and 10 mg/kg, respectively. Cadmium concentrations exceeded KDHE RSK for cadmium in Sediment Samples SED-1 (41 mg/kg) and SED-2 (60 mg/kg). Sediment Sample SED-3 exceeded the KDHE RSK for lead with a concentration of 400 mg/kg. Zinc was not detected in the sediment samples at concentrations exceeding the KDHE RSK for zinc.

## 4.7 OFF-SITE SURFACE SOIL SAMPLES

### 4.7.1 XRF Results

Field screening results obtained using the portable XRF indicate arsenic was detected at Sample Location PS-1 at a concentration of 157 mg/kg, exceeding the KDHE RSK for arsenic. Lead was detected at Sample Location PS-1 at a concentration of 2,270 mg/kg, exceeded KDHE RSK for lead. There were no other exceedences of KDHE RSK in any of the other off-Site surface soil sample locations.

### 4.7.2 Laboratory Results

No off-Site surface soil samples were collected for laboratory analysis. Approximately 15 percent of the soil samples collected at the Site were collected as splits and submitted for laboratory analysis; however, Burns & McDonnell personnel did not collect a split of an off-Site surface soil for laboratory analysis.

## 4.8 DIRECT-PUSH SAMPLES

### 4.8.1 XRF Results

Field screening results of subsurface soil samples collected using direct-push sampling techniques indicate arsenic was detected at concentrations exceeding KDHE RSK for arsenic in 13 soil samples at concentrations ranging from 7 mg/kg in Samples GP-1/SS-3 to 279 mg/kg in Sample GP-1/SS-1. Cadmium was detected at concentrations exceeding KDHE RSK for cadmium in 4 soil samples with concentrations ranging from 97 mg/kg in Sample GP-2/SS-2 to 841 mg/kg in Sample GP-2/SS-1. Lead was detected at concentrations exceeding KDHE RSK in 4 direct-push soil samples with concentrations ranging from 928 mg/kg in Sample GP-3/SS-1 to 12,065 mg/kg in Sample GP-1/SS-1. Zinc was detected in Soil Sample GP-2/SS-1 at a concentration of 47,474 mg/kg, exceeding KDHE RSK for zinc. Zinc was also detected over the range of the instrument in Sample GP-1/SS-1; Sample GP-1/SS-1 is composed of greater than 10% zinc.

### 4.8.2 Laboratory Results

**Soil**

Laboratory analytical results of the soil samples collected using direct-push techniques indicate arsenic was detected at 85 mg/kg in Sample GP-1/SS-1, exceeding KDHE RSK for arsenic. Soil Samples GP-1/SS-1 and GP-2/SS-2 exhibited cadmium concentrations of 57 mg/kg and 71 mg/kg, respectively, exceeding KDHE RSK for cadmium. The lead concentration of 9,400 mg/kg in Soil Sample GP-1/SS-1

exceeded KDHE RSK for lead. Zinc was detected in Soil Sample GP-1/SS-1 at a concentration of 61,000 mg/kg exceeding KDHE RSK for zinc.

### Groundwater

Laboratory analytical results of the groundwater samples collected from the temporary piezometers indicate cadmium was detected in Groundwater Samples GP-1/GW-1 (0.20 mg/l), GP-2/GW-1 (0.048 mg/l), and DUP-2/GW-1 (0.049 mg/l) at concentrations exceeding KDHE RSK for cadmium. Lead was detected in Groundwater Sample GP-1/GW-1 at a concentration of 0.037 mg/l, exceeding KDHE RSK for lead. Zinc was detected in Groundwater Sample GP-1/GW-1 at a concentration of 35 mg/l, exceeding KDHE RSK for zinc.

## 4.9 QUALITY CONTROL SAMPLES

Laboratory analytical results of Duplicate Samples DUP-1/SS-1 and DUP-2/GW-1 indicated acceptable correlation with the original samples (Soil Sample GP-3/SS-1 and Groundwater Sample GP-2/GW-1, respectively). Arsenic, cadmium, lead, and zinc were not detected in the rinsate blank sample.

* * * * *

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

## 5.1 CONCLUSIONS

During the Phase I FFSA Site reconnaissance conducted in March 2005, slag piles and scattered slag were found across the Site and appeared to have impacted vegetation growth in the area of former smelter operations. From March 22 to April 8, 2005, Burns & McDonnell personnel conducted a Phase II FFSA at the Site.

A portable XRF was used to analyze surface soil, subsurface soil, smelter waste, and sediment samples for arsenic, cadmium, lead, and zinc. Selected samples were submitted to ESC for laboratory analysis of arsenic, cadmium, lead, and zinc. The following samples were collected as part of the Phase II FFSA:

**XRF Analysis**

- 109 on-Site grid, unbiased surface soil samples
- 24 on-Site grid, biased soil samples ("prepared")
- 24 off-Site, surface soil samples
- 6 smelter waste samples (in-situ)
- 10 sediment samples ("prepared")
- 17 soil samples collected by direct-push sampling techniques ("prepared")

**Laboratory Analysis**

- 3 on-Site grid, unbiased surface soil samples
- 5 on-Site grid, biased soil samples
- 1 smelter waste sample
- 3 sediment samples
- 4 soil samples collected by direct-push sampling techniques
- 4 groundwater samples collected from temporary piezometers
- 5 surface water samples
- 1 rinsate blank sample

Soil samples collected at the Site indicate surface and shallow subsurface soil at the Site is impacted with metals (arsenic, cadmium, lead, and zinc). Results of slag analysis suggests elevated metals in the soil are likely related to historical smelter operations. Field screening results obtained using the portable XRF indicate surface soil at the Site exceeds KDHE RSK for arsenic, cadmium, lead and zinc. Arsenic was detected at concentrations exceeding KDHE RSK for arsenic at 18 unbiased surface soil sample locations with concentrations ranging from 107 mg/kg at Sample Location SS-34 to 615 mg/kg at Sample Location SS-13. Cadmium concentrations exceeded KDHE RSK for cadmium at 32 unbiased surface soil sample locations with concentrations ranging from 54.6 mg/kg at Sample Location SS-23 to 468 mg/kg at Sample Location SS-6. Lead concentrations exceeded KDHE RSK for lead at all 36 unbiased surface soil sample locations with concentrations ranging from 405 mg/kg at Sample Location SS-9 to 13,100 mg/kg at Sample Location SS-27. Zinc was detected at concentrations exceeding KDHE RSK for zinc at 12 of the unbiased surface soil sample locations with concentrations ranging from 23,500 mg/kg at Sample Location SS-2 to 93,400 mg/kg at Sample Location SS-11. Soil samples collected at the Site generally exhibited arsenic, cadmium, lead, and zinc concentrations well above metals concentrations observed in background soil samples. One surface soil sample collected from a nearby off-Site location exhibited lead and arsenic concentrations in exceedence of KDHE RSK. Groundwater was encountered in all 3 direct-push borings conducted at the Site and laboratory analytical results indicate cadmium, lead, and zinc is present in on-Site groundwater at concentrations exceeding KDHE RSKs.

## 5.2 RECOMMENDATIONS

Based on the elevated metals concentrations in the surface and shallow subsurface soil at the Site, Burns & McDonnell recommends additional soil sampling to delineate the horizontal and vertical extent of metals impact in the soil at the Site. Laboratory analytical results of the groundwater sample collected at the Site indicate cadmium, lead, and zinc were detected at concentrations exceeding KDHE RSKs. Burns & McDonnell recommends additional groundwater sampling to delineate the horizontal extent of metals-impacted groundwater at the Site.

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# Tables

**Table 3-1**
**Sample Results with XRF**
**Phase II Investigation**
**Former East La Harpe Smelter**
**La Harpe, Kansas**

| Sample ID | Date | Sample Depth (ft.bgs) | Analyte with KDHE RSK | | | |
|---|---|---|---|---|---|---|
| | | | Arsenic 5.84 | Cadmium 39 | Lead 400 | Zinc 23,000 |
| SS-1 A | 3/22/2005 | 0-0.5 | **255** | **94.2** | **3,610** | **42,000** |
| SS-1 B | 3/22/2005 | 0-0.5 | **372** | **75.0** | **3,770** | **36,300** |
| SS-1 C | 3/22/2005 | 0-0.5 | 110 U | **76.2** | **2,150** | 17,400 |
| SS-2 A | 3/22/2005 | 0-0.5 | **241** | **194** | **7,310** | **30,600** |
| SS-2 B | 3/22/2005 | 0-0.5 | **303** | **210** | **6,520** | **27,500** |
| SS-2 C | 3/22/2005 | 0-0.5 | **256** | **178** | **6,440** | **23,500** |
| SS-3 A | 3/22/2005 | 0-0.5 | **471** | 67 U | **7,200** | **42,000** |
| SS-3 B | 3/22/2005 | 0-0.5 | **526** | **113** | **7,860** | **49,000** |
| SS-3 C | 3/22/2005 | 0-0.5 | **392** | **85.4** | **9,060** | **44,000** |
| SS-4 A | 3/22/2005 | 0-0.5 | 68 U | 56 U | **1,070** | 4,800 |
| SS-4 B | 3/22/2005 | 0-0.5 | 95 U | 65 U | **1,770** | 6,960 |
| SS-4 C | 3/22/2005 | 0-0.5 | 64 U | 49 U | **930** | 3,540 |
| SS-5 A | 3/22/2005 | 0-0.5 | 72 U | **438** | **1,140** | 11,200 |
| SS-5 B | 3/22/2005 | 0-0.5 | 76 U | **422** | **1,300** | 11,500 |
| SS-5 C | 3/22/2005 | 0-0.5 | **149** | **460** | **1,820** | 22,300 |
| SS-6 A | 3/22/2005 | 0-0.5 | 63 U | **306** | **1,110** | 7,930 |
| SS-6 B | 3/22/2005 | 0-0.5 | 110 U | **468** | **2,250** | 18,800 |
| SS-6 C | 3/22/2005 | 0-0.5 | 110 U | **178** | **2,690** | 15,900 |
| SS-7 A | 3/22/2005 | 0-0.5 | 130 U | **239** | **2,630** | 18,300 |
| SS-7 B | 3/22/2005 | 0-0.5 | 100 U | **170** | **1,850** | 18,400 |
| SS-7 C | 3/22/2005 | 0-0.5 | 110 U | **173** | **2,300** | 16,300 |
| SS-8 A | 3/22/2005 | 0-0.5 | 99 U | **142** | **2,080** | 10,800 |
| SS-8 B | 3/22/2005 | 0-0.5 | 78 U | **136** | **1,370** | 7,160 |
| SS-8 C | 3/22/2005 | 0-0.5 | 71 U | **132** | **1,270** | 5,870 |
| SS-9 A | 3/22/2005 | 0-0.5 | 48 U | 48 U | **436** | 1,700 |
| SS-9 B | 3/22/2005 | 0-0.5 | 44 U | **65.2** | 389 | 1,230 |
| SS-9 C | 3/22/2005 | 0-0.5 | 41 U | 44 U | **405** | 1,190 |
| SS-10 A | 3/23/2005 | 0-0.5 | **394** | 49 U | **5,830** | 15,300 |
| SS-10 B | 3/23/2005 | 0-0.5 | **462** | 58 U | **6,600** | 18,700 |
| SS-10 C | 3/23/2005 | 0-0.5 | **314** | 56 U | **5,740** | 15,700 |
| SS-11 A | 3/23/2005 | 0-0.5 | **313** | **94.4** | **8,270** | **93,400** |
| SS-11 B | 3/23/2005 | 0-0.5 | **272** | **94.9** | **7,810** | **89,000** |
| SS-11 C | 3/23/2005 | 0-0.5 | **271** | **158** | **7,860** | **87,400** |
| SS-12 A | 3/23/2005 | 0-0.5 | 210 U | **177** | **6,050** | **36,900** |
| SS-12 B | 3/23/2005 | 0-0.5 | 190 U | **209** | **5,700** | **37,100** |
| SS-12 C | 3/23/2005 | 0-0.5 | 180 U | **185** | **4,970** | **32,300** |
| SS-13A | 3/23/2005 | 0-0.5 | **615** | **137** | **5,850** | **57,100** |
| SS-13 B | 3/23/2005 | 0-0.5 | **533** | **184** | **5,910** | **55,700** |
| SS-13 C | 3/23/2005 | 0-0.5 | **581** | **226** | **5,420** | **55,100** |
| SS-14 A | 3/23/2005 | 0-0.5 | 120 U | **216** | **2,210** | 16,400 |
| SS-14 B | 3/23/2005 | 0-0.5 | 120 U | **187** | **2,360** | 16,500 |
| SS-14 C | 3/23/2005 | 0-0.5 | 130 U | **172** | **2,560** | 17,700 |
| SS-15 A | 3/23/2005 | 0-0.5 | 130 U | **277** | **2,940** | **34,000** |
| SS-15 B | 3/23/2005 | 0-0.5 | **183** | **305** | **3,910** | **41,500** |
| SS-15 C | 3/23/2005 | 0-0.5 | 130 U | **273** | **2,840** | **33,600** |
| SS-16 A | 3/23/2005 | 0-0.5 | **248** | **193** | **4,230** | **36,600** |
| SS-16 B | 3/23/2005 | 0-0.5 | **266** | **206** | **4,340** | **36,100** |
| SS-16 C | 3/23/2005 | 0-0.5 | **314** | **201** | **4,490** | **36,600** |
| SS-17 A | 3/23/2005 | 0-0.5 | 120 U | **126** | **2,330** | **27,100** |
| SS-17 B | 3/23/2005 | 0-0.5 | **126** | **130** | **2,280** | **24,100** |
| SS-17 C 1 | 3/23/2005 | 0-0.5 | 120 U | **163** | **2,330** | **28,900** |
| SS-17 C 2 | 3/23/2005 | 0-0.5 | -- | **170** | -- | -- |
| SS-18 A | 3/23/2005 | 0-0.5 | 52 U | **67** | **482** | 2,410 |
| SS-18 B | 3/23/2005 | 0-0.5 | 58 U | 58 U | **562** | 2,350 |
| SS-18 C | 3/23/2005 | 0-0.5 | 56 U | 64 U | **570** | 2,200 |
| SS-19 A | 3/23/2005 | 0-0.5 | 63 U | **58.4** | **1,020** | 4,280 |
| SS-19 B | 3/23/2005 | 0-0.5 | 70 U | 52 U | **1,150** | 4,120 |
| SS-19 C | 3/23/2005 | 0-0.5 | 66 U | **59.7** | **1,150** | 4,350 |
| SS-20 A | 3/23/2005 | 0-0.5 | **395** | **78.7** | **12,500** | 20,300 |
| SS-20 B | 3/23/2005 | 0-0.5 | **516** | **110** | **12,100** | 19,600 |
| SS-20 C | 3/23/2005 | 0-0.5 | **449** | **96** | **12,200** | 21,100 |
| SS-21 A | 3/23/2005 | 0-0.5 | 59 U | 44 U | **569** | 1,820 |
| SS-21 B | 3/23/2005 | 0-0.5 | 63 U | 40 U | **610** | 2,310 |
| SS-21 C | 3/23/2005 | 0-0.5 | 55 U | 49 U | **485** | 1,530 |
| SS-22 A | 3/23/2005 | 0-0.5 | 150 U | **66.9** | **4,260** | 17,300 |
| SS-22 B | 3/23/2005 | 0-0.5 | 140 U | **106** | **4,080** | 15,000 |
| SS-22 C | 3/23/2005 | 0-0.5 | 140 U | 53 U | **3,770** | 14,300 |
| SS-23 A | 3/23/2005 | 0-0.5 | 87 U | **54.6** | **1,850** | 12,600 |
| SS-23 B | 3/23/2005 | 0-0.5 | 96 U | **86.6** | **2,130** | 13,200 |
| SS-23 C | 3/23/2005 | 0-0.5 | 88 U | **79.5** | **1,680** | 12,400 |
| SS-24 A | 3/23/2005 | 0-0.5 | **511** | **170** | **4,560** | **28,500** |
| SS-24 B | 3/23/2005 | 0-0.5 | **328** | **209** | **4,820** | **30,100** |
| SS-24 C | 3/23/2005 | 0-0.5 | **393** | **124** | **4,680** | **29,300** |

Unbiased Surface Soil Samples

**Table 3-1**
**Sample Results with XRF**
**Phase II Investigation**
**Former East La Harpe Smelter**
**La Harpe, Kansas**

| Sample ID | Date | Sample Depth (ft.bgs) | Analyte with KDHE RSK | | | | |
|---|---|---|---|---|---|---|---|
| | | | Arsenic 5.84 | Cadmium 39 | Lead 400 | Zinc 23,000 | |
| SS-25 A | 3/23/2005 | 0-0.5 | **137** | **276** | **3,340** | 12,600 | Unbiased Surface Soil Samples (Continued) |
| SS-25 B | 3/23/2005 | 0-0.5 | **203** | **218** | **4,060** | 15,200 | |
| SS-25 C | 3/23/2005 | 0-0.5 | **152** | **237** | **4,400** | 15,900 | |
| SS-26 A | 3/23/2005 | 0-0.5 | 110 U | **68** | **2,600** | 8,010 | |
| SS-26 B | 3/23/2005 | 0-0.5 | 110 U | **77** | **2,700** | 7,760 | |
| SS-26 C | 3/23/2005 | 0-0.5 | **129** | **79.3** | **2,910** | 8,920 | |
| SS-27 A | 3/23/2005 | 0-0.5 | **280** | **155** | **9,620** | **40,900** | |
| SS-27 B | 3/23/2005 | 0-0.5 | 310 U | **100** | **13,100** | **54,200** | |
| SS-27 C | 3/23/2005 | 0-0.5 | 270 U | **156** | **10,600** | **42,600** | |
| SS-28 A | 3/23/2005 | 0-0.5 | 82 U | 49 U | **1,400** | 4,080 | |
| SS-28 B | 3/23/2005 | 0-0.5 | 82 U | 56 U | **1,390** | 3,940 | |
| SS-28 C | 3/23/2005 | 0-0.5 | -- | **105** | **1,380** | 4,140 | |
| SS-29 A | 3/23/2005 | 0-0.5 | 190 U | 55 U | **5,220** | **26,900** | |
| SS-29 B | 3/23/2005 | 0-0.5 | 210 U | 66 U | **6,730** | **32,500** | |
| SS-29 C | 3/23/2005 | 0-0.5 | **244** | 64 U | **6,590** | **36,300** | |
| SS-30 A | 3/23/2005 | 0-0.5 | 130 U | **102** | **2,830** | 18,000 | |
| SS-30 B | 3/23/2005 | 0-0.5 | 140 U | **81** | **3,170** | 20,700 | |
| SS-30 C | 3/23/2005 | 0-0.5 | 120 U | **81.2** | **2,540** | 17,200 | |
| SS-31 A | 3/23/2005 | 0-0.5 | 34 U | 49 U | 344 | 3,620 | |
| SS-31 B | 3/23/2005 | 0-0.5 | 35 U | **77.2** | 342 | 3,710 | |
| SS-31 C | 3/23/2005 | 0-0.5 | -- | **57.7** | **439** | 3,800 | |
| SS-32 A | 3/23/2005 | 0-0.5 | 90 U | **69.5** | **1,680** | 12,600 | |
| SS-32 B | 3/23/2005 | 0-0.5 | 100 U | 57 U | **1,980** | 13,900 | |
| SS-32 C | 3/23/2005 | 0-0.5 | 64 U | **83.1** | **1,120** | 7,220 | |
| SS-33 A | 3/23/2005 | 0-0.5 | **159** | **223** | **2,150** | 14,400 | |
| SS-33 B | 3/23/2005 | 0-0.5 | **145** | **203** | **2,160** | 18,400 | |
| SS-33 C | 3/23/2005 | 0-0.5 | **108** | **137** | **1,880** | 13,500 | |
| SS-34 A | 3/23/2005 | 0-0.5 | **107** | **129** | **1,820** | 12,700 | |
| SS-34 B | 3/23/2005 | 0-0.5 | 89 U | **167** | **1,960** | 11,300 | |
| SS-34 C | 3/23/2005 | 0-0.5 | 70 U | **106** | **1,290** | 9,180 | |
| SS-35 A | 3/23/2005 | 0-0.5 | 39 U | **196** | **466** | 6,920 | |
| SS-35 B | 3/23/2005 | 0-0.5 | 39 U | **111** | **423** | 4,900 | |
| SS-35 C | 3/23/2005 | 0-0.5 | -- | **218** | 296 | 5,430 | |
| SS-36 A | 3/23/2005 | 0-0.5 | 75 U | **92.2** | **1,210** | 15,800 | |
| SS-36 B | 3/23/2005 | 0-0.5 | 68 U | **83.8** | **1,060** | 13,000 | |
| SS-36 C | 3/23/2005 | 0-0.5 | 56 U | **108** | **812** | 14,500 | |
| HS-1 SS-1 | 3/30/2005 | 0-1 | **92.4** | **91.2** | **1,070** | 8,990 | Biased Subsurface Soil Samples (Prepared) |
| HS-1 SS-2 | 3/30/2005 | 1-2 | 40 U | 49 U | 169 | 1,210 | |
| HS-1 SS-3 | 3/30/2005 | 2-3 | 42 U | **63.8** | 184 | 1,350 | |
| HS-2 SS-1 A | 3/30/2005 | 0-1 | **189** | 72 U | **4,210** | 20,100 | |
| HS-2 SS-1 B | 3/30/2005 | 1-2 | 180 U | -- | **3,970** | 19,300 | |
| HS-2 SS-2 | 3/30/2005 | 2-3 | 49 U | 51 U | 300 | 903 | |
| HS-2 SS-3 | 3/30/2005 | 3-4 | 35 U | 55 U | 109 | 310 | |
| HS-3 SS-1 | 3/30/2005 | 0-1 | **654** | 75 U | **10,700** | **55,300** | |
| HS-3 SS-2 | 3/30/2005 | 1-2 | **596** | **130** | **11,700** | **71,900** | |
| HS-3 SS-3 | 3/30/2005 | 2-3 | **608** | **112** | **10,300** | **62,000** | |
| HS-4 SS-1 | 3/30/2005 | 0-1 | 60 U | 64 U | **1,040** | 4,090 | |
| HS-4 SS-2 | 3/30/2005 | 1-2 | 28 U | 50 U | 79.4 | 804 | |
| HS-4 SS-3 | 3/30/2005 | 2-3 | 34 U | 53 U | 132 | 501 | |
| HS-5 SS-1 | 3/30/2005 | 0-1 | 270 U | **147** | **6,510** | **98,100** | |
| HS-5 SS-2 | 3/30/2005 | 1-2 | 58 U | 54 U | **509** | 3,290 | |
| HS-5 SS-3 | 3/30/2005 | 2-3 | 48 U | 55 U | 331 | 3,720 | |
| HS-6 SS-1 | 3/30/2005 | 0-1 | 89 U | **64.7** | **1,290** | 1,990 | |
| HS-6 SS-2 | 3/30/2005 | 1-2 | 95 U | **173** | **1,370** | 10,600 | |
| HS-7 SS-1 | 3/30/2005 | 0-1 | 540 U | **153** | **22,600** | **87,000** | |
| HS-7 SS-2 | 3/30/2005 | 1-2 | 150 U | **224** | **2,900** | 22,200 | |
| HS-7 SS-3 | 3/30/2005 | 2-3 | 61 U | 55 U | **541** | 1,980 | |
| HS-8 SS-1 | 3/30/2005 | 0-1 | **110** | **162** | **1,650** | 10,500 | |
| HS-8 SS-2 | 3/30/2005 | 1-2 | 34 U | 47 U | 105 | 724 | |
| HS-8 SS-3 | 3/30/2005 | 2-3 | 37 U | 49 U | 178 | 688 | |

**Table 3-1**
**Sample Results with XRF**
**Phase II Investigation**
**Former East La Harpe Smelter**
**La Harpe, Kansas**

| Sample ID | Date | Sample Depth (ft.bgs) | Analyte with KDHE RSK | | | | |
|---|---|---|---|---|---|---|---|
| | | | Arsenic 5.84 | Cadmium 39 | Lead 400 | Zinc 23,000 | |
| PS-1 A | 3/23/2005 | 0-0.5 | 120 U | 62 U | **2,010** | 7,060 | Off-Site Surface Soil Samples |
| PS-1 B | 3/23/2005 | 0-0.5 | **157** | 59 U | **2,270** | 7,880 | |
| PS-1 C | 3/23/2005 | 0-0.5 | 110 U | 60 U | **2,060** | 7,420 | |
| PS-2 A | 3/23/2005 | 0-0.5 | 42 U | 50 U | 252 | 737 | |
| PS-2 B | 3/23/2005 | 0-0.5 | 40 U | 36 U | 212 | 678 | |
| PS-2 C | 3/23/2005 | 0-0.5 | 38 U | 50 U | 225 | 662 | |
| PS-3 A | 3/23/2005 | 0-0.5 | 39 U | 47 U | 58.6 | 416 | |
| PS-3 B | 3/23/2005 | 0-0.5 | -- | 45 U | 82.0 | 534 | |
| PS-3 C | 3/23/2005 | 0-0.5 | 37 U | 49 U | 83.3 | 336 | |
| PS-4 A | 3/23/2005 | 0-0.5 | 34 U | 42 U | 92.0 | 618 | |
| PS-4 B | 3/23/2005 | 0-0.5 | -- | 41 U | 110 | 352 | |
| PS-4 C | 3/23/2005 | 0-0.5 | 32 U | 46 U | 85.5 | 379 | |
| PS-5 A | 3/23/2005 | 0-0.5 | 20 U | 44 U | 40 | 185 | |
| PS-5 B | 3/23/2005 | 0-0.5 | 18 U | 41 U | 30.5 | 176 | |
| PS-5 C | 3/23/2005 | 0-0.5 | 22 U | 44 U | 50.3 | 195 | |
| PS-6 A | 3/23/2005 | 0-0.5 | -- | 45 U | 191 | 757 | |
| PS-6 B | 3/23/2005 | 0-0.5 | 32 U | 48 U | 179 | 736 | |
| PS-6 C | 3/23/2005 | 0-0.5 | 32 U | 43 U | 215 | 842 | |
| PS-7 A | 3/23/2005 | 0-0.5 | -- | 34 U | 141 | 450 | |
| PS-7 B | 3/23/2005 | 0-0.5 | 29 U | 44 U | 112 | 440 | |
| PS-7 C | 3/23/2005 | 0-0.5 | 29 U | 38 U | 140 | 332 | |
| PS-8 A | 3/23/2005 | 0-0.5 | -- | 37 U | 184 | 501 | |
| PS-8 B | 3/23/2005 | 0-0.5 | -- | 43 U | 211 | 598 | |
| PS-8 C | 3/23/2005 | 0-0.5 | -- | 36 U | 187 | 525 | |
| SLAG-1 | 3/23/2005 | NA | **1,150** | 96 U | **12,000** | **30,800** | Slag Samples |
| SLAG-2 | 3/23/2005 | NA | 370 U | **345** | **5,090** | **57,400** | |
| SLAG-3 | 3/23/2005 | NA | **862** | 93 U | **4,390** | **28,100** | |
| SLAG-4 | 3/23/2005 | NA | 84 U | 61 U | **833** | 4,800 | |
| SLAG-5 | 3/23/2005 | NA | **319** | **172** | **2,050** | 22,000 | |
| SLAG-6 | 3/23/2005 | NA | **291** | 65 U | **589** | 16,100 | |
| SED-1A | 3/31/2005 | NA | **13** | **73** | 186 | 2,087 | Sediment Samples (Prepared) |
| SED-1B | 3/31/2005 | NA | **16** | 59 U | 190 | 2,109 | |
| SED-2A | 3/31/2005 | NA | **24** | **102** | **498** | 4,434 | |
| SED-2B | 3/31/2005 | NA | **19** | **89** | **515** | 4,481 | |
| SED-3 A | 3/31/2005 | NA | **52** | 63 U | **2,731** | 9,805 | |
| SED-3 B | 3/31/2005 | NA | **62** | 62 U | **2,622** | 9,032 | |
| SED-4 A | 3/31/2005 | NA | **10** | 56 U | 84 | 469 | |
| SED-4 B | 3/31/2005 | NA | **9** | 56 U | 85 | 459 | |
| SED-5 A | 3/31/2005 | NA | **12** | 57 U | 91 | 285 | |
| SED-5 B | 3/31/2005 | NA | **11** | 57 U | 83 | 280 | |
| GP-1/SS-1 | 4/1/2005 | 0.1 | **279** | 118 U | **12,065** | **>10% *** | Direct-Push Samples |
| GP-1/SS-2 | 4/1/2005 | 1 | **42** | 67 U | 324 | 2,660 | |
| GP-1/SS-3 | 4/1/2005 | 2 | 7 | 68 U | 21 | 1,258 | |
| GP-1/SS-4 | 4/1/2005 | 4 | **9** | 67 U | 13 | 1,810 | |
| GP-1/SS-5 | 4/1/2005 | 5 | 8 U | 69 U | 29 | 3,836 | |
| GP-1/SS-6 | 4/1/2005 | 7 | 7 U | 75 U | 11 U | 3,327 | |
| GP-2/SS-1 | 4/1/2005 | 0.5 | **163** | **841** | **3,095** | **47,474** | |
| GP-2/SS-2 | 4/1/2005 | 1.5 | **19** | **97** | 64 | 3,242 | |
| GP-2/SS-3 | 4/1/2005 | 4 | 8 U | 77 U | 23 | 228 | |
| GP-2/SS-4 | 4/1/2005 | 5 | **12** | 67 U | 19 | 66 | |
| GP-2/SS-5 | 4/1/2005 | 8 | **10** | 69 U | 10 U | 52 | |
| GP-3/SS-1 | 4/1/2005 | 0-0.5 | **107** | **200** | **928** | 19,794 | |
| GP-3/SS-2 | 4/1/2005 | 2 | **45** | **109** | **1,366** | 7,885 | |
| GP-3/SS-3 | 4/1/2005 | 3 | **9** | 66 U | 9 | 76 | |
| GP-3/SS-4 | 4/1/2005 | 4 | 7 | 67 U | 16 | 65 | |
| GP-3/SS-5 | 4/1/2005 | 5 | **9** | 67 U | 14 | 53 | |
| GP-3/SS-6 | 4/1/2005 | 7 | 6 U | 65 U | 18 | 52 | |
| BGS-1/SS-1 | 10/30/2004 | 0-1 | <22.92 | **118** | 37 | 83 | Background Subsurface Soil Samples (Prepared) |
| BGS-1/SS-2 | 10/30/2004 | 1-2 | <19.89 | **122** | 30 | 70 | |
| BGS-1/SS-3 | 10/30/2004 | 2-3 | <17.95 | <53.45 | 40 | 78 | |
| BGS-2/SS-1 | 10/30/2004 | 0-1 | <23.61 | **93** | <33.57 | 108 | |
| BGS-2/SS-2 | 10/30/2004 | 1-2 | <24.70 | <62.12 | 52 | 50 | |
| BSED-1 | 10/30/2004 | NA | <27.39 | <54.19 | 72 | 73 | Background Sediment Samples (Prepared) |
| BSED-2 | 10/30/2004 | NA | <21.51 | <54.09 | 49 | 125 | |
| SS1 A | 10/30/2004 | 0-0.5 | <18.75 | **203** | <30.62 | 53 | Background Surface Soil Samples |
| SS1 B | 10/30/2004 | 0-0.5 | <14.49 | <48.24 | 26 | 63 | |
| SS1 C | 10/30/2004 | 0-0.5 | <17.17 | <50.54 | 32 | 70 | |
| SS2 A | 10/30/2004 | 0-0.5 | <20.22 | <59.46 | <30.53 | 85 | |
| SS2 B | 10/30/2004 | 0-0.5 | <15.48 | **54** | <21.31 | 72 | |
| SS2 C | 10/30/2004 | 0-0.5 | <20.46 | <65.06 | <29.08 | 88 | |

Bold values exceed KDHE Tier 2 RSK values
All results in milligrams per kilogram
NA - Not applicable
* Instrument over-range; material composed of >10% zinc
-- Reading not taken

# Table 4-1
## Soil Laboratory Analytical Results
## Phase II Investigation
## Former East La Harpe Smelter
## La Harpe, Kansas

| Sample ID | Date | Sample Depth (ft.bgs) | Sample Matrix | Analyte with KDHE RSK | | | |
|---|---|---|---|---|---|---|---|
| | | | | Arsenic 5.84 | Cadmium 39 | Lead 400 | Zinc 23,000 |
| SS-1 | 3/24/2005 | 0-0.5 | Surface Soil | **340** | **94** | **4,700** | **30,000** |
| SS-11 | 3/24/2005 | 0-0.5 | Surface Soil | **97** | **110** | **8,800** | **48,000** |
| SS-15 | 3/24/2005 | 0-0.5 | Surface Soil | **76** | **180** | **2,200** | 18,000 |
| GP-1/SS-1 | 4/1/2005 | 0.5-1 | Soil (direct-push) | **85** | **57** | **9,400** | **61,000** |
| GP-2/SS-1 | 4/1/2005 | 2-2.5 | Soil (direct-push) | 1.9 | **71** | 95 | 2,400 |
| GP-3/SS-1 | 4/1/2005 | 2.5-3.5 | Soil (direct-push) | 1.0 U | 1.1 | 11 | 260 |
| DUP-1/SS-1 | 4/1/2005 | 0-0.5 | Surface Soil | 1.0 U | 0.87 | 7.1 | 71 |
| HS-1/SS-1 | 3/23/2005 | 0-1 | Subsurface Soil | **91** | **43** | **1,400** | 12,000 |
| HS-1/SS-2 | 3/23/2005 | 1-2 | Subsurface Soil | **12** | 2.3 | **76** | 560 |
| HS-2/SS-1 | 3/23/2005 | 0-1 | Subsurface Soil | **40** | 20 | **1,200** | 6,900 |
| HS-3/SS-1 | 3/23/2005 | 0-1 | Subsurface Soil | **110** | **55** | **5,900** | 18,000 |
| HS-7/SS-1 | 3/24/2005 | 0-1 | Subsurface Soil | **42** | **55** | **12,000** | 19,000 |
| Slag-1 | 3/23/2005 | 0-1 | Smelter Waste | **460** | **130** | **29,000** | **44,000** |
| SED-1 | 3/22/2005 | NA | Sediment Sample | **5.9** | **41** | 100 | 1,000 |
| SED-2 | 3/22/2005 | NA | Sediment Sample | **13** | **60** | 240 | 3,600 |
| SED-3 | 3/24/2005 | NA | Sediment Sample | **10** | 24 | **400** | 11,000 |

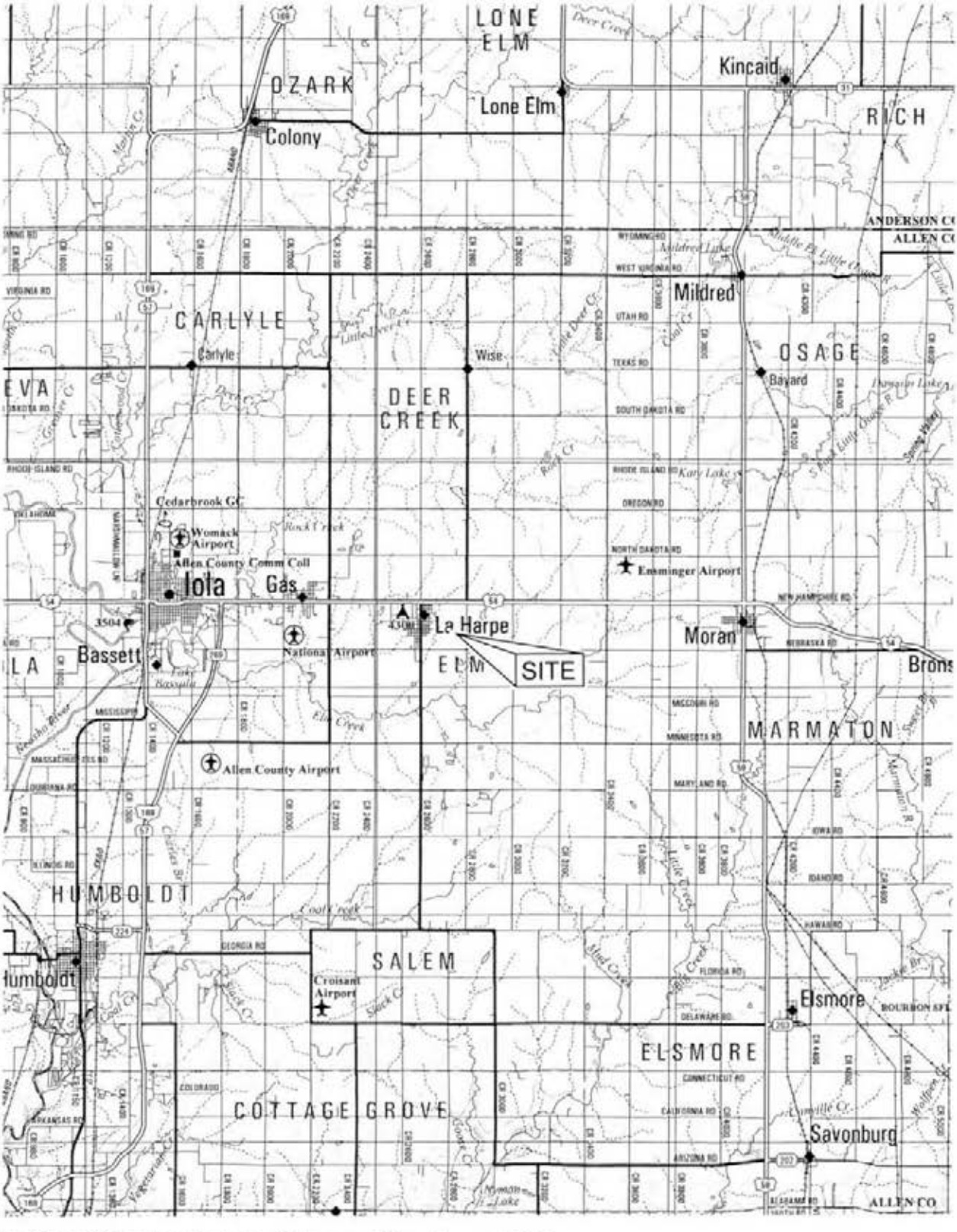
**Bold** results indicate exceedence of KDHE Tier 2 RSK values
Results in milligrams per kilogram
NA - Not applicable
Sample DUP-1/SS-1 is a duplicate of Sample GP-3/SS-1

**Table 4-2**
**Water Laboratory Analytical Results**
**Phase II Investigation**
**Former East La Harpe Smelter**
**La Harpe, Kansas**

| Sample ID | Date | Sample Matrix | Analyte with KDHE RSK | | | |
|---|---|---|---|---|---|---|
| | | | Arsenic 0.01 | Cadmium 0.005 | Lead 0.015 | Zinc 5 |
| GP-1/GW-1 | 4/8/2005 | Groundwater | 0.020 U | **0.20** | **0.037** | **35** |
| GP-2/GW-1 | 4/8/2005 | Groundwater | 0.020 U | **0.048** | 0.0085 | 1.3 |
| GP-3/GW-1 | 4/8/2005 | Groundwater | 0.020 U | 0.0050 U | 0.013 | 1.7 |
| DUP-2/GW-1 | 4/8/2005 | Groundwater | 0.020 U | **0.049** | 0.0092 | 1.2 |
| SW-1 | 3/22/2005 | Surface Water | 0.020 U | 0.0050 U | 0.0050 U | 0.069 |
| SW-2 | 3/22/2005 | Surface Water | 0.020 U | **0.041** | 0.0050 U | 1.8 |
| SW-3 | 3/24/2005 | Surface Water | 0.020 U | **0.055** | 0.0050 U | 1.8 |
| SW-4 | 3/24/2005 | Surface Water | 0.020 U | 0.0050 U | 0.0050 U | 0.078 |
| SW-5 | 3/24/2005 | Surface Water | 0.020 U | 0.0050 U | 0.0050 U | 0.046 |
| Rinsate Blank | 4/1/2005 | Rinsate Blank | 0.020 U | 0.0050 U | 0.0050 U | 0.030 U |
| BKG-1/SW-1 | 10/30/2004 | Surface Water (Background) | 0.010 U | 0.0050 U | 0.010 | 0.030 U |
| BKG-2/SW-2 | 10/30/2004 | Surface Water (Background) | 0.010 U | 0.0050 U | 0.0070 | 0.042 |

**Bold** results exceed KDHE Tier 2 RSK values
Results in milligrams per liter (mg/l)
0.010 U - Analyte not detected above reporting limit (0.010 U)
Sample DUP-2/GW-1 is a duplicate of Sample GP-2/GW-1

# Figures




Taken from DeLorme, Kansas Atlas and Gazetteer, 1997.

NORTH

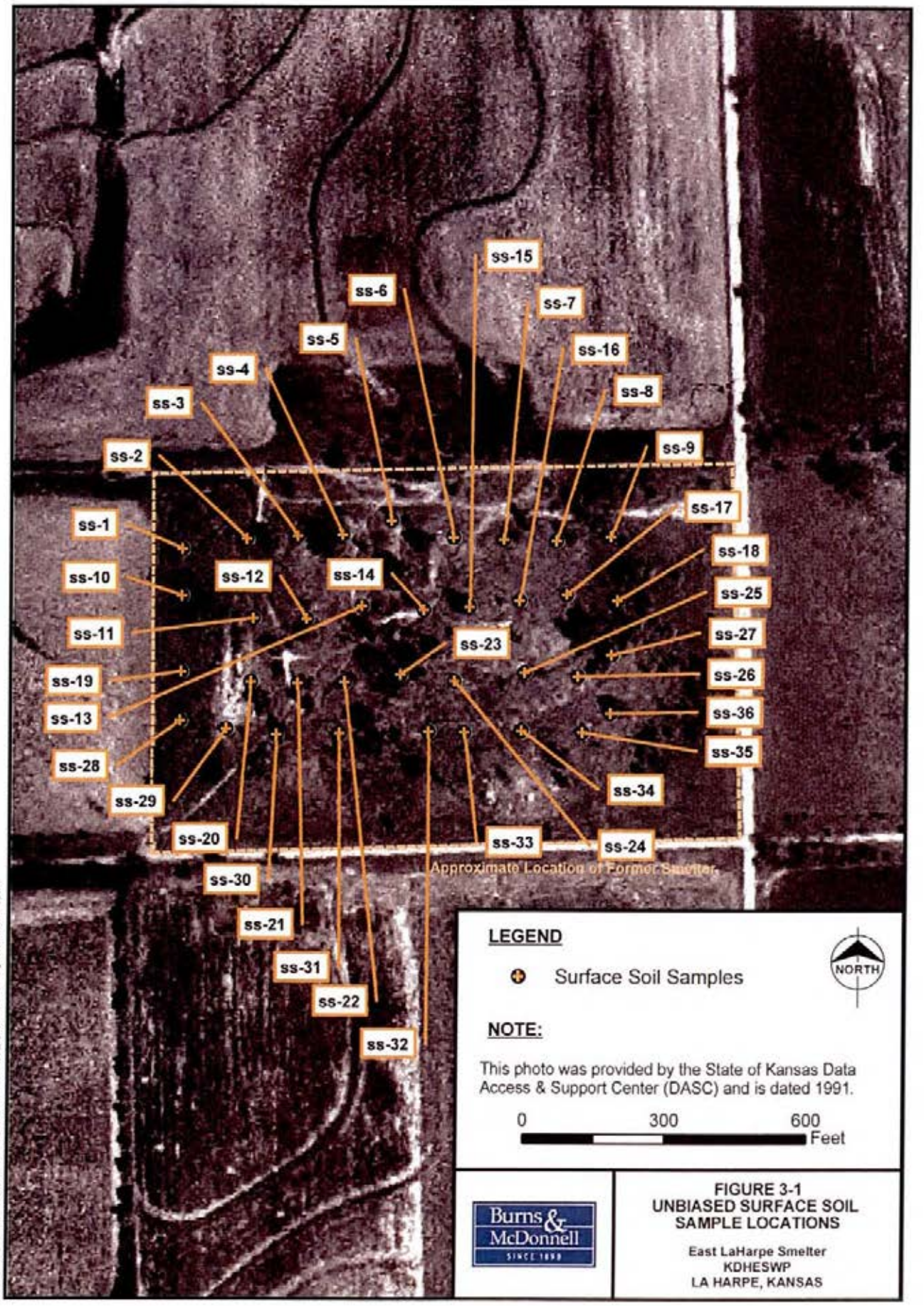
3.2 0 3.2 6.4

SCALE IN MILES

Burns & McDonnell
SINCE 1898

Figure 1-1

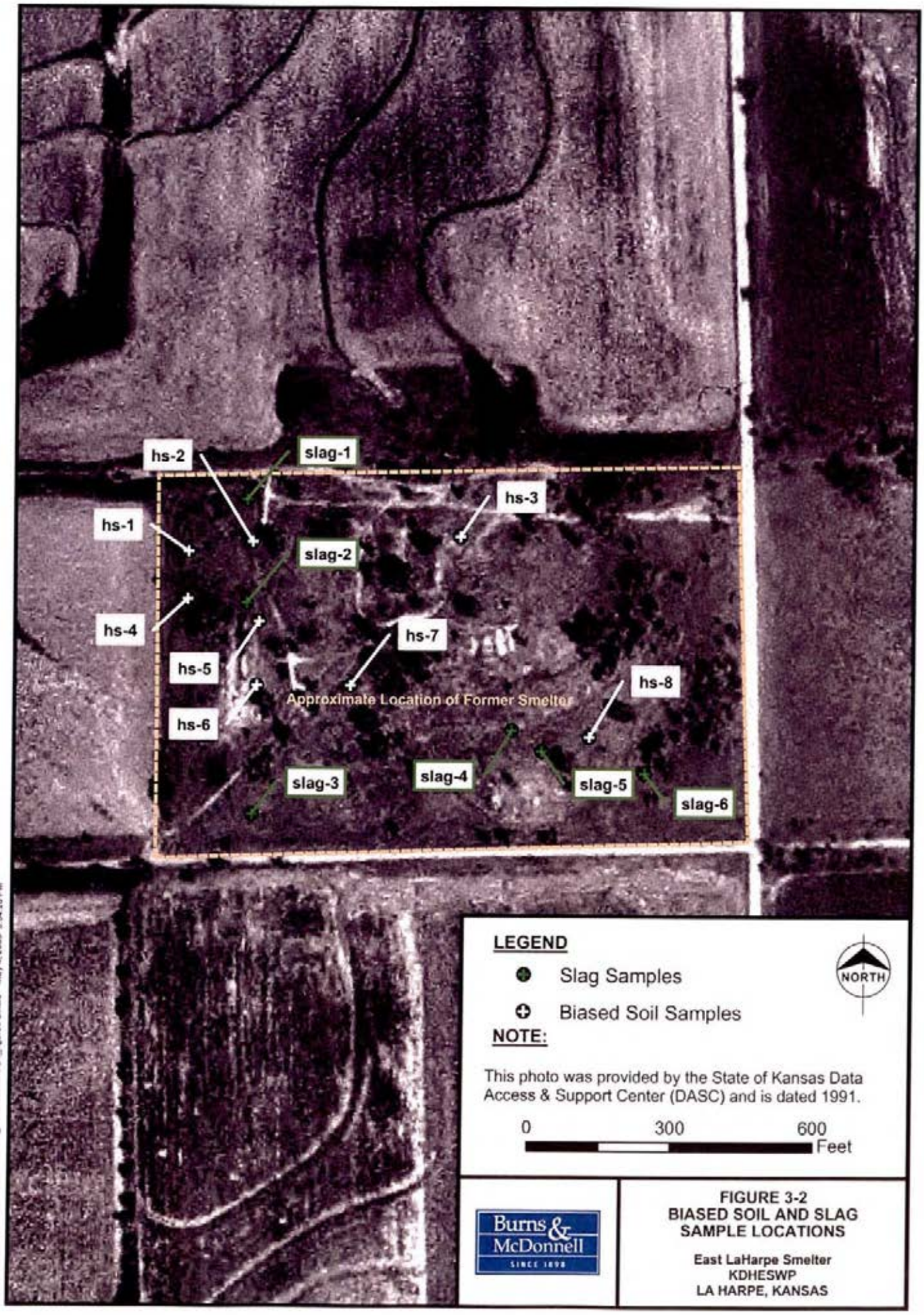
REGIONAL MAP
EAST LA HARPE SMELTER
KDHESWP
LA HARPE, KANSAS




Burns & McDonnell
SINCE 1898

**FIGURE 3-1**
**UNBIASED SURFACE SOIL SAMPLE LOCATIONS**

East LaHarpe Smelter
KDHESWP
LA HARPE, KANSAS

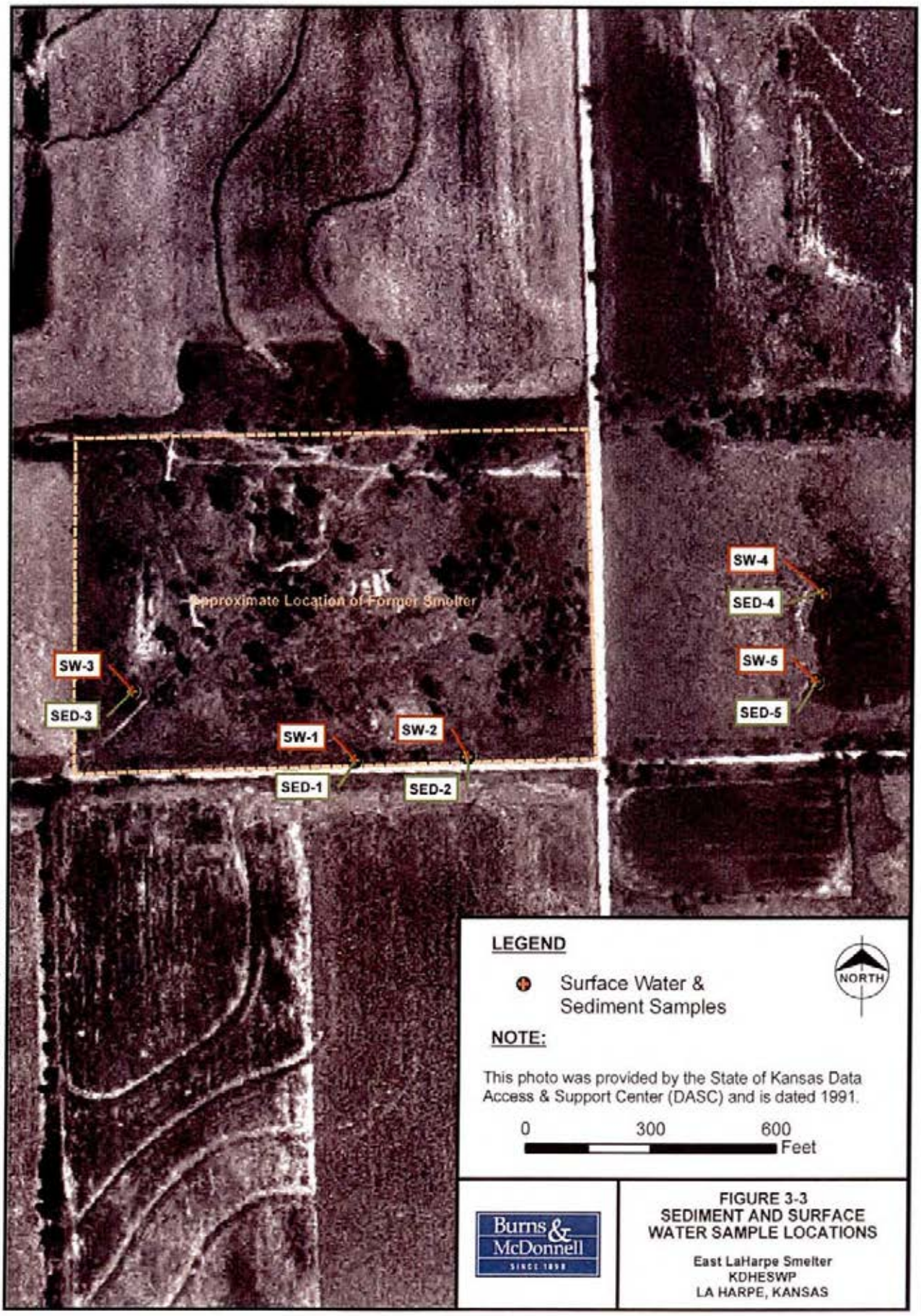



Burns & McDonnell
SINCE 1898

**FIGURE 3-2**
**BIASED SOIL AND SLAG SAMPLE LOCATIONS**

**East LaHarpe Smelter**
**KDHESWP**
**LA HARPE, KANSAS**

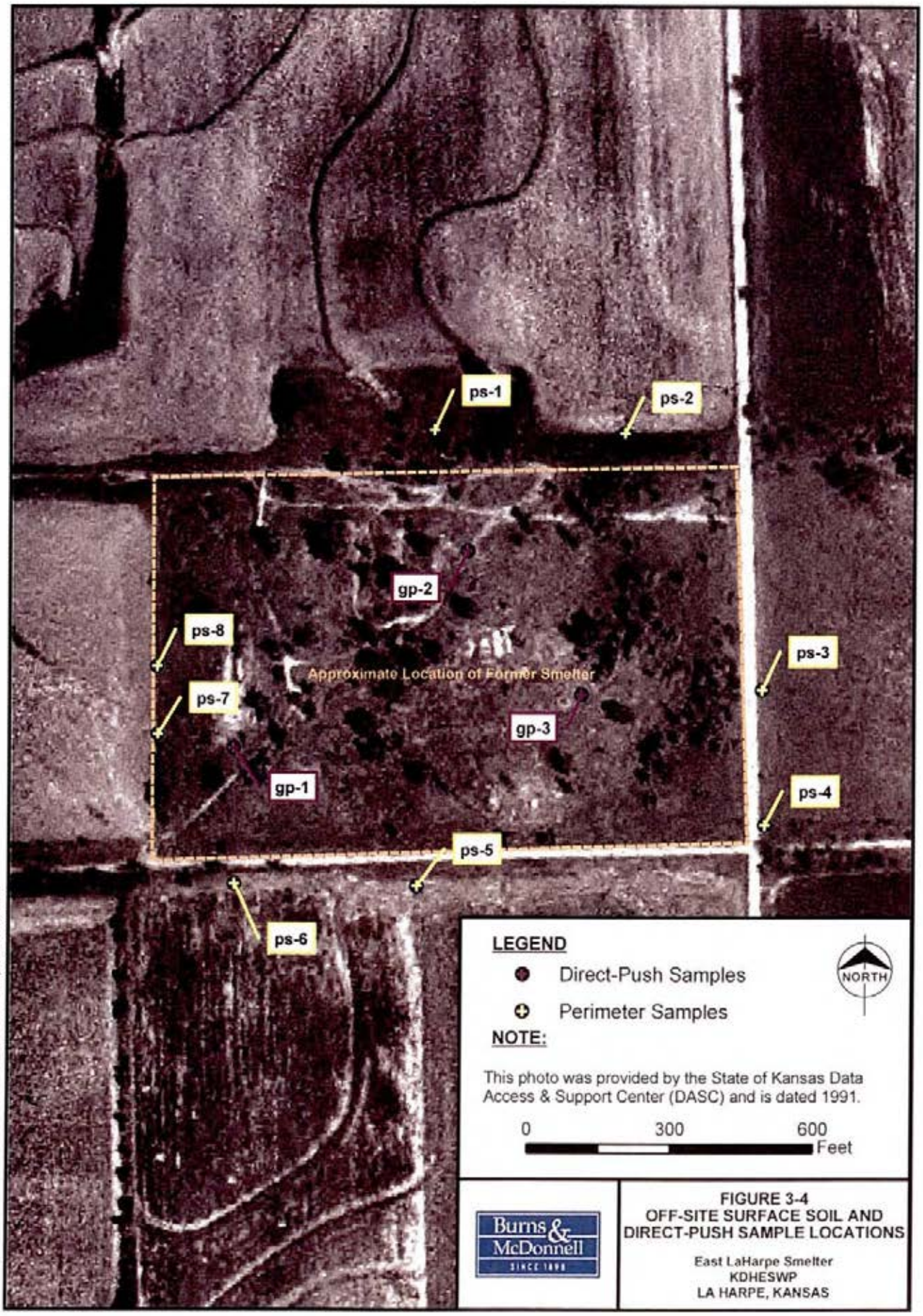
\\gisstr\projects\smelter\ARC\ArcDocs\Site_Aerial\eastlaharpe_figure3-2.mxd May 4, 2005 3:04:28 PM




Burns & McDonnell

**FIGURE 3-3**
**SEDIMENT AND SURFACE WATER SAMPLE LOCATIONS**

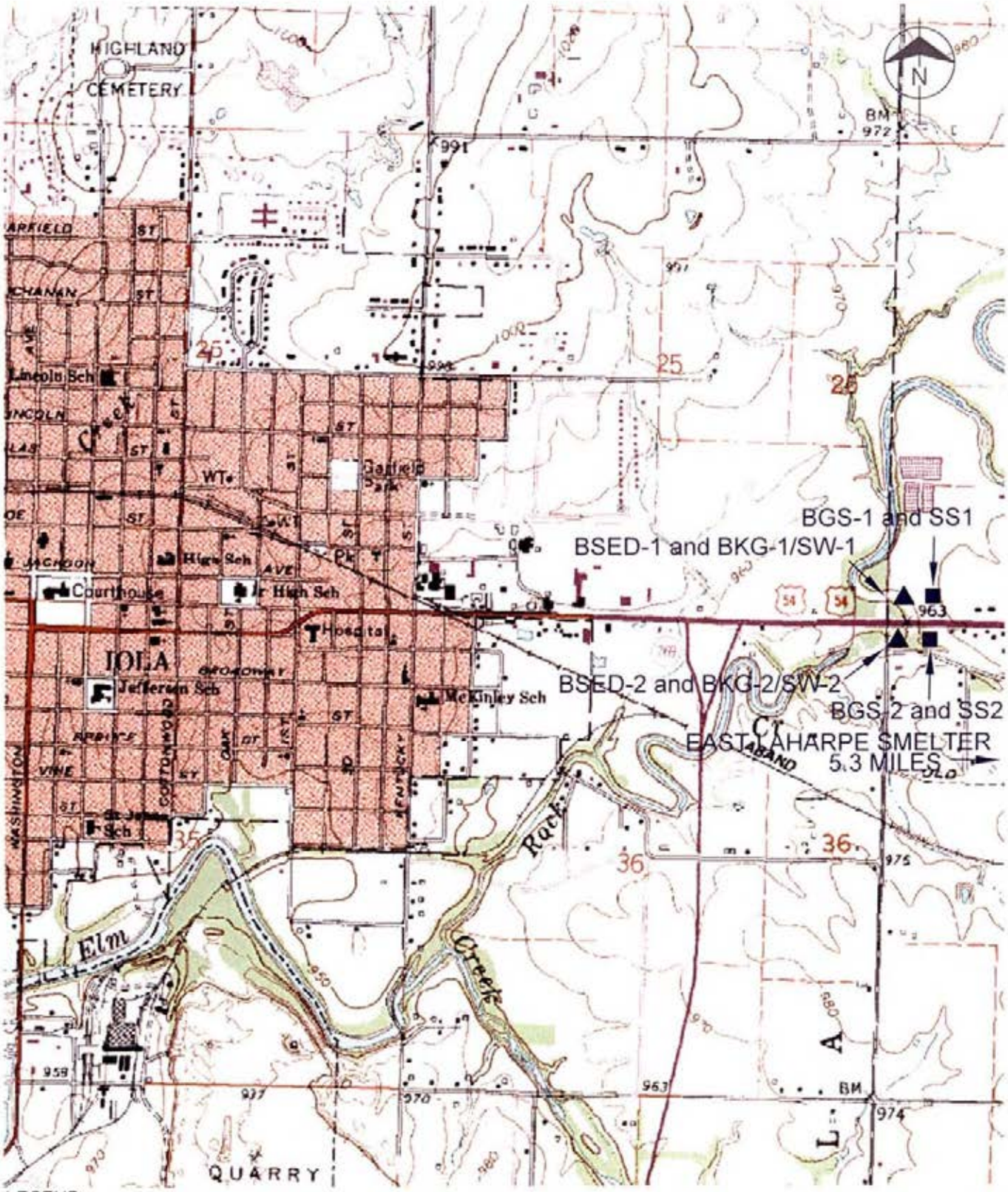
**East LaHarpe Smelter**
**KDHESWP**
**LA HARPE, KANSAS**




Burns & McDonnell
SINCE 1898

**FIGURE 3-4**
**OFF-SITE SURFACE SOIL AND DIRECT-PUSH SAMPLE LOCATIONS**

East LaHarpe Smelter
KDHESWP
LA HARPE, KANSAS




LEGEND

▲ BACKGROUND SEDIMENT & SURFACE WATER SAMPLES

■ BACKGROUND SURFACE & SUBSURFACE SOIL SAMPLES

APPROXIMATE SCALE IN FEET

1600 0 1600 3200

Burns & McDonnell SINCE 1898

Figure 3-5
BACKGROUND
SAMPLE LOCATIONS
EAST LA HARPE SMELTER
KDHESWP
LA HARPE, KANSAS

K:\ENVIX\DHE\SITE\35833\DELIVERIL\LAHARPE\PHASE II REPORT\BACKGROUND.DWG

# APPENDIX A

## Field Logbook

3-22-05 La HARPE SMELTER Schutte

0715 ARRIVE on site @ Former La Harpe Smelter. WEATHER is RAINY, 42°F, Slight breeze from the SE. SITE has gotten muddy from RAIN LAST NIGHT + yesterday.

0723 Continue finishing SITE WALK.

WALKING in thicket AREA on eastern side of SITE. Ground is SOFT and it appeared on older Topo MAPS to have had a pond. No Pond observed, possibly filled in, 4 low spots in AREA where WATER is STANDING. 1/2' of WATER in low spots. Surface WATER on eastern side. Flows south as it appears to flow to MARSH AREA @ SE side of site.

* LOCATED 2 DRUMS on North Central Part of site. Both empty, one is being used as a TRASH Receptacle.

* LOCATED 1 Vehicle fuel tank (APPROX 20 gallon CAPACITY → it too was empty)

3-22-05 East La Hoque Smelter Schutt

0750 Setting out GRID LOCATIONS onsite.

0830 Call Trevor + let him know that some of the GRID locations will be offset due to standing WATER AREAS which are now abandoned on the site w/ the rains.

0845 Two guys onsite in a Jeep cherokee. I question them on what they are here for + they SAID Mr WOMACK gave them permission to come out. They appear to be mudcrawing around the site.

0915 HAD to pull 2 guys out w/ their Jeep w/ my tow-STRAP. Asked them if they would leave the site, cause I would not pull them out again if they got stuck.

0930 Continue w/ grid location set-up.

1020 Call Pam w/ KDHE, she is getting ready to leave



3-22-05 East La Hoque Smelter Schutt

1045 offsite for ice + batteries

1125 Back onsite, Talked w/ Trevor and he told me to go ahead + start bagging up some of the SAMPLES

1155 Putting bagged samples of surface soil on Dock w/ Defrost on.

1225 Talked w/ Pam from KDHE, she said they were approx 45 min to an hour AWAY.

1300 Have collected SUR SS-1 thru SUR SS-9. AWAITING KDHE as 7 day samples in truck w/ Defrost + Heater. These ARE NON-Biased samples, and do not need to be prepped.

1310 KDHE onsite

PAM CHAFFEE, RANDY BROWN, John Antle Vaughn

1330 Let them know where nearest Hospital is as I give them short Tailgate. MAIN TOPIC SLIPS + Falls.

1400 KDHE has both Innovex + Niton XRF equipment Calibrating both of them now.

1430 Randy instructs Pam on how to use Niton as Innovex Gun is not working

1500 I go out to collect more surface samples to be read by Niton.

1545 Winter samples in TRUCK, BAGGY

1600 Go out to collect SURFACE WATER and Sediment SAMPLES ONES

1610 Collect SW-1 (Drainage Ditch - source)

1615 Collect SED-1 @ SW-1 Location

1625 Collect SW-2 (Downstream Drainage)

1630 Collect SED-2 @ SW-2 Location

1650 Randy + Pam off site

1700 Finishing collecting SURFACE SAMPLES in 2nd Row. SUR. SS-14 thru SUR SS-18

1715 Observed 2 of the Tanks on South side of site had a yellowish



Sludge in them, one of the tanks may have been leaking into the Drainage Ditch. Randy asks me to make a note of this for possible clean up problems w/ former smelter wash. Pam + Randy off site

1738 Keith and John w/ KDHE off site

3-22-05

3-23-05 E. La Hoppe Schutte

0728 onsite @ Former East La Hoppe SMELTER

WEATHER CONDITIONS: 40°F, mostly cloudy

chance of RAIN, slight wind from the north.

0735 Prepare to finish bagging surface samples

for KDHE to run, we have had to dry

surface samples due to the RAIN creating

moisture in this soil that may block the

READING from the NITON as water is a beta

alpha and gamma shield.

0755 John w/ KDHE onsite to pick up samples

I have collected. He will be a courier to

PAM whom will run XRF-NITON @ Hotel.

0900 Finish w/ GRID SAMPLES FOR SURFACE

analysis.

0905 John and I observe one AST north

of SUR-SS-7 w/ Asphalt TAR when

it that has leaked onto the ground.

0930 John taking samples to PAM,

I tell him to come back and



3-23-05 E. La Hoppe Schutte

I will get him SMELTER WASTE SAMPLES

for Pam to analyze.

950 Collect SLAG-1 (SMELTER waste sample)

LOCATED NW side of site

955 Collect Slag-2 (SMELTER waste) North

of main structure @ west side of site

958 Collect SLAG-3 (SMELTER waste)

south of structures

005 Collect SLAG-4 (SMELTER waste sample)

located @ central PART of SITE

1007 Collect SLAG-5 (SMELTER waste)

located @ site center.

1010 Collect SLAG-6 (smelter waste)

Located SE side of site, west of MARSH.

1030 John w/ KDHE onsite as he helps

me w/ Perimeter sampling (8 offsite

surface samples) SUR PS-1 thru SUR PS-8

1050 Notice ~~6~~ batteries (car batteries) on

NE area of site (photo)

3-23-05 E. J. La Hanpe Schutte

While collecting offsite surface samples PS-3, PS-4 notice that BORAX water line makes running north & south on east side of 2800 Rd.

1120 John offsite while I continue collecting 4 remaining offsite surface samples locations for VRF analysis.

1150 Done w/ Perimeter surface samples for VRF RUN.

1155 Take 2 photos of Tank lying on side in Drainage Ditch @ SE side of site. Water appears to have a slight sheen to it downgradient of tank.

1205 OFF-S.L. to take last surface samples to PAM @ Tolar, Take lunch offsite also

1315 Get final readings for hand auger locations from PAM

1355 Back onsite, set up Decon bucket w/ DI + Liquinox soap.

1400 Prepare to take 0-3' samples



3-23-05 E. J. La Hanpe Schutte

1405 Collect HS-1 / SS-1 (0-1' bgs) silty clay. (@ SUR SS-1 LOCATION)

1410 Collect HS-1 / SS-2 (1-2' bgs) silty clay

1415 Collect HS-1 / SS-3 (2-3' bgs) clay-silty

1422 Decon Push Probe in 5 gal Bucket w/ D.I + Liquinox soap.

1430 John w/ KDHS onsite

1440 Collect HS-2 / SS-1 (0-1') silty-sandy @ SUR SS-2 LOCATION

1445 Collect HS-2 / SS-2 (1-2') silty clay

1450 Collect HS-2 / SS-3 (2-3') sandy clay

1500 Decontam w/ DI + Liquinox soap

1510 Collect HS-3 / SS-1 (0-1') clay location is 10' north of SUR SS-6.

1515 Collect HS-3 / SS-2 (1-2') clay

1520 Collect HS-3 / SS-3 (2-3') clay

1530 Decon Probe w/ D.I with Liquinox soap.

1540 Collect HS-4 / SS-1 (0-1') @ SUR SS-[illegible] location

3-23-05 EAST La Harpe Schutt

1545 Collect HS-4/SS-2 (1-2') Clay

1550 Collect HS-4/SS-3 (2-3') sandy clay, w

1600 Decon HAND Probe w/ DI water

T Liquinox SOAP

1610 John and I drive to property to the west @ 2861 54 Hwy to see if they know who owns the pond to the east of the site, Noone answers the door bell, appears noone is home.

1640 Called Steve Hoffman, let him know we will be done tomorrow.

1710 offsite w/ John from KDHE

3-23-05



3-24-05 East La Harpe Schutt

710 Arrive @ 2861 54 Hwy, Knock on door

0715 Resident says they own property w/ POND

* Barbara Diehl

I give her my info + card for Bridgette Wilson. She tells me that pond wasn't there when SMELTER were there. But she tells me I can get a couple samples. She would like a copy of the analytical on her pond's Data though.

0720 Arrive onsite @ Former SMELTER.

WEATHER: 40° F, cloudy, calm.

0725 Prepare to Finish w/ Subsurface Samples.

0730 Collect HS5/SS1 (0-1') @ SUR-SS-11 LOCATION (SILTS)

0735 Collect HS-5/SS-2 (1-2') SILTY CLAY

0740 Collect HS-5/SS-3 (2-3') clay, some silt, wet

Rain is picking up as I decon Probe w/ DI + Liquinox

3-24-05 East La Harpe Schutte

0750 collect HS-6/SS-1 (0-1') @ SUR SS-20 location (sandy clay)

0755 collect HS-6/SS-2 (1-1.5' Refusal) Possible sandstone? (sandy clay, gravel)

Decon Probe w/ Decon water (D.I) + Liquinox.

0805 collect HS-7/SS-1 (0-1') @ SUR SS-22 location (silty clay)

0810 collect HS-7/SS-2 (1-2') silty clay

0815 collect HS-7/SS-3 (2-3') silty clay w/

Decon Probe w/ DI and Liquinox

0820 call Trevor + update him on work

0825 collect HS-8/SS-1 (0-1') @ SUR SS-35 location, clay, some silt

0830 Collect HS-8/SS-2 (1-2') silty clay, wet

0835 collect HS-8/SS-3 (2-3') silty clay, wet

0845 collect SURFACE water (SW-3) @ small Pond southwest of old remaining structure at site

0850 collect SED-3 @ SAME LOCATION.



3-24-05 East La Harpe Site Schutte

855 Take SPLIT of SUR SS-1 sample

900 Take SPLIT of SUR SS-11 sample

905 Take split of SUR SS-15 sample

910 Dumping bags of surface soil sample north

Notice a large # of shotgun shells onsite from skeet shooting as I have seen 2 broken clay pigeons. Noting this because of possible lead from shells

920 Collect SURface water (SW-4) on north side of pond east of site

925 collect SED-4 @ same location

930 Collect SW-5 @ south side of pond east of site

935 collect SED-5 @ same location

945 OFFSite

3-24-05

4-1-05 E. La Harpe

1306 Arrive onsite @ E. La Harpe Smelter, weather is 65°F, wind out of west @ 10 mph, clear skies

1315 Brothers said they saw two Rattlesnakes, I did not see them, set out Geoprobe locations

1335 Begin Probe GP-1

1350 End @ Refusal 7.5' bgs (Limestone)

1400 Sample GP-1/SS-1 0.5-1.0' bgs

1420 Start Probe GP-2 location

1445 Sample GP-2/SS-1 (2-2.5' bgs)

Begin Probe GP-3

1600 End @ 6.0' bgs Refusal

1510 Sample GP-3/SS-1 + DUP-1/SS-1 (2.5 to 3.5)

1515 EPS decons

1520 Grab Rinsate SAMPLE (LOT # 046143) HPLC

1530 Pack GPS GRID

1630 off site

4-8-05 E. La Harpe Schuth

1445 Arrive onsite @ E. La Harpe Site 75a

Weather: 68°F, slight wind from west, partly cloudy.

1500 GP-1 WL = 3.56' from TOC; 3.30' BGS

Purge 1/2 gal from Piezometer.

1515 Sample GP-1/GW-1

1525 Arrive @ GP-2 WL = 2.42 from TOC 2.19' bgs

1530 Purge 1/2 gal

1535 Sample GP-2/GW-1 + DUP-2/GW-1

1540 @ GP-3 WL = 1.27' TOC 1.05' BGS

1543 Purge 1/2 gal

1550 Sample GP-3/GW-1

1555 ALL Holes ABANDONED by pulling up Piezometers + Bentonite Hole to surface.

1605 OFF site

4-8-05

# APPENDIX B

## Color Photographic Log

**PHOTO LOG**

| Photograph | Description |
|---|---|
| | Looking west at an on-Site drainage ditch on the south side of the site. Old tires, two USTs, an oil reclaiming tank, and various other debris were located in the ditch. |
| | Looking northeast at I-beams and air stacks, presumably from the smelter, piled on-Site. |

**PHOTO LOG**

| Photograph | Description |
|---|---|
| | Looking southwest at a large smelter waste pile located in the south-central area of the Site. |
| | Looking northwest at EPS personnel probing Boring GP-1. Boring GP-1 was conducted south of a former smelter structure remaining on-Site. |

**PHOTO LOG**

| Photograph | Description |
|---|---|
| | Looking northwest at a various assortment of tanks stored on the northeast side of the Site. |
| | Looking northeast at a large smelter waste pile on-Site. |

**PHOTO LOG**

| Photograph | Description |
|---|---|
| | Looking west at an on-Site AST leaking orange sludge into a drainage ditch on the SE corner of the Site. |
| | Looking down at an asphalt/tar tank that is leaking. The tank is located on the northeastern portion of the Site. |

**PHOTO LOG**

| Photograph | Description |
|---|---|
| | Looking down at KDHE personnel using a portable XRF to scan a soil core for arsenic, cadmium, lead, and zinc. The soil core was recovered from an on-Site boring using direct-push sampling techniques. |
| | Looking west at structures of the former smelter remaining on-Site. |

# APPENDIX C

## XRF Results – Field Log Sheets

Site: E. LaHarpe Smelter

Red Cd
Yellow Am

| | Ss | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | Other |
|---|---|---|---|---|---|---|---|---|---|
| Cd | 30 | 3/22/05 | 2:18 | SUR SS-1A | 255. | | 3610. | 42.K | Hg 85.8 |
| | 33 | | 2:21 | SUR SS-1B | 372. | | 3770. | 36.3K | Hg 109. |
| | 30 | | 2:25 | SUR SS-1C | <110. | | 2150. | 17.4K | |
| Am | 62 | | 2:29 | SUR SS-1A | | 94.2 | | | |
| | 31 | | 2:31 | SUR SS-1B | | 75.0 | | | |
| | 32 | | 2:33 | SUR SS-1C | | 76.2 | | | |
| | 32 | | 2:34 | SUR SS-2A | | 194.0 | | | |
| | 31 | | 2:35 | SUR SS-2B | | 210.0 | | | |
| | 31 | | 2:37 | SUR SS-2C | | 178. | | | |
| Cd | 30 | | 2:39 | SUR SS-2A | 241. | | 7310. | 30.6K | |
| | 35 | | 2:43 | SUR SS-2B | 303. | | 6520. | 27.5K | |
| | 30 | | 2:45 | SUR SS-2C | 256. | | 6440. | 23.5K | |
| | 31 | | 2:49 | SUR SS-3A | 471. | | 7200. | 42.0K | |
| | 30 | | 2:51 | SUR SS-3B | 526 | | 7860. | 49.K | Hg 144. |
| | 30 | | 2:54 | SUR SS-3C | 392. | | 9060. | 44.K | |
| Am | 30 | | 2:56 | SUR SS-3A | | <67. | | | |
| | 31 | | 2:58 | SUR SS-3B | | 113. | | | |
| | 31 | | 2:59 | SUR SS-3C | | 85.4 | | | |
| | 31 | | 3:03 | SUR SS-4A | | <56. | | | |
| | 37 | | 3:04 | SUR SS-4B | | <65. | | | |
| | 31 | | 3:05 | SUR SS-4C | | <49 | | | |
| Cd | 30 | | 3:08 | SUR SS-4A | <68 | | 1070 | 4800 | |
| | 31 | | 3:11 | SUR SS-4B | <95 | | 1770 | 6960 | |
| | 31 | | 3:14 | SUR SS-4C | <64 | | 930. | 3540 | |
| | 30 | | 3:18 | SUR SS-5A | <72 | | 1140 | 11.2K | |
| | 30 | | 3:21 | SUR SS-5B | <76 | | 1300 | 11.5K | |
| | 31 | | 3:24 | SUR SS-5C | 149 | | 1820 | 22.3K | |
| Am | 32 | | 3:25 | SUR SS-5A | | 438. | | | |
| | 32 | | 3:27 | SUR SS-5B | | 422. | | | |
| | 31 | | 3:28 | SUR SS-5C | | 460. | | | |
| | 31 | | 3:29 | SUR SS-6A | | 306 | | | |
| | 31 | | 3:31 | SUR SS-6B | | 468 | | | |
| | 44 | | 3:32 | SUR SS-6C | | 178 | | | |
| | | | | | | | | | |

Site: E. LaHarpe Smelter

Red Cd
Yellow Am

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | Other |
|---|---|---|---|---|---|---|---|---|---|
| Cd | 30 | 3/22/05 | 3:35p | SUR SS-6A | <63. | | 1110 | 7930. | |
| | 30 | | 3:38 | SUR SS-6B | <110 | | 2250 | 18.8K | Hg 49. |
| | 30 | | 3:41 | SUR SS-6C | <110 | | 2690 | 15.9K | Hg 55.1 |
| | 31 | | 3:45 | SUR SS-7A | <130 | | 2630 | 18.3K | Hg 69.6 |
| | 30 | | 3:47 | SUR SS-7C | <110 | | 2300 | 16.3K | Hg 55.5 |
| | 31 | | 3:50 | SUR SS-7B | <100 | | 1850 | 18.4K | |
| Am | 32 | | 3:52 | SUR SS-7A | | 239. | | | |
| | 32 | | 3:53 | SUR SS-7C | | 173. | | | |
| | 32 | | 3:54 | SUR SS-7B | | 170. | | | |
| | 31 | | 3:56 | SUR SS-8A | | 142. | | | |
| | 32 | | 3:57 | SUR SS-8B | | 136. | | | |
| | 32 | | 3:58 | SUR SS-8C | | 132. | | | |
| Cd | 30 | | 4:00 | SUR SS-8A | <99 | | 2080 | 10.8K | |
| | 31 | | 4:04 | SUR-SS-8B | <78. | | 1370 | 7160 | |
| | 30 | | 4:06 | SUR SS-8C | <71 | | 1270 | 5870 | |
| | 33 | | 4:10 | SUR SS-9A | <48. | | 436. | 1700 | |
| | 31 | | 4:12 | SUR SS-9B | <44 | | 389 | 1230 | |
| | 31 | | 4:15 | SUR SS-9C | <41 | | 405 | 1190 | |
| Am | 31 | | 4:17 | SUR SS-9A | | <48 | | | |
| | 32 | | 4:19 | SUR SS-9B | | 65.2 | | | |
| | 32 | | 4:20 | SUR SS-9C | | <44. | | | |
| | | | | | | | | | |
| Cd | 30 | 3/23/05 | 7:54A | SUR SS-10A | 394. | | 5830 | 15.3K | |
| | 30 | | 7:57 | SUR SS-10B | 462. | | 6600 | 18.7K | |
| | 30 | | 7:59 | SUR SS-10C | 314 | | 5740 | 15.7K | |
| | 31 | | 8:03 | SUR SS-11A | 313. | | 8270 | 93.4K | |
| | 31 | | 8:06 | SUR SS-11B | 272. | | 7810. | 89.0K | |
| | 31 | | 8:09 | SUR SS-11C | 271. | | 7860 | 87.4K | |
| Am | 31 | | 8:10 | SUR SS-11A | | 94.4 | | | |
| | 32 | | 8:22 | SUR SS-11B | | 94.9 | | | |
| | 32 | | 8:23 | SUR SS-11C | | 158. | | | |
| | 32 | | 8:24 | SUR SS-10A | | <49 | | | |
| | 32 | | 8:26 | SUR SS-10B | | <58 | | | |
| | 33 | | | SUR SS-10C | | <56. | | | |

Red Cd
Yellow Am

Site: E. LaHarpe Smelter

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | Other |
|---|---|---|---|---|---|---|---|---|---|
| Am | 31 | 3/23/05 | 8:29A | SVR SS-12A | | 177. | | | |
| | 32 | | 8:30 | SVR SS-12B | | 209 | | | |
| | 32 | | 8:31 | SVR SS-12C | | 185. | | | |
| Cd | 30 | | 8:33 | SVR SS-12A | <210 | | 6050 | 36.9K | Hg 84.9//Cu 1160. |
| | 30 | | 8:37 | SVR SS-12B | <190 | | 5700 | 37.1K | Cu 1180 |
| | 30 | | 8:39 | SVR SS-12C | <180 | | 4970 | 32.3K | Cu 1070 |
| | 30 | | 8:42 | SVR SS-13A | 615 | | 5850 | 57.1K | Hg 116//Cu 2491 |
| | 31 | | 8:45 | SVR SS-13B | 533. | | 5910 | 55.7K | Cu 2080 |
| | 30 | | 8:47 | SVR SS-13C | 581. | | 5420. | 55.1K | Hg 95.3// Cu 2222 |
| Am | 31 | | 8:50 | SVR SS-13A | | 137 | | | |
| | 32 | | 8:51 | SVR SS-13B | | 184. | | | |
| | 31 | | 8:52 | SVR SS-13C | | 226 | | | |
| | 31 | | 8:54 | SVR SS-14A | | 216 | | | |
| | 31 | | 8:55 | SVR SS-14B | | 187 | | | |
| | 31 | | 8:56 | SVR SS-14C | | 172. | | | |
| Cd | 31 | | 8:58 | SVR SS-14A | <120 | | 2210 | 16.4K | |
| | 31 | | 9:00 | SVR-SS-14B | <120 | | 2360 | 16.5K | |
| | 30 | | 9:03 | SVR SS-14C | <130 | | 2560 | 17.7K | |
| | 30 | | 9:06 | SVR-SS-15A | <130 | | 2940 | 34.0K | Cu 1100 |
| | 30 | | 9:09 | SVR-SS-15B | 183 | | 3910 | 41.5K | Hg 95.5/Cu 1140 |
| | 30 | | 9:12 | SVR SS-15C | <130 | | 2840 | 33.6K | Cu 925. |
| Am | 32 | | 9:13 | SVR SS-15A | | 277 | | | |
| | 31 | | 9:14 | SVR-SS-15B | | 305. | | | |
| | 32 | | 9:15 | SVR SS-15C | | 273. | | | |
| | 31 | | 9:18 | SVR SS-16A | | 193 | | | |
| | 32 | | 9:19 | SVR SS-16B | | 206 | | | |
| | 32 | | 9:20 | SVR SS-16C | | 201. | | | |
| Cd | 30 | | 9:22 | SVR SS-16A | 248 | | 4230 | 36.6K | Cu 1450. |
| | 30 | | 9:25 | SVR SS-16B | 266 | | 4340 | 36.1K | Cu 1650 |
| | 30 | | 9:27 | SVR SS-16C | 314 | | 4490 | 36.6K | Cu 1730 |
| | 30 | | 9:31 | SVR SS-17A | <120 | | 2330 | 27.1K | |
| | 30 | | 9:33 | SVR SS-17B | 126 | | 2280 | 24.1K | |
| | 30 | | 9:36 | SVR SS-17C | <120 | | 2330 | 28.9K | |
| | | | | | | | | | |

Site: E. LaHarpe Smelter

Red Cd
Yellow Am

| | SS | Date | Time | Sample Location | Arsenic | Cadmium (ppm) | Lead | Zinc | Other |
|---|---|---|---|---|---|---|---|---|---|
| Am | 31 | 3/23/05 | 9:39 | SUR SS-17A | | 126. | | | |
| | 31 | | 9:40 | SUR SS-17B | | 130 | | | |
| | 30 | | 9:41 | SUR SS-17C | | 163 | | | |
| | 32 | | 9:42 | SUR SS-17C | | 170 | | | |
| | 31 | | 9:45 | SUR SS-18A | | 67 | | | |
| | 31 | | 9:46 | SUR SS-18B | | <58 | | | |
| | 31 | | 9:47 | SUR SS-18C | | <64 | | | |
| Cd | 31 | | 9:49 | SUR SS-18A | <52 | | 482 | 2410 | |
| | 31 | | 9:52 | SUR SS-18B | <58 | | 562. | 2350 | |
| | 31 | | 9:55 | SUR SS-18C | <56 | | 570 | 2200 | |
| | 30 | | 10:25 | SUR SS-20A | 395 | | 12.5K | 20.3K | |
| | 30 | | 10:28 | SUR SS-20B | 516 | | 12.1K | 19.6K | |
| | 30 | | 10:30 | SUR SS-20C | 449 | | 12.2K | 21.1K | Hg 100. |
| Am | 31 | | 10:32 | SUR SS-20A | | 78.7 | | | |
| | 31 | | 10:33 | SUR SS-20B | | 110. | | | Sb |
| | 32 | | 10:34 | SUR SS-20C | | 96 | | | 101 |
| | 31 | | 10:37 | SUR SS-21A | | <44 | | | |
| | 31 | | 10:38 | SUR SS-21B | | <40 | | | |
| | 31 | | 10:39 | SUR SS-21C | | <49 | | | |
| Cd | 31 | | 10:44 | SUR SS-21A | <59. | | 569 | 1820 | |
| | 31 | | 10:46 | SUR SS-21B | <63. | | 610. | 2310 | |
| | 31 | | 10:49 | SUR SS-21C | <55. | | 485 | 1530 | |
| | 30 | | 11:12 | SUR SS-19A | <63 | | 1020 | 4280 | |
| | 31 | | 11:15 | SUR SS-19B | <70 | | 1150 | 4120 | |
| | 30 | | 11:17 | SUR SS-19C | <66. | | 1150 | 4350 | |
| Am | 32 | | 11:19 | SUR SS-19A | | 58.4 | | | |
| | 31 | | 11:20 | SUR SS-19B | | <52 | | | |
| | 31 | | 11:21 | SUR SS-19C | | 59.7 | | | |
| | 31 | | 11:22 | SUR SS-22A | | 66.9 | | | |
| | 31 | | 11:23 | SUR SS-22B | | 106 | | | |
| | 31 | | 11:24 | SUR SS-22C | | <53 | | | |
| Cd | 30 | | 11:27 | SUR SS-22A | <150 | | 4260 | 17.3K | |
| | 30 | | 11:29 | SUR SS-22B | <140 | | 4080 | 15.0K | |
| | 30 | | 11:33 | SUR SS-22C | <140 | | 3770 | 14.3K | Hg 56.3 |

Site: E. LaHarpe Smelter

Rd Cd
Yellow Am

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| Cd | 30 | 3/23/05 | 11:37 | SUR SS-23A | | | ~~2130~~ | | |
| | 30 | | 11:40 | SUR SS-23B | <96 | | 2130 | 13.2K | |
| | 30 | | 11:43 | SUR SS-23A | <87 | | 1850 | 12.6K | Hg 57.5 |
| | 30 | | 11:45 | SUR SS-23C | <88. | | 1680 | 12.4K | |
| Am | 32 | | 11:47 | SUR SS-23A | | 54.6 | | | |
| | 31 | | 11:48 | SUR SS-23B | | 86.6 | | | |
| | 31 | | 11:50 | SUR SS-23C | | 79.5 | | | |
| | 32 | | 11:53 | SUR SS-24A | | 170 | | | |
| | 31 | | 11:54 | SUR SS-24B | | 209. | | | |
| | 31 | | 11:55 | SUR SS-24C | | 124 | | | |
| Cd | 30 | | 12:05 | SUR SS-24A | 511. | | 4560 | 28.5K | Cu 1390 |
| | 30 | | 12:07 | SUR SS-24B | 328 | | 4820 | 30.1K | |
| | 30 | | 12:10 | SUR SS-24C | 393. | | 4680 | 29.3K | Cu 1660 |
| | 30 | | 12:13 | SUR SS-25A | 137 | | 3340 | 12.6K | |
| | 30 | | 12:17 | SUR SS-25B | 203 | | 4060 | 15.2K | |
| | 30 | | 12:19 | SUR SS-25C | 152 | | 4400 | 15.9K | |
| Am | 32 | | 12:20 | SUR SS-25A | | 276 | | | |
| | 31 | | 12:22 | SUR SS-25B | | 218 | | | |
| | 32 | | 12:23 | SUR SS-25C | | 237 | | | |
| | 31 | | 12:26 | SUR SS-26A | | 68. | | | |
| | 31 | | 12:27 | SUR SS-26B | | 77. | | | |
| | 31 | | 12:28 | SUR SS-26C | | 79.3 | | | |
| Cd | 30 | | 12:30 | SUR SS-26A | <110 | | 2600 | 8010 | |
| | 30 | | 12:33 | SUR SS-26B | <110 | | 2700 | 7760 | |
| | 30 | | 12:35 | SUR SS-26C | 129 | | 2910 | 8920 | |
| | 32 | | 12:41 | SUR SS-27A | 280 | | 9620 | 40.9K | |
| | 31 | | 12:44 | SUR SS-27B | <310 | | 13.1K | 54.2K | |
| | 31 | | 12:47 | SUR SS-27C | <270 | | 10.6K | 42.6K | |
| Am | 31 | | 12:49 | SUR SS-27A | | 155. | | | |
| | 31 | | 12:50 | SUR SS-27B | | 100. | | | |
| | 31 | | 12:51 | SUR SS-27C | | 156. | | | |
| | 31 | | 12:53 | SUR SS-29A | | <55. | | | |
| | 31 | | 12:55 | SUR SS-29B | | <66 | | | |
| | 30 | | 12:56 | SUR SS-29C | | <64 | | | |

Site: E. La Harpe Smelter

Red Cd
Yellow Am

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc |
|---|---|---|---|---|---|---|---|---|
| Cd | 30 | 3/23/05 | 1:00p | SVR SS-29A | <190 | | 5220 | 26.9K |
| | 30 | | 1:03 | SVR SS-29B | <210 | | 6730. | 32.5K |
| | | | | ~~SVR SS-29C~~ | | | | |
| | 30 | 3/23/05 | 2:32 | SVR SS-29C | 244 | | 6590 | 36.3K |
| | 31 | | 2:36 | SVR SS-28A | <82 | | 1400 | 4080 |
| | 31 | | 2:38 | SVR SS-28B | <82 | | 1390 | 3940 |
| | 30 | | 2:44 | SVR SS-28C | — | | 1380 | 4140 |
| Am | 31 | | 2:47 | SVR SS-28A | | <49. | | |
| | 31 | | 2:48 | SVR SS-28B | | <56 | | |
| | 31 | | 2:49 | SVR SS-28C | | 105 | | |
| | 31 | | 2:50 | SVR SS-30A | | 102 | | |
| | 31 | | 2:51 | SVR SS-30B | | 81. | | |
| | 31 | | 2:52 | SVR SS-30C | | 81.2 | | |
| Cd | 30 | | 2:54 | SVR SS-30A | <130 | | 2830 | 18.K |
| | 30 | | 2:57 | SVR SS-30B | <140 | | 3170 | 20.7K |
| | 30 | | 3:03 | SVR SS-30C | <120 | | 2540 | 17.2K |
| | 30 | | 3:07 | SVR SS-31A | <34 | | 344 | 3620 |
| | 30 | | 3:10 | SVR SS-31B | <35 | | 342 | 3710 |
| | 30 | | 3:12 | SVR SS-31C | — | | 439 | 3800 |
| Am | 31 | | 3:14 | SVR SS-31A | | <49 | | |
| | 31 | | 3:15 | SVR SS-31B | | 77.2 | | |
| | 31 | | 3:16 | SVR SS-31C | | 57.7 | | |
| | 31 | | 3:18 | SVR SS-32A | | 69.5 | | |
| | 31 | | 3:19 | SVR SS-32B | | <57. | | |
| | 31 | | 3:20 | SVR SS-32C | | 83.1 | | |
| Cd | 30 | | 3:23 | SVR SS-32A | <90 | | 1680 | 12.6K |
| | 30 | | 3:25 | SVR SS-32B | <100 | | 1980 | 13.9K |
| | 30 | | 3:28 | SVR SS-32C | <64 | | 1120 | 7220 |
| | 30 | | 3:31 | SVR SS-33A | 159 | | 2150 | 14.4K |
| | 30 | | 3:33 | SVR SS-33B | 145 | | 2160 | 18.4K |
| | 31 | | 3:37 | SVR SS-33C | 108 | | 1880 | 13.5K |
| Am | 31 | | 3:38 | SVR SS-33A | ~~223~~ | 223 | | |
| | 31 | | 3:39 | SVR SS-33B | ~~203~~ | 203 | | |
| | 31 | | 3:40 | SVR SS-33C | | 137 | | |

Red Cd
Yellow Am

Site: E. La Harpe Smelter

ppm

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| Am | 31 | 3/23/05 | 3:44p | SUR SS-34 A | | 129. | | | |
| | 31 | | 3:45 | SUR SS-34 B | | 167. | | | |
| | 32 | | 3:46 | SUR SS-34 C | | 106 | | | |
| Cd | 30 | | 3:48 | SUR SS-34 A | 107 | | 1820 | 12.7K | |
| | 30 | | 3:50 | SUR SS-34 B | <89 | | 1960 | 11.3K | |
| | 30 | | 3:53 | SUR SS-34 C | <70 | | 1290 | 9180 | |
| | 30 | | 3:57 | SUR SS-35 A | <39 | | 466 | 6920 | |
| | 30 | | 4:00 | SUR SS-35 B | <39 | | 423 | 4900 | |
| | 30 | | 4:02 | SUR SS-35 C | — | | 296 | 5430 | |
| Am | 31 | | 4:03 | SUR SS-35 A | | 196 | | | |
| | 30 | | 4:04 | SUR SS-35 B | | 111 | | | |
| | 31 | | 4:06 | SUR SS-35 C | | 218 | | | |
| | 31 | | 4:07 | SUR SS-36 A | | 92.2 | | | |
| | 31 | | 4:08 | SUR SS-36 B | | 83.8 | | | |
| | 31 | | 4:09 | SUR SS-36 C | | 108. | | | |
| Cd | 30 | | 4:11 | SUR SS-36 A | <75 | | 1210 | 15.8K | |
| | 30 | | 4:13 | SUR SS-36 B | <68 | | 1060 | 13.0K | |
| | 30 | | 4:16 | SUR SS-36 C | <56 | | 812. | 14.5K | |
| Cd | 30 | | 4:19 | SLAG-5 | 319 | | 2050 | 22.0K | |
| | 30 | | 4:21 | SLAG-1 | 1150 | | 12.0K | 30.8K | |
| | 30 | | 4:24 | SLAG-2 | <370 | | 5090 | 57.4K | Cu 2020 |
| | 30 | | 4:27 | SLAG-3 | 862 | | 4390 | 28.1K | Cu 1540 |
| | 30 | | 4:30 | SLAG-4 | <84 | | 833 | 4800 | |
| | 30 | | 4:32 | SLAG-4 | <180 ~~<630~~ | | 1630 | 10.8K | |
| | 30 | | 4:35 | SLAG-6 | 291 | | 589 | 16.1K | |
| AM | | | 4:45 | SLAG-6 | ~~<65~~ | <65 | | | |
| | 31 | | 4:47 | SLAG-5 | | 172 | | | |
| | 31 | | 4:48 | SLAG-4 | | <61 | | | |
| | 31 | | 4:50 | SLAG-3 | | <93 | | | |
| | 31 | | 4:51 | SLAG-2 | | 345 | | | |
| | 30 | | 4:52 | SLAG-1 | | <96 | | | |
| | 31 | | 4:54 | SUR PS-1A | | <62 | | | |
| | 31 | | 4:55 | SUR PS-1B | | <59 | | | |
| | 31 | | 4:56 | SUR PS-1C | | <60 | | | |

Site: E. LaHarpe Smelter

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc |
|---|---|---|---|---|---|---|---|---|
| Cd | 30 | 3/23/05 | 4:59p | SUR PS-1A | <120 | | 2010 | 7060 |
| | 31 | | 5:01 | SUR PS-1B | 157 | | 2270 | 7880 |
| | 31 | | 5:03 | SUR PS-1C | <110 | | 2060 | 7420 |
| | 31 | | 5:06 | SUR PS-2A | <42 | | 252 | 737 |
| | 30 | | 5:08 | SUR PS-2B | <40 | | 212 | 678 |
| | 31 | | 5:11 | SUR PS-2C | <38 | | 225 | 662 |
| Am | 31 | | 5:12 | SUR PS-2A | | <50 | | |
| | 31 | | 5:13 | SUR PS-2B | | <36 | | |
| | 31 | | 5:14 | SUR PS-2C | | <50 | | |
| | 31 | | 5:15 | SUR-PS-3A | | <47 | | |
| | 31 | | 5:16 | SUR-PS-3B | | <45 | | |
| | 31 | | 5:17 | SUR-PS-3C | | <49 | | |
| Cd | 30 | | 5:19 | SUR-PS-3A | <39 | | 58.6 | 416 |
| | 30 | | 5:22 | SUR PS-3B | — | | 82.0 | 534 |
| | 30 | | 5:24 | SUR PS-3C | <37 | | 83.3 | 336 |
| | 30 | | 5:27 | SUR PS-4A | <34 | | 92.0 | 618. |
| | 30 | | 5:29 | SUR PS-4B | — | | 110. | 352. |
| | 30 | | 5:31 | SUR PS-4C | <32 | | 85.5 | 379. |
| Am | 31 | | 5:33 | SUR PS-4A | | <42 | | |
| | 31 | | 5:34 | SUR PS-4B | | <41 | | |
| | 30 | | 5:35 | SUR PS-4C | | <46 | | |
| | 32 | | 5:37 | SUR PS-5A | | <44 | | |
| | 31 | | 5:38 | SUR PS-5B | | <41 | | |
| | 31 | | 5:39 | SUR PS-5C | | <44 | | |
| Cd | 31 | | 5:42 | SUR PS-5A | <20 | | 40. | 185. |
| | 31 | | 5:44 | SUR PS-5B | <18 | | 30.5 | 176 |
| | 31 | | 5:47 | SUR PS-5C | <22 | | 50.3 | 195 |
| | 31 | | 5:50 | SUR PS-6A | — | | 191. | 757 |
| | 31 | | 5:52 | SUR PS-6B | <32 | | 179 | 736 |
| | 31 | | 5:55 | SUR PS-6C | <32 | | 215. | 842 |
| Am | 31 | | 5:56 | SUR PS-6A | | <45 | | |
| | 31 | | 5:57 | SUR PS-6B | | <48 | | |
| | 31 | | 5:58 | SUR PS-6C | | <43 | | |
| | | | | | | | | |

Site: E. LaHarpe Smelter

| | | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc |
|---|---|---|---|---|---|---|---|---|
| | 35 | | | | | | | |
| Am | 36 | 3/23/05 | 6:01 | SUR PS-7A | | <34 | | |
| | 31 | | 6:02 | SUR PS-7B | | <44 | | |
| | 31 | | 6:03 | SUR PS-7C | | <38. | | |
| Cd | 31 | | 6:05 | SUR PS-7A | — | | 141 | 450. |
| | 31 | | 6:08 | SUR PS-7B | <29 | | 112 | 440 |
| | 30 | | 6:13 | SUR PS-7C | <29 | | 140 | 332 |
| | 31 | | 6:16 | SUR PS-8A | — | | 184. | 501 |
| | 31 | | 6:18 | SUR PS-8B | — | | 211 | 598 |
| | 31 | | 6:21 | SUR PS-8C | — | | 187 | 525 |
| Am | 31 | | 6:22 | SUR PS-8A | | <37 | | |
| | 31 | | 6:23 | SUR PS-8B | | <43 | | |
| | 31 | | 6:24 | SUR PS-8C | | <36 | | |

Site: E. LaHarpe Smelter

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| Cd | 31 | 3/30/05 | 12:06A | HS-1 SS-1 | 92.4 | | 1070 | 8990 | |
| | 31 | | 12:08 | HS-1 SS-2 | <40 | | 169 | 1210 | |
| | 30 | | 12:11 | HS-1 SS-3 | <42 | | 184 | 1350 | |
| | 44 | | 12:15 | HS-2 SS-1 | 189 | | 4210 | 20.1K | |
| | 31 | | 12:17 | HS-2 SS-1 | <180 | | 3970 | 19.3K | |
| | 31 | | 12:20 | HS-2 SS-2 | <49 | | 300. | 903 | |
| | 30 | | 12:23 | HS-2 SS-3 | <35 | | 109. | 310 | |
| | 30 | | 12:25 | HS-3 SS-1 | 654 | | 10.7K | 55.3K | Hg 341 |
| | 31 | | 12:29 | HS-3 SS-2 | 596 | | 11.7K | 71.9K | Cu 2150 |
| | 30 | | 12:32 | HS-3 SS-3 | 608 | | 10.3K | 62 K | Hg 365./Cu 2090 |
| Am | 32 | | 12:44 | HS-1 SS-1 | | 91.2 | | | |
| | 31 | | 12:46 | HS-1 SS-2 | | <49 | | | |
| | 31 | | 12:47 | HS-1 SS-3 | | 63.8 | | | |
| | 30 | | 12:48 | HS-2 SS-1 | | <72 | | | |
| | 32 | | 12:49 | HS-2 SS-2 | | <51 | | | |
| | 31 | | 12:51 | HS-2 SS-3 | | <55 | | | |
| | 31 | | 12:52 | HS-3 SS-1 | | <75 | | | |
| | 32 | | 12:53 | HS-3 SS-2 | | 130 | | | |
| | 31 | | 12:55 | HS-3 SS-3 | | 112 | | | |
| Cd | 57 | | ~~7:45A~~ | ~~HS-4 SS-1~~ | <60 | | 1040 | 4090 | |
| | 31 | | 7:49A | HS-4 SS-2 | <28 | | 79.4 | 804 | |
| | 31 | | 7:52 | HS-4 SS-3 | <34 | | 132 | 501 | |
| 0-1' | 31 | | 7:55 | HS-5 SS-1 | <270 | | 6510 | 98.1K | |
| 1-2' | 31 | | 7:58 | HS-5 SS-2 | <58 | | 509 | 3290 | |
| 2-3 | 31 | | 8:01 | HS-5 SS-3 | <48 | | 331 | 3720 | |
| | 31 | | 8:04 | HS-6 SS-1 | <89 | | 1290 | 1990 | |
| | 31 | | 8:07 | HS-6 SS-2 | <95 | | 1370 | 10.6K | |
| Am | 31 | | 8:08 | HS-4 SS-1 | | <64 | | | |
| | 31 | | 8:09 | HS-4 SS-2 | | <50 | | | |
| | 31 | | 8:10 | HS-4 SS-3 | | <53 | | | |
| | 31 | | 8:12 | HS-5 SS-1 | | 147 | | | |
| | 32 | | 8:13 | HS-5 SS-2 | | <54 | | | |
| | 31 | | 8:14 | HS-5 SS-3 | | <55 | | | |
| | | | | | | | | | |

Site: E. LaHarpe Smelter

| | SS | Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| AM | 32 | 3/30/05 | 8:15 A | HS-6 SS-1 | | 64.7 | | | |
| 1'-1½' R | 31 | | 8:17 | HS-6 SS-2 | | 173. | | | |
| | 32 | | 8:29 | HS-7 SS-1 | | 153 | | | |
| | 31 | | 8:31 | HS-7 SS-2 | | 224 | | | |
| | 31 | | 8:32 | HS-7 SS-3 | | <55 | | | |
| Cd | 31 | | 8:34 | HS-7 SS-1 | <540 | | 22.6 K | 87.0 K | Hg 323/CU 3670 |
| | 31 | | 8:37 | HS-7 SS-2 | <150 | | 2900 | 22.2 K | Cu 1260 |
| | 31 | | 8:40 | HS-7 SS-3 | <61 | | 541 | 1980 | |
| | 31 | | 8:57 | HS-8 SS-1 | 110 | | 1650 | 10.5 K | |
| | 31 | | 8:59 | HS-8 SS-2 | <34 | | 105 | 724 | |
| | 31 | | 9:02 | HS-8 SS-3 | <37 | | 178 | 688 | |
| Am | 32 | | 9:03 | HS-8 SS-1 | | 162 | | | |
| | 31 | | 9:04 | HS-8 SS-2 | | <47 | | | |
| | 32 | | 9:05 | HS-8 SS-3 | | <49 | | | |

Burns & McDonnell
SINCE 1898

122199 Form GCO-28

Client _____ Page _____ of _____
Project _____ Date _____ Made By _____
Checked By _____
Preliminary _____ Final _____

| Time | Sample | Pb | Zn | Cd | As |
|---|---|---|---|---|---|
| 21:31 | HS-3 SS-1 (0-1) | 426/10 | 2490/33 | <75 | <21 |
| 21:20 | | | | | |
| 22:00 | HS4 SS1 (0-1) | 573/15 | 2195/38 | <94 | <30 |
| | HS4 SS2 (1-2) | 109/6 | 887/16 | <75 | 18/4 |
| | HS4-SS3 (2-3) | 61/5 | 5139/52 | <72 | <9 |
| | HS5-SS1 (0-1) | 2039/32 | 17385/180 | <96 | <54 |
| 22: | HS5-SS2 (1-2) | 1953/33 | 18370/205 | <103 | 92/19 |

End 3/31/05 std at 1:55 Pb 1124/18, Zn 324/11
As 85/12, Cd <75

| | | | | | | |
|---|---|---|---|---|---|---|
| 4/1/05 | GP1 | | | | | |
| 2:00 | GP1 | 0.1' | 12,065/163 | >10% | <118 | 279/56 |
| 4:02 | | 2.0 | 21/3 | 1258/26 | <68 | 7/2 |
| 05 | | 1.0 | 324/9 | 2660/32 | <67 | 42/6 |
| 14:10 | | 4.0 | 13/3 | 1810/25 | <67 | 9/2 |
| 14:12 | | 5.0 | 29/4 | 3836/42 | <69 | <8 |
| 14:15 | | 7.0 | <11 | 3327/41 | <75 | <7 |

10% Z

LaHarp 2

4WD trip to location -

| | | | | | |
|---|---|---|---|---|---|
| 14:30 | GP2 | 3095/39 | 47474/422 | 841/32 | 163/21 |
| | 0.5' | 64/4 | 3242/34 | 97/21 | 19/3 |
| | 1.5 | 23/4 | 228/10 | <77 | <8 |
| | 4.0 | 19/3 | 66/5 | <67 | 12/2 |
| | 5.0 | <10 | 52/5 | <69 | 10/2 |
| | 8.0 | | | | |

LaHarpe

| Site Name | Date | Operator | XRF/Niton | Page # |
|---|---|---|---|---|
| LA Harp | 4/1/05 | Conkad | | |

| Persons on Site | Representing Company | Weather Data |
|---|---|---|
| 1 | | Cost Nice windy |
| 2 | | |
| 3 | | 3:00pm |
| 4 | | |
| 5 | | |

| Sample # | Pb | Cd | Zn | Cr | Hg | As | Ba | Se | Ag | Notes | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~GPA3 (6.5)~~ | | | | | | | | | | | |
| GP3 (0-0.5) | 428 | 200 | 19794 | | | 107 | | | | 3:10 | Slag |
| ±STD | 13 | 19 | 133 | | | 9 | | | | | |
| (2.0) | 1366 | 109 | 7885 | | | 45 | | | | Slag | |
| ± | 18 | 22 | 66 | | | 11 | | | | | |
| (3.0) | 9 | <66 | 76 | | | 9 | | | | 3:15 | |
| ± | 3 | | 5 | | | 2 | | | | | |
| (4.0) | 16 | <67 | 65 | | | 7 | | | | | |
| ± | 3 | | 5 | | | 2 | | | | | |
| (5.0) | 14 | <67 | 53 | | | 9 | | | | | |
| ± | 3 | | 5 | | | 2 | | | | | |
| (7.0) | 18 | <65 | 52 | | | <6 | | | | | |
| ± | 3 | | 5 | | | | | | | | |
| End of Cores | | | | | | | | | | | |
| Start Bagging | | | 3:25 pm | | | | | | | | |
| SH LaHarp | | | | | | | | | | | |
| A Slag-2 | 1655 | <74 | 10369 | | | 118 | | | | | Damp |
| ± | 24 | | 101 | | | 15 | | | | | |
| B | 2575 | <66 | 12360 | | | 177 | | | | | |
| ± | 28 | | 101 | | | 16 | | | | | |
| A PS-8 LAnyon | 140 | 73 | 649 | | | <12 | | | | | Damp |
| | 6 | 22 | 14 | | | | | | | | |
| B | 154 | <68 | 737 | | | <13 | | | | 3:40 | |
| | 6 | | 16 | | | | | | | | |
| A PS-5 LAnyon | 16 | <74 | 252 | | | <7 | | | | 4:00 | Damp |
| ± | 4 | | 10 | | | | | | | | |
| B | 20 | <67 | 160 | | | 9 | | | | 4:02 | |
| | 3 | | 7 | | | 2 | | | | | |
| A PS-2 LAnyon | 147 | <63 | 1725 | | | <12 | | | | 4:06 | Damp |
| ± | 6 | | 23 | | | | | | | | |
| B | 206 | <75 | 1899 | | | 18 | | | | | |
| | 8 | | 30 | | | 5 | | | | | |
| A PS-6 LAnyon | 13 | <70 | 288 | | | 11 | | | | | Damp |
| | 3 | | 10 | | | 2 | | | | | |
| B | 15 | <61 | 281 | | | <6 | | | | | |
| | 3 | | 9 | | | | | | | | |
| A PS-7 LAnyon | 352 | <70 | 1532 | | | 19 | | | | | Damp |
| | 9 | | 24 | | | 6 | | | | | |
| B | 333 | <69 | 1381 | | | <18 | | | | | |
| | 9 | | 23 | | | | | | | | |

LaHarpe

Site: W+J Canyon Smelter / East Lathrop

| Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc | Notes |
|---|---|---|---|---|---|---|---|
| 3/30 | 20:00 | SURSS -15 A | <15 | 57/17 | 427/8 | 3605/31 | wet |
| 3/30 | 20:10 | SURSS - 15 A | 32/7 | <68 | 442/10 | 4892/49 | 2-SS-15A? |
| | | B | 35/8 | <68 | 649/12 | 5535/52 | 2-SS-13A |
| | | C | 36/8 | <66 | 758/13 | 7713/67 | 4 see next page |
| | 20:25 | HA2551 #8 (0-1) | 68/11 | <79 | 1010/18 | 11482/111 | Not Prep/sieved |
| | 20:30 | | 99/15 | <91 | 1267/24 | 31670/325 | |
| | 20:35 | | 68/11 | <75 | 922/17 | 8479/85 | |
| | 20:45 | SURSS - 14 A | 86/14 | <70 | 1434/24 | 12847/107 | |
| | 20:52 | B | 79/14 | 72/23 | 2162/25 | 15342/123 | |
| | 20:55 | C | 64/15 | 150/24 | 2189/26 | 20658/164 | |
| | 21:00 | SURSS - 16 A | <10 | <62 | 117/5 | 669/13 | Ag 69/13 |
| | 21:05 | B | <11 | <61 | 143/5 | 910/15 | Ag 50/13 |
| | 21:10 | C | 12/3 | <65 | 112/5 | 803/15 | Ag 77/13 |
| | 21:15 | D | <9 | <62 | 92/5 | 667/13 | |
| | 21:17 | SURSS - 13 A | 149/20 | 111/23 | 4453/41 | 22908/172 | |
| | 21:20 | B | 97/22 | 88/24 | 4924/48 | 24132/195 | |
| | 21:25 | C | 120/20 | <76 | 3601/40 | 17689/155 | |
| | 21:30 | SURSS - 19 A | 24/6 | <58 | 422/8 | 1869/22 | |
| | | B | <14 | <58 | 283/7 | 1236/18 | |
| | | C | <14 | <57 | 307/7 | 1952/23 | |
| | 21:44 | SURSS -20 A | <15 | <68 | 240/7 | 1282/20 | |
| | | B | 26/7 | <68 | 393/9 | 1700/24 | |
| | | C | 22/6 | <68 | 322/8 | 1391/21 | |
| | 22:00 | SURSS - 17 A | 11/3 | <60 | 91/4 | 616/12 | |
| | 22:02 | B | 14/3 | <61 | 63/4 | 411/10 | |
| | 22:05 | C | 12/3 | <60 | 112/5 | 649/13 | |
| | 22:15 | SURSS - 18 A | 24/7 | <60 | 632/11 | 4045/39 | |
| | | B | 37/8 | <64 | 685/12 | 4618/44 | |
| | | C | 42/7 | <64 | 631/11 | 3893/39 | |
| East Lathrop | 3/31 | 8:05 | Sed - 1 A | 13/4 | 73/20 | 181/6 | 2087/24 |
| | | 8:09 | B | 16/4 | <59 | 190/6 | 2109/24 |
| East Lathrop | | 8:12 | Sed -2 A | 24/6 | 102/20 | 498/9 | 4434/40 |
| | | 8:15 | B | 19/6 | 89/20 | [illegible] | 4481/30 |
| | | | | | 515/9 | | |

Site: WJS Canyon Smelter / East Calhoun / SH Canyon

Notes

| | Date | Time | Sample Location | | Arsenic | Cadmium | Lead | Zinc | |
|---|---|---|---|---|---|---|---|---|---|
| East Calhoun | 3/31/05 | 8:26 | Sed -3 | A | 52/14 | <63 | 2731/26 | 9805/76 | |
| | 3/31/05 | 8:28 | Sed -3 | B | 62/14 | <62 | 2622/25 | 9032/70 | |
| Sediments | 3/31/05 | 8:30 | Sed - 4 | A | 10/3 | <56 | 84/4 | 469/10 | |
| | 3/31/05 | 8:32 | Sed -4 | B | 9/3 | <56 | 83/4 | 459/10 | |
| | 3/31 | 8:34 | Sed - 5 | A | 12/3 | <57 | 91/4 | 285/8 | |
| | 3/31 | 8:36 | Sed - 5 | B | 11/3 | <57 | 83/4 | 280/8 | |
| WJS Prepped | 3/31 | 8:38 | HS2-SS1 #8 (0-1) | A | 71/10 | <71 | 936/15 | 5761/52 | Sived - other sample was wet |
| | 3/31 | 8:40 | | B | 66/11 | 94/25 | 1077/17 | 6217/62 | |
| SH ~~Calhoun~~ Canyon | 3/31 | 8:47 | HS2SS3 (2-3') | A | 14/3 | <58 | 46/4 | 318/8 | |
| | 3/31 | 8:50 | | B | 14/3 | <59 | 49/4 | 269/8 | |
| Purged | 3/31 | 8:55 | HS1SS3 (2-3') | A | 9/2 | <57 | 36/3 | 1578/19 | open |
| | 3/31 | 8:58 | | B | 11/2 | <56 | 42/3 | 1695/20 | open |
| | 3/31 | 9:03 | | C | 8/2 | <58 | 43/3 | 1884/22 | Bagged |
| | 3/31 | 9:05 | HS1SS1 (0-1) | A | 11/3 | <60 | 134/5 | 2047/23 | |
| | 3/31 | 9:12 | | B | 15/3 | <59 | 130/5 | 2327/25 | |
| | 3/31 | 9:15 | HS1SS2 (1-2) | A | 17/3 | <66 | 44/4 | 1412/21 | |
| | 3/31 | 9:17 | | B | 18/3 | <65 | 40/4 | 1664/23 | |
| | 3/31 | 9:20 | HS2SS1 (0-1) | A | ~~[illegible]~~ 20 | <56 | ~~[illegible]~~ 6/5 | 15441 ~~[illegible]~~ | ? Fe? |
| | 3/31 | 9:25 | | B | 14/3 | <56 | 138/5 | 1033/15 | |
| | 3/31 | 9:30 | | C | <10 | <56 | 128/5 | 973/14 | |
| | 3/31 | 9:35 | HS4SS3 (2-3) | A | 15/3 | <60 | 63/4 | 779/14 | |
| | 3/31 | 9:37 | | B | 12/3 | <60 | 73/4 | 743/13 | |
| | 3/31 | 9:45 | HS4SS2 (1-2) | A | <14 | <61 | 276/7 | 2453/27 | |
| | 3/31 | 10:00 | HS4SS1 (0-1) | A | <13 | 64 | 267/6 | 1823/21 | |
| | 3/31 | 10:05 | HS3SS1 (0-1) | A | 48/6 | <75 | 304/9 | 2041/29 | |
| | 3/31 | 10:15 | HS1SS1 (0-1) | A | <9 | <56 | 109/4 | 552/11 | |
| | 3/31 | 10:25 | HS1SS2 (1-2) | A | 10/2 | <58 | 29/3 | 506/10 | |
| | 3/31 | 10:30 | HS1SS3 (2-3) | A | 13/3 | <62 | 48/4 | 468/11 | Ag 84/13 |

| RSK Values | | | | | |
|---|---|---|---|---|---|
| | Res → | 11 | 39 | 400 | 23000 |
| | Non Res → | 38 | 1000 | 1000 | 610000 |

Calibration

Site: E. LaHarpe Smelter

Red - Cd 109 - Pb
Yellow - Am 241 - Cd

| Date | Time | Sample Location | Arsenic | Cadmium | Lead | Zinc |
|---|---|---|---|---|---|---|
| 3/22/05 | 2:08p | MED STD | 88.1 | | 1060 | 304. |
| | 4:22 | MED STD | | 91.7 | | |
| | 4:25 | MED STD | 85. | | 1060 | 331 |
| | | Pb PD | 8.8% | | | |
| | | | | | | |
| | | Leak Check 16:30 OK | | | | |
| | | | | | | |
| 3/23/05 | 7:48A | MED STD | 95. | | 1080. | 317 |
| | 2:25p | MED STD | 86.8 | | 1110 | 331 |
| | 4:42p | MED STD | <84 | | 1120 | 318 |
| | 6:31p | MED STD | <81 | | 1120 | 325 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 3/28/05 | 3:06p | MED STD | | | 1060 | |
| 3/29/05 | 11:58p | Med Std | 119 | | 1100 | 317 |
| 3/30/05 | 1:05A | Med Std | 132 | | 1070 | 308 |
| 3/30/05 | 7:39A | Med Std | <84 | | 1150 | 310 |
| 3/30/05 | 9:13A | Med Std | 104 | | 1040 | 309 |
| w+5 ~~3/30~~ | ~~22:30~~ | ~~Med Std~~ | ~~95/10~~ | ~~90/21~~ | ~~1153/15~~ | ~~327/9~~ |

# APPENDIX D

## Boring Logs

# Drilling Log

| Project Name | Project Number | Boring Number |
|---|---|---|
| KDHE - Eat La Harpe | 35833 | GP-1 |

| Ground Elevation | Location | Page |
|---|---|---|
| | La Harpe, KS | 1 |

| Air Monitoring Equipment | Total Footage |
|---|---|
| NA | ~~4-1-05~~ 7.6' |

| Drilling Type | Hole Size | Overburden Footage | Bedrock Footage | No. of Samples | No. of Core Boxes |
|---|---|---|---|---|---|
| DIRECT-PUSH | 2" | | | | |

| Drilling Company | Driller(s) |
|---|---|
| EPS | Ryan Wixon, Sean Estrella |

| Drilling Rig | Type of Sampler |
|---|---|
| TRUCK-MOUNTED GEOPROBE | MACROCORE |

| Date | To | Field Observer(s) |
|---|---|---|
| 4-1-05 | 4-1-05 | K. Schutte, C. Conrad |

| Depth (feet) | Description | Class | Blow Count | Recov. | Run/ Time | Sample Desig. | PID (ppm) BZ | PID (ppm) BH | PID (ppm) S | Remarks/ Water Levels |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILTS, TRACE GRAVELS, BLACK (10YR 2/1), NON PLASTIC, SOFT, DAMP. -BRICK FRAGMENTS. | | | | | | | | | START: 1335' |
| 1 | SANDY CLAY W/ SILT, Light Brown (5YR 5/6), NON-PLASTIC, SOFT, DRY. | | | 2.8/4.0 | | | | | | |
| 2 | SILTY CLAY, MODERATE BROWN (5YR 4/4), MED PLASTIC, MED CONSISTENCY, DRY TO DAMP. | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | SANDY CLAY, Light Brown (5YR 5/6), MED PLASTIC, MED. CONSISTENCY, DAMP. | | | | | | | | | |
| 5 | | | | 3.0/4.0 | | | | | | |
| 6 | -DAMP TO MOIST | | | | | | | | | |
| 7 | LIMESTONE CHUNKS | | | | | | | | | END: 1350 |
| 8 | REFUSAL @ 7.6' BGS | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |

BZ=Breathing Zone BH=Bore Hole S=Sample

Burns & McDonnell SINCE 1898

051601 Form WCD-2-1

# Drilling Log

| | | |
|---|---|---|
| Project Name: KDHE - East La Harpe | Project Number: 35833 | Boring Number: GP-2 |
| Ground Elevation: | Location: LA HARPE, KS | Page: 1 |
| Air Monitoring Equipment: N/A | | Total Footage: 8.5' |

| Drilling Type | Hole Size | Overburden Footage | Bedrock Footage | No. of Samples | No. of Core Boxes |
|---|---|---|---|---|---|
| DIRECT-PUSH | 2" | | | | |

| | |
|---|---|
| Drilling Company: EPS | Driller(s): R. Weisa, S. Estrada |
| Drilling Rig: TRUCK-MOUNTED GEOPROBE | Type of Sampler: MACROCORE |
| Date: 4-1-05 To: 4-1-05 | Field Observer(s): K. Schutte, C. Conrad |

| Depth (feet) | Description | Class | Blow Count | Recov. | Run/ Time | Sample Desig. | PID (ppm) BZ | PID (ppm) BH | PID (ppm) S | Remarks/ Water Levels |
|---|---|---|---|---|---|---|---|---|---|---|
| | FILL MATERIAL, SILTS, BLACK (10 YR 2/1), NON-PLASTIC, SOFT, DAMP. | | | | | | | | | START: 1420 |
| 1 | - PIECES OF SLAG. | | | 3.6/4.0 | | | | | | |
| | - CHUNKS OF GLASS | | | | | | | | | |
| 2 | SILTY CLAY, VERY DARK BROWN (10 YR 2/2), MED. PLASTIC, DAMP, SOFT CONSISTENCY, | | | | | SS-1 2.0-2.5' | | | | |
| 3 | - TRACE SAND. | | | | | | | | | |
| 4 | CLAY, TRACE SILT, TRACE SAND, BROWN (10 YR 4/3) TRACE to MED. PLASTIC, DRY to DAMP. | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | 3.5/4.0 | | | | | | |
| 7 | | | | | | | | | | |
| 8 | CLAY, REDDISH BROWN, HIGHLY PLASTIC, MED. CONSISTENCY, DAMP. | | | | | | | | | END: 1435 |
| | REFUSAL @ 8.5' BGS | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |

BZ=Breathing Zone BH=Bore Hole S=Sample

Burns & McDonnell SINCE 1898

051601 Form WCD-2-1

# Drilling Log

| Project Name | Project Number | Boring Number |
|---|---|---|
| KDHE · Former La Harpe | 35833 | GP-3 |
| **Ground Elevation** | **Location** | **Page** |
| | La Harpe, KS | 1 |
| **Air Monitoring Equipment** | | **Total Footage** |
| N/A | | 8.0' |

| Drilling Type | Hole Size | Overburden Footage | Bedrock Footage | No. of Samples | No. of Core Boxes |
|---|---|---|---|---|---|
| Direct-Push | 2" | | | | |

| | |
|---|---|
| **Drilling Company** EPS | **Driller(s)** S. Estrell, R. Wesler. |
| **Drilling Rig** Truck-mounted Geoprobe | **Type of Sampler** Macrocore |
| **Date** 4-1-05 **To** 4-1-05 | **Field Observer(s)** K. Schotte, C. Conrad |

| Depth (feet) | Description | Class | Blow Count | Recov. | Run/ Time | Sample Desig. | PID (ppm) BZ | PID (ppm) BH | PID (ppm) S | Remarks/ Water Levels |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fill material, coal embers? | | | | | | | | | START: 1445' |
| 1 | Silty clay, dark brown (10YR 2/2), med plastic, damp, soft consistency | | | 3.6/4.0 | | | | | | |
| | - Region - slag waste - | | | | | | | | | |
| 2 | Silts, trace brick fragments, black (10YR 2/1), non plastic, soft, damp. | | | | | | | | | |
| | - Damp to moist - | | | | | | | | | |
| 3 | Silty clay, very dark brown (10YR 2/2), higher plastic, soft to med. consistency. Damp to moist. | | | | 1510 | SS-1 + DUP-1 | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | 2.7/4.0 | | | | | | |
| 6 | - trace sand - | | | | | | | | | |
| 7 | - limestone chunks - | | | | | | | | | END: 1500 |
| 8 | Refusal @ 8.0' bgs | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |

BZ=Breathing Zone BH=Bore Hole S=Sample

Burns & McDonnell

051601 Form WCD-2-1

# APPENDIX E

## Laboratory Analytical Results

ENVIRONMENTAL
SCIENCE CORP.

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-01

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SED-1

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/22/05 16:15

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 5.9 | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 41. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 100 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 1000 | 1.5 | mg/kg | 6010B | 03/31/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 04/02/05 18:02 Printed: 04/04/05 11:56

ENVIRONMENTAL
SCIENCE CORP.

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-02

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SED-2

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/22/05 16:30

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 13. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 60. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 240 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 3600 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
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SCIENCE CORP.

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Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-03

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SLAG-1

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/23/05 09:50

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 460 | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 130 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 29000 | 25. | mg/kg | 6010B | 03/31/05 | 100 |
| Zinc | 44000 | 150 | mg/kg | 6010B | 03/31/05 | 100 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-04

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : HS-1 SS-1 0-1 FT

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/23/05 14:05

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 91. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 43. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 1400 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 12000 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-05

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : HS-1 SS-2 1-2 FT

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/23/05 14:10

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 12. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 2.3 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 76. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 560 | 1.5 | mg/kg | 6010B | 03/31/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-06

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : HS-2 SS-1 0-1 FT

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/23/05 14:40

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 40. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 20. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 1200 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 6900 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-07

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : HS-3 SS-1 0-1 FT

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/23/05 15:10

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 110 | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 55. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 5900 | 2.5 | mg/kg | 6010B | 03/31/05 | 10 |
| Zinc | 18000 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-08

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : HS-7 SS-1 0-1 FT

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 08:05

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 42. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 55. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 12000 | 2.5 | mg/kg | 6010B | 03/31/05 | 10 |
| Zinc | 19000 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-09

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SED-3

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 08:50

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 10. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 24. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 400 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 11000 | 15. | mg/kg | 6010B | 03/31/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-10

Site ID :

Project # : 35833

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Sample ID : SUR SS-1

Collected By : Keith Schutte
Collection Date : 03/24/05 08:55

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 340 | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 94. | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 4700 | 2.5 | mg/kg | 6010B | 03/31/05 | 10 |
| Zinc | 30000 | 150 | mg/kg | 6010B | 04/02/05 | 100 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2008, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-11

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SUR SS-11

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 09:00

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 97. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 110 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 8800 | 2.5 | mg/kg | 6010B | 03/31/05 | 10 |
| Zinc | 48000 | 150 | mg/kg | 6010B | 04/02/05 | 100 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193049-12

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SUR SS-15

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 09:05

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 76. | 1.0 | mg/kg | 6010B | 03/31/05 | 1 |
| Cadmium | 180 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Lead | 2200 | 0.25 | mg/kg | 6010B | 03/31/05 | 1 |
| Zinc | 18000 | 15. | mg/kg | 6010B | 04/01/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
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Burns & McDonnell
SINCE 1898

# Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell Engineering
9400 Ward Parkway
Kansas City, Missouri 64114
Phone: (816) 333-8787 Fax: (816) 822-3463

Attention: Trevor Gustafson

Laboratory: ESC
Address: 12065 Lebanon Rd
City/State/Zip: Mt. Juliet, TN 37122
Telephone:

Document Control No:
Lab. Reference No. or Episode No.:

Project Number: 35833
Client Name: KDHE - LA HARPE SMELTER

| Sample Number: Group or SWMU Name | Sample Number: Sample Point | Sample Number: Sample Designator | Sample Event: Round | Sample Event: Year | Sample Depth (in feet): From | Sample Depth (in feet): To | Sample Collected: Date | Sample Collected: Time | Sample Type: Matrix: Liquid | Sample Type: Matrix: Solid | Sample Type: Matrix: Gas | Number of Containers | Analysis: Lead | Analysis: Zinc | Analysis: Cadmium | Analysis: Arsenic | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SED-1 | | | | | | 3-22 | 1615 | | X | | 1 | X | X | | | | | L193049-01 |
| | SED-2 | | | | | | 3-22 | 1630 | | X | | 1 | X | X | | | | | -02 |
| | SLAG-1 | | | | | | 3-23 | 0950 | | X | | 1 | X | X | | | | | -03 |
| | HS-1 | SS-1 | | | 0' | 1' | 3-23 | 1405 | | X | | 1 | X | X | | | | | -04 |
| | HS-1 | SS-2 | | | 1' | 2' | 3-23 | 1410 | | X | | 1 | X | X | | | | | -05 |
| | HS-2 | SS-1 | | | 0' | 1' | 3-23 | 1440 | | X | | 1 | X | X | | | | | -06 |
| | HS-3 | SS-1 | | | 0' | 1' | 3-23 | 1510 | | X | | 1 | X | X | | | | | -07 |
| | HS-7 | SS-1 | | | 0' | 1' | 3-24 | 0805 | | X | | 1 | X | X | | | | | -08 |
| | SED-3 | | | | | | 3-24 | 0850 | | X | | 1 | X | X | | | | | -09 |
| | SUR SS-1 | | | | | | 3-24 | 0855 | | X | | 1 | X | X | | | | | -10 |
| | SUR SS-11 | | | | | | 3-24 | 0900 | | X | | 1 | X | X | | | | | -11 |
| | SUR SS-15 | | | | | | 3-24 | 0905 | | X | | 1 | X | X | | | | | -12 |

Sampler (signature): Keith Schutte
Sampler (signature):
Special Instructions: dk

Relinquished By (signature): 1. Date/Time 3-25/1815
Received By (signature): Date/Time
Ice Present in Container: Yes ☐ No ☐
Temperature Upon Receipt:

Relinquished By (signature): 2. Date/Time
Received By (signature): Date/Time 3/24/05
Laboratory Comments: 10:00 SWK 12 containers 3.1°

052501 Form WCD-KC1

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 16, 2005

ESC Sample # : L194335-01

Date Received : April 06, 2005
Description : KDHE - East La Harpe

Site ID :

Sample ID : GP-1 SS-1 .5-1FT

Project # : 35833

Collected By :
Collection Date : 04/01/05 14:00

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 85. | 1.0 | mg/kg | 6010B | 04/13/05 | 1 |
| Cadmium | 57. | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Lead | 9400 | 2.5 | mg/kg | 6010B | 04/13/05 | 10 |
| Zinc | 61000 | 150 | mg/kg | 6010B | 04/15/05 | 100 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 16, 2005

ESC Sample # : L194335-02

Date Received : April 06, 2005
Description : KDHE - East La Harpe

Site ID :

Sample ID : GP-2 SS-1 2-2.5FT

Project # : 35833

Collected By :
Collection Date : 04/01/05 14:45

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | 1.9 | 1.0 | mg/kg | 6010B | 04/13/05 | 1 |
| Cadmium | 71. | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Lead | 95. | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Zinc | 2400 | 1.5 | mg/kg | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 16, 2005

ESC Sample # : L194335-03

Date Received : April 06, 2005
Description : KDHE - East La Harpe

Site ID :

Sample ID : GP-3 SS-1 2.5-3.5F

Project # : 35833

Collected By :
Collection Date : 04/01/05 15:10

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 1.0 | mg/kg | 6010B | 04/13/05 | 1 |
| Cadmium | 1.1 | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Lead | 11. | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Zinc | 260 | 1.5 | mg/kg | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
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Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 16, 2005

ESC Sample # : L194335-04

Date Received : April 06, 2005
Description : KDHE - East La Harpe

Site ID :

Sample ID : DUP-1 SS-1

Project # : 35833

Collected By :
Collection Date : 04/01/05 00:00

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 1.0 | mg/kg | 6010B | 04/13/05 | 1 |
| Cadmium | 0.87 | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Lead | 7.1 | 0.25 | mg/kg | 6010B | 04/12/05 | 1 |
| Zinc | 71. | 1.5 | mg/kg | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 16, 2005

ESC Sample # : L194335-05

Date Received : April 06, 2005
Description : KDHE - East La Harpe

Site ID :

Sample ID : RINSATE BLANK

Project # : 35833

Collected By :
Collection Date : 04/01/05 15:20

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/09/05 | 1 |
| Cadmium | BDL | 0.0050 | mg/l | 6010B | 04/09/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/09/05 | 1 |
| Zinc | BDL | 0.030 | mg/l | 6010B | 04/09/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
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Attachment A
List of Analytes with QC Qualifiers

| Sample # | Analyte | Qualifier |
|---|---|---|
| L194335-01 | Arsenic | J3 |
| L194335-02 | Arsenic | J3 |
| L194335-03 | Arsenic | J3 |
| L194335-04 | Arsenic | J3 |

Attachment B
Explanation of QC Qualifier Codes

| Qualifier | Meaning |
|---|---|
| J3 | The associated batch QC was outside the established quality control range for precision. |

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods,it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable unless qualified as 'R' (Rejected).

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

| | Control Limits | | | | (AQ) | (SS) |
|---|---|---|---|---|---|---|
| 2-Fluorophenol | 31-119 | Nitrobenzene-d5 | 43-118 | Dibromfluoromethane | 79-126 | 83-119 |
| Phenol-d5 | 12-134 | 2-Fluorobiphenyl | 45-128 | Toluene-d8 | 81-114 | 82-116 |
| 2,4,6-Tribromophenol | 51-141 | Terphenyl-d14 | 43-137 | 4-Bromofluorobenzene | 65-129 | 72-126 |

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Burns & McDonnell
SINCE 1898

# Request for Chemical Analysis and Chain of Custody Record

8418 3713 8784

Burns & McDonnell Engineering
9400 Ward Parkway
Kansas City, Missouri 64114
Phone: (816) 333-8787 Fax: (816) 822-3463

Attention: TREVOR GUSTAFSON

Laboratory: ESC
Address:
City/State/Zip:
Telephone:

Document Control No:
Lab. Reference No. or Episode No.:

Project Number: 35833

Client Name: KDHE - EAST LA HARPE SITE

| Sample Number | | | Sample Event | | Sample Depth (in feet) | | Sample Collected | | Sample Type: Matrix | | | Number of Containers | Analysis: Pb, Lead, Zinc, Arsenic, Cadmium | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Group or SWMU Name | Sample Point | Sample Designator | Round | Year | From | To | Date | Time | Liquid | Solid | Gas | | | | | | | | |
| | GP-1 | SS-1 | | | 0.5' | 1.0' | 4-1-05 | 1400 | | X | | 1 | X | X | | | | | L194335-01 |
| | GP-2 | SS-1 | | | 2.0' | 2.5' | " | 1445 | | X | | 1 | X | X | | | | | 02 |
| | GP-3 | SS-1 | | | 2.5' | 3.5' | " | 1510 | | X | | 1 | X | X | | | | | 03 |
| | DUP-1 | SS-1 | | | — | — | " | — | | X | | 1 | X | X | | | | | 04 |
| | RINSATE | BLANK | | | — | — | 4-1 | 1520 | X | | | 1 | X | X | | | | | NOT FILTERED ($HNO_3$) 05 |

Sampler (signature):

Sampler (signature):

Special Instructions: Each sample soils in seperate ziplock

Relinquished By (signature): 1.
Date/Time: 4-5 1700

Received By (signature):
Date/Time:

Ice Present in Container: Yes ☐ No ☐

Temperature Upon Receipt:

Relinquished By (signature): 2.
Date/Time:

Received By (signature): 4/6/05 9:00
Date/Time:

Laboratory Comments: custody seal in tact. 5 containers 3.5° 1<2

052501 Form WCD-KC1

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 15, 2005

ESC Sample # : L194952-01

Date Received : April 12, 2005
Description : KDHE - East LA HARPE

Site ID :

Sample ID : GP-1

Project # : 35833

Collected By :
Collection Date : 04/08/05 15:15

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic,Dissolved | BDL | 0.020 | mg/l | 6010B | 04/13/05 | 1 |
| Cadmium,Dissolved | 0.20 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Lead,Dissolved | 0.037 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Zinc,Dissolved | 35. | 0.30 | mg/l | 6010B | 04/15/05 | 10 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 15, 2005

ESC Sample # : L194952-02

Date Received : April 12, 2005
Description : KDHE - East LA HARPE

Site ID :

Sample ID : GP-2

Project # : 35833

Collected By :
Collection Date : 04/08/05 15:35

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic,Dissolved | BDL | 0.020 | mg/l | 6010B | 04/13/05 | 1 |
| Cadmium,Dissolved | 0.048 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Lead,Dissolved | 0.0085 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Zinc,Dissolved | 1.3 | 0.030 | mg/l | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 15, 2005

ESC Sample # : L194952-03

Date Received : April 12, 2005
Description : KDHE - East LA HARPE

Site ID :

Sample ID : GP-3

Project # : 35833

Collected By :
Collection Date : 04/08/05 15:50

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic,Dissolved | BDL | 0.020 | mg/l | 6010B | 04/13/05 | 1 |
| Cadmium,Dissolved | BDL | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Lead,Dissolved | 0.013 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Zinc,Dissolved | 1.7 | 0.030 | mg/l | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 15, 2005

ESC Sample # : L194952-04

Date Received : April 12, 2005
Description : KDHE - East LA HARPE

Site ID :

Sample ID : DUP-2

Project # : 35833

Collected By :
Collection Date : 04/08/05 00:00

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic,Dissolved | BDL | 0.020 | mg/l | 6010B | 04/13/05 | 1 |
| Cadmium,Dissolved | 0.049 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Lead,Dissolved | 0.0092 | 0.0050 | mg/l | 6010B | 04/13/05 | 1 |
| Zinc,Dissolved | 1.2 | 0.030 | mg/l | 6010B | 04/13/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
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Reported: 04/15/05 11:44 Printed: 04/15/05 11:45

Burns & McDonnell SINCE 1898

# Request for Chemical Analysis and Chain of Custody Record

BURNSMCKC- KDHE

Burns & McDonnell Engineering
9400 Ward Parkway
Kansas City, Missouri 64114
Phone: (816) 333-8787 Fax: (816) 822-3463

Attention: TREVOR GUSTAFSON

Laboratory: ESC
Address: 12065 Lebanon Rd
City/State/Zip: Mt. Juliet, TN 37122
Telephone: 800 767 5859

Document Control No:
Lab. Reference No. or Episode No.:

Project Number: 35833

Client Name: KDHE- East La HARPE

| Sample Number: Group or SWMU Name | Sample Number: Sample Point | Sample Number: Sample Designator | Sample Event: Round | Sample Event: Year | Sample Depth (in feet): From | Sample Depth (in feet): To | Sample Collected: Date | Sample Collected: Time | Matrix: Liquid | Matrix: Solid | Matrix: Gas | Number of Containers | Analysis: Lead | Analysis: Arsenic | Analysis: Cadmium | Analysis: Zinc | | | L194952 Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | GP-1 | GW-1 | | | | | 4-8 | 1515 | X | | | 1 | X | X | | | | | Filtered -01 |
| | GP-2 | GW-1 | | | | | 4-8 | 1535 | X | | | 1 | X | X | | | | | Filtered -02 |
| | GP-3 | GW-1 | | | | | 4-8 | 1550 | X | | | 1 | X | X | | | | | Filtered -03 |
| | DUP-2 | GW-1 | | | | | 4-8 | — | X | | | 1 | X | X | | | | | Filtered -04 |

Sampler (signature):

Sampler (signature):

Special Instructions: All samples field filtered

| Relinquished By (signature) | Date/Time | Received By (signature) | Date/Time |
|---|---|---|---|
| 1. Trevor Gustafson | 4/10/05 0900 | [signature] | |
| 2. | | [signature] | 4/12/05 0745 |

Ice Present in Container: Yes ☐ No ☐

Temperature Upon Receipt: 3.2°C

Laboratory Comments:

CC 4-8R

052501 Form WCD-KC1

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193054-01

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SW-1

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/22/05 16:10

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/02/05 | 1 |
| Cadmium | BDL | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Zinc | 0.069 | 0.030 | mg/l | 6010B | 04/02/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193054-02

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SW-2

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/22/05 16:25

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/02/05 | 1 |
| Cadmium | 0.041 | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Zinc | 1.8 | 0.030 | mg/l | 6010B | 04/02/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193054-03

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SW-3

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 08:45

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/02/05 | 1 |
| Cadmium | 0.055 | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/02/05 | 1 |
| Zinc | 1.8 | 0.030 | mg/l | 6010B | 04/02/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

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REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193054-04

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SW-4

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 09:20

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/01/05 | 1 |
| Cadmium | BDL | 0.0050 | mg/l | 6010B | 04/01/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/01/05 | 1 |
| Zinc | 0.078 | 0.030 | mg/l | 6010B | 04/01/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ -0612, MN - 047-999-395, NY - 11742, NJ - 81002, WI - 998093910

Note:
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 04/04/05 13:46 Printed: 04/04/05 17:30

ENVIRONMENTAL
SCIENCE CORP.

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Trevor Gustafson
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114

April 04, 2005

ESC Sample # : L193054-05

Date Received : March 26, 2005
Description : KDHE - La Harpe Smelter

Site ID :

Sample ID : SW-5

Project # : 35833

Collected By : Keith Schutte
Collection Date : 03/24/05 09:30

| Parameter | Result | Det. Limit | Units | Method | Date | Dil. |
|---|---|---|---|---|---|---|
| Arsenic | BDL | 0.020 | mg/l | 6010B | 04/01/05 | 1 |
| Cadmium | BDL | 0.0050 | mg/l | 6010B | 04/01/05 | 1 |
| Lead | BDL | 0.0050 | mg/l | 6010B | 04/01/05 | 1 |
| Zinc | 0.046 | 0.030 | mg/l | 6010B | 04/01/05 | 1 |

Tom Mellette, ESC Representative

BDL - Below Detection Limit
Det. Limit - Estimated Quantitation Limit(EQL)

Laboratory Certification Numbers:
AIHA - 100789, AL - 40660, CA - I-2327, CT- PH-0197, FL - E87487, GA - 923, IN - C-TN-01
KY - 90010, KYUST - 0016, NC - ENV375,DW21704, ND - R-140, SC - 84004, TN - 2006, VA - 00109, WV - 233
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Burns & McDonnell
SINCE 1898

# Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell Engineering
9400 Ward Parkway
Kansas City, Missouri 64114
Phone: (816) 333-8787 Fax: (816) 822-3463

Attention: Trevor Gustafson

Laboratory: ESC
Address: 12065 Lebanon Rd
City/State/Zip: Mt. Juliet, TN 37122
Telephone:

Document Control No:
Lab. Reference No. or Episode No.:

Project Number: 35833
Client Name: KOHE - LA HARPE SMELTER

| Sample Number: Group or SWMU Name | Sample Number: Sample Point | Sample Number: Sample Designator | Sample Event: Round | Sample Event: Year | Sample Depth (in feet): From | Sample Depth (in feet): To | Sample Collected: Date | Sample Collected: Time | Sample Type: Matrix: Liquid | Matrix: Solid | Matrix: Gas | Number of Containers | Analysis: Lead | Analysis: Zinc | Analysis: Cadmium | Analysis: Arsenic | | | Remarks (L193054) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SW-1 | | | | | | 3-22 | 1610 | X | | | 1 | X | X | | | | | w/ $HNO_3$ -01 |
| | SW-2 | | | | | | 3-22 | 1625 | X | | | 1 | X | X | | | | | w/ $HNO_3$ -02 |
| | SW-3 | | | | | | 3-24 | 0845 | X | | | 1 | X | X | | | | | w/ $HNO_3$ -03 |
| | SW-4 | | | | | | 3-24 | 0920 | X | | | 1 | X | X | | | | | w/ $HNO_3$ -04 |
| | SW-5 | | | | | | 3-24 | 0930 | X | | | 1 | X | X | | | | | w/ $HNO_3$ -05 |

Sampler (signature): Keith Schutte
Sampler (signature):
Special Instructions:

Relinquished By (signature): 1. — Date/Time: 3/25 / 1815
Received By (signature): — Date/Time:

Relinquished By (signature): 2. — Date/Time:
Received By (signature): — Date/Time: 3/24/05

Ice Present in Container: Yes ☐ No ☐
Temperature Upon Receipt:

Laboratory Comments: 10:00 SWA SBR / < 2 / 3.1°

052501 Form WCD-KC1