KSB000704241
CHERRYVALE RODEO

Site: Cherryvale Rodeo
ID # KSB000704241
Break: 1.5
Other:
9-5-01

BROWNFIELDS TARGETED ASSESSMENT (BTA) FOR THE CHERRYVALE RODEO GROUNDS PROPERTY, CHERRYVALE, MONTGOMERY COUNTY, KANSAS

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT (KDHE)
BUREAU OF ENVIRONMENTAL REMEDIATION (BER)
REMEDIAL SECTION, SITE ASSESSMENT UNIT
FORBES FIELD
BUILDING 740
TOPEKA, KANSAS 66620

40066017
SUPERFUND RECORDS

BROWNFIELDS TARGETED ASSESSMENT (BTA) FOR THE CHERRYVALE RODEO GROUNDS PROPERTY, CHERRYVALE, MONTGOMERY COUNTY, KANSAS

SEPTEMBER, 2001

SITE RECONNAISSANCE AND FIELD WORK BY:

Randolph L. Brown, Environmental Geologist, Project Manager and Radiation Safety Officer
Peter Haxton, Environmental Technician and Health and Safety Officer
Travis Kogl, Quality Assurance Officer

CHERRYVALE RODEO GROUNDS BROWNFIELDS TARGETED ASSESSMENT
TABLE OF CONTENTS

Section and Title:	Page:
SECTION 1: INTRODUCTION	1
SECTION 2: SITE LOCATION, DESCRIPTION, OPERATIONAL HISTORY	1
Section 2.0 Site Location	1
Section 2.1 Climate	1
Section 2.2 Site Description	2
Section 2.3 Site History	2
Section 2.4 Hazardous Substance Characteristics	3
SECTION 3: BTA Field Activities	3
Section 3.0 Phase I Activities	3
Section 3.1 Phase II Activities	3
Section 3.1.0 Geophysical Survey	3
Section 3.1.1 Soil Sampling	4
Section 3.1.2 *In-Situ* XRF Analysis	4
Section 3.1.3 Field Quality Control (QC) XRF Samples	4
Section 3.1.4 Ground Water Sampling	4
Section 3.1.5 Quality Control (QC) Samples	5
SECTION 4: ANALYTICAL RESULTS	5
Section 4.0 Geophysical Survey Results	5
Section 4.1 Soil Analytical Results	5
Section 4.2 Quality Control Sample Results	6
SECTION 5: ANALYTICAL CONCLUSIONS	7
Section 5.0 Surface Soil Analytical Conclusions	7
Section 5.1 Surface Water Analytical Conclusions	7
Section 5.2 Ground Water Analytical Conclusions	7
SECTION 6: GROUND WATER PATHWAY	7
Section 6.0 Soils	7
Section 6.1 Hydrogeology	8
Section 6.2 Ground Water Targets	8
Section 6.3 Ground Water Conclusions	9
SECTION 7: SURFACE WATER PATHWAY	9
Section 7.0 Hydrologic Setting	9
Section 7.1 Surface Water Targets	9
Section 7.2 Surface Water Conclusions	10
SECTION 8: SOIL AND AIR PATHWAY	10
Section 8.0 Physical Conditions/Current Site Conditions	10
Section 8.1 Soil and Air Targets	11
Section 8.2 Soil and Air Conclusions	11
SECTION 9: CONCLUSIONS	11
SECTION 10: REFERENCES	12

LIST OF FIGURES:

Figure 1:	Site Area Topographic Map
Figure 2:	Sample Location Map
Figure 3:	Sample Results/Location Map
Figure 4:	Aerial Photograph
Figure 5:	Geonics EM-31 Terrain Conductivity Survey Map

LIST OF TABLES:

Table 1:	Laboratory Results for Soil Samples
Table 2:	X-Ray Fluorescence (XRF) Results for Soil Samples
Table 3:	XRF *In-Situ* and Laboratory Confirmation Sample Data Summary
Table 4:	Comparative *XRF In-Situ* and Laboratory Statistical Comparison Table
Table 5:	Quality Assurance/Quality Control (QA/QC) Parameters Summary

APPENDICES:

APPENDIX A:	Figures and Tables
APPENDIX B:	Photographic Documentation
APPENDIX C:	Laboratory Sheets for Analytical Results
APPENDIX D:	Field Sheets for XRF Field Analysis
APPENDIX E:	Brownfields Assessment Form
APPENDIX F:	RCRA Generators and UST Trust Fund Sites Within 4 Miles
APPENDIX G:	Geophysical Survey Data and Notes
APPENDIX H:	Geopositioning Satellite (GPS) Locations for Sample Points and Site
APPENDIX I:	Well Logs and Well Development Information
APPENDIX J:	Hazardous Substance Characteristics Information

SECTION 1: INTRODUCTION

The Kansas Department of Health and Environment (KDHE) has a cooperative agreement with the U.S. Environmental Protection Agency (EPA) to perform Brownfields Targeted Assessments (BTAs) at selected sites which are owned or to be purchased by a municipal, county or other quasi-governmental agency. The purpose of the National Zinc BTA is to conduct a Phase I and II property evaluation of the site to facilitate future development of the property and assist the City of Cherryvale, Kansas in determining response options for the candidate property.

The City of Cherryvale submitted an application for KDHE to conduct a BTA on the municipal property known as the "Rodeo Grounds". The "Rodeo Grounds" property is directly adjacent to the former National Zinc site, **KSD980406698.** KDHE has completed an Expanded Site Inspection (ESI) at the National Zinc facility, a Removal Site Evaluation (RSE) at adjacent residential yards, and is currently in the process of conducting a potentially responsible party (PRP) search. Review of the historical file information was conducted, and field activities included a site reconnaissance, topographic and geophysical surveys, and sampling of environmental media. A site-specific Quality Assurance Project Plan (QAPP) was approved by EPA for the National Zinc BTA in March, 2000.

SECTION 2: SITE LOCATION, DESCRIPTION, OPERATIONAL HISTORY

2.0 Site Location

The Rodeo Grounds property is located between Martin and First Streets (N-S) and Catherine and Maple Streets (E-W) at the at the northwestern city limits of Cherryvale, Montgomery County, Kansas (see Figure 1). Cherryvale is a rural community with some light industry. The population of Cherryvale as of the last census was 2,464 persons (Reference 8). The geographic coordinates of the site are 39° 42' 30.0" North latitude and 96° 25' 00" West longitude (see Appendix H). The site is located in Section 8 in Township 32 South, Range 17 East (Reference 1).

2.1 Climate

The climate of Montgomery County is characterized as a continental climate that is typically warm to hot in the summers and cold in the winters with the majority of precipitation events occurring in the spring and early summer. The average annual precipitation in Montgomery County is 36.95 inches per year. The average winter temperature is 36.8° Fahrenheit (F) and the average summer temperature is 78.4° F. Prevailing surface winds in Montgomery County are southerly. The maximum 24-hour precipitation event recorded for Montgomery County is 6.38 inches (Reference 3).

2.2 Site Description

The site consists of the former Cherryvale Rodeo grounds. Prior to its acquisition by the City of Cherryvale, the property was utilized as residential housing for employees of the former National Zinc smelter facility.

2.3 Site History

The National Zinc site consists of approximately 350 acres containing the former National Zinc smelter facility on the northern edge of Cherryvale, Kansas. Historical review from Sanborn Fire Insurance maps and historical archive information available during the BTA indicates that the Edgar Zinc Company began construction of a primary lead and zinc smelter at the site in 1898. The facility initially was constructed with 1,800 retorts and 3 furnace buildings. By 1908 the smelter facility had 4,800 retorts and 24 furnaces. The 1928 Sanborn Map (the most recent available) also indicates the facility had four (4) massive ore roasters and 24 furnaces in operation, consistent with the 1908 configuration.

The Sanborn Maps indicate the facility as operating "day and night". This facility was recognized as the largest zinc smelter in the world until World War I. Nearly 500 employees worked at this facility at its peak, and the population of Cherryvale was nearly 8,000 during the early 1900s at the peak of the Edgar Zinc facility production. The Edgar Zinc facility was by far the largest employer and industrial facility in Cherryvale during its operational life. The location of the Frisco Railroad line at the eastern edge of the site in addition to plentiful shallow natural gas from oil and gas production in the local area provided the necessary transportation and energy resources for the Edgar Zinc facility. At least one half of the demand for primary zinc production was for galvanizing purposes. U.S. Steel Corporation may also have had some ownership interest in the Edgar Zinc Company around 1910.

The facility operated as the Edgar Zinc Company until sometime after 1928, when it was reorganized as the National Zinc Company (References 6, 28, 29). Production appears to have declined through the 1930s when most active operations ceased. The National Zinc smelter facility permanently terminated operations on December 24, 1976. The housing area was deeded to the City of Cherryvale with the rest of the former National Zinc property. The employee housing area currently comprising the Rodeo Grounds appears to have been vacated with the decline in smelter production in the 1920s.

Preliminary Assessment (PA) and Site Inspection forms were completed by KDHE in 1981 and the site was assigned the CERCLA Identification System (CERCLIS) identification number KSD980406698. The BTA Report for the National Zinc property was completed in 1999. The Removal Site Evaluation and Expanded Site Inspection Reports for the site were completed by KDHE for the National Zinc site in 2001. KDHE's Enforcement/Negotiation program is currently in the process of conducting a potentially responsible party (PRP) search for the National Zinc site.

2.4 Hazardous Substance Characteristics

The primary contaminants of concern identified at the National Zinc site are lead, cadmium and arsenic. Additional information concerning the chemical and physical properties, uses, and health effects of these metals are included in Appendix J.

SECTION 3: BTA FIELD ACTIVITIES

3.0. Phase I Considerations

The Rodeo Grounds property was visited by KDHE personnel in May, 2000 and April, 2001. A review of the available records for this site indicated previous evidence of releases of hazardous substances, especially heavy metals, from the site. Since previous evidence of hazardous substance releases was present from the adjacent National Zinc site reports, this BTA was therefore designed to focus primarily on a general assessment of releases of heavy metal constituents and smelter wastes to soils remaining at the site from the adjacent former primary smelting operations. No other CERCLA Information System (CERCLIS) sites except the adjacent National Zinc site were identified within one mile of the site.

There are several nearby KDHE underground storage tank (UST) sites that are currently being addressed by KDHE's UST Trust Fund program. The Phase I also identified several Resource Conservation and Recovery Act (RCRA) generators within one mile of the site These facilities are included in Appendix F. None of the UST or RCRA facilities identified has likely impacted the Rodeo Grounds property given the difference in waste streams and constituents from these facilities compared to the smelter wastes and constituents from the adjacent National Zinc site. The BTA form in Appendix E includes further Phase I considerations.

3.1 Phase II Field Activities

3.1.0 Geophysical Survey

A geophysical survey was conducted at the site after surveying with KDHE's Geonics EM-31 terrain conductivity meter. Because of the large area of the site, the instrument was utilized in a continuous data-logging mode. Raw geophysical survey data, and notes are included in Appendix G. The Geonics EM-31 terrain conductivity meter was warmed up and zeroed at the northwest corner of the site in what appeared to be an area undisturbed from previous activities. The EM-31 was zeroed in the in-phase mode, and all initial quadrature precision, sensitivity and accuracy parameters were checked (standard operational checks) prior to initiation of profile lines.

3.1.1 Soil Sampling

Soils were sampled continuously from 0-2 feet with KDHE's 5400 Geoprobe unit and a large-bore continuous soil sampling device at 15 locations. The soil sampling was conducted on August 22, 2001. Each sampling location was identified with geopositioning satellite (GPS) survey equipment. These samples were obtained as site-wide non-biased samples. Continuous samples were obtained directly into prepared acetate liners, capped and placed directly on ice for transport to the laboratory. Selected soil samples were submitted for laboratory analysis were analyzed for Resource Conservation and Recovery Act (RCRA) metals by EPA methods 6010 and 7471 by Pace Analytical Services in Lenexa, Kansas after XRF analysis.

3.1.2 *In-Situ* XRF Analysis

Each 0-2 foot sample was subdivided into 6" (0.5 feet) intervals for in-situ XRF analysis. Each 0.5' core section was subsequently analyzed in at least two (2) discrete locations on each interval by placing the KDHE Niton Model 733 directly on the interval being analyzed with a special soil "sled" used for *in-situ* analysis. The "sled" has a thin protective mylar window which keeps the soil from direct contact with the instrument. The shutter was then opened, and the sample was analyzed for a minimum of 30 source seconds (Ss) with the XRF using both Cadmium-109 and Americium-241 radioactive sources. To correlate field readings later in the office and maintain maximum data quality, the XRF readings were recorded in the field on field data sheets and also simultaneously in the XRF data logger unit. An average XRF concentration was calculated from each subinterval.

3.1.3 Field XRF Quality Control (QC) Samples

Three (3) field duplicate analyses were performed during XRF analysis. A prepared commercial reference material (NIST) of known concentration soil standard was analyzed 11 times throughout the XRF analysis. The XRF was calibrated/zeroed every day of field analysis, and after any period during which the XRF was shut off (lunch breaks, etc.). QC samples and calibration information is included on the XRF field analysis sheets.

3.1.4 Ground Water Samples

Four (4) temporary monitoring wells were installed for the BTA. After three (3) months the maximum amount of water identified in all wells was 0.3 feet, an insufficient amount to develop and sample. The limited occurrence of ground water at the site therefore did not allow the ground water pathway to be evaluated for the Rodeo Grounds BTA. Well logs and survey information are included in Appendix I.

3.1.5 Quality Control (QC) Samples

A rinsate sample was obtained during the decontamination of soil sampling equipment for laboratory analyses. For XRF analysis, QC samples (NIST standards and field duplicates) are discussed in Section 3.1.4 above.

SECTION 4: ANALYTICAL RESULTS

4.0 Geophysical Survey Results

The EM-31 geophysical survey was completed in April, 2001. Appendix G includes survey notes and raw data. The EM-31 terrain conductivity data was collected simultaneously in both in-phase and quadrature modes in a vertical dipole configuration. The EM-31 data generally was in agreement between the quadrature and in-phase modes. The in-phase mode, measuring differences in induced secondary magnetic fields, is more sensitive to metallic material. The quadrature phase measures apparent relative terrain conductivity and is generally less sensitive to smaller metallic body surficial or subsurface anomalies than the in-phase, but is more sensitive to areal variations in apparent terrain conductivity or features in long linear ground contact. The quadradture phase survey results generally reflect a similar trend compared to the in-phase results.

The results of both the quadrature terrain conductivity and the relative in-phase response display well the former water and sewer lines servicing the rodeo grounds and former National Zinc smelter works employee housing area. No other significant anomalies besides these were identified in interpretation of the geophysical survey data. The EM-31 data is presented in Figures 5 and 6. Because high-voltage overhead power lines surround the site, the magnetometer survey was abandoned because of interference potential from overhead power lines.

4.1. Surficial Soil Sample Results

The results from the fifteen (15) sample locations indicated a maximum laboratory lead value of 492.0 mg/kg at location SS10/0-6". The maximum XRF detection was 363.5 mg/kg at location SS5/0-6" followed by SS10/0-6" at 346.0 mg/kg. Lead was only detected in one location above KDHE's residential RSK level of 400 mg/kg for lead, and was detected below KDHE's non-residential lead levels in all samples, in both XRF and laboratory analyses. A linear regression was calculated for the Method 6200 XRF *in-situ* analysis data verses the laboratory data. The QAPP had determined a threshold regression value (r^2 value) of 0.7-0.9 as being acceptable quantitative screening quality data, and 0.9 or higher for definitive level data. If the r^2 value was calculated to be below 0.7, the XRF data would be of qualitative screening quality data. The regression for the *in-situ* data determined the r^2 value to be 0.855 for the XRF vs. laboratory data for lead. The soil sampling analytical results are

summarized in Tables 1-2. The XRF data site-wide was therefore accepted at 100 % completeness as being of at least quantitative screening level data.

Arsenic also exceeded its residential RSK value of 11 mg/kg in four (4) samples, SS5/0-6", SS9/0-6", SS10/0-6", and SS15/0-6". The maximum arsenic concentration detected was 12.7 mg/kg in SS5/0-6", which was also the location of the maximum XRF lead detection and the second highest laboratory lead detection at 351.0 mg/kg. All arsenic exceedences above residential RSK levels were associated with laboratory or XRF lead detections above 300 mg/kg. In general, the elevated arsenic values are therefore associated with elevated lead values. Arsenic was not detected above its non-residential RSK level in any samples. No other RCRA metals were detected above residential RSKs during the BTA. The GPS locational data table is included as Appendix H.

Previous historic background sample data from the National Zinc site investigations were utilized for the BTA. The lead three times (3X) mean background concentration from the ESI was calculated to be 130.1 mg/kg, and the lead 3X background maximum (3XMAX) concentration was calculated to be approximately 627 mg/kg. The arsenic 3X mean concentration was calculated to be 6.7 mg/kg, and the 3XMAX concentration was calculated to be 24.0 mg/kg.

4.2 Quality Control Sample Results

Quality control samples for XRF screening were obtained by analyzing field duplicates as well as comparing percent differences of successive analyses of NIST standard reference materials (SRMs). According to EPA Method 6200, a percent difference (PD) of 20 % or less for successive standard analyses is established as the criteria for acceptable instrument fundamental parameter (FP) energy calibration and thus adequate radioactive energy being transmitted into the medium to effectively perform the analysis. If the PD exceeds 20 % for lead, adjustment to the calibration curve and re-analysis of the SRM are necessary. The 20 % PD value is also used as the threshold value for acceptable calibration verification and checking the instrument accuracy and stability for the analytes of interest. The highest individual PD identified in field XRF analysis was 9.6 %, well below the 20 % maximum recommended PD value. The PD statistical calculations indicate that the instrument accuracy and calibration were acceptable to produce usable XRF data. The PD determination also indicates that the FP energy calibration curve and the internal accuracy of the internal Niton 733 XRF (including internal calculations, detector sensitivity/calibration and x-ray emmission efficiency) were all within acceptable performance limits.

Both a high (5,000 mg/kg range) and medium (1,000 mg/kg) range NIST standard were used during field XRF work for SRM analysis. Approximately 11 NIST SRM standard analyses were performed during the XRF field work. Typically, a standard was analyzed at the beginning and end of each day and once every 20 field measurements. EPA Method 6200 recommends one standard analysis at the

beginning and end of each work day and one standard every 20 field measurements. QA/QC parameters are summarized in Table 4.

SECTION 5: ANALYTICAL CONCLUSIONS

5.0 Surface Soil Analytical Conclusions

The site-wide soil sampling does not indicate any areas elevated above non-residential RSK levels for lead or arsenic at the 0-6" interval and no lead or arsenic elevated above KDHE's residential RSK level for soil samples in the 18-24" interval. Thus existing limited areas of soil contamination in excess of residential RSKs appears to be confined to the upper 6" of soil across the site. Lead was identified above residential RSKs in one sample, and arsenic was identified above residential RSK levels in four (4) samples in the 0-6" interval. The maximum level of lead (492 mg/kg in SS-10/0-6") was within its 3 times (3X) background range of 47.1 mg/kg minimum 3X background to 130.1 mg/kg mean 3X concentration to a maximum 3X background concentration of 627.1 mg/kg. The maximum detection of arsenic (12.7 mg/kg in SS-5/0-6") was below its respective three times (3X) background ranges of 17.1 mg/kg (minimum) to 20.0 mg/kg mean to 24.0 mg/kg maximum 3X background concentration determined during the National Zinc ESI.

5.2 Ground Water Analytical Conclusions

Analytical results from temporary monitoring wells were not available because of low recharge conditions at the site. The ground water pathway was therefore not fully evaluated but is not believed to be a significant pathway because of the localized and limited occurrence of ground water at the site.

SECTION 6: GROUND WATER PATHWAY

6.0 Soils

The undisturbed areas of the site (primarily in the northeast half of the site) are typically underlain by the Kenoma series soils. The Kenoma soils are generally deep, moderately well drained, very slowly permeable soils on uplands, of 0 to 2 percent slopes. The surface layer (A horizon) typically consists of a dark grayish brown silt loam about 6-12 inches thick. The upper portion of the subsoil layer (B horizon) is typically 9 inches thick and consists of very dark grayish brown to grayish brown silty clay. The lower portion of the subsoil layer is typically 40 inches thick and consists of dark yellowish brown to dark brown to reddish brown silty clay. Typical depth of Kenoma soils averages 60 inches or greater. The southern edge of the site is also within the Dennis series, but the native soil profile for this series is very similar to the Kenoma series. No C horizon is recognized because of the generally deep

(60 inches) thickness of these soil types. The unified soil classification of the A horizon is CL to CL-ML to ML (18-29 % clay) with a plasticity index range of 3-18 and a liquid limit range of 24-40. The unified soil classification of the B horizon is CH (40-60 % clay) with a plasticity index range of 30-48 and a liquid limit range of 50-75. Available water content is high (0.10-0.24). Surface runoff is slow (0.2-0.06 in/hr) and shrink-swell potential is high, especially below 12 inches. Permeability generally ranges from 0.2 to 0.6 inches/hour (Reference 3).

6.1 Hydrogeology

The site is located in a broad, low-relief upland of the Osage Questas physiographic area of southeast Kansas. Bedrock of Pennsylvanian age is present at the base of the soil profile. During the installation of temporary monitoring wells at the site, bedrock was typically encountered between 14 feet (TW-1) and 3.5 feet (TW-8). The location of TW-8 is in the new U.S. 169 right-of-way which was excavated approximately 6-10 feet for installation of the highway, and the depth to bedrock from surface in TW-8 is not representative of native conditions. The bedrock units underlying the site are believed to be composed of sandstone and limestone of the Cherryvale Shale and Dennis Limestone Formations of the Kansas City Group. A yellowish to reddish-brown sandstone was typically encountered as the bedrock layer upon auger refusal. Ground water occurrence within the Cherryvale Shale and Dennis Formations is typically localized with very low (less than 3 gallons per minute) yields of generally poor quality. These bedrock units typically yield little to no water except in the shallow weathered zone near the upper bedrock surface. Oil field intrusion of brines in the site area from oil production dating back to the early 1900s has impacted shallow ground water quality regionally in this portion of Southeast Kansas (Reference 4).

Ground water occurrence in the site area is primarily restricted to unconsolidated alluvial deposits of the Verdigris River and Cherry Creek. The City of Cherryvale receives water from a surface intake on Big Hill Lake located approximately five (5) miles east of Cherryvale. Significant karst terrain does not exist in the site area given the sequential shale-sandstone-limestone stratigraphy of the bedrock units. A detailed stratigraphic sequence is included as Figure 12. The City of Cherryvale and Montgomery County Rural Water District # 12 supplies water to private residences surrounding the site. The generalized stratigraphic section for Montgomery County is included as Figure 13.

6.2 Ground Water Targets

The entire population of Cherryvale relies on surface water from Big Hill Lake for the its public water supply (PWS). Big Hill Lake is located upstream of surface drainage from the National Zinc site. The Verdigris River upstream of the site near Neodesha supplies Montgomery County Rural Water District #12. Only three (3) domestic wells were identified within one mile of the site, and the nearest well (3/4 mile) is located northeast of the site in an apparent upgradient direction. Well water quality in this portion of Montgomery County is reportedly marginal due to sulfates and excessive hardness

(Reference 4). A review of available water well records indicate 17 wells within 4 miles of the site (Reference 7). The breakdown of numbers of ground water targets by distance from the site is:

Distance:	Number of Wells:	Number of Targets:
0-1/2 mile	0	0
½-1 mile	3	7.26
1-2 miles	2	4.84
2-3 miles	10	24.20
3-4 miles	2	4.84
Total:	17	41.14

In summary, the total number of potential ground water targets at the National Zinc site is approximately 41 persons (Census). Figure 14 illustrates ground water targets in the site area.

6.3 Ground Water Conclusions

A release of heavy metals was not identified on the Rodeo Grounds property. Soil samples obtained between 18 and 24 inches indicated no elevated levels of lead or other heavy metals of concern above KDHE residential or non-residential RSKs. Because of the highly localized nature of ground water occurrence in the area, as well as lack of ground water targets, the ground water pathway is not expected to be significantly impacted by the Rodeo Grounds property. Approximately 41 potential ground water targets were identified within a 4-mile radius of the site.

SECTION 7: SURFACE WATER PATHWAY

7.0 Hydrologic Setting

An intermittent stream drains the site and enters Drum Creek approximately 3/4 mile from the site. Drum Creek enters the Verdigris River approximately seven (7) linear miles from the site. This unnamed intermittent stream basically drains the entire site, including the former productions areas, remaining smelter slag pile/waste areas, and the area of the lagoon cap. Drum Creek enters the Verdigris River downstream of the City of Independence's surface water intake. The unnamed intermittent streams crossing the site which also form the boundaries of the waste disposal area and leave the site at the western edge of the waste disposal area are within the 100-year floodplain of Drum Creek

7.1 Surface Water Targets

No primary surface water targets have been identified within the 15-mile downstream target distance limit. No surface water intakes were identified along the 15-mile target distance limit. The Black Vermillion and Big Blue Rivers have been designated as critical habitats for the butterfly mussel, the

Neosho mucket mussel, the Ouachita kidneyshell mussel, and the rabbitsfoot mussel. Several other threatened or endangered or threatened species occur in Marshall County that may be potential environmental targets at the site. These are as follows:

Species	Status	Occurrence in County
Bald Eagle	E	Occurs occasionally in winter
E. Hognose Snake	T	May occur in suitable habitat
E. Spotted Skunk	T	May occur in suitable habitat
Eskimo Curlew	E	Former spring migrant, last sighting 1902
Least Tern	E	Occurs occasionally in summer
Peregrine Falcon	E	May occur occasionally in winter
Piping Plover	T	May occur occasionally, spring or fall
Snowy Plover	T	May occur occasionally, spring or summer
White-faced Ibis	T	May occur occasionally at wetlands
Whooping Crane	E	Occurs occasionally, spring and fall
American Burying Beetle	E	May occur in suitable grasslands and uplands
Common Map Turtle	T	May occur in streams, lakes and oxbows
Western Fanshell	E	Generally associated with shallow riffles

T=threatened E=endangered

Other potential targets for the site include recreational fisheries of Drum Creek and the Verdigris River upstream of Coffeyville, Kansas and downstream of the confluence of Drum Creek and the Verdigris River.

7.2 Surface Water Conclusions

No perennial surface water body is present on the Rodeo Grounds property. Surface water samples were not obtained at the site as no surface water was present during BTA activities and drainage at the site appears to pond and not run off-site.

SECTION 8: SOIL EXPOSURE AND AIR PATHWAYS

8.0 Physical Conditions/Current Site Conditions

The site is vacant with the exception of cattle grazing portions of the property. No remaining intact structures are present. The site is fenced with an electric cattle fence around the perimeter. Only small debris piles are remaining from the previous structures, and most of the property has returned to pasture grass. Limited areas of visible smelter waste are scattered across the property, but are generally most prevalent in the north portion of the property where it appears the slag was used as road bed material for the roadways servicing the former housing area. Several residences are located along all boundaries of the Rodeo Grounds property. Prevailing winds are from the south. The nearest residence is within 1/4 mile from the site. The nearest school is approximately 3/4 mile from the site.

The site is not fenced and readily accessible. No known day care facilities or schools are present within 200 feet of the site.

8.1 Soil and Air Targets

The total population within four miles of the site is 3,132 persons, based on U.S. Census Bureau information and U.S. Geological Survey topographic maps of the area. The breakdown of population based on radius from the center of the site area is as follows:

Distance:	Number of Targets:
0-1 mile	1,048
½-1 mile	1,048
1-2 miles	725
2-3 miles	104
3-4 miles	207
Total:	3,132 persons

8.2 Soil and Air Conclusions

Surface soil sample results indicate that levels of lead at the site are within non-residential RSK levels for lead. Limited samples near waste piles indicate that areas of visible slag may exceed non-residential RSK levels. Approximately 3,132 potential air and soil exposure targets have been identified for this site.

SECTION 9: CONCLUSIONS

The BTA for the Cherryvale Rodeo Grounds property was conducted to provide an environmental assessment of the subject property to assist in identifying potential development opportunities based on identified environmental conditions. The BTA did not indicate significant areas of lead contamination in *surficial soils* at the site in excess of KDHE RSK value of 1,000 mg/kg for lead in non-residential soils. Only one sample location indicated laboratory lead levels above KDHE's residential RSK levels for lead. Four (4) locations indicated arsenic levels above KDHE's residential RSK levels; however none of these indicated levels in excess of non-residential RSK levels for arsenic. No other RCRA metals were indicated above residential RSKs through the BTA soil analyses. The full extent and nature of lead and arsenic were not determined during this BTA.

Contaminated surficial soil appears to be present at 0-6" in scattered areas in excess of residential RSKs but within non-residential RSK levels. Removal of soils from the site prior to development, including those commingled with waste slag and debris at the site should include proper characterization of waste material for RCRA waste disposal compliance.

SECTION 10: REFERENCES

1. U.S. Geological Survey, 7.5-minute topographic quadrangle maps of Kansas: Cherryvale, Kansas, 1962, photorevised 1979.

2. U.S. Environmental Protection Agency, *Standard Operating Procedure to Determine Site Latitude and Longitude Coordinates*, 1991.

3. U.S. Department of Agriculture, *Soil Survey of Montgomery County, Kansas*, 1980.

4. Kansas Geological Survey, *Geology and Ground Water Resources of Montgomery County, Kansas*, Bulletin Ground Water Series #1 (GW-1), 1974.

5. KDHE Interviews with Mr. Roy Riedner, City Manager of Cherryvale, May-December, 1999.

6. May Jane Blades, *Cherryvale Industries*, 1996.

7. Kansas Department of Health and Environment, Division of Environment, Bureau of Water, Well Record Forms WWC-5 KSA 82a-1212.

8. U.S. Department of Commerce, *1990 Household, Family, and Group Quarters Characteristics.*

9. Kansas Rural Water Association/Kansas Water Office/Kansas Department of Health and Environment, *Rural Water Districts in Kansas*, 1994.

10. Kansas Board of Agriculture, Division of Water Resource, Water Rights Data Base, Amounts/Statistics, 1999.

11. Kansas Department of Wildlife and Parks, *Threatened and Endangered Species List*, 1991, Montgomery County.

12. Kansas Department of Transportation State and County Maps and Aerial Photographs.

13. Federal Emergency Management Agency, Flood Maps for Montgomery County, 1992.

14. Kansas Department of Health and Environment, *Surface Water Register and Maps*, 1995.

15. U.S. Geological Survey, *Surface Water Data for Kansas, Water Year 1994.*

16. Kansas Department of Health and Environment (KDHE) Bureau of Water (BOW) Public Water Supply Files.

17. Kansas Department of Health and Environment (KDHE) Bureau of Waste Management (BWM) Files.

18. Kansas Department of Health and Environment (KDHE) Bureau of Environmental Remediation (BER) Files.

19. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry:
Draft Toxicological Profile for Lead, May, 1994;.
Draft Toxicological Profile for Cadmium, May, 1994.
Draft Toxicological Profile for Arsenic, May, 1994.
Draft Toxicological Profile for Chromium, May, 1994.
Draft Toxicological Profile for Silver, May, 1994.
Draft Toxicological Profile for Barium, May, 1994.

20. U.S. Environmental Protection Agency, *Guidance for Conducting Preliminary Assessments under CERCLA*, EPA/OSWER 540/G-91/013, 1991.

21. U.S. Environmental Protection Agency, *Guidance for Performing Site Inspections under CERCLA*, EPA/OSWER 9345.1-05, 1992

22. U.S. Environmental Protection Agency, *Hazard Evaluation Manual: A Guide to Removal Actions*, EPA Region III, 1993.

23. U.S. Environmental Protection Agency, *Quality Assurance Guidance for Conducting Brownfields Site Assessments*, EPA/OSWER 540/R-98/038, 1998.

24. Kansas Department of Health and Environment, Bureau of Environmental Remediation, *Quality Assurance Project Plan* (QAPP) *for the Brownfields Targeted Assessment of the National Zinc Site*, CERCLIS I.D. # KSD980406698, approved May, 1999.

25. U.S. Environmental Protection Agency, Office of Solid Waste, Method 6200: *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soils and Sediment* (EPA Method 6200), 1998.

26. Geometrics, Applications Manual for Portable Magnetometers, 1973.

27. Geonics, *Electrical Conductivity of Soils and Rocks*, Technical Note TN-5, and *Electrical Terrain Conductivity Measurements at Low Induction Numbers*, Technical Note TN-6, 1980.

28. Crystal Harper, *Cherryvale, 1987-1996, 125th Anniversary,* 1996.

29. Kansas Museum of History, Sanborn Fire Maps for Cherryvale, Kansas, 1885-1928.

30. Kansas Department of Health and Environment, Bureau of Environmental Field Services. Stream sampling network data base for Drum Creek and the Verdigris River, Montgomery County, Kansas.

31. Kansas Department of Health and Environment, *Expanded Site Inspection for the National Zinc Site*, 2001.

32. Kansas Department of Health and Environment, *Brownfields Targeted Assessment of the National Zinc Site*, 2001.

33. Kansas Department of Health and Environment, Removal Site Evaluation of the *Cherryvale Residential Yards Site*, 2001.

APPENDIX A

FIGURES AND TABLES

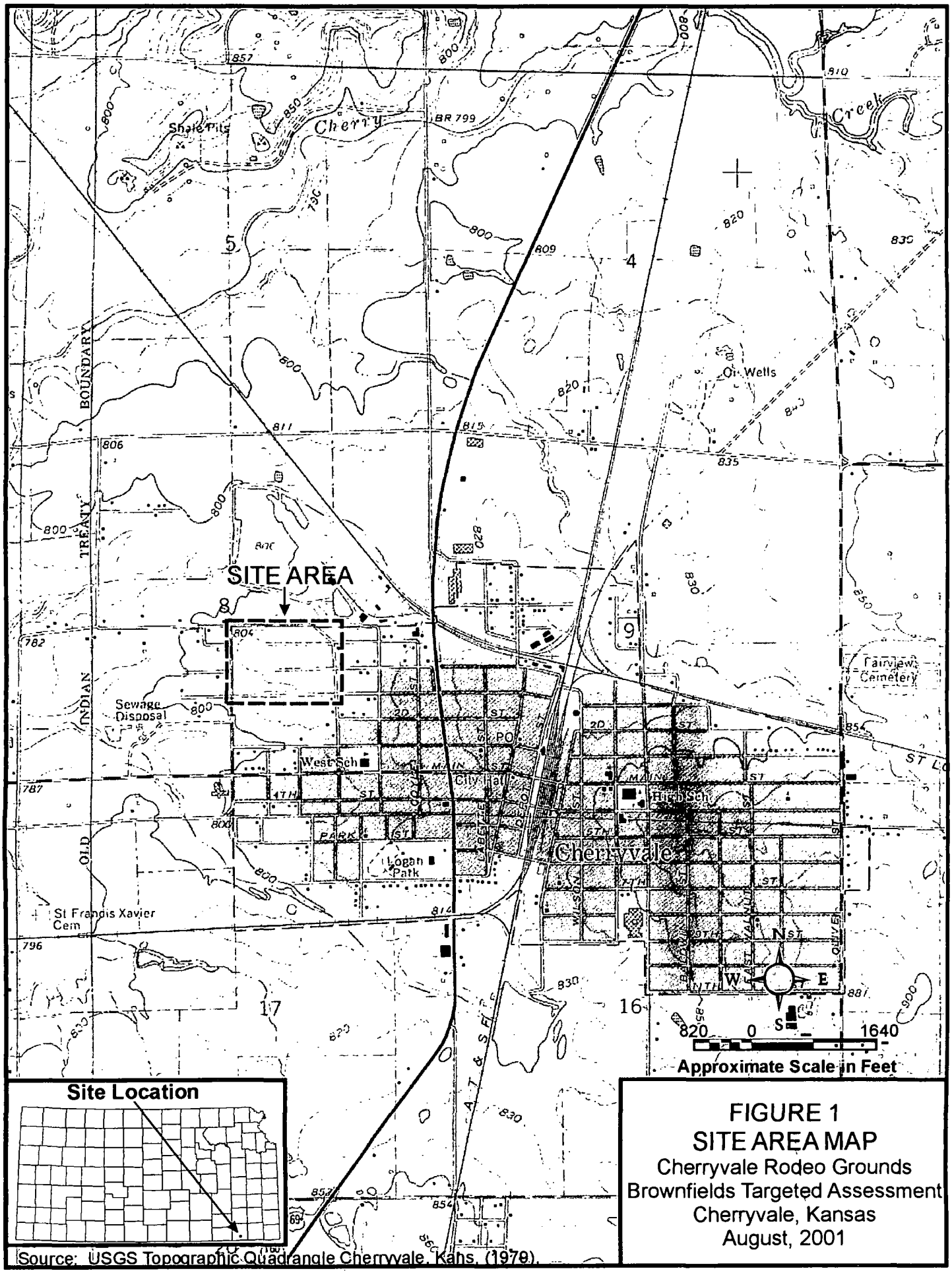
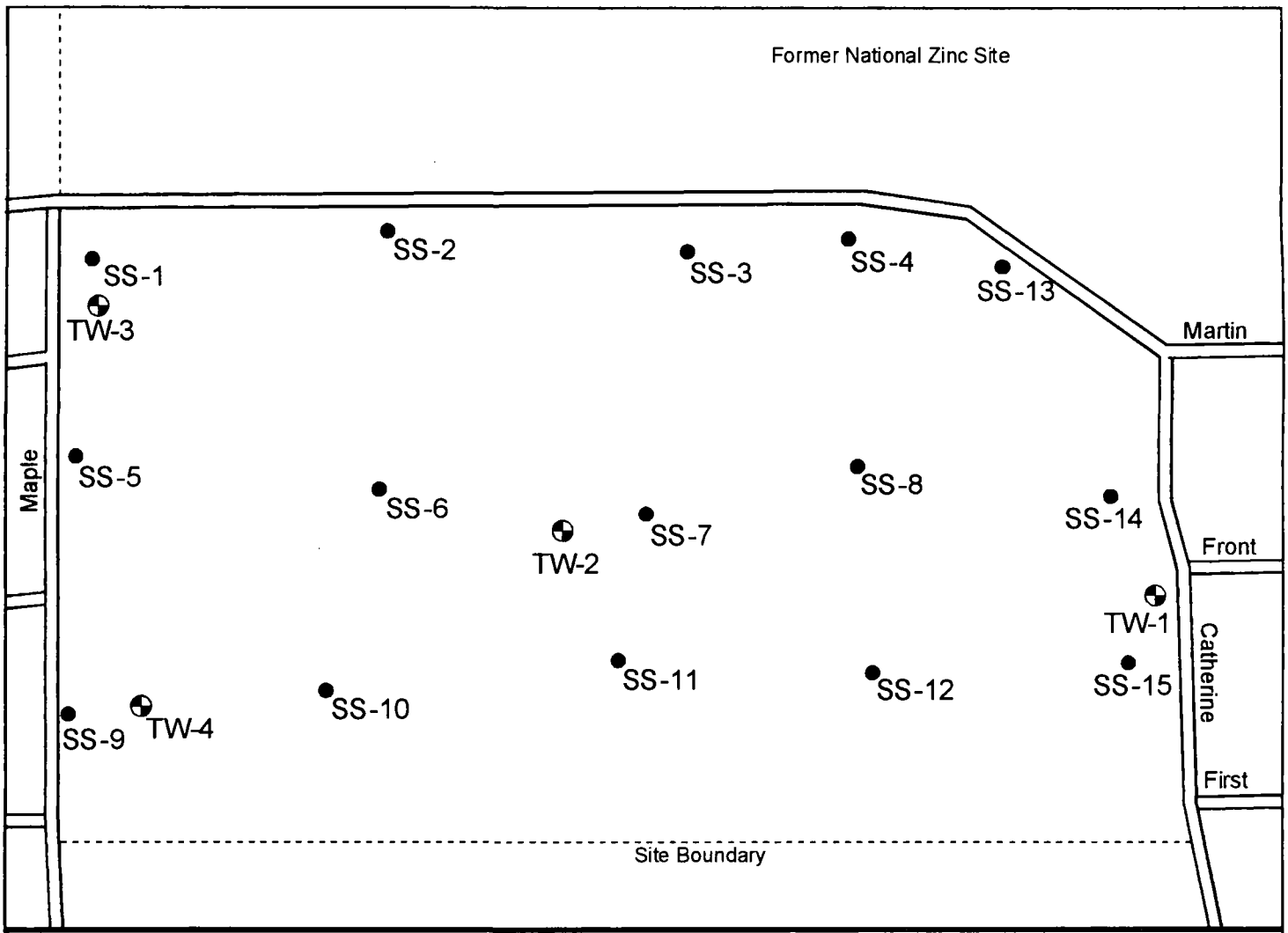


FIGURE 1
SITE AREA MAP
Cherryvale Rodeo Grounds
Brownfields Targeted Assessment
Cherryvale, Kansas
August, 2001



EXPLANATION

- Soil sample location
- Monitoring well

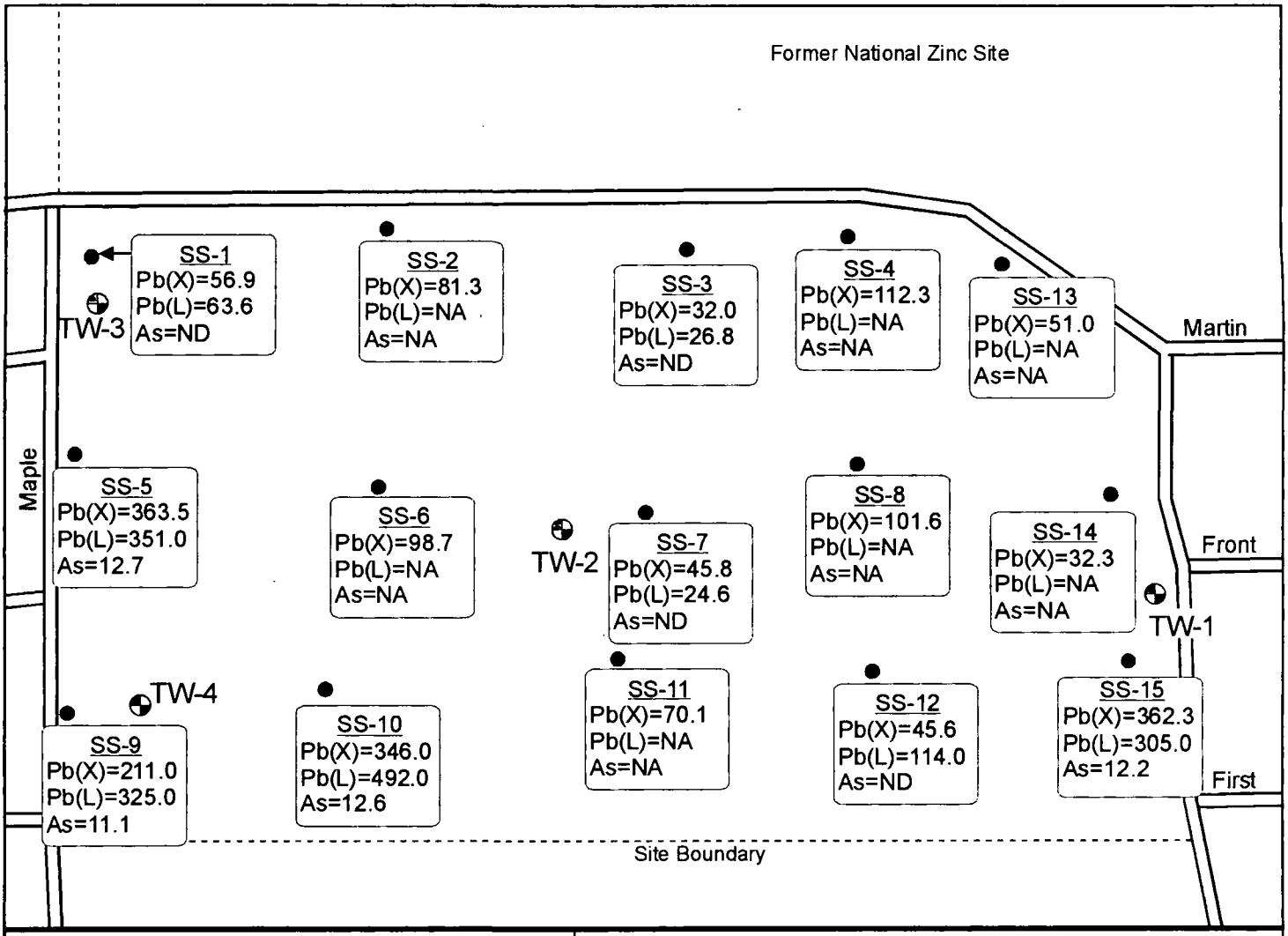
N
W E
S

150 0 300

Scale in feet

FIGURE 2
SITE MAP WITH SAMPLE LOCATIONS

Cherryvale Rodeo Grounds
Brownfields Targeted Assessment
Cherryvale, Kansas
August, 2001



EXPLANATION

- ● Soil sample location
- ◐ Monitoring well

Pb(X) = X-Ray Fluorescence averaged value for Lead in mg/kg

Pb(L) = Laboratory value for Lead in mg/kg

As = Laboratory value for Arsenic in mg/kg

ND = Not Detected
NA = Not Analyzed

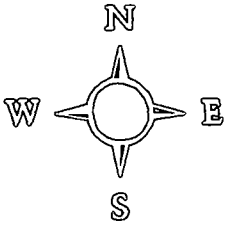
150 0 300
Scale in feet

N
W E
S

FIGURE 3
SITE MAP WITH SAMPLE LOCATIONS AND ANALYTICAL RESULTS FOR 0-6" INTERVAL

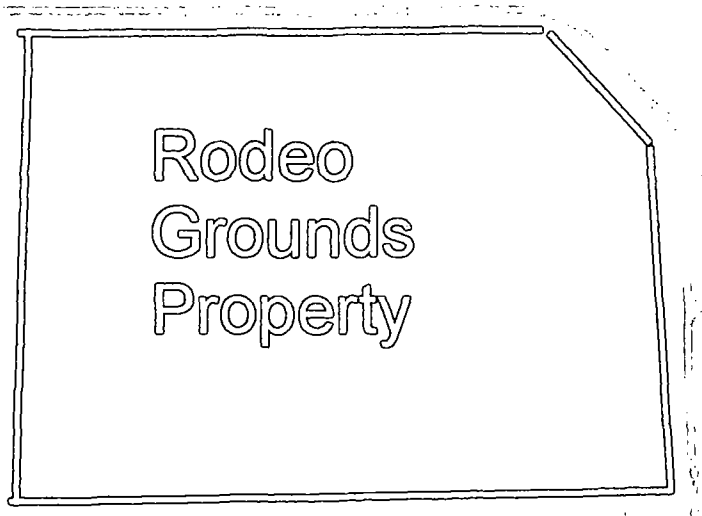
Cherryvale Rodeo Grounds
Brownfields Targeted Assessment
Cherryvale, Kansas
August, 2001

Figure 4
Aerial Photograph



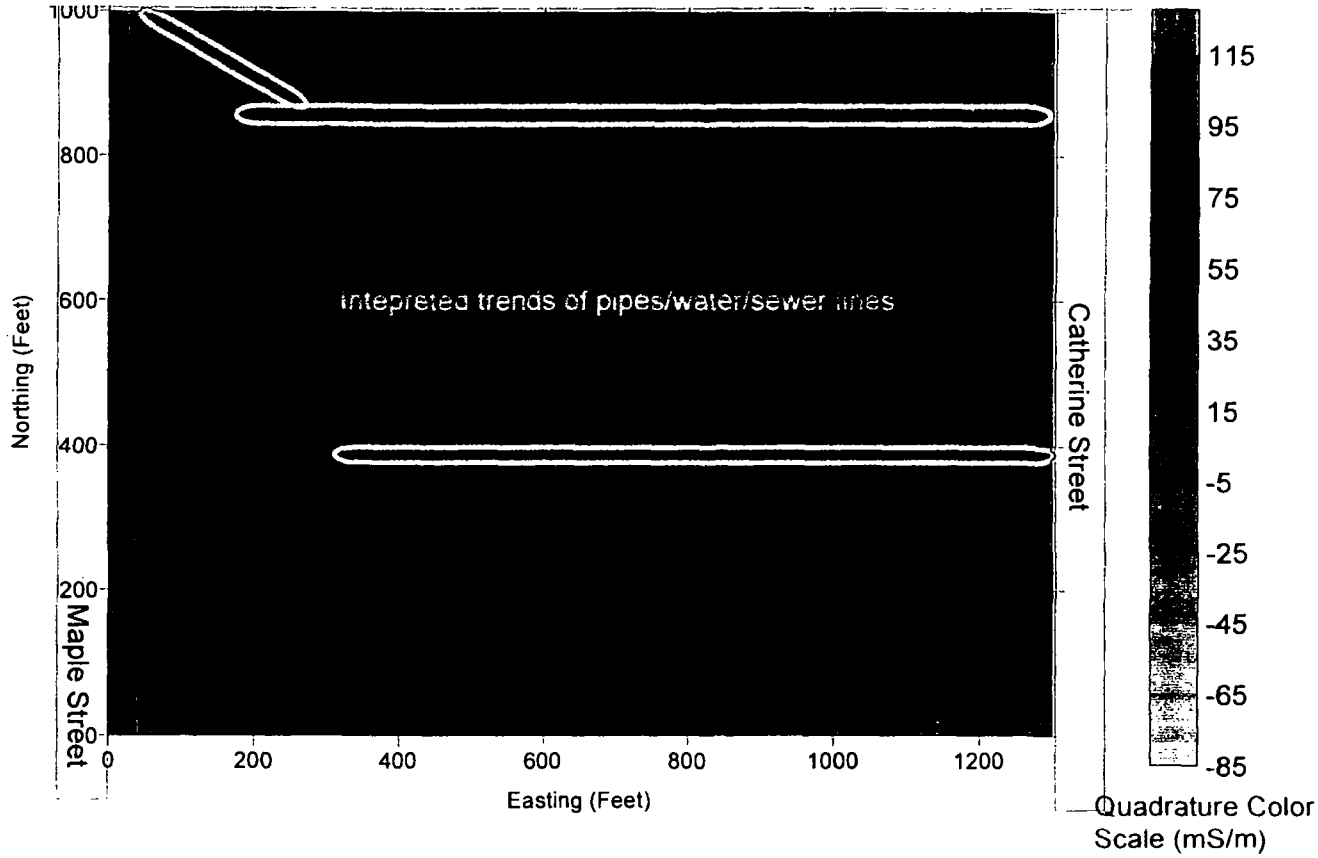
Approximate Scale: 1inch = 400 feet

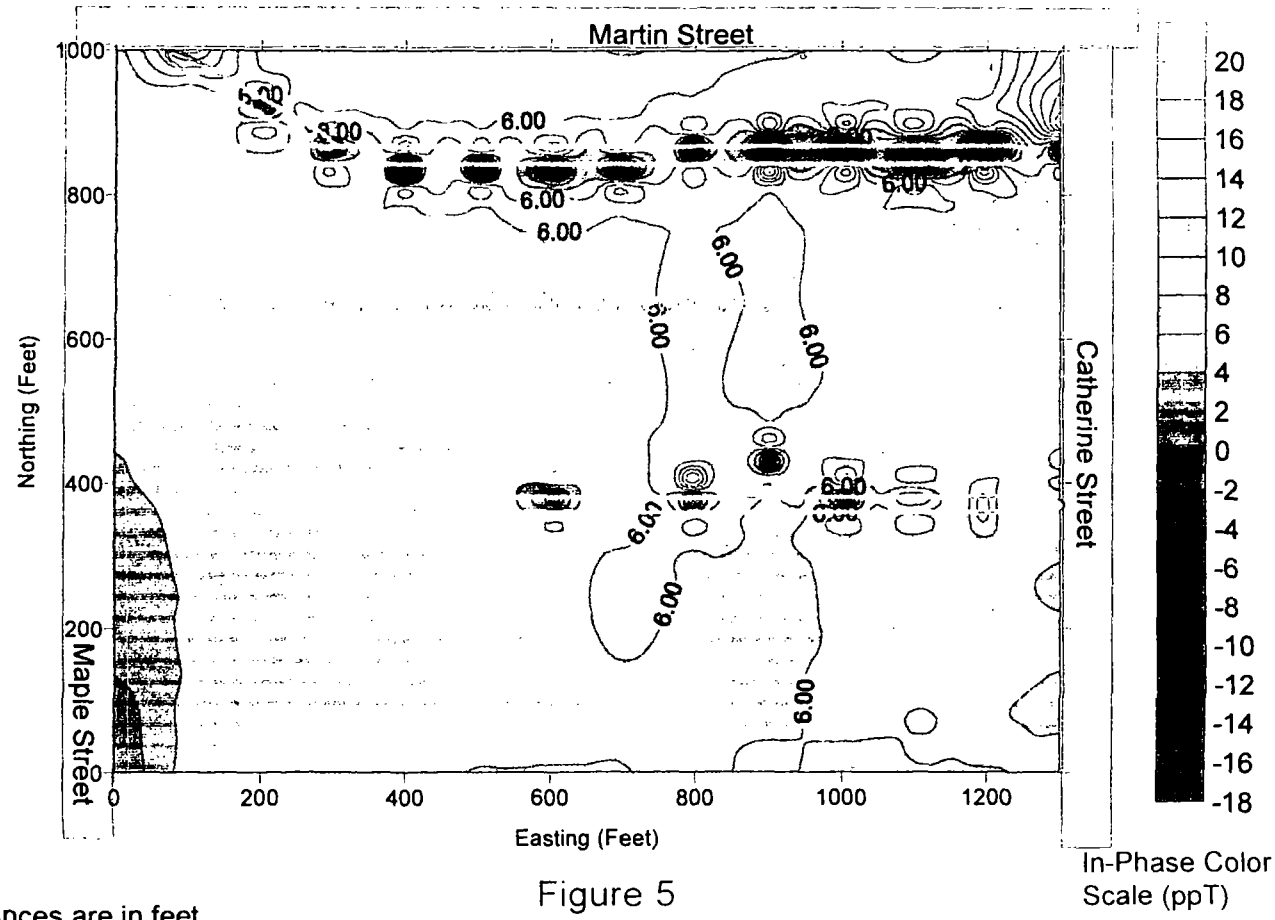
National Zinc Site



Cherrywale Residential Yards Area

Source: USDS Aerial Photo (1955)





Notes: All distances are in feet
EM-31 Survey Conducted
03/01 by KDHE/BER
Data Edited, Filtered and Interpreted
by KDHE/BER 08/01

Figure 5
Geonics EM-31 Survey
Quadrature Phase (Top Figure)
and In-Phase (Lower Figure)
Cherryvale Rodeo Grounds BTA

Table 1
Summary of Laboratory Analytical Data
Cherryvale Rodeo Grounds BTA

Sample I.D.:	Arsenic (mg/kg):	Lead: (mg/kg):	Cadmium: (mg/kg):
SS1/0-6"	ND	63.6	8.6
SS1/18-24"	ND	19.7	ND
SS3/0-6"	ND	26.8	2.2
SS3/18-24"	ND	23.9	ND
SS5/0-6"	12.7	351.0	15.0
SS5/18-24"	ND	20.1	ND
SS-7/6-12"	ND	24.6	1.6
SS7/18-24"	ND	12.9	ND
SS9/0-6"	11.1	325.0	15.0
SS9/18-24"	ND	12.0	ND
SS10/0-6"	12.6	492.0	15.1
SS10/18-24"	ND	12.4	ND
SS12/0-6"	ND	114.0	14.5
SS12/18-24"	ND	16.5	3.8
SS15/0-6"	12.2	305.0	9.72
SS15/18-24"	ND	22.4	2.2
Residential RSK Values (mg/kg):	11	400	39
Non-Residential RSK Values (mg/kg):	38	1,000	1,000

Table 2
Summary of Averaged X-Ray Fluorescence (XRF) Concentrations for Lead
Cherryvale Rodeo Grounds BTA

Sample ID:	Average XRF Lead Concentration (mg/kg):
SS1/0-6"	56.9
SS1/6-12"	40.8
SS1/12-18"	32.0
SS1/18-24"	27.0
SS2/0-6"	81.3
SS2/6-12"	53.4
SS2/12-18"	275.6
SS2/18-24"	34.0
SS3/0-6"	32.0
SS3/6-12"	43.4
SS3/12-18"	56.2
SS3/18-24"	Not Sampled (NS) due to poor sample recovery
SS4/0-6"	112.3
SS4/6-12"	50.3
SS4/12-18"	58.9
SS4/18-24"	48.7
SS5/0-6"	363.5
SS5/6-12"	40.4
SS5/12-18"	32.5
SS5/18-24"	125.0
SS6/0-6"	98.7
SS6/6-12"	28.5
SS6/12-18"	28.0

Table 2
Summary of Averaged X-Ray Fluorescence (XRF) Concentrations for Lead
Cherryvale Rodeo Grounds BTA (continued)

Sample ID:	Average XRF Lead Concentration (mg/kg):
SS6/18-24"	30.0
SS7/0-6"	45.8
SS7/6-12"	85.9
SS7/12-18"	29.0
SS7/18-24"	31.0
SS8/0-6"	101.6
SS8/6-12"	31.0
SS8/12-18"	33.5
SS8/18-24"	34.0
SS9/0-6"	211.0
SS9/6-12"	34.5
SS9/12-18"	29.0
SS9/18-24"	31.5
SS10/0-6"	346.0
SS10/6-12"	34.0
SS10/12-18"	33.5
SS10/18-24"	28.5
SS11/0-6"	70.1
SS11/6-12"	50.7
SS11/12-18"	29.5
SS11/18-24"	29.5
SS12/0-6"	45.6
SS12/6-12"	30.0
SS12/12-18"	29.5

Table 2
Summary of Averaged X-Ray Fluorescence (XRF) Concentrations for Lead
Cherryvale Rodeo Grounds BTA (continued)

Sample ID:	Average XRF Lead Concentration (mg/kg):
SS12/18-24"	Not Sampled (NS) due to poor sample recovery
SS13/0-6"	51.0
SS13/6-12"	29.0
SS13/12-18"	30.5
SS13/18-24"	29.5
SS14/0-6"	32.3
SS14/6-12"	31.0
SS14/12-18"	31.5
SS14/18-24"	31.5
SS15/0-6"	362.3
SS15/6-12"	33.5
SS15/12-18"	27.0
SS15/18-24"	27.5
KDHE Residential RSK Value (mg/kg):	400
KDHE Non-Residential RSK Value (mg/kg):	1,000

Table 3

Comparison of XRF and Laboratory Data and Comparative Statistical Analysis

Sample ID:	Lead by XRF Analysis (mg/kg):	Lead by EPA Method 6010 (mg/kg):
SS1/0-6"	56.9	63.6
SS1/18-24"	27.0	19.7
SS3/0-6"	32.0	26.8
SS3/12-18"	56.2	23.9
SS5/0-6"	363.5	351.0
SS5/18-24"	125.0	20.1
SS-7/6-12"	85.9	24.6
SS7/18-24"	31.0	12.9
SS9/0-6"	211.0	325.0
SS9/18-24"	31.5	12.0
SS10/0-6"	346.0	492.0
SS10/18-24"	28.5	12.4
SS12/0-6"	45.6	114.0
SS12/12-18"	29.5	16.5
SS15/0-6"	362.3	305.0
SS15/18-24"	27.5	22.4

Table 3(b)

Summary of Statistical Data for Comparison of XRF and Laboratory Data

Linear Regression Parameters:		
$r^2 = 0.855$	Degrees of Freedom = 14	Number of Observations = 16
Constant = 27.995	Standard Error of Y Estimate = 50.807	Slope (X Coefficient) = 0.759

Table 4
XRF Quality Control (QC) Parameters
Percent Difference for NIST Standards

NIST Standard:	Date:	XRF Lead Concentration (mg/kg):	NIST Standard Value:	Percent Difference: (% PD):
High	08/24/01	5,500.0	5,532	5.8
High	08/24/01	5,540.0	5,532	1.4
High	08/24/01	5,500.0	5,532	5.8
High	08/24/01	5,570.0	5,532	6.9
Medium	08/23/01	1,080.0	1,162	7.1
Medium	08/23/01	1,110.0	1,162	4.5
Medium	08/24/01	1,190.0	1,162	2.4
Medium	08/24/01	1,240.0	1,162	6.7
Medium	08/24/01	1,050.0	1,162	9.6
Medium	08/24/01	1,070.0	1,162	7.9
Medium	08/24/01	1,130.0	1,162	2.8

Notes: All samples collected 08/01 by KDHE/BER/Site Assessment Unit. XRF: X-Ray Fluorescence
Analytical methods referenced to EPA *Method SW-846, Methods for Analysis of Solid Waste, Methods 6010 and 7471.*
Percent difference for standards calculated by $((C_s - C_k) / C_k \times 100$ where C_k = certified National Institute of Standards and Testing (NIST) lead concentration value of medium standard, 1,162 ± 31 mg/kg; concentration of high standard, 5532 mg/kg ± 100 mg/kg; C_s = measured in-field XRF lead concentration of standard. **% PD were exceeded consistent with EPA Method 6200 criteria (% PD > 20).**

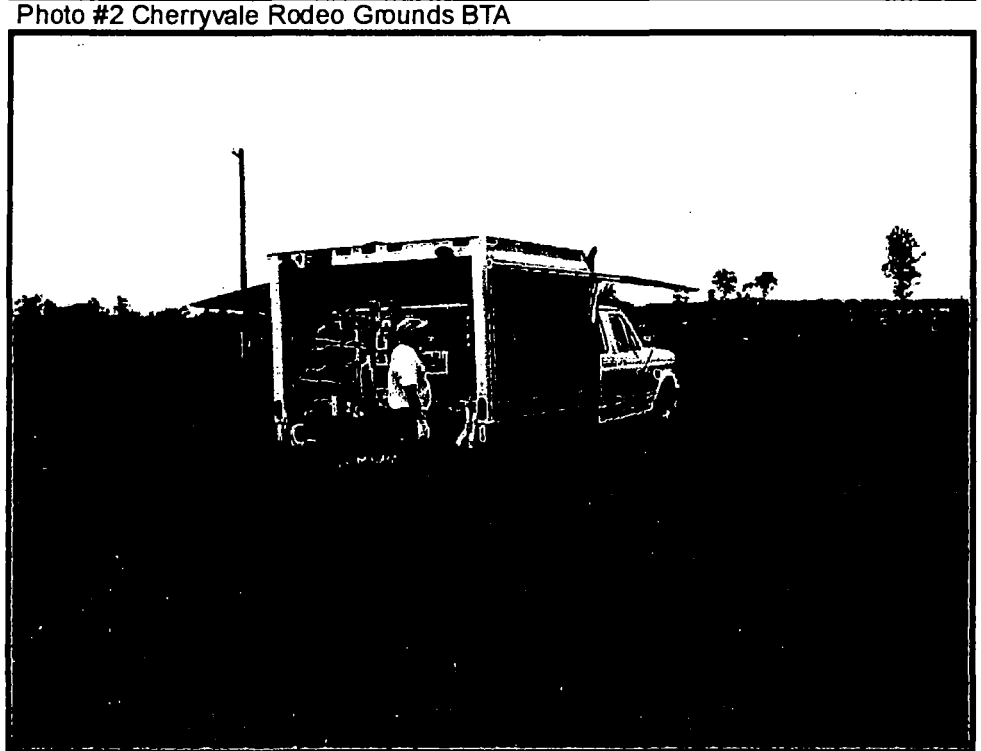
APPENDIX B

PHOTOGRAPHIC DOCUMENTATION

Photo #1 Cherryvale Rodeo Grounds BTA

Date: 8/22/01 Direction: North Photographer: Randolph L. Brown
Comments:
KDHE personnel and Geoprobe unit advancing SS-1.

Photo #2 Cherryvale Rodeo Grounds BTA



Date: 8/22/01 Direction: North Photographer: Randolph L. Brown
Comments:
KDHE personnel and Geoprobe unit advancing SS-2.

Photo #3 Cherryvale Rodeo Grounds BTA

Date: 8/22/01 Direction: North Photographer: Randolph L. Brown
Comments:
KDHE personnel and Geoprobe unit advancing SS-3. Former National Zinc facility structures are visible in background.

Photo #4 Cherryvale Rodeo Grounds BTA

Date: 8/22/01 Direction: North Photographer: Randolph L. Brown
Comments:
KDHE personnel and Geoprobe unit advancing SS-4.

Photo #5 Cherryvale Rodeo Grounds BTA

Date: 8/22/01 Direction: North Photographer: Randolph L. Brown
Comments:
KDHE personnel and Geoprobe unit advancing SS-8.

APPENDIX C

LABORATORY ANALYTICAL DATA

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

September 05, 2001

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Mr. RANDY BROWN
KDHE
BUILDING 740, FORBES FIELD
TOPEKA, KS 66620

RE: Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Dear Mr. BROWN:

Enclosed are the analytical results for sample(s) received by the laboratory on August 31, 2001. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Angie Brown
Project Manager

Kansas/NELAP Certification Number E-10116

Enclosures

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

KDHE
BUILDING 740, FORBES FIELD
TOPEKA, KS 66620

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Attn: Mr. RANDY BROWN
Phone: (785)296-8065

Solid results are reported on a dry weight basis

Lab Sample No: 604551770 | Project Sample Number: 6052312-001 | Date Collected: 08/22/01 13:15
Client Sample ID: SS-1 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.07	1.0	09/04/01	TMG	7440-38-2		
Barium	175.	mg/kg	0.427	1.0	09/04/01	TMG	7440-39-3		
Cadmium	8.62	mg/kg	0.534	1.0	09/04/01	TMG	7440-43-9		
Chromium	12.6	mg/kg	0.747	1.0	09/04/01	TMG	7440-47-3		
Lead	63.6	mg/kg	5.34	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.7	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.747	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.173	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	10.8	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551788 | Project Sample Number: 6052312-002 | Date Collected: 08/22/01 13:15
Client Sample ID: SS-1 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.27	0.9	09/04/01	TMG	7440-38-2		
Barium	268.	mg/kg	0.436	0.9	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.545	0.9	09/04/01	TMG	7440-43-9		
Chromium	19.6	mg/kg	0.763	0.9	09/04/01	TMG	7440-47-3		
Lead	19.7	mg/kg	5.45	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.9	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.763	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.180	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	14.3	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551796 | Project Sample Number: 6052312-003 | Date Collected: 08/22/01 14:00
Client Sample ID: SS-3 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	8.85	0.9	09/04/01	TMG	7440-38-2		
Barium	136.	mg/kg	0.416	0.9	09/04/01	TMG	7440-39-3		
Cadmium	2.19	mg/kg	0.521	0.9	09/04/01	TMG	7440-43-9		
Chromium	15.1	mg/kg	0.729	0.9	09/04/01	TMG	7440-47-3		
Lead	26.8	mg/kg	5.21	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.4	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.729	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.175	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	11.9	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551804 | Project Sample Number: 6052312-004 | Date Collected: 08/22/01 14:00
Client Sample ID: SS-3 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.39	0.9	09/04/01	TMG	7440-38-2		
Barium	151.	mg/kg	0.442	0.9	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.552	0.9	09/04/01	TMG	7440-43-9		
Chromium	20.7	mg/kg	0.773	0.9	09/04/01	TMG	7440-47-3		
Lead	23.9	mg/kg	5.52	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	11.0	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.773	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.182	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	15.4	%		0.8	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551812 | Project Sample Number: 6052312-005 | Date Collected: 08/22/01 14:28
Client Sample ID: SS-5 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	12.7	mg/kg	8.75	0.9	09/04/01	TMG	7440-38-2		
Barium	434.	mg/kg	0.412	0.9	09/04/01	TMG	7440-39-3		
Cadmium	15.0	mg/kg	0.515	0.9	09/04/01	TMG	7440-43-9		
Chromium	11.0	mg/kg	0.721	0.9	09/04/01	TMG	7440-47-3		
Lead	351.	mg/kg	5.15	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.3	0.9	09/04/01	TMG	7782-49-2		
Silver	0.980	mg/kg	0.721	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.170	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	9.2	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551820 | Project Sample Number: 6052312-006 | Date Collected: 08/22/01 14:28
Client Sample ID: SS-5 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.37	1.0	09/04/01	TMG	7440-38-2		
Barium	192.	mg/kg	0.441	1.0	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.551	1.0	09/04/01	TMG	7440-43-9		
Chromium	17.1	mg/kg	0.772	1.0	09/04/01	TMG	7440-47-3		
Lead	20.1	mg/kg	5.51	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	11.0	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.772	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.178	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	13.6	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551838 | Project Sample Number: 6052312-007 | Date Collected: 08/22/01 14:46
Client Sample ID: SS-7 6-12" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	8.42	0.9	09/04/01	TMG	7440-38-2		
Barium	104.	mg/kg	0.396	0.9	09/04/01	TMG	7440-39-3		
Cadmium	1.58	mg/kg	0.495	0.9	09/04/01	TMG	7440-43-9		
Chromium	9.73	mg/kg	0.693	0.9	09/04/01	TMG	7440-47-3		
Lead	24.6	mg/kg	4.95	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	9.90	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.693	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.166	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	7.4	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551846 | Project Sample Number: 6052312-008 | Date Collected: 08/22/01 14:46
Client Sample ID: SS-7 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Req Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.89	1.0	09/04/01	TMG	7440-38-2		
Barium	210.	mg/kg	0.466	1.0	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.582	1.0	09/04/01	TMG	7440-43-9		
Chromium	18.8	mg/kg	0.815	1.0	09/04/01	TMG	7440-47-3		
Lead	12.9	mg/kg	5.82	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	11.6	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.815	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.183	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	15.8	%		0.8	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551853 | Project Sample Number: 6052312-009 | Date Collected: 08/22/01 15:42
Client Sample ID: SS-9 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method:	EPA 3050 / EPA 6010							
Arsenic	11.1	mg/kg	9.00	1.0	09/04/01	TMG	7440-38-2		
Barium	224.	mg/kg	0.423	1.0	09/04/01	TMG	7440-39-3		
Cadmium	15.0	mg/kg	0.529	1.0	09/04/01	TMG	7440-43-9		
Chromium	11.7	mg/kg	0.741	1.0	09/04/01	TMG	7440-47-3		
Lead	325.	mg/kg	5.29	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.6	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.741	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method:	EPA 7471 / EPA 7471							
Mercury	ND	mg/kg	0.171	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	10.0	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551861 | Project Sample Number: 6052312-010 | Date Collected: 08/22/01 15:42
Client Sample ID: SS-9 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Req Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.20	1.0	09/04/01	TMG	7440-38-2		
Barium	543.	mg/kg	0.433	1.0	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.541	1.0	09/04/01	TMG	7440-43-9		
Chromium	16.0	mg/kg	0.758	1.0	09/04/01	TMG	7440-47-3		
Lead	12.0	mg/kg	5.41	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.8	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.758	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.173	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	11.2	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551879 | Project Sample Number: 6052312-011 | Date Collected: 08/22/01 15:35
Client Sample ID: SS-10 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	12.6	mg/kg	8.74	1.0	09/04/01	TMG	7440-38-2		
Barium	234.	mg/kg	0.411	1.0	09/04/01	TMG	7440-39-3		
Cadmium	15.1	mg/kg	0.514	1.0	09/04/01	TMG	7440-43-9		
Chromium	11.5	mg/kg	0.720	1.0	09/04/01	TMG	7440-47-3		
Lead	492.	mg/kg	5.14	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.3	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.720	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.166	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	7.4	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551887 | Project Sample Number: 6052312-012 | Date Collected: 08/22/01 15:35
Client Sample ID: SS-10 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Req Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.78	1.0	09/04/01	TMG	7440-38-2		
Barium	157.	mg/kg	0.460	1.0	09/04/01	TMG	7440-39-3		
Cadmium	ND	mg/kg	0.575	1.0	09/04/01	TMG	7440-43-9		
Chromium	18.0	mg/kg	0.805	1.0	09/04/01	TMG	7440-47-3		
Lead	12.4	mg/kg	5.75	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	11.5	1.0	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.805	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.179	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	13.9	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551895 | Project Sample Number: 6052312-013 | Date Collected: 08/22/01 15:10
Client Sample ID: SS-12 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	8.37	0.9	09/04/01	TMG	7440-38-2		
Barium	107.	mg/kg	0.394	0.9	09/04/01	TMG	7440-39-3		
Cadmium	14.5	mg/kg	0.492	0.9	09/04/01	TMG	7440-43-9		
Chromium	8.89	mg/kg	0.689	0.9	09/04/01	TMG	7440-47-3		
Lead	114.	mg/kg	4.92	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	9.84	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.689	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.167	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	7.6	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551903 | Project Sample Number: 6052312-014 | Date Collected: 08/22/01 15:10
Client Sample ID: SS-12 12-18" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.01	0.9	09/04/01	TMG	7440-38-2		
Barium	187.	mg/kg	0.424	0.9	09/04/01	TMG	7440-39-3		
Cadmium	3.81	mg/kg	0.530	0.9	09/04/01	TMG	7440-43-9		
Chromium	18.7	mg/kg	0.742	0.9	09/04/01	TMG	7440-47-3		
Lead	16.5	mg/kg	5.30	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.6	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.742	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.180	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	14.2	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551911 | Project Sample Number: 6052312-015 | Date Collected: 08/22/01 16:25
Client Sample ID: SS-15 0-6" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Req Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	12.2	mg/kg	9.40	1.0	09/04/01	TMG	7440-38-2		
Barium	98.5	mg/kg	0.442	1.0	09/04/01	TMG	7440-39-3		
Cadmium	9.72	mg/kg	0.553	1.0	09/04/01	TMG	7440-43-9		
Chromium	10.6	mg/kg	0.774	1.0	09/04/01	TMG	7440-47-3		
Lead	305.	mg/kg	5.53	1.0	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	11.1	1.0	09/04/01	TMG	7782-49-2		
Silver	1.78	mg/kg	0.774	1.0	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.175	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	12.2	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Lab Sample No: 604551929 | Project Sample Number: 6052312-016 | Date Collected: 08/22/01 16:25
Client Sample ID: SS-15 18-24" | Matrix: Soil | Date Received: 08/31/01 11:00

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Soil	Prep/Method: EPA 3050 / EPA 6010								
Arsenic	ND	mg/kg	9.07	0.9	09/04/01	TMG	7440-38-2		
Barium	237.	mg/kg	0.427	0.9	09/04/01	TMG	7440-39-3		
Cadmium	2.19	mg/kg	0.534	0.9	09/04/01	TMG	7440-43-9		
Chromium	18.9	mg/kg	0.747	0.9	09/04/01	TMG	7440-47-3		
Lead	22.4	mg/kg	5.34	0.9	09/04/01	TMG	7439-92-1		
Selenium	ND	mg/kg	10.7	0.9	09/04/01	TMG	7782-49-2		
Silver	ND	mg/kg	0.747	0.9	09/04/01	TMG	7440-22-4		
Date Digested					09/04/01				
Mercury, Soil CVAAS	Prep/Method: EPA 7471 / EPA 7471								
Mercury	ND	mg/kg	0.179	1.0	09/04/01	TMG	7439-97-6		
Organics Prep									
Percent Moisture	Method:								
Percent Moisture	14.0	%		0.9	09/05/01	DCKI			

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

PARAMETER FOOTNOTES

ND Not Detected
NC Not Calculable

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

QC Batch: 108918 — Analysis Method: EPA 7471
QC Batch Method: EPA 7471 — Analysis Description: Mercury, Soil CVAAS
Associated Lab Samples: 604551770 604551788 604551796 604551804 604551812 604551820 604551838 604551846 604551853 604551861 604551879 604551887 604551895 604551903 604551911 604551929

METHOD BLANK: 604554113
Associated Lab Samples: 604551770 604551788 604551796 604551804 604551812 604551820 604551838 604551846 604551853 604551861 604551879 604551887 604551895 604551903 604551911 604551929

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Mercury	mg/kg	ND	0.154	

LABORATORY CONTROL SAMPLE: 604554147

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	Footnotes
Mercury	mg/kg	0.7500	0.7576	101	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 604554121 604554139

Parameter	Units	604551770 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	RPD	Footnotes
Mercury	mg/kg	0.02303	0.8404	0.8666	0.8578	100	99	1	

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.
ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

QC Batch: 108935 — Analysis Method: EPA 6010
QC Batch Method: EPA 3050 — Analysis Description: Metals-Standard ICP, Soil
Associated Lab Samples: 604551770 604551788 604551796 604551804 604551812 604551820 604551838 604551846 604551853 604551861 604551879 604551887 604551895 604551903 604551911 604551929

METHOD BLANK: 604554402
Associated Lab Samples: 604551770 604551788 604551796 604551804 604551812 604551820 604551838 604551846 604551853 604551861 604551879 604551887 604551895 604551903 604551911 604551929

Parameter	Units	Blank Result	Reporting Limit	Footnotes
Arsenic	mg/kg	ND	7.73	
Barium	mg/kg	ND	0.364	
Cadmium	mg/kg	ND	0.455	
Chromium	mg/kg	ND	0.636	
Lead	mg/kg	ND	4.55	
Selenium	mg/kg	ND	9.09	
Silver	mg/kg	ND	0.636	

LABORATORY CONTROL SAMPLE: 604554436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	Footnotes
Arsenic	mg/kg	91.74	87.81	96	
Barium	mg/kg	91.74	94.72	103	
Cadmium	mg/kg	9.174	8.716	95	
Chromium	mg/kg	91.74	89.98	98	
Lead	mg/kg	91.74	85.57	93	
Selenium	mg/kg	91.74	87.65	96	
Silver	mg/kg	9.174	8.787	96	

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.
ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

QUALITY CONTROL DATA

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 604554410 604554428

Parameter	Units	604551770 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	RPD	Footnotes
Arsenic	mg/kg	4.765	104.70	98.92	93.59	90	86	6	
Barium	mg/kg	174.9	104.70	247.0	269.8	69	92	9	1
Cadmium	mg/kg	8.621	10.47	17.78	17.75	88	89	0	
Chromium	mg/kg	12.63	104.70	109.0	105.1	92	90	4	
Lead	mg/kg	63.59	104.70	149.0	148.0	82	82	1	
Selenium	mg/kg	3.464	104.70	98.37	92.23	91	86	6	
Silver	mg/kg	0.2831	10.47	9.862	9.587	92	90	3	

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

QC Batch: 108926 Analysis Method:
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 604551770 604551788 604551796 604551804 604551812 604551820 604551838 604551846 604551853 604551861 604551879 604551887 604551895 604551903 604551911 604551929

SAMPLE DUPLICATE: 604554212

Parameter	Units	604551770 Result	DUP Result	RPD	Footnotes
Percent Moisture	%	10.80	15.40	35	

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.
ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

LCS(D) Laboratory Control Sample (Duplicate)
MS(D) Matrix Spike (Duplicate)
DUP Sample Duplicate
ND Not Detected
NC Not Calculable
RPD Relative Percent Difference
[1] The spike recovery was outside acceptance limits for the MS or MSD due to matrix interference. The LCS was within acceptance limits showing that the laboratory is in control and the data is acceptable.

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.
ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

CROSS REFERENCE TABLE

KDHE
BUILDING 740, FORBES FIELD
TOPEKA, KS 66620

Lab Project Number: 6052312
Client Project ID: CHERRY VALE BTA

Attn: Mr. RANDY BROWN
Phone: (785)296-8065

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
604551770	SS-1 0-6"	EPA 7471	108918		
604551788	SS-1 18-24"	EPA 7471	108918		
604551796	SS-3 0-6"	EPA 7471	108918		
604551804	SS-3 18-24"	EPA 7471	108918		
604551812	SS-5 0-6"	EPA 7471	108918		
604551820	SS-5 18-24"	EPA 7471	108918		
604551838	SS-7 6-12"	EPA 7471	108918		
604551846	SS-7 18-24"	EPA 7471	108918		
604551853	SS-9 0-6"	EPA 7471	108918		
604551861	SS-9 18-24"	EPA 7471	108918		
604551879	SS-10 0-6"	EPA 7471	108918		
604551887	SS-10 18-24"	EPA 7471	108918		
604551895	SS-12 0-6"	EPA 7471	108918		
604551903	SS-12 12-18"	EPA 7471	108918		
604551911	SS-15 0-6"	EPA 7471	108918		
604551929	SS-15 18-24"	EPA 7471	108918		
604551770	SS-1 0-6"	EPA 3050	108935	EPA 6010	108958
604551788	SS-1 18-24"	EPA 3050	108935	EPA 6010	108958
604551796	SS-3 0-6"	EPA 3050	108935	EPA 6010	108958
604551804	SS-3 18-24"	EPA 3050	108935	EPA 6010	108958
604551812	SS-5 0-6"	EPA 3050	108935	EPA 6010	108958
604551820	SS-5 18-24"	EPA 3050	108935	EPA 6010	108958
604551838	SS-7 6-12"	EPA 3050	108935	EPA 6010	108958
604551846	SS-7 18-24"	EPA 3050	108935	EPA 6010	108958
604551853	SS-9 0-6"	EPA 3050	108935	EPA 6010	108958
604551861	SS-9 18-24"	EPA 3050	108935	EPA 6010	108958

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.
ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 10 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

Lab Sample No Identifier	Client Sample Identifier	QC Batch Method	QC Batch Identifier	Analytical Method	Analytical Batch Identifier
604551879	SS-10 0-6"	EPA 3050	108935	EPA 6010	108958
604551887	SS-10 18-24"	EPA 3050	108935	EPA 6010	108958
604551895	SS-12 0-6"	EPA 3050	108935	EPA 6010	108958
604551903	SS-12 12-18"	EPA 3050	108935	EPA 6010	108958
604551911	SS-15 0-6"	EPA 3050	108935	EPA 6010	108958
604551929	SS-15 18-24"	EPA 3050	108935	EPA 6010	108958
604551770	SS-1 0-6"		108926		
604551788	SS-1 18-24"		108926		
604551796	SS-3 0-6"		108926		
604551804	SS-3 18-24"		108926		
604551812	SS-5 0-6"		108926		
604551820	SS-5 18-24"		108926		
604551838	SS-7 6-12"		108926		
604551846	SS-7 18-24"		108926		
604551853	SS-9 0-6"		108926		
604551861	SS-9 18-24"		108926		
604551879	SS-10 0-6"		108926		
604551887	SS-10 18-24"		108926		
604551895	SS-12 0-6"		108926		
604551903	SS-12 12-18"		108926		
604551911	SS-15 0-6"		108926		
604551929	SS-15 18-24"		108926		

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RECEIVED
SEP 13 2001
BUREAU OF
ENVIRONMENTAL REMEDIATION

KDHE
BUILDING 740, FORBES FIELD
TOPEKA, KS 66620

Lab Project Number: 6052187
Client Project ID: Cherryvale Rodeo BTA

Attn: Mr. RANDY BROWN
Phone: (785)296-8065

Solid results are reported on a dry weight basis

Lab Sample No: 604538538 Project Sample Number: 6052187-001 Date Collected: 08/22/01 00:00
Client Sample ID: RINSATE Matrix: Water Date Received: 08/24/01 11:38

Parameters	Results	Units	Report Limit	Dilution	Analyzed		CAS No.	Ftnote	Reg Limit
Metals									
Metals-Standard ICP, Water	Prep/Method: EPA 3010 / EPA 6010								
Arsenic	ND	ug/l	85.0	1.0	08/29/01	TMG	7440-38-2		
Barium	ND	ug/l	4.00	1.0	08/29/01	TMG	7440-39-3		
Cadmium	ND	ug/l	5.00	1.0	08/29/01	TMG	7440-43-9		
Chromium	ND	ug/l	7.00	1.0	08/29/01	TMG	7440-47-3		
Lead	ND	ug/l	50.0	1.0	08/29/01	TMG	7439-92-1		
Selenium	ND	ug/l	100.	1.0	08/29/01	TMG	7782-49-2		
Silver	ND	ug/l	7.00	1.0	08/29/01	TMG	7440-22-4		
Date Digested					08/28/01				
Mercury, CVAAS	Prep/Method: EPA 7470 / EPA 7470								
Mercury	ND	ug/l	0.200	1.0	08/31/01 13:48	TMG	7439-97-6		

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

ACCREDITED IN ACCORDANCE WITH nelac

APPENDIX D

X-RAY FLUORESCENCE (XRF) DATA

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/23/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Haxton

System Check, Warm-Up and Internal Calibration Notes:
Uniton 1307; source strength: 8mCi resolution 387 eV

Method 6200 Utilized? Y X N ___ In-situ readings? Y ___ N X
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
Med Std	401	Cd 109	30	1080 ± 100	
SS-1 0-6"	402	Cd 109	31	348 ± 230	
	403	Am 241	34		Cd < 78.0
	404	Am 241	34		Cd < 72.0
	405	Cd 109	31	79.0 ± 30.0	Avg. 56.9
SS-1 6-12"	406	Cd 109	34	< 25.0	
	407	Am 241	30		Cd < 71.0
	408	Am 241	30		Cd < 65.0
	409	Cd 109	35	46.8 ± 24.0	Ave. 40.8
SS-1 12-18"	410	Cd 109	31	< 28.0	
	411	Am 241	30		Cd < 70.0
	412	Am 241	30		Cd < 75.0
	413	Cd 109	31	< 38.0	~~< 3~~
SS-1 18-24"	414	Cd 109	31	< 28.0	Ave: 27
	415	Am 241	30		< 61.0
	416	Am 241	30		< 75.0
	417	Cd 109	31	< 28.0	
Low Std	418	Cd 109		< 34.0	

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/23 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Harton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-2 0-6"	419	Cd 109	31	59.5 ± 30.0	
	420	Am 241	32		
	421	Am 241	32		< 73.0
	422	Cd 109	31	103.0 ± 35.0	Ave = 81.3
SS-2 6-12"	423	Cd 109	31	68.7 ± 29.0	
	424	Am 241	29		< 82.0
	425	Am 241	33		< 80.0
	426	Cd 109	31	< 39.0	Ave = 53.4
SS-2 12-18"	427	Cd 109	31		518.0 ± 340
	428	Am 241	33		< 79.0
	429	Am 241	30		< 72.0
	430	Cd 109	31	< 34.0	Ave = > 75.6
SS-2 18-24"	431	Cd 109	32	< 34.0	
	432	Am 241	31		Cd < 100
	433	~~Am 241~~ Fe55			
	434	Am 241	30		Cd < 88.0
	435	Cd 109	31	< 36.0	Ave = 34.0
Med Std	436	Cd 109	33	1110 ± 97.0	

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hexton

System Check, Warm-Up and Internal Calibration Notes:
Unit on 0924 : res 387 eV; s.strength 8mCi

Method 6200 Utilized? Y X N ___ In-situ readings? Y ___ N X
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
Med Std	438	Cd 109	31	1190 ± 110	
SS-3 0-6"	439	Cd 109	35	< 32.0	
	440	Am 241	31	<	Cd <62.0
	441	Am 241	30		Cd <77.0
	442	Cd 109		< 34.0	Ave=37.0
SS-3 6-12"	443	Cd 109	31	52.8 ± 26	
	444	Am 241	31		Cd <92.0
	445	Am 241	33		Cd <74.0
	446	Cd 109	31	102.0 ± 31	
	447	Cd 109	31	< 34.0	Ave= 43.4
SS-3 12-18"	448	Cd 109	31	55.9 ± 27	
	449	Am 241	31		Cd <62.0
	450	Am 241	36		Cd <52.0
	451	Cd 109	31	56.4 ± 27	Ave=56.2
SS-4 0-6"	452	Cd 109	31	127.0 ± 37.0	
	453	Am 241	31		Cd <75.0
	454	Am 241	30		Cd <71.0
	455	Cd 109	31	92.5 ± 30	Ave=134.8

SS-3 18-24 insufficient sample

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hoxton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-4 0-6"	456	Cd 109	31	67.4 ± 27.0	Ave = 112.3
SS-4 6-12"	457	Cd 109	31	55.2 ± 28.0	
	458	Am 241	30		Cd < 79.0
	459	Am 241	33		Cd < 67.0
	460	Cd 109	31	45.3 ± 27.0	Ave = 50.3
duplicate of #460	461	Cd 109	31	< 36.0	
SS-4 12-18"	462	Cd 109	31	43.3 ± 25.0	
	463	Am 241	30		Cd < 84.0
	464	Am 241	33		Cd < 63.0
	465	Cd 109	31	74.5 ± 30.0	Ave = 58.9
SS-4 18-24"	466	Cd 109	31	44.9 ± 26.0	
	467	Am 241	31		Cd < 65.0
	468	Am 241	30		Cd < 63.0
	469	Cd 109	31	47.4 ± 27.0	Ave =
Med Std	470	Cd 109	30	1240 ± 110	
SS-5 0-6"	471	Cd 109	31	40.7 ± 25.0	
	472	Am 241	31		Cd < 64.0
	473	Am 241	30		Cd < 74.0

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Radar Ground Operator Name: Peter Harton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-5 0-6"	474	Cd109	31	< 32.0	Ave = 363.5
SS-5 6-12"	475	Cd109	31	488 ± 25.0	
	476	Am241	30		Cd < 72.0
	477	Am241	31		Cd < 55.0
	478	Cd109	31	< 33.0	Ave = 40.4
SS-5 12-18"	479	Cd109	31	< 31.0	
	480	Am241	30		Cd < 63.0
	481	Am241	30		Cd < 60.0
	482	Cd109	31	< 36.0	Ave = 32.5
SS-5 18-24"	483	Cd109	31	46.0 ± 25.0	
	484	Am241	30		Cd < 71.0
	485	Am241	30		Cd < 72.0
	486	Cd 109	31	191.0 ± 40.0	
	487	Cd 109	31	138.0 ± 35.0	Ave = 125.0
SS-6 0-6"	488	Cd 109	31	80.3 ± 29.0	
	489	Am241	30		Cd < 78.0
	490	Am241	32		Cd < 67.0
	491	Cd 109	31.	117.0 ± 32.0	Ave = 98.7

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Haxton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-6 6-12"	492	Cd 109	31	<32.0	
	493	Am 241	32		Cd <57.0
	494	Am 241	32		Cd <75.0
	495	Cd 109	31	<27.0	Ave = 28.5
SS-6 12-18"	496	Cd 109	31	<28.0	
	497	Am 241	30		Cd <59.0
	498	Am 241	30		Cd <62.0
	499	Cd 109	31	<30.0	Ave = 28.0
SS-6 18-24"	500	Cd 109	31	<30.0	
	501	Am 241	30		Cd < 67.0
	502	Am 241	32		Cd < 58.0
	503	Cd 109	31	<32.0	Ave = 30.0
High Std	504	Cd 109	32	5500 ± 260	
SS-7 0-6"	505	Cd 109	31	54.6 ± 27.0	
	506	Am 241	30		Cd < 72.0
	507	Am 241	32		Cd < 46.0
	508	Cd 109	31	<38.0	Ave =

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Gr. Operator Name: Peter Haxton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-7 6-12"	509	Cd 109	31	116.0 ± 33.0	
	510	Am 241	33		Cd < 67.0
	511	Am 241	39		Cd < 51.0
	512	Cd 109	31	55.7 ± 26.0	Ave = 85.9
SS-7 12-18"	513	Cd 109	31	< 32.0	
	514	Am 241	32		Cd < 73.0
	515	Am 241	32		Cd < 74.0
	516	Cd 109	31	< 28.0	Ave = 29.0
SS-7 18-24"	517	Cd 109	31	< 30.0	
	518	Am 241	30		Cd < 75.0
	519	Am 241	30		Cd < 61.0
	520	Cd 109	31	< 34.0	Ave = 31.0
SS-8 0-6"	521	Cd 109	31	125.0 ± 35.0	
	522	Am 241	30		Cd < 58.0
	523	Am 241	33		Cd < 71.0
	524	Cd 109	31	58.7 ± 27.0	Ave = 101.6
	525	Cd 109	31	121.0 ± 33.0	

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Haytas

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-8 6-12"	526	Cd 109	34	<34.0	
	527	Am 241	30		Cd < 80.0
	528	Am 241	32		Cd < 63.0
	529	Cd 109	31	<30.0	Ave=31.0
SS-8 12-18"	530	Cd 109	31	<34.0	
	531	Am 241	30		Cd < 63.0
	532	Am 241	30		Cd < 70.0
	533	Cd 109	31	<35.0	Ave=33.5
SS-8 18-24"	534	Cd 109	31	<33.0	
	535	Am 241	33		Cd< 67.0
	536	Am 241	32		Cd< 69.0
	537	Cd 109	31	<37.0	Ave=34.0
Med Std	538	Cd 109	33	1050 ± 95.0	
SS-9 0-6"	539	Cd 109	31	36.3 ± 23.0	
	540	Am 241	30		Cd < 64.0
	541	Am 241	33		Cd < 75.0
	542	Cd 109	31	128.0 ± 34.0	Ave= 211.0
	543	Cd 109	31	142.0 ± 35.0	

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hayton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS9 6-12"	544	Cd109	31	<37.0	
	545	Am241	32		Cd < 69.0
	546	Am241	32		Cd < 80.0
	547	Cd 109	31	<34.0	Ave = 2345
SS9 12-18"	548	Cd 109	31	<30.0	
	549	Am241	30		Cd < 70.0
	550	Am241	33		Cd < 71.0
	551	Cd 109	31	<30.0	Ave = 29.0
SS9 18-24"	552	Cd 109	31	<38.0	
	553	Am241	30		Cd < 67.0
	554	Am241	32		Cd < 64.0
	555	Cd 109	31	<32.0	Ave = 31.5
SS10 0-6"	556	Cd 109	31	201.0 ± 40.0	
	557	Am241	33		Cd < 66.0
	558	Am241	32		Cd < 72.0
	559	Cd109	31	563.0 ± 63.0	Ave = 346.0
	560	Cd109	31	274.0 ± 48.0	

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hexton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-10 6-12"	561	Cd 109	31	< 36.0	
	562	Am 241	30		Cd < 75.0
	563	Am 241	32		Cd < 69.0
	564	Cd 109	31	< 34.0	Ave = 34.0
SS-10 12-18"	565	Cd 109	31	< 34.0	
	566	Am 241	30		Cd < 64.0
	567	Am 241	32		Cd < 71.0
	568	Cd 109	31	< 35.0	Ave = 33.5
SS-10 18-24"	569	Cd 109	31	< 32.0	
	570	Am 241	37		Cd < 51.0
	571	Am 241	30		Cd < 59.0
	572	Cd 109	31	< 27.0	Ave = 28.5
High Std	573	Cd 109	32	5540 ± 260	
Unit Off					

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hayton

System Check, Warm-Up and Internal Calibration Notes:
Unit on 1213 ; resolution 397 eV ; source strength 8mCi

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
Med Std	575	Cd 109	30	1070 ± 100	
SS-11 0-6"	576	Cd 109	31	64.1 ± 28.0	
	577	Am 241	33		Cd < 79.0
	578	Am 241	33		Cd < 77.0
	579	Cd 109	31	77.2 ± 29.0	Ave = 70.1
SS-11 6-12"	580	Cd 109	31	< 35.0	
	581	Am 241	33	✓	Cd < 72.0
	582	Am 241	33		Cd < 69.0
	583	Cd 109	31	85.2 ± 29.0	
	584	Cd 109	31	< 34.0	Ave = 50.7
SS-11 12-18"	585	Cd 109	31	< 30.0	
duplicate #585	586	Cd 109	31	< 31.0	
	587	Am 241	41		Cd < 66.0
	588	Am 241	32		Cd < 75.0
	589	Cd 109	31	< 31.0	Ave = 29.5
SS-11 18-24"	590	Cd 109	31	< 31.0	
	591	Am 241	31		Cd < 61.0
	592	Am 241	33		Cd < 67.0

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets.

Date: 8/24/01 Site Name: Cherryvale Operator Name: _____

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-11 18-24"	593	Cd109	31	< 30	Ave= 29.5
SS-12 0-6"	594	~~Am241~~ Cd109	31	< 35.0	~~Cd <~~
	595	Am241	32		Cd < 59.0
	596	~~Cd109~~ Am241	33		Cd < 70.0
	597	Cd109	31	57.2 ± 26.0	Ave= 45.6
SS-12 6-12"	598	Cd109	31	< 31.0	
	599	Am241	35		Cd < 53.0
	600	Am241	33		Cd < 77.0
	601	Cd109	31	< 31.0	Ave= 36.0
SS-12 12-18"	602	Cd109	31	< 32.0	
	603	Am241	33		Cd < 72.0
	604	Am241	31		Cd < 91.0
	605	Cd109	31	< 29.0	Ave= 29.5
High Std	606	Cd109	32	5500 ± 260	
SS-13 0-6	607	Cd109	31	< 34.0	
	608	Am241	32		Cd < 78.0
	609	Am241	29		Cd < 60.0
	610	Cd109	31	84.0 ± 30	~~Ave= 61.0~~

SS-12 18-24" Insufficient sample

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Hoxton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-13 0-6"	611	Cd109	31	<32.0	Ave=51.0
SS-13 6-12"	612	Cd109	31	<28.0	
	613	Am241	32		Cd<67.0
	614	Am241	32		Cd<69.0
	615	Cd109	31	<32.0	Ave=29.0
SS-13 12-18"	616	Cd109	31	<30.0	
	617	Am241	30		Cd<55.0
	618	Am241	33		Cd<60.0
	619	Cd109	31	<33.0	Ave=30.5
SS-13 18-24"	620	Cd109	31	<30.0	
	621	Am241	33		Cd<52.0
	622	Am241	30		Cd<76.0
	623	Cd109	31	<31.0	Ave=29.5
SS-14 0-6"	624	Cd109	31	<31.0	
	625	Am241	30		Cd<61.0
	626	Am241	29		Cd<72.0
	627	Cd109	31	34.6±	Ave=32.3

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: _____ Operator Name: _____

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-14 6-12"	628	Cd109	31	<36.0	
	629	Am241	34		Cd <63.0
	630	Am241	32		Cd <58.0
	631	Cd109	31	<28.0	Ave = 31.0
SS-14 12-18"	632	Cd109	31	<30.0	Cr 634.0 ± 340
	633	Am241	30		Cd < 65.0
	634	Am241	30		Cd < 52.0
	635	Cd109	31	<35.0	Ave = 31.5
SS-14 18-24"	636	Cd109	31	<37.0	
	637	Am241	32		Cd < 76.0
	638	Am241	32		Cd < 63.0
	639	Cd109	31	<28.0	Ave = 31.5
Med Std	640	Cd109	30	1130 ± 100	
SS-15 0-6"	641	Cd109	31	42.6 ± 25.0	
	642	Am241	33		Cd < 57.0
	643	Am241	32		Cd < 57.0
	644	Cd109	31	115 ± 33.0	
	645	Cd109	31	54.6 ± 26.0	Ave = 32.3

KDHE/Bureau of Environmental Remediation
Site Assessment Program
Niton 733 X-Ray Fluorescence (XRF) Soil Analysis Field Data Sheets

Date: 8/24/01 Site Name: Cherryvale Rodeo Grounds Operator Name: Peter Harton

System Check, Warm-Up and Internal Calibration Notes:

Method 6200 Utilized? Y __ N __ In-situ readings? Y __ N __
If N, briefly explain sample preparation, homogenization, sample drying time/temp, analysis notes, etc.:

Sample I.D. #	XL #:	Source:	Run Time (Ssec.):	Lead (mg/kg):	Comments:
SS-15 6-12"	646	Cd 109	31	< 35.0	
	647	Am 241	33		Cd < 64.0
	648	Am 241	32		Cd < 58.0
	649	Cd 109	31	< 34.0	Ave = 33.5
SS-15 12-18"	650	Cd 109	31	< 29.0	
	651	Am 241	33		Cd < 58.0
	652	Am 241	36		Cd < 50.0
	653	Cd 109	31	< 27.0	Ave = 27.0
SS-15 18-24"	654	Cd 109	31	< 28.0	
	655	Am 241	30		Cd < 75.0
	656	Am 241	32		Cd < 65.0
	657	Cd 109	31	< 29.0	Ave = 27.5
High Std	658	Cd 109	32	5570 ± 260	

APPENDIX E

BROWNFIELDS TARGETED ASSESSMENT (BTA) FORM

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

I. SITE NAME AND LOCATION:

NAME: CHERRYVALE RODEO GROUNDS PROPERTY

ADDRESS OR OTHER LOCATION IDENTIFIER: Northeast 1/4 Section 8, Township 32 South, Range 17 East

CITY: Cherryvale	**STATE:** Kansas	**ZIP:** 67335

DIRECTIONS TO SITE: Property is bounded by on the north by Martin Street, on the east by Maple Street, on the south by an abandoned truck terminal and on the east by Catherine Street in Cherryvale, Montgomery County, Kansas.

MAP ATTACHED: Y_X_ or N___

II. PROGRAM CONTACTS:

REQUESTED BY: Roy Riedner	**DATE OF REQUEST:** 05/00	
AGENCY/OFFICE: City Manager, City of Cherryvale		
MAILING ADDRESS: 123 West Main		
CITY: Cherryvale	**STATE:** Kansas	**ZIP:** 67335
TELEPHONE: (316) 336-2776	**FAX:**	
EVALUATOR: Randolph L. Brown		
AGENCY/OFFICE: KDHE/Bureau of Environmental Remediation		
MAILING ADDRESS: Building 740, Forbes Field		
CITY: Topeka	**STATE:** Kansas	**ZIP:** 66620
TELEPHONE: (785) 296-8065	**FAX:** (785) 296-7030	

III. SITE INFORMATION:

TYPE OF FACILITY: Abandoned lead/zinc smelter	**TYPE OF OWNERSHIP:** Municipal

OWNER/OPERATOR INFORMATION: Operated by Edgar Zinc Company and subsequently the National Zinc Company

SITE STATUS (active/inactive): Inactive	**YEARS OF OPERATION:** 1898-1976

OPERATIONAL HISTORY: (How was the site identified?)
The site was identified through complaints, self-reporting for lagoon closure, and identification by municipality (City of Cherryvale) as concern/redevelopment potential. The site was the largest primary zinc smelter in the world during the early 1900s. Production appears to have declined after 1920 and most active operations ceased by the 1930s. The facility appears to have permanently ceased all operations in 1976.

IV. SUPERFUND SITE SCREENING CRITERIA

A. REMEDIAL CRITERIA

1. SOURCE AND WASTE CHARACTERISTICS

KNOWN OR SUSPECTED SOURCE TYPES AND LOCATIONS: Suspected source types include proximity (within 1/4 mile) to former National Zinc site and associated disposal areas

SIZE OF SOURCES AND QUANTITIES (Volume, Area): Approximately 110 acres of source waste on National Zinc site adjacent to Rodeo Grounds property.

WASTE TYPES OR HAZARDOUS SUBSTANCES KNOWN OR SUSPECTED TO BE PRESENT: Heavy metals, especially lead, cadmium, and arsenic.

2. GROUND WATER PATHWAY:

What is the likelihood that a release to ground water has occurred at the site? A release to ground water of heavy metals is not likely considering data gathered during the BTA. Ground water appears to be limited in quantity on the BTA property.

a. USE AND CHARACTERISTICS:

GENERAL STRATIGRAPHY AND HYDROLOGY: The site is located in a broad, low-relief upland of the Osage Questas physiographic area of southeast Kansas. Bedrock of Pennsylvanian age is present at the base of the soil profile. During the installation of temporary monitoring wells at the site, bedrock was typically encountered between 14 feet (TW-1) and 3.5 feet (TW-8). The bedrock units underlying the site are believed to be composed of sandstone and limestone of the Cherryvale Shale and Dennis Limestone Formations of the Kansas City Group.

Ground water occurrence within the Cherryvale Shale and Dennis Formations is typically localized with very low (less than 3 gallons per minute) yields of generally poor quality. These bedrock units typically yield little to no water except in the shallow weathered zone near the upper bedrock surface. Oil field intrusion of brines in the site area from oil production dating back to the early 1900s has impacted shallow ground water quality regionally in this portion of Southeast Kansas (Reference 4).

Ground water occurrence in the site area is primarily restricted to unconsolidated alluvial deposits of the Verdigris River and Cherry Creek. The City of Cherryvale receives water from a surface intake on Big Hill Lake located approximately five (5) miles east of Cherryvale. Significant karst terrain does not exist in the site area given the sequential shale-sandstone-limestone stratigraphy of the bedrock units. A detailed stratigraphic sequence is included as Figure 12. The City of Cherryvale and Montgomery County Rural Water District # 12 supplies water to private residences surrounding the site.

PRESENCE OF KARST TERRAIN: None suspected given the sequential sandstone/shale/thin limestone nature of the local bedrock stratigraphy

DEPTH TO SHALLOWEST AQUIFER: Less than 10 feet (6-8 feet to ground water typical)

PRIVATE WELLS WITHIN 4 MILES (locations and population served): 17 wells, 41 persons served

MUNICIPAL WELLS WITHIN 4 MILES (locations and population served): 0 wells

DISTANCE TO NEAREST DRINKING WATER WELL: approximately 3/4 (well could not be located and verified during BTA field work).

WELLHEAD PROTECTION AREAS: None identified in site area.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

3. SURFACE WATER PATHWAY:

What is the likelihood that a release to surface water has occurred at the site? A release to surface water has not been observed at the Rodeo Grounds property. No surface water bodies are present on the property and drainage is generally poor across the property. No surface water samples were obtained during the BTA.

FLOOD FREQUENCY: The site does not appear to be within the 100-year floodplain of Drum Creek.

DISTANCE TO NEAREST SURFACE WATER: Less than one mile

SURFACE WATER BODIES WITHIN 15 DOWNSTREAM MILES: Drum Creek and the Veridigris River

DESIGNATED USES OF SURFACE WATER BODIES (ACCORDING TO KANSAS SURFACE WATER REGISTER):
Drum Creek Designated Uses: Food Procurement and Aquatic Life Support;
Verdigris River Designated Uses: Aquatic Life Support, Contact Recreation, Domestic Water Supply, Food Procurement, Ground Water Recharge, Industrial Water Supply, Irrigation, Livestock Watering

DRINKING WATER INTAKES WITHIN 15 DOWNSTREAM MILES (locations and populations served): 0

FISHERIES WITHIN 15 DOWNSTREAM MILES: 0

KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS AND WETLANDS WITHIN 15 DOWNSTREAM MILES:
Habitats of threatened or endangered species in Drum Creek and the Verdigris River

4. SOIL EXPOSURE PATHWAY:

What is the likelihood of exposure to hazardous substances at the site? A release of hazardous substances, especially lead and arsenic, has been observed at the site in surficial soils and documented by valid data. Levels of lead and arsenic identified at the site are above KDHE's residential RSK values but below KDHE's non-residential RSK values.

NUMBER OF PEOPLE LIVING WITHIN 200 FEET: approximately 24

SCHOOLS OR DAY-CARES WITHIN 200 FEET: none

POPULATIONS WITHIN 1 MILE: Approximately 1,048 persons

NUMBER OF WORKERS AT THE FACILITY OR ADJACENT FACILITIES: Abandoned facility

LOCATIONS OF KNOWN OR POTENTIAL TERRESTRIAL SENSITIVE ENVIRONMENTS:
Habitats of threatened or endangered species in Drum Creek and the Verdigris River

5. AIR PATHWAY:

What is the likelihood that a release of hazardous substances are migrating from the site to the air? The site is south of and therefore upwind of the former National Zinc site based on the prevailing southerly wind direction in Montgomery County. A significant air release is therefore not expected. The soil results on the portion of the National Zinc site directly north of the Rodeo Grounds area are generally low compared to other areas northeast of the Rodeo Grounds property.

POPULATIONS WITHIN 4 MILES: Approximately 3,132 persons

DISTANCE TO NEAREST INDIVIDUAL: 200 feet

LOCATIONS OF KNOWN OR POTENTIAL SENSITIVE ENVIRONMENTS WITHIN 0 TO 1/4 MILE AND 1/4 TO ½ MILE:
Areas corresponding to terrestrial habitats of threatened and endangered species present in this portion of Montgomery County.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

B. REMOVAL CRITERIA

IS THERE A RELEASE AS DEFINED BY THE NCP? **YES _X_ or NO __**
EXPLAIN: A release of lead and arsenic to surficial soils in excess of residential RSKs has been identified at the site. Lead and arsenic were not identified in excess of non-residential RSK levels.

IS THE SOURCE A FACILITY OR VESSEL AS DEFINED BY THE NCP? **YES _X_ or NO __**
EXPLAIN: The source is a nearby primary lead and zinc smelter facility.

DOES THE RELEASE INVOLVE A HAZARDOUS SUBSTANCE, OR POLLUTANT CONTAMINANT AS DEFINED BY THE NCP? **YES _X_ or NO__**
EXPLAIN: All of the RCRA metals indicated in elevated levels at the site (especially lead and arsenic) are hazardous substances as defined in § 302.4 of the NCP.

IS THE RELEASE SUBJECT TO THE LIMITATIONS ON RESPONSE? **YES _X_ or NO __**
EXPLAIN: No statutory limitations on response appear to exist at the National Zinc site.

DOES THE QUANTITY OR CONCENTRATION WARRANT RESPONSE? **YES_X_ or NO __**
EXPLAIN: Lead and arsenic were detected above residential RSKs in surficial soils but not above non-residential RSKs. The necessity for response actions appears to be dependent on intended land use.

HAS A PRP BEEN IDENTIFIED? (Include name, address and telephone number) YES __ or NO X__ EXPLAIN: A PRP search is ongoing by KDHE as a separate project task. Last address: National Zinc Co., P.O. Box 579, Bartlesville, OK 74003

IS THERE AN ACTUAL OR POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS, OR CONTAMINANTS? **YES_X_ or NO__**
EXPLAIN: Elevated levels of several heavy metals have been identified in surficial soils at the site.

IS THERE ACTUAL OR A POTENTIAL FOR CONTAMINATION OF DRINKING WATER SUPPLIES?
YES__ NO __ UNKNOWN _X_
EXPLAIN: Ground water was not evaluated during this BTA because of limited available quantities in temporary monitoring wells. The threat to ground water supplies would be only potential because no nearby ground water users were identified and local ground water is of highly localized and limited quantity and quality naturally.

ARE THERE HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN DRUMS, BARRELS, OR BULK STORAGE CONTAINERS? **YES __ or NO _X_**
EXPLAIN: No intact hazardous substance or waste containers were identified to remain at the site during the BTA.

ARE THERE HIGH LEVELS OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN NEAR-SURFACE SOILS? **YES_X_ or NO __**
EXPLAIN: XRF and laboratory analysis indicated areas of lead and arsenic in surficial soils slightly in excess of KDHEs residential RSK values. See BTA for more specific information.

ARE THERE CONDITIONS ON SITE WHICH MAY BE SUSCEPTIBLE TO IMPACT FROM ADVERSE WEATHER CONDITIONS? **YES __ or NO_X_**
EXPLAIN: The facility has been abandoned for a significant time and no conditions susceptible to adverse weather impact were identified during the BTA.

IS THERE A THREAT OF FIRE OR EXPLOSION? **YES __ or NO _X_**
EXPLAIN: No threat of fire or explosion was identified during the BTA.

IS THERE A POTENTIAL FOR OTHER FEDERAL OR STATE RESPONSE MECHANISMS? **YES_X_ or NO__**
IF SO, IDENTIFY THE APPROPRIATE PROGRAM: _RCRA __NRC _FIFRA _UST __OTHER _X_STATE DEFERRAL
EXPLAIN: The site may qualify for KDHE's Voluntary Cleanup or State Cooperative Programs if a cooperative PRP is present to conduct response actions. Otherwise, the site may qualify for further CERCLA response.

ARE THERE OTHER SITUATIONS OR FACTORS WHICH WARRANT FURTHER CERCLA RESPONSE? **YES_X_ or NO__**
EXPLAIN: Further response actions will likely be taking place at the adjacent National Zinc and at residential yards impacted by the National Zinc site also adjacent to the Rodeo Grounds property.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

V. SUPERFUND SITE SCREENING FINDINGS AND RECOMMENDATIONS:

COMMENT: SITE IS ACTIVE IN CERCLIS

REMOVAL ACTION RECOMMENDED:___EMERGENCY __TIME-CRITICAL __NON-TIME-CRITICAL

(Cite one or more of the conditions or factors from Section IV. REMOVAL CRITERIA, as a basis for recommending a removal action.)

Yes	No	Unknown	Issue	Yes	No	Unknown	Issue
X			Exposure To Hazardous Substances/Pollutants/Contaminants		X		Adverse Weather Impacts
	X		Contaminated Drinking Water		X		Fire/Explosion Threat
X			Contaminated Soil		X		Drums, Barrels Or Containers
	X		Other Response Mechanism		X		Other Factors

V. SUPERFUND SITE SCREENING RECOMMENDATIONS (*continued*):

COMMENT: Additional site evaluation may be appropriate to further investigate areas of elevated lead and arsenic detections; however since levels were not identified above KDHE non-residential RSK levels further response may be contingent on developed land use. Removal site evaluation is not recommended since the area is not zoned or used for residential purposes.

X **ADDITIONAL INTEGRATED ASSESSMENT RECOMMENDED**

(Cite the appropriate criteria from Section IV as a basis for recommending that additional site evaluation be performed.)

Yes	No	Unknown	Issue	Yes	No	Unknown	Issue
		X	Ground water Pathway Threat	X			Direct Exposure Pathway Threat
		X	Surface Water Pathway Threat			X	Air Pathway Threat
X			Release Of Hazardous Substances Or Pollutants Or Contaminants	X			The Source Is A Facility As Defined By The NCP
X			CERCLA "Limitations On Response" Provisions Do Not Apply	X			Contaminants Present In Sufficient Quantity And/Rr Concentration
		X	Willing/Capable PRPS Willing To Respond At This Time	X			Actual Or Potential Exposure Threat
	X		Drums, Barrels Or Containers Are Present	X			High Levels Of Contaminants In Surface Soils
	X		The Site Is Susceptible To Adverse Weather Conditions		X		A Threat Of Fire Or Explosion
	X		Other Federal, State, Or Other Response Mechanisms Available To Investigate The Site		X		Endangered Species/ Wetlands/ Other Sensitive Environments May Be Impacted By The Site

VI. ADDITIONAL INFORMATION OR COMMENTS: Additional integrated CERCLA site assessment is not recommended to further evaluate potential releases of hazardous substances contingent on developed/intended land use. The Rodeo Grounds property may qualify for KDHE's Voluntary Cleanup and Property Redevelopment Program (VCPRP) for future response actions.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

VII. BROWNFIELDS CRITERIA:

A. RECORDS REVIEW

1. ENVIRONMENTAL RECORDS

ARE ANY FEDERAL SUPERFUND (CERCLIS) SITES LOCATED WITHIN A 0.5 MILE RADIUS? **YES __ or NO X_**

EXPLAIN: The National Zinc Site, **KSD980406698**, is located within 1/4 mile north and northeast of the Rodeo Grounds property.

ARE ANY FEDERAL NPL SITES LOCATED WITHIN A 1.0 MILE RADIUS? **YES__or NO_X_**

EXPLAIN: No sites identified in radius, however the former National Zinc site may be a future NPL candidate.

ARE ANY FEDERAL RCRA TSD FACILITIES LOCATED WITHIN A 1.0 MILE RADIUS? **YES__or NO_X_**

EXPLAIN: No facilities identified in search radius.

ARE ANY FEDERAL RCRA GENERATORS LOCATED ON THE PROPERTY OR ADJOINING PROPERTIES? **YES__or NO_X_**

EXPLAIN: No facilities identified in adjoining properties. Several small quantity generators and one large quantity generator are located within 1 mile of the center of the site in the North Highway 169 Industrial Park but are not located adjoining to the Rodeo Grounds property.

IS THERE ANY RECORD OF FEDERAL SPILL NOTIFICATIONS (ERNS) ON THE PROPERTY? **YES__or NO_X_**

EXPLAIN: No Federal spill records identified from this property.

ARE OTHER STATE HAZARDOUS WASTE SITE LISTINGS (State Registry, VCPs, etc.) LOCATED WITHIN A 1.0 MILE RADIUS? **YES_X or NO__**

EXPLAIN: State complaints, inspection reports and previous analytical results identified for this site in KDHE files.

ARE ANY STATE/MUNICIPAL LANDFILLS OR SOLID WASTE DISPOSAL FACILITIES LOCATED WITHIN A 0.5 MILE RADIUS? **YES__ or NO_X**

EXPLAIN: No facilities were identified in search radius, however a former City of Cherryvale and National Zinc consturction/demolition debris area is present ½ mile northeast of the Rodeo Grounds property.

ARE ANY STATE REGISTERED USTs OR LEAKING USTs LOCATED WITHIN A 0.5 MILE RADIUS? **YES__ or NO_X**

EXPLAIN: No UST sites identified within 0.5 miles.

WERE ANY OTHER STATE OR LOCAL SOURCES CONTACTED? **YES_X or NO__**

EXPLAIN: All KDHE individual bureaus were contacted for relevant file information. Local officials were also contacted for additional information.

DOES THE PROPERTY HAVE ANY HISTORY OF ENVIRONMENTAL VIOLATIONS OR ENVIRONMENTAL LIENS? **YES_ or NO_X_**

EXPLAIN: Environmental compliance and other concerns appear to be only related to the former National Zinc site located immediately north and northeast of the Rodeo Grounds property.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

VII. BROWNFIELDS CRITERIA:

A. RECORDS REVIEW (continued):

2. HISTORICAL USE RECORDS

WHAT HAVE BEEN THE USES OF THE PROPERTY SINCE 1940?

The property has been abandoned during most of the time since 1940. The National Zinc Company had originally used the Rodeo Grounds property as an employee housing area for workers at the adjacent smelter works. The housing area appears to have been abandoned in the 1920s. The City of Cherryvale formerly used the property for the public city rodeo grounds between the 1940s and the 1980s. The property has been a grass pasture area since at least the 1980s.

WERE THE FOLLOWING RESOURCES CONSULTED?

Fire Insurance Maps	**YES_X_ or NO__**
Property Tax Files	**YES_X_ or NO__**
Property Title Records	**YES_X_ or NO__**
Zoning/Land Use Records	**YES_X_ or NO__**
Aerial Photographs	**YES_X_ or NO__**
USGS 7.5 Minute Topographic Map (required, attach)	**YES_X_ or NO__**
Local Street Directories	**YES_X_ or NO__**
Building Department Records (for alterations, improvements, demolitions, etc.)	**YES_X_ or NO__**
Other (explain)	**YES_X or NO__**

Historic city directories, literature on smelting and similar historic operations at the beginning of the 20th century.

B. SITE RECONAISSANCE

1. SITE CONDITIONS RELEVANT TO TRANSACTION SCREEN PROCESS

(NOTE: These criteria are in addition to environmental conditions identified in sections IV through VI above.)

WHAT IS THE PRESENT USE OF THE PROPERTY?

The property is generally abandoned and is used only for cattle grazing. An abandoned truck terminal borders the Rodeo Grounds property to the south, the former National Zinc site borders the site to the north and northeast, and residential properties surround the Rodeo Grounds property to the east and west.

ARE ANY BUILDINGS OR STRUCTURES LOCATED ON THE PROPERTY? IF SO, INCLUDE THE FOLLOWING INFORMATION FOR EACH BUILDING:

No intact structures remain at the Rodeo Grounds property.

No. of Stories:

Approximate Age:

Ancillary Structures (if any):

Description of Interior (accessible common areas, HVAC, stains or corrosion, drains or sumps):

DESCRIBE ANY ROADS OR PATHWAYS ON THE PROPERTY:

The site is bounded by roads on three sides. Maple Street is present on the west, Martin Street to the north and northeast, and Catherine Street is present at the east site boundary. No roads are present on the property, only vestiges of former driveways, etc. from the Rodeo Grounds and former National Zinc employee housing areas. The Rodeo Grounds property is bounded by an electric cattle fence.

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

VII. BROWNFIELDS CRITERIA:

IS THE PROPERTY SERVED BY A POTABLE WATER SUPPLY? **YES X or NO __**

EXPLAIN: The area including the Rodeo Grounds property is supplied with water from the City of Cherryvale and Montgomery County Rural Water District #12.

IS THE PROPERTY SERVED BY A SEWAGE SYSTEM? **YES X or NO __**

EXPLAIN: The City of Cherryvale sewer system serves the area of the Rodeo Grounds property. Some cisterns or abandoned water/sewage lines may still be present at the site.

WERE ANY PONDS OR LAGOONS OBSERVED ON SITE? **YES_ or NO X__**

EXPLAIN: No waste ponds or lagoons are present on the Rodeo Grounds property.

WERE ANY OTHER INDICATIONS OF THE PRESENCE OF HAZARDOUS MATERIALS OBSERVED? **YES X or NO __**

EXPLAIN: Surficial smelter waste, especially visible waste slag waste, is scattered throughout the property area and may have been used for fill material for roads in the property area.

DESCRIBE SITE GEOLOGIC, HYDROGEOLOGIC, HYDROLOGIC, OR TOPOGRAPHIC CONDITIONS:

The site is relatively flat with approximately 1% slope). Shallow ground water occurs as perched water at the soil/bedrock interface between 6 and 15 feet deep.

IS THERE REASON TO SUSPECT ANY OF THE FOLLOWING MAY BE PRESENT ON SITE:

Asbestos-Containing Materials	**YES__ or NO_X**
Radon	**YES__ or NO_X**
Lead-Based Paint	**YES__ or NOX_**
Lead Soldered Water Lines	**YES__ or NOX_**
Heating/Cooling Fluids	**YES__ or NO X**
PCB-Containing Electric/Hydraulic Equipment	**YES__ or NO_X**
Wetlands	**YES__ or NO_X**

EXPLAIN: No intact structures remain at the site.

2. ADJOINING PROPERTY USE (Past and Present)

WHAT ARE THE PRESENT USES OF ADJOINING PROPERTIES? **MAP ATTACHED YES _X__ NO ___**

Adjoining properties are generally residential. The former National Zinc smelter works is located immediately north and northeast of the Rodeo Grounds property.

WHAT ARE THE PAST USES OF ADJOINING PROPERTIES?

REGION 7 SUPERFUND SITE
PRE-CERCLIS/BROWNFIELDS SCREENING FORM

VII. BROWNFIELDS CRITERIA:

WERE THE FOLLOWING RESOURCES CONSULTED TO VERIFY ADJOINING PROPERTY USES?

Fire Insurance Maps	**YES_X_ or NO__**
Property Tax Files	**YES_X_ or NO__**
Property Title Records	**YES_X_ or NO__**
Zoning/Land Use Records	**YES_X_ or NO__**
Aerial Photographs	**YES_X_ or NO__**
USGS 7.5 Minute Topographic Map (required, attach)	**YES_X_ or NO__**
Local Street Directories	**YES_X_ or NO__**
Building Department Records (for alterations, improvements, demolitions, etc.)	**YES_X_ or NO__**
Other (explain)	**YES_X_ or NO__**

Historic city business directories and historical information were also consulted for the BTA.

C. PERSONAL INTERVIEWS:

OWNERS/OPERATORS INTERVIEWED and CONTACT INFORMATION:
The Rodeo Grounds property and the former National Zinc facility is currently vacant and abandoned. The City of Cherrryvale is the current landowner.

ASTM E-1528 QUESTIONNAIRE(S) ATTACHED? YES _ or NO X

GOVERNMENTAL OFFICIALS INTERVIEWED and CONTACT INFORMATION:
Roy Riedner, City Manager; 123 West Main, Cherryvale, Kansas, 67335; (316) 336-2776

ASTM E-1528 QUESTIONNAIRE(S) ATTACHED? YES _ or NO X

EVALUATOR SIGNATURE

EVALUATIOR: Randolph L. Brown
Name

SIGNATURE: _____ **DATE:** 09/28/01

POSITION/TITLE: Site Assessment Unit Chief

OFFICE/AGENCY: KDHE/BER/Remedial Section

APPENDIX F

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) GENERATORS AND UNDERGROUND STORAGE TANK (UST) SITES WITHIN 4 MILES

EPA United States Environmental Protection Agency

Envirofacts Warehouse — Hazardous Waste Data

Overview | Law EXIT EPA | Query | Model | Feedback | EF Home

RCRIS Query Results

Page No. 1

Consolidated facility information (from multiple EPA systems) was searched to select facilities

ZIP CODE: **67335**
COUNTY NAME: **Montgomery**
STATE ABBREVIATION: **KS**
EPA REGION CODE: **7**
Results are based on data extracted on DEC-20-1999

Note: Click on the underlined CORPORATE LINK value for links to that company's environmental web pages. Click on the underlined MAPPING INFO value to obtain mapping information for the facility. Click on the underlined FACILITY ID value to view EPA Facility information for the facility.

Go To Bottom Of The Page

HANDLER NAME:	CHARLOMA INC	HANDLER ID:	KSD007168834
STREET:	N LIBERTY ST RD	FACILITY ID:	KSD007168834
CITY:	CHERRYVALE	CORPORATE LINK:	No
STATE:	KS	COUNTY:	MONTGOMERY
ZIP CODE:	67335	MAPPING INFO:	MAP
EPA REGION:	7		

Contact Information

Name	Street	City	State	ZIP Code	Phone	Type of Information
WELLS WENDELL	BX 367	CHERRYVALE	KS	67335	(316) 336-2124	Part A Data - Core
WELLS WENDELL	PO BOX 367	CHERRYVALE	KS	67335	(316) 336-2124	Notification Data - Core

Handler/Facility Classification

Handler Type	Land Disposal	Incinerator	Boiler and/or Industrial Furnace	Storage and Treatment
LARGE QTY GENERATOR				

NDLER NAME:	VALLIS WNGROFF BUSINESS FORMS INC	HANDLER ID:	KSD007164247
REET:	N HWY 169 INDUSTRIAL PARK	FACILITY ID:	KSD007164247
TY:	CHERRYVALE	CORPORATE LINK:	No
ATE:	KS	COUNTY:	MONTGOMERY
CODE:	67335	MAPPING INFO:	MAP
A REGION:	7		

ntact Information

Name	Street	City	State	ZIP Code	Phone	Type of Information
ARTER ANCE	P.O. BOX 7	CHERRYVALE	KS	67335	(316) 336-2171	Part A Data - Core
ARTER ANCE	PO BOX 7	CHERRYVALE	KS	67335	(316) 336-2171	Notification Data - Core

Handler/Facility Classification

Handler Type	Land Disposal	Incinerator	Boiler and/or Industrial Furnace	Storage and Treatment
MALL QTY ENERATOR				

o To Top Of The Page

tal Number of Facilities Displayed: 4

NDLER NAME:	CHERRYVALE CORP	HANDLER ID:	KSD031206329
REET:	N HWY 169 INDUSTRIAL PARK	FACILITY ID:	KSD031206329
TY:	CHERRYVALE	CORPORATE LINK:	No
ATE:	KS	COUNTY:	MONTGOMERY
P CODE:	67335	MAPPING INFO:	MAP
A REGION:	7		

ntact Information

Name	Street	City	State	ZIP Code	Phone	Type of Information
EAN AWRENCE	PO BOX 96	CHERRYVALE	KS	67335	(316) 336-2155	Notification Data - Core
ROLLOPE ARREL	P.O. BOX 96	CHERRYVALE	KS	67335	(316) 336-2155	Part A Data - Core

Handler/Facility Classification

Handler Type	Land Disposal	Incinerator	Boiler and/or Industrial Furnace	Storage and Treatment
SMALL QTY GENERATOR				

HANDLER NAME:	KC 24 HOUR TRUCK REPAIR	HANDLER ID:	KSD981708076
STREET:	N HWY 169	FACILITY ID:	KSD981708076
CITY:	CHERRYVALE	CORPORATE LINK:	No
STATE:	KS	COUNTY:	MONTGOMERY
ZIP CODE:	67335	MAPPING INFO:	MAP
EPA REGION:	7		

Contact Information

Name	Street	City	State	ZIP Code	Phone	Type of Information
SUTHERLAND KENT	NORTH HWY 169	CHERRYVALE	KS	67335	(316) 336-3912	Part A Data - Core
SUTHERLAND KENT	RR 1 BOX 56	CHERRYVALE	KS	67335	(316) 336-3912	Notification Data - Core

Handler/Facility Classification

Handler Type	Land Disposal	Incinerator	Boiler and/or Industrial Furnace	Storage and Treatment
SMALL QTY GENERATOR				

SPLAY RECORD NUMBER: ___ DATA GROUP: 1-TRACKING; 2-BTLA: _

	FAC. NO.	BTLA DATE	PROJECT CODE	PROJECT NAME	ADDRESS	STAT	LEGAL DISC.
L	88888	19870116	U306300280	ADKINS OIL CO	101 E 4TH	CLSD	163217E
2	26359	19900126	U306300215	ANR FREIGHT	169 N IND	CLSD	093217E
3	26359	19901115	U306300215B	ANR FREIGHT SYSTEMS INC	169 N IND	CLSD	093217E
4	88888	19891017	U306300149	CHERRYVALE GAZETTE	300 W MAI	CLSD	093217E
5	81567	19970905	U306311692	CHERRYVALE MIDDLE SCHOOL	401 E MAI	CLSD	093217E
6	13607	19890830	U306300129	DEWEY AUTO	307 W MAI	CLSD	163217E
7	81373	19951024	U306310682	GENE'S SERVICE	300 N LIB	CLSD	083217E
8	00699	19941024	U306300682	TED'S SERVICE	314 S LIB	CLSD	173217E
9	29189	19991221	U305012806	TRI CITY AIRPORT	163 HWY 1	CLSD	233117E
0	26954	19931209	U306300611	U-DO STORE #8	100 N LIB	CLSD	083217E
1	27485	19961009	U306311172	US ARMY CORP, BIG HILL R	PO BOX 42	CLSD	
2	07133	19980107	U306311834	ZIP TRIP	312 S LIB	HOLD	173217E
3	07133	19990317	U306312424	ZIP TRIP	312 S LIB	ACT	173217E

APPENDIX G

GEOPHYSICAL SURVEY DATA

EM-31 Conductivity Survey Notes Page: 1

Site Name: Cherryvale Rodeo Grounds BTA Dates: 03/23/01

Operator: Randolph L. Brown

Survey Information/Notes :

Survey conducted 03/23/01

Background Reading Reference Point:
Located 50' southwest of grid point N 00, E 00.
Survey area flagged at 100'X 100' grid by flagging.

Calibration Date/Time: 03/232/01/1340 Weather: Warm, humid, 75°, partly cloudy

Calibration Notes: Quadrature internal calibration adequate, no phase/comp adjustment necessary. Conductivity range set at 100 mS/m. In-phase null/zero adjusted to zero ppT. Datalogger program/EM-31 operating program runs O.K. Survey begin 1400, end 1545. Survey conducted in both in-phase and quadrature modes, vertical dipole mode.

Other Notes:

Metal buildings beyond south site boundary. High terrain conductivity values noticed in linear features indicative of buried pipes. Raw data file included

X	Y	Q	I
0.000	0.000	46.000	-0.215
0.000	9.901	45.250	-0.150
0.000	19.802	47.000	0.460
0.000	29.703	46.000	1.125
0.000	39.604	47.000	1.040
0.000	49.505	48.000	0.500
0.000	59.406	46.250	0.437
0.000	69.307	47.000	0.150
0.000	79.208	47.000	0.650
0.000	89.109	48.000	1.250
0.000	99.010	48.000	1.002
0.000	108.911	48.000	1.320
0.000	118.812	48.000	1.557
0.000	128.713	49.000	1.460
0.000	138.614	49.000	2.310
0.000	148.515	52.000	2.802
0.000	158.416	49.250	2.320
0.000	168.317	47.000	1.970
0.000	178.218	44.000	2.040
0.000	188.119	53.250	2.627
0.000	198.020	52.000	2.700
0.000	207.921	49.000	2.630
0.000	217.822	50.000	2.600
0.000	227.723	50.000	2.760
0.000	237.624	50.000	2.850
0.000	247.525	51.000	2.997
0.000	257.426	51.000	2.870
0.000	267.327	50.000	3.050
0.000	277.228	50.000	3.160
0.000	287.129	51.000	2.950
0.000	297.030	50.000	3.070
0.000	306.931	51.250	3.150
0.000	316.832	51.000	2.980
0.000	326.733	50.000	2.980
0.000	336.634	49.250	3.010
0.000	346.535	50.000	2.990
0.000	356.436	51.750	3.470
0.000	366.337	51.000	3.630
0.000	376.238	52.000	3.710
0.000	386.139	51.000	3.830
0.000	396.040	53.000	3.980
0.000	405.941	53.000	3.857
0.000	415.842	51.000	3.720
0.000	425.743	51.250	4.030
0.000	435.644	52.250	3.850
0.000	445.545	52.000	4.120
0.000	455.446	56.000	4.082
0.000	465.347	46.000	4.280
0.000	475.248	57.000	4.190
0.000	485.149	53.250	4.210
0.000	495.050	52.000	4.350
0.000	504.951	53.250	4.310

0.000	514.852	53.000	4.227
0.000	524.753	52.500	4.430
0.000	534.654	54.500	4.370
0.000	544.555	55.250	4.512
0.000	554.455	51.250	4.392
0.000	564.356	54.000	4.450
0.000	574.257	56.000	4.545
0.000	584.158	55.000	4.720
0.000	594.059	56.000	4.610
0.000	603.960	56.000	4.680
0.000	613.861	55.000	4.615
0.000	623.762	58.000	4.750
0.000	633.663	58.000	4.712
0.000	643.564	57.000	4.652
0.000	653.465	58.750	4.730
0.000	663.366	59.000	4.647
0.000	673.267	57.500	4.607
0.000	683.168	59.000	4.740
0.000	693.069	61.000	4.550
0.000	702.970	58.000	4.785
0.000	712.871	60.000	4.732
0.000	722.772	58.000	4.510
0.000	732.673	57.000	4.680
0.000	742.574	58.000	4.587
0.000	752.475	54.000	4.490
0.000	762.376	52.000	4.560
0.000	772.277	52.000	4.510
0.000	782.178	50.000	4.362
0.000	792.079	48.000	4.430
0.000	801.980	48.000	4.550
0.000	811.881	47.000	4.392
0.000	821.782	48.000	4.380
0.000	831.683	46.250	4.100
0.000	841.584	46.750	4.440
0.000	851.485	48.000	4.482
0.000	861.386	48.000	4.400
0.000	871.287	48.000	4.402
0.000	881.188	47.000	4.400
0.000	891.089	48.000	4.490
0.000	900.990	48.000	4.700
0.000	910.891	47.000	4.520
0.000	920.792	45.250	4.530
0.000	930.693	45.000	4.530
0.000	940.594	45.000	4.530
0.000	950.495	45.250	4.740
0.000	960.396	45.250	4.652
0.000	970.297	45.000	4.680
0.000	980.198	45.000	4.750
0.000	990.099	45.000	4.720
0.000	1000.000	45.000	5.050
100.000	1000.000	104.000	14.482
100.000	991.071	125.000	19.567
100.000	982.143	87.000	12.450

100.000	973.214	63.000	8.562
100.000	964.286	50.250	6.690
100.000	955.357	44.000	5.820
100.000	946.429	42.000	5.330
100.000	937.500	40.000	4.900
100.000	928.571	39.000	4.790
100.000	919.643	37.000	4.450
100.000	910.714	37.000	4.420
100.000	901.786	37.000	4.250
100.000	892.857	37.000	4.220
100.000	883.929	36.000	4.217
100.000	875.000	36.500	4.170
100.000	866.071	38.000	4.240
100.000	857.143	36.000	4.180
100.000	848.214	36.000	4.260
100.000	839.286	38.000	4.220
100.000	830.357	39.500	4.090
100.000	821.429	40.000	4.150
100.000	812.500	42.750	4.180
100.000	803.571	42.000	4.117
100.000	794.643	43.000	4.122
100.000	785.714	44.000	4.210
100.000	776.786	45.250	4.220
100.000	767.857	46.000	4.220
100.000	758.929	47.000	4.310
100.000	750.000	47.000	4.230
100.000	741.071	47.250	4.300
100.000	732.143	48.000	4.270
100.000	723.214	49.000	4.320
100.000	714.286	50.000	4.280
100.000	705.357	50.000	4.290
100.000	696.429	50.000	4.390
100.000	687.500	52.000	4.370
100.000	678.571	51.500	4.320
100.000	669.643	52.000	4.350
100.000	660.714	52.250	4.320
100.000	651.786	53.000	4.355
100.000	642.857	52.000	4.320
100.000	633.929	53.250	4.330
100.000	625.000	53.000	4.450
100.000	616.071	54.000	4.380
100.000	607.143	54.250	4.430
100.000	598.214	54.250	4.400
100.000	589.286	53.000	4.410
100.000	580.357	54.000	4.320
100.000	571.429	54.000	4.250
100.000	562.500	53.750	4.350
100.000	553.571	53.000	4.380
100.000	544.643	51.000	4.300
100.000	535.714	51.000	4.350
100.000	526.786	51.000	4.290
100.000	517.857	49.000	4.340
100.000	508.929	49.250	4.530

100.000	500.000	46.000	4.710
100.000	491.071	49.000	4.617
100.000	482.143	48.000	4.270
100.000	473.214	48.000	4.407
100.000	464.286	49.250	4.550
100.000	455.357	53.000	4.452
100.000	446.429	60.250	4.630
100.000	437.500	55.250	4.320
100.000	428.571	-1.000	4.687
100.000	419.643	72.000	4.340
100.000	410.714	55.000	4.382
100.000	401.786	49.000	4.540
100.000	392.857	47.000	4.397
100.000	383.929	47.000	4.350
100.000	375.000	46.000	4.380
100.000	366.071	48.000	4.495
100.000	357.143	48.000	4.310
100.000	348.214	49.000	4.350
100.000	339.286	50.250	4.330
100.000	330.357	50.000	4.452
100.000	321.429	48.000	4.250
100.000	312.500	47.000	4.320
100.000	303.571	45.250	4.177
100.000	294.643	44.000	4.350
100.000	285.714	41.000	4.132
100.000	276.786	40.000	4.290
100.000	267.857	39.000	4.185
100.000	258.929	40.000	4.160
100.000	250.000	38.000	4.000
100.000	241.071	41.000	4.180
100.000	232.143	43.000	4.110
100.000	223.214	43.500	4.300
100.000	214.286	44.000	4.262
100.000	205.357	43.750	4.250
100.000	196.429	44.000	4.080
100.000	187.500	46.000	4.360
100.000	178.571	46.000	4.190
100.000	169.643	46.000	4.190
100.000	160.714	46.000	4.200
100.000	151.786	47.000	4.230
100.000	142.857	47.250	4.190
100.000	133.929	48.000	4.112
100.000	125.000	47.000	4.230
100.000	116.071	47.000	4.322
100.000	107.143	46.750	4.260
100.000	98.214	47.000	4.492
100.000	89.286	46.000	4.500
100.000	80.357	47.000	4.652
100.000	71.429	45.000	4.360
100.000	62.500	43.000	4.460
100.000	53.571	41.000	4.420
100.000	44.643	38.000	4.500
100.000	35.714	38.000	4.410

100.000	26.786	38.000	4.530
100.000	17.857	37.000	4.400
100.000	8.929	39.000	4.630
100.000	0.000	42.000	4.920
200.000	0.000	42.000	4.470
200.000	9.259	43.000	4.730
200.000	18.519	42.000	4.600
200.000	27.778	44.000	4.410
200.000	37.037	46.000	4.520
200.000	46.296	45.000	4.350
200.000	55.556	47.000	4.390
200.000	64.815	48.000	4.292
200.000	74.074	47.000	4.420
200.000	83.333	46.000	4.200
200.000	92.593	47.000	4.540
200.000	101.852	47.000	4.270
200.000	111.111	46.250	4.350
200.000	120.370	48.000	4.360
200.000	129.630	45.750	4.400
200.000	138.889	45.000	4.482
200.000	148.148	47.000	4.480
200.000	157.407	47.750	4.460
200.000	166.667	49.000	4.412
200.000	175.926	49.000	4.500
200.000	185.185	47.000	4.430
200.000	194.444	48.000	4.570
200.000	203.704	48.000	4.460
200.000	212.963	51.000	4.480
200.000	222.222	50.000	4.460
200.000	231.481	50.000	4.630
200.000	240.741	51.000	4.600
200.000	250.000	48.000	4.860
200.000	259.259	51.000	4.707
200.000	268.519	49.000	4.460
200.000	277.778	48.750	4.640
200.000	287.037	46.250	4.580
200.000	296.296	41.250	4.530
200.000	305.556	38.000	4.580
200.000	314.815	38.000	4.792
200.000	324.074	34.000	4.510
200.000	333.333	33.750	4.670
200.000	342.593	34.250	4.690
200.000	351.852	34.750	4.582
200.000	361.111	35.000	4.622
200.000	370.370	36.000	4.787
200.000	379.630	37.000	4.750
200.000	388.889	39.000	4.875
200.000	398.148	45.000	4.900
200.000	407.407	58.000	5.070
200.000	416.667	-17.000	3.735
200.000	425.926	47.750	5.005
200.000	435.185	76.000	5.762
200.000	444.444	52.000	5.100

200.000	453.704	48.000	4.902
200.000	462.963	47.000	4.882
200.000	472.222	49.000	4.860
200.000	481.481	49.000	4.840
200.000	490.741	50.000	4.880
200.000	500.000	49.500	4.960
200.000	509.259	51.000	4.900
200.000	518.518	51.000	5.072
200.000	527.778	51.000	4.867
200.000	537.037	51.000	4.775
200.000	546.296	50.250	4.950
200.000	555.556	50.250	4.862
200.000	564.815	51.000	4.920
200.000	574.074	50.250	4.920
200.000	583.333	50.000	4.860
200.000	592.593	49.000	4.970
200.000	601.852	48.250	4.802
200.000	611.111	48.000	4.840
200.000	620.370	49.000	4.840
200.000	629.630	48.750	4.980
200.000	638.889	48.000	4.870
200.000	648.148	47.000	4.865
200.000	657.407	48.000	4.620
200.000	666.667	47.500	4.832
200.000	675.926	47.000	4.830
200.000	685.185	47.000	4.830
200.000	694.444	45.000	4.840
200.000	703.704	44.000	4.770
200.000	712.963	44.000	4.780
200.000	722.222	43.000	4.717
200.000	731.482	43.000	4.740
200.000	740.741	42.000	4.760
200.000	750.000	41.000	4.730
200.000	759.259	40.500	4.720
200.000	768.518	39.000	4.750
200.000	777.778	38.000	4.740
200.000	787.037	36.000	4.592
200.000	796.296	35.250	4.807
200.000	805.556	34.000	4.705
200.000	814.815	33.000	4.910
200.000	824.074	32.000	4.965
200.000	833.333	31.000	4.980
200.000	842.593	32.000	5.132
200.000	851.852	33.000	5.280
200.000	861.111	34.250	5.540
200.000	870.370	37.000	6.167
200.000	879.630	42.000	7.107
200.000	888.889	57.000	9.627
200.000	898.148	91.750	15.500
200.000	907.407	20.000	-0.125
200.000	916.667	-63.250	-15.820
200.000	925.926	85.250	13.602
200.000	935.185	79.000	11.950

200.000	944.444	61.000	9.297
200.000	953.704	49.000	7.375
200.000	962.963	42.750	6.192
200.000	972.222	41.000	5.810
200.000	981.482	39.000	5.590
200.000	990.741	37.250	5.362
200.000	1000.000	35.000	5.207
300.000	1000.000	32.000	4.410
300.000	990.291	32.000	4.600
300.000	980.583	32.000	4.560
300.000	970.874	33.000	4.580
300.000	961.165	32.000	4.650
300.000	951.456	32.000	4.780
300.000	941.748	32.000	4.760
300.000	932.039	32.000	4.875
300.000	922.330	33.750	5.120
300.000	912.621	35.000	5.500
300.000	902.913	37.000	5.965
300.000	893.204	45.000	7.500
300.000	883.495	65.000	10.532
300.000	873.786	113.000	18.095
300.000	864.078	-25.000	-12.197
300.000	854.369	-42.500	-11.507
300.000	844.660	99.500	15.172
300.000	834.951	58.250	7.955
300.000	825.243	47.000	6.425
300.000	815.534	43.000	5.700
300.000	805.825	43.000	5.240
300.000	796.117	43.750	5.272
300.000	786.408	41.000	4.897
300.000	776.699	40.000	4.765
300.000	766.990	40.000	4.740
300.000	757.282	40.000	4.672
300.000	747.573	39.000	4.702
300.000	737.864	39.000	4.837
300.000	728.155	40.000	4.700
300.000	718.447	40.000	4.750
300.000	708.738	41.000	4.660
300.000	699.029	41.000	4.750
300.000	689.320	42.000	4.650
300.000	679.612	40.250	4.640
300.000	669.903	39.250	4.480
300.000	660.194	40.000	4.660
300.000	650.485	38.500	4.600
300.000	640.777	39.000	4.657
300.000	631.068	41.000	4.705
300.000	621.359	41.000	4.625
300.000	611.650	42.000	4.790
300.000	601.942	44.000	4.700
300.000	592.233	45.000	4.682
300.000	582.524	46.000	4.685
300.000	572.815	47.000	4.690
300.000	563.107	49.000	4.800

300.000	553.398	49.250	4.780
300.000	543.689	51.000	4.807
300.000	533.981	52.000	4.870
300.000	524.272	53.000	4.990
300.000	514.563	54.000	4.910
300.000	504.854	53.750	4.870
300.000	495.146	53.000	5.800
300.000	485.437	56.000	4.985
300.000	475.728	57.000	4.960
300.000	466.019	56.000	5.330
300.000	456.311	57.000	5.380
300.000	446.602	57.000	5.367
300.000	436.893	56.000	5.340
300.000	427.184	53.000	5.215
300.000	417.476	54.000	4.660
300.000	407.767	56.000	4.935
300.000	398.058	54.000	5.000
300.000	388.349	54.000	4.962
300.000	378.641	52.250	4.867
300.000	368.932	53.000	4.852
300.000	359.223	51.000	4.902
300.000	349.515	53.000	4.840
300.000	339.806	52.000	4.962
300.000	330.097	51.000	4.780
300.000	320.388	53.000	4.850
300.000	310.680	51.000	4.840
300.000	300.971	53.000	4.740
300.000	291.262	54.000	4.690
300.000	281.553	53.000	4.740
300.000	271.845	52.000	4.697
300.000	262.136	55.000	4.810
300.000	252.427	52.000	4.662
300.000	242.718	53.000	4.690
300.000	233.010	51.000	4.752
300.000	223.301	51.000	4.707
300.000	213.592	50.000	4.690
300.000	203.883	47.000	4.680
300.000	194.175	46.000	4.640
300.000	184.466	47.000	4.660
300.000	174.757	46.000	4.650
300.000	165.049	44.000	4.610
300.000	155.340	44.000	4.670
300.000	145.631	45.000	4.620
300.000	135.922	46.000	4.630
300.000	126.214	45.000	4.850
300.000	116.505	45.000	4.600
300.000	106.796	45.250	4.740
300.000	97.087	46.250	4.570
300.000	87.379	49.000	4.535
300.000	77.670	48.000	4.597
300.000	67.961	47.250	4.520
300.000	58.252	48.000	4.725
300.000	48.544	47.000	4.870

300.000	38.835	47.750	4.810
300.000	29.126	48.250	4.730
300.000	19.417	47.000	4.720
300.000	9.709	47.000	4.770
300.000	-0.000	47.000	4.820
400.000	0.000	45.000	4.570
400.000	9.524	49.000	4.697
400.000	19.048	57.000	4.500
400.000	28.571	66.000	4.420
400.000	38.095	72.250	4.160
400.000	47.619	66.000	3.990
400.000	57.143	57.250	4.515
400.000	66.667	49.000	5.110
400.000	76.190	47.000	5.232
400.000	85.714	45.000	4.800
400.000	95.238	45.750	4.880
400.000	104.762	46.000	4.752
400.000	114.286	45.000	4.730
400.000	123.810	44.000	4.900
400.000	133.333	44.000	4.812
400.000	142.857	43.000	4.707
400.000	152.381	43.000	4.860
400.000	161.905	44.000	4.910
400.000	171.429	43.000	5.020
400.000	180.952	42.000	4.730
400.000	190.476	44.000	4.620
400.000	200.000	44.000	4.790
400.000	209.524	43.250	4.850
400.000	219.048	44.000	4.860
400.000	228.571	45.000	4.817
400.000	238.095	43.000	4.820
400.000	247.619	44.000	4.850
400.000	257.143	42.000	4.800
400.000	266.667	42.000	4.982
400.000	276.190	42.000	4.690
400.000	285.714	43.000	4.850
400.000	295.238	43.250	4.805
400.000	304.762	44.000	4.850
400.000	314.286	46.000	4.920
400.000	323.810	48.000	4.870
400.000	333.333	50.000	4.960
400.000	342.857	50.000	5.050
400.000	352.381	51.000	5.120
400.000	361.905	51.250	5.300
400.000	371.429	53.000	5.225
400.000	380.952	53.000	5.165
400.000	390.476	53.000	5.110
400.000	400.000	57.000	5.305
400.000	409.524	68.250	5.750
400.000	419.048	75.000	5.690
400.000	428.571	-33.750	3.242
400.000	438.095	102.000	6.890
400.000	447.619	73.000	5.932

400.000	457.143	56.000	5.420
400.000	466.667	52.000	5.187
400.000	476.190	52.500	5.430
400.000	485.714	53.000	5.232
400.000	495.238	50.750	5.040
400.000	504.762	49.000	5.080
400.000	514.286	48.500	5.120
400.000	523.810	47.000	5.040
400.000	533.333	45.000	5.025
400.000	542.857	42.750	4.860
400.000	552.381	40.000	4.930
400.000	561.905	37.000	4.980
400.000	571.429	35.000	5.010
400.000	580.952	33.000	4.970
400.000	590.476	33.000	4.850
400.000	600.000	34.000	4.960
400.000	609.524	33.500	4.960
400.000	619.048	33.000	4.990
400.000	628.571	34.000	5.062
400.000	638.095	33.750	4.782
400.000	647.619	35.000	4.965
400.000	657.143	35.000	4.770
400.000	666.667	36.000	4.860
400.000	676.190	36.250	4.782
400.000	685.714	37.000	4.980
400.000	695.238	37.000	4.950
400.000	704.762	37.000	4.942
400.000	714.286	36.250	5.000
400.000	723.810	38.000	4.980
400.000	733.333	39.000	4.960
400.000	742.857	38.000	4.920
400.000	752.381	38.250	5.050
400.000	761.905	38.000	5.095
400.000	771.429	37.750	5.250
400.000	780.952	39.000	5.340
400.000	790.476	42.000	5.750
400.000	800.000	44.250	6.322
400.000	809.524	52.000	7.207
400.000	819.048	77.000	10.982
400.000	828.571	83.250	10.047
400.000	838.095	-87.250	-20.470
400.000	847.619	63.250	7.677
400.000	857.143	93.250	14.490
400.000	866.667	54.000	8.770
400.000	876.190	44.000	7.370
400.000	885.714	38.000	6.172
400.000	895.238	37.000	5.732
400.000	904.762	35.000	5.520
400.000	914.286	35.000	5.137
400.000	923.810	38.000	5.000
400.000	933.333	24.250	5.160
400.000	942.857	29.000	5.170
400.000	952.381	41.000	4.910

400.000	961.905	34.500	4.990
400.000	971.429	33.000	5.010
400.000	980.952	32.000	5.020
400.000	990.476	32.000	4.900
400.000	1000.000	32.000	4.942
500.000	1000.000	37.000	5.070
500.000	990.476	37.000	5.260
500.000	980.952	39.000	5.350
500.000	971.429	38.000	5.070
500.000	961.905	35.000	4.507
500.000	952.381	34.500	4.135
500.000	942.857	32.000	3.860
500.000	933.333	34.000	5.310
500.000	923.810	40.000	5.000
500.000	914.286	39.000	5.170
500.000	904.762	37.000	5.390
500.000	895.238	38.250	5.662
500.000	885.714	40.000	5.990
500.000	876.190	43.000	6.610
500.000	866.667	51.000	7.790
500.000	857.143	74.000	10.952
500.000	847.619	46.500	2.275
500.000	838.095	-108.250	-20.470
500.000	828.571	128.750	19.265
500.000	819.048	55.250	12.437
500.000	809.524	50.500	7.762
500.000	800.000	55.000	6.240
500.000	790.476	45.000	5.900
500.000	780.952	41.000	5.530
500.000	771.429	38.000	5.150
500.000	761.905	39.000	5.335
500.000	752.381	39.250	5.057
500.000	742.857	40.000	4.950
500.000	733.333	38.000	5.332
500.000	723.810	37.000	6.020
500.000	714.286	39.000	5.280
500.000	704.762	39.000	4.905
500.000	695.238	38.000	4.900
500.000	685.714	37.000	5.060
500.000	676.190	36.000	5.195
500.000	666.667	37.000	5.070
500.000	657.143	37.000	5.140
500.000	647.619	39.000	4.960
500.000	638.095	39.000	5.680
500.000	628.571	41.000	5.932
500.000	619.048	43.000	5.400
500.000	609.524	44.000	4.882
500.000	600.000	48.000	4.930
500.000	590.476	51.250	4.980
500.000	580.952	54.000	5.015
500.000	571.429	57.000	5.010
500.000	561.905	59.000	5.310
500.000	552.381	60.000	5.085

500.000	542.857	62.000	5.080
500.000	533.333	63.000	5.160
500.000	523.810	63.000	5.140
500.000	514.286	62.000	5.080
500.000	504.762	61.250	5.050
500.000	495.238	61.250	5.180
500.000	485.714	62.000	5.190
500.000	476.190	61.500	5.060
500.000	466.667	61.000	5.122
500.000	457.143	61.000	5.160
500.000	447.619	60.000	5.080
500.000	438.095	61.000	5.305
500.000	428.571	67.250	5.460
500.000	419.048	88.000	5.507
500.000	409.524	23.500	4.407
500.000	400.000	-61.750	3.810
500.000	390.476	123.000	6.040
500.000	380.952	59.000	5.460
500.000	371.429	53.000	5.112
500.000	361.905	52.000	4.890
500.000	352.381	51.000	5.020
500.000	342.857	49.000	4.865
500.000	333.333	47.000	5.140
500.000	323.810	48.000	4.810
500.000	314.286	47.000	4.760
500.000	304.762	47.000	4.950
500.000	295.238	47.000	4.860
500.000	285.714	46.000	4.920
500.000	276.190	47.000	4.800
500.000	266.667	47.000	4.930
500.000	257.143	46.000	4.880
500.000	247.619	48.000	4.890
500.000	238.095	47.000	4.790
500.000	228.571	48.000	4.785
500.000	219.048	47.000	4.792
500.000	209.524	45.250	4.767
500.000	200.000	45.000	4.790
500.000	190.476	44.000	4.750
500.000	180.952	42.000	4.850
500.000	171.429	44.000	4.882
500.000	161.905	41.000	4.850
500.000	152.381	41.000	4.930
500.000	142.857	40.000	4.892
500.000	133.333	40.250	4.905
500.000	123.810	40.250	4.810
500.000	114.286	40.000	5.010
500.000	104.762	39.000	4.830
500.000	95.238	39.000	4.860
500.000	85.714	38.250	5.040
500.000	76.190	39.000	4.812
500.000	66.667	41.000	4.940
500.000	57.143	41.750	4.930
500.000	47.619	42.000	4.932

500.000	38.095	43.000	5.030
500.000	28.571	46.000	5.120
500.000	19.048	53.000	5.640
500.000	9.524	64.000	5.890
500.000	0.000	73.000	6.485
600.000	0.000	56.000	6.340
600.000	10.309	53.000	6.012
600.000	20.619	51.000	5.780
600.000	30.928	50.000	5.510
600.000	41.237	48.000	5.395
600.000	51.546	46.000	5.347
600.000	61.856	44.250	5.260
600.000	72.165	43.000	5.195
600.000	82.474	42.000	5.180
600.000	92.784	40.000	5.220
600.000	103.093	38.250	5.090
600.000	113.402	37.000	5.120
600.000	123.711	36.000	5.050
600.000	134.021	36.000	5.170
600.000	144.330	36.000	4.990
600.000	154.639	38.000	5.070
600.000	164.948	39.000	5.170
600.000	175.258	40.000	4.950
600.000	185.567	42.000	4.995
600.000	195.876	44.000	4.892
600.000	206.186	46.000	4.990
600.000	216.495	47.750	5.030
600.000	226.804	47.000	4.980
600.000	237.113	44.000	5.110
600.000	247.423	44.000	5.060
600.000	257.732	42.500	5.222
600.000	268.041	41.250	5.160
600.000	278.351	43.000	5.150
600.000	288.660	43.000	5.162
600.000	298.969	44.000	5.190
600.000	309.278	45.500	5.250
600.000	319.588	48.000	5.140
600.000	329.897	50.000	5.280
600.000	340.206	52.000	5.460
600.000	350.515	56.250	5.700
600.000	360.825	67.250	6.780
600.000	371.134	114.000	9.360
600.000	381.443	-66.750	-14.740
600.000	391.753	38.500	3.880
600.000	402.062	103.250	7.485
600.000	412.371	68.000	5.512
600.000	422.680	63.000	5.420
600.000	432.990	63.000	5.140
600.000	443.299	65.000	4.967
600.000	453.608	63.000	5.170
600.000	463.918	59.000	5.100
600.000	474.227	59.000	5.247
600.000	484.536	55.750	5.090

600.000	494.845	54.000	5.070
600.000	505.155	53.750	5.162
600.000	515.464	53.000	5.060
600.000	525.773	54.250	5.232
600.000	536.082	55.000	5.382
600.000	546.392	55.000	5.135
600.000	556.701	54.250	5.280
600.000	567.010	54.250	5.090
600.000	577.320	53.250	5.070
600.000	587.629	53.000	5.030
600.000	597.938	50.000	5.120
600.000	608.247	49.000	5.120
600.000	618.557	45.000	5.070
600.000	628.866	43.000	5.070
600.000	639.175	41.000	5.080
600.000	649.485	39.250	5.010
600.000	659.794	38.000	4.935
600.000	670.103	37.000	5.030
600.000	680.412	36.000	5.112
600.000	690.722	37.000	5.045
600.000	701.031	37.000	5.080
600.000	711.340	41.000	5.140
600.000	721.649	50.000	5.160
600.000	731.959	50.500	5.217
600.000	742.268	-18.000	5.222
600.000	752.577	72.250	6.095
600.000	762.887	54.000	6.270
600.000	773.196	47.000	6.707
600.000	783.505	53.250	7.280
600.000	793.814	74.000	9.585
600.000	804.124	143.250	15.485
600.000	814.433	-140.000	-7.332
600.000	824.742	37.250	8.650
600.000	835.052	-33.750	-20.470
600.000	845.361	49.250	-1.157
600.000	855.670	132.750	20.222
600.000	865.979	69.000	9.245
600.000	876.289	61.000	7.620
600.000	886.598	56.000	6.555
600.000	896.907	54.000	5.907
600.000	907.216	50.000	5.560
600.000	917.526	48.000	5.435
600.000	927.835	47.000	5.350
600.000	938.144	45.000	5.190
600.000	948.454	45.000	5.160
600.000	958.763	43.000	5.120
600.000	969.072	40.000	4.940
600.000	979.381	39.000	4.950
600.000	989.691	38.000	5.097
600.000	1000.000	37.000	5.250
700.000	1000.000	77.250	6.280
700.000	989.362	78.000	6.272
700.000	978.723	66.000	5.352

700.000	968.085	62.000	5.260
700.000	957.447	49.000	4.985
700.000	946.809	44.000	5.137
700.000	936.170	43.000	5.310
700.000	925.532	43.500	5.400
700.000	914.894	43.000	5.580
700.000	904.255	45.000	5.830
700.000	893.617	53.000	6.230
700.000	882.979	55.000	7.087
700.000	872.340	65.000	9.467
700.000	861.702	92.750	14.220
700.000	851.064	-21.000	-14.085
700.000	840.426	-39.750	-19.102
700.000	829.787	-31.750	10.172
700.000	819.149	132.000	17.327
700.000	808.511	73.000	8.627
700.000	797.872	52.000	7.347
700.000	787.234	44.000	6.497
700.000	776.596	40.000	5.950
700.000	765.957	39.000	5.590
700.000	755.319	38.000	5.610
700.000	744.681	39.000	5.447
700.000	734.043	41.000	5.280
700.000	723.404	42.000	5.250
700.000	712.766	44.000	5.310
700.000	702.128	46.000	5.400
700.000	691.489	48.000	5.430
700.000	680.851	49.000	5.122
700.000	670.213	50.000	5.210
700.000	659.574	52.000	5.350
700.000	648.936	51.000	5.200
700.000	638.298	51.000	5.220
700.000	627.660	50.250	5.320
700.000	617.021	51.000	5.340
700.000	606.383	52.000	5.270
700.000	595.745	51.000	5.267
700.000	585.106	52.000	5.330
700.000	574.468	53.000	5.390
700.000	563.830	53.000	5.160
700.000	553.191	52.250	5.267
700.000	542.553	52.000	5.467
700.000	531.915	52.000	5.380
700.000	521.277	51.000	5.090
700.000	510.638	51.250	5.462
700.000	500.000	50.000	5.490
700.000	489.362	52.000	5.320
700.000	478.723	51.000	5.280
700.000	468.085	54.000	5.310
700.000	457.447	54.000	5.350
700.000	446.808	54.000	5.222
700.000	436.170	53.000	5.162
700.000	425.532	54.000	5.282
700.000	414.894	53.000	5.240

700.000	404.255	55.000	5.320
700.000	393.617	70.000	5.390
700.000	382.979	71.000	5.335
700.000	372.340	-34.000	5.030
700.000	361.702	120.000	5.460
700.000	351.064	78.000	5.560
700.000	340.426	68.000	5.380
700.000	329.787	62.750	5.455
700.000	319.149	70.000	5.650
700.000	308.511	70.000	6.310
700.000	297.872	68.000	6.407
700.000	287.234	69.000	6.510
700.000	276.596	65.000	6.607
700.000	265.957	62.750	6.520
700.000	255.319	61.250	6.840
700.000	244.681	61.250	6.840
700.000	234.043	59.250	6.880
700.000	223.404	59.000	6.710
700.000	212.766	60.000	6.860
700.000	202.128	59.000	6.560
700.000	191.489	58.000	6.490
700.000	180.851	55.000	6.300
700.000	170.213	55.000	6.260
700.000	159.574	53.000	5.990
700.000	148.936	52.000	6.120
700.000	138.298	49.000	5.920
700.000	127.660	47.000	5.820
700.000	117.021	48.000	5.980
700.000	106.383	45.250	5.780
700.000	95.745	46.000	5.700
700.000	85.106	46.000	5.740
700.000	74.468	45.500	5.770
700.000	63.830	46.000	5.780
700.000	53.191	48.000	5.720
700.000	42.553	47.000	5.947
700.000	31.915	50.000	5.962
700.000	21.277	48.000	5.850
700.000	10.638	48.000	5.957
700.000	0.000	50.000	6.185
800.000	0.000	62.000	5.230
800.000	10.638	62.500	5.465
800.000	21.277	59.000	5.525
800.000	31.915	57.000	5.520
800.000	42.553	70.000	5.810
800.000	53.191	61.000	5.685
800.000	63.830	48.250	5.390
800.000	74.468	52.250	5.450
800.000	85.106	53.000	5.400
800.000	95.745	52.000	5.340
800.000	106.383	51.000	5.390
800.000	117.021	51.000	5.422
800.000	127.660	51.000	5.440
800.000	138.298	51.750	5.340

800.000	148.936	51.000	5.430
800.000	159.574	52.000	5.420
800.000	170.213	50.000	5.390
800.000	180.851	53.000	5.480
800.000	191.489	52.000	5.370
800.000	202.128	52.000	5.630
800.000	212.766	54.000	5.437
800.000	223.404	53.000	5.502
800.000	234.043	54.000	5.500
800.000	244.681	55.000	5.497
800.000	255.319	55.000	5.630
800.000	265.957	58.000	5.700
800.000	276.596	65.000	6.080
800.000	287.234	83.000	6.690
800.000	297.872	14.750	4.107
800.000	308.511	63.250	6.615
800.000	319.149	99.000	8.182
800.000	329.787	67.000	6.980
800.000	340.426	67.250	7.150
800.000	351.064	68.000	7.620
800.000	361.702	89.000	10.552
800.000	372.340	136.250	18.320
800.000	382.979	-67.500	-15.947
800.000	393.617	11.250	1.035
800.000	404.255	132.250	20.477
800.000	414.894	61.250	10.072
800.000	425.532	55.000	8.500
800.000	436.170	49.750	7.550
800.000	446.809	46.000	6.880
800.000	457.447	45.000	6.880
800.000	468.085	44.000	6.600
800.000	478.723	44.000	6.572
800.000	489.362	45.000	6.435
800.000	500.000	45.500	6.490
800.000	510.638	47.000	6.270
800.000	521.277	49.000	6.230
800.000	531.915	51.000	6.380
800.000	542.553	51.000	6.402
800.000	553.192	51.000	6.480
800.000	563.830	52.000	6.575
800.000	574.468	53.000	6.615
800.000	585.106	54.000	6.470
800.000	595.745	57.000	6.680
800.000	606.383	54.000	6.687
800.000	617.021	53.000	6.670
800.000	627.660	56.000	7.350
800.000	638.298	54.000	6.990
800.000	648.936	56.000	7.190
800.000	659.574	56.000	6.842
800.000	670.213	56.000	6.890
800.000	680.851	57.000	6.915
800.000	691.489	58.250	6.700
800.000	702.128	58.000	6.640

800.000	712.766	59.250	6.650
800.000	723.404	56.000	6.400
800.000	734.043	56.000	6.340
800.000	744.681	56.000	6.370
800.000	755.319	53.000	5.930
800.000	765.957	51.000	6.197
800.000	776.596	49.000	6.250
800.000	787.234	47.000	6.462
800.000	797.872	47.000	6.750
800.000	808.511	53.000	7.737
800.000	819.149	69.250	8.955
800.000	829.787	122.000	12.725
800.000	840.426	-33.500	7.000
800.000	851.064	36.000	10.472
800.000	861.702	-115.000	-20.470
800.000	872.340	113.750	15.442
800.000	882.979	92.000	12.720
800.000	893.617	72.250	8.062
800.000	904.255	59.000	7.180
800.000	914.894	41.000	6.690
800.000	925.532	44.000	6.050
800.000	936.170	32.000	5.710
800.000	946.809	51.000	5.880
800.000	957.447	75.000	6.542
800.000	968.085	71.000	6.167
800.000	978.723	50.000	5.420
800.000	989.362	50.000	5.530
800.000	1000.000	51.000	5.460
900.000	1000.000	97.000	5.360
900.000	990.654	104.000	5.862
900.000	981.308	97.000	5.955
900.000	971.963	102.000	6.640
900.000	962.617	97.000	6.540
900.000	953.271	95.000	6.712
900.000	943.925	93.000	6.560
900.000	934.579	97.000	6.780
900.000	925.234	96.000	6.600
900.000	915.888	93.250	6.920
900.000	906.542	88.000	7.090
900.000	897.196	79.000	8.357
900.000	887.850	102.000	13.255
900.000	878.505	63.500	3.165
900.000	869.159	-70.750	-16.925
900.000	859.813	-105.000	-20.470
900.000	850.467	21.000	1.260
900.000	841.121	140.000	19.822
900.000	831.776	72.000	9.217
900.000	822.430	60.000	8.100
900.000	813.084	53.000	7.045
900.000	803.738	53.000	6.330
900.000	794.393	54.750	5.750
900.000	785.047	54.000	5.130
900.000	775.701	54.000	5.510

900.000	766.355	56.750	5.565
900.000	757.009	54.000	5.540
900.000	747.664	55.000	5.540
900.000	738.318	55.000	5.380
900.000	728.972	56.000	5.300
900.000	719.626	56.000	5.317
900.000	710.280	55.000	5.310
900.000	700.935	55.000	5.320
900.000	691.589	55.000	5.250
900.000	682.243	54.000	5.367
900.000	672.897	53.000	5.480
900.000	663.551	53.000	5.640
900.000	654.206	51.250	6.120
900.000	644.860	51.000	5.480
900.000	635.514	50.000	5.420
900.000	626.168	51.000	5.412
900.000	616.822	51.000	5.180
900.000	607.477	49.750	5.290
900.000	598.131	49.000	5.307
900.000	588.785	48.750	5.240
900.000	579.439	47.000	5.320
900.000	570.093	47.000	5.320
900.000	560.748	46.000	5.090
900.000	551.402	46.000	4.897
900.000	542.056	44.000	5.205
900.000	532.710	43.000	5.110
900.000	523.365	44.000	5.370
900.000	514.019	44.000	5.290
900.000	504.673	45.000	5.340
900.000	495.327	47.750	5.575
900.000	485.981	52.000	5.790
900.000	476.635	53.000	6.335
900.000	467.290	59.000	7.537
900.000	457.944	81.000	11.445
900.000	448.598	176.500	20.477
900.000	439.252	-136.000	-20.470
900.000	429.906	57.750	4.807
900.000	420.561	140.000	17.930
900.000	411.215	81.000	8.730
900.000	401.869	78.000	7.117
900.000	392.523	23.250	6.397
900.000	383.178	78.000	5.820
900.000	373.832	69.000	5.695
900.000	364.486	59.000	5.522
900.000	355.140	57.000	5.380
900.000	345.794	54.000	5.322
900.000	336.449	54.000	5.280
900.000	327.103	53.000	5.237
900.000	317.757	50.000	5.222
900.000	308.411	51.000	5.220
900.000	299.065	50.750	5.090
900.000	289.720	50.000	5.150
900.000	280.374	50.000	5.320

900.000	271.028	50.000	5.105
900.000	261.682	51.000	5.130
900.000	252.336	51.000	5.480
900.000	242.991	50.000	5.247
900.000	233.645	49.000	5.510
900.000	224.299	50.000	5.740
900.000	214.953	50.000	5.710
900.000	205.607	49.000	5.255
900.000	196.262	52.000	5.635
900.000	186.916	53.000	5.480
900.000	177.570	52.000	5.120
900.000	168.224	52.000	5.175
900.000	158.878	52.250	5.290
900.000	149.533	52.250	5.335
900.000	140.187	53.000	5.480
900.000	130.841	53.000	5.510
900.000	121.495	53.000	5.580
900.000	112.150	53.250	5.625
900.000	102.804	55.000	5.760
900.000	93.458	57.000	5.340
900.000	84.112	59.000	5.370
900.000	74.766	59.000	5.400
900.000	65.421	62.000	5.622
900.000	56.075	63.000	5.490
900.000	46.729	69.000	5.960
900.000	37.383	77.000	6.050
900.000	28.037	92.000	6.700
900.000	18.692	130.000	7.370
900.000	9.346	-60.750	5.400
900.000	0.000	-32.000	6.775
1000.000	0.000	59.000	5.010
1000.000	10.526	57.000	5.215
1000.000	21.053	53.000	5.235
1000.000	31.579	57.000	5.920
1000.000	42.105	46.000	5.890
1000.000	52.632	45.000	6.360
1000.000	63.158	46.000	6.400
1000.000	73.684	43.000	6.670
1000.000	84.211	43.000	6.665
1000.000	94.737	41.000	6.550
1000.000	105.263	41.000	6.590
1000.000	115.789	40.000	6.440
1000.000	126.316	40.000	6.630
1000.000	136.842	39.000	7.070
1000.000	147.368	39.000	6.512
1000.000	157.895	40.000	6.030
1000.000	168.421	41.500	6.230
1000.000	178.947	42.000	6.162
1000.000	189.474	44.000	6.150
1000.000	200.000	44.000	6.180
1000.000	210.526	44.250	6.382
1000.000	221.053	44.000	6.185
1000.000	231.579	46.000	6.102

1000.000	242.105	48.000	6.240
1000.000	252.632	47.000	6.380
1000.000	263.158	46.000	6.387
1000.000	273.684	48.000	6.380
1000.000	284.211	50.000	6.540
1000.000	294.737	48.000	6.480
1000.000	305.263	50.000	6.600
1000.000	315.789	55.000	6.770
1000.000	326.316	58.000	7.410
1000.000	336.842	57.000	7.890
1000.000	347.368	60.000	8.860
1000.000	357.895	69.250	11.280
1000.000	368.421	103.000	13.495
1000.000	378.947	-19.500	-9.175
1000.000	389.474	-84.250	-13.002
1000.000	400.000	139.250	20.477
1000.000	410.526	87.250	10.467
1000.000	421.053	64.000	9.020
1000.000	431.579	57.000	7.610
1000.000	442.105	56.000	7.350
1000.000	452.632	55.000	6.970
1000.000	463.158	54.000	6.710
1000.000	473.684	54.000	6.430
1000.000	484.211	52.000	6.370
1000.000	494.737	52.000	6.460
1000.000	505.263	52.000	6.290
1000.000	515.789	52.000	6.475
1000.000	526.316	51.000	6.400
1000.000	536.842	51.000	6.200
1000.000	547.368	52.000	6.155
1000.000	557.895	51.000	6.430
1000.000	568.421	52.000	6.125
1000.000	578.947	52.000	6.102
1000.000	589.474	52.750	6.440
1000.000	600.000	53.000	6.540
1000.000	610.526	52.250	6.500
1000.000	621.053	52.000	6.652
1000.000	631.579	52.000	6.317
1000.000	642.105	53.000	6.950
1000.000	652.632	52.000	6.620
1000.000	663.158	53.000	6.490
1000.000	673.684	53.000	6.620
1000.000	684.211	52.250	6.715
1000.000	694.737	54.000	6.880
1000.000	705.263	52.000	6.852
1000.000	715.789	52.000	6.745
1000.000	726.316	52.250	6.522
1000.000	736.842	45.000	6.565
1000.000	747.368	52.000	6.585
1000.000	757.895	50.000	6.310
1000.000	768.421	47.000	6.470
1000.000	778.947	45.000	6.800
1000.000	789.474	46.000	6.905

1000.000	800.000	46.000	7.462
1000.000	810.526	44.000	7.857
1000.000	821.053	50.000	9.017
1000.000	831.579	68.000	12.402
1000.000	842.105	117.000	20.477
1000.000	852.632	-30.500	-12.175
1000.000	863.158	-49.750	-16.900
1000.000	873.684	-88.000	-20.470
1000.000	884.211	106.500	15.462
1000.000	894.737	96.500	15.037
1000.000	905.263	63.000	9.655
1000.000	915.789	62.000	8.170
1000.000	926.316	60.000	7.260
1000.000	936.842	57.250	6.750
1000.000	947.368	56.000	6.730
1000.000	957.895	46.000	6.662
1000.000	968.421	45.000	6.520
1000.000	978.947	41.000	6.190
1000.000	989.474	38.000	6.260
1000.000	1000.000	41.000	6.230
1100.000	1000.000	86.000	5.700
1100.000	988.506	86.000	5.750
1100.000	977.011	70.000	6.082
1100.000	965.517	58.000	6.310
1100.000	954.023	54.000	6.510
1100.000	942.529	66.000	6.680
1100.000	931.034	80.250	6.760
1100.000	919.540	89.000	7.320
1100.000	908.046	84.000	8.100
1100.000	896.552	70.000	10.015
1100.000	885.057	92.750	14.930
1100.000	873.563	131.250	14.487
1100.000	862.069	12.000	-20.470
1100.000	850.575	-28.750	-16.552
1100.000	839.080	-46.250	-12.430
1100.000	827.586	140.250	20.477
1100.000	816.092	68.000	10.282
1100.000	804.598	55.000	9.145
1100.000	793.103	52.750	8.090
1100.000	781.609	52.000	7.140
1100.000	770.115	52.000	7.010
1100.000	758.621	52.000	6.470
1100.000	747.126	52.250	6.487
1100.000	735.632	51.250	6.450
1100.000	724.138	52.000	6.240
1100.000	712.644	50.250	6.145
1100.000	701.149	49.000	6.230
1100.000	689.655	46.750	6.020
1100.000	678.161	45.000	6.057
1100.000	666.667	43.000	6.192
1100.000	655.172	42.000	6.590
1100.000	643.678	40.250	6.505
1100.000	632.184	41.000	6.590

1100.000	620.690	39.750	6.605
1100.000	609.195	40.000	6.540
1100.000	597.701	39.000	6.705
1100.000	586.207	37.000	7.012
1100.000	574.713	38.250	6.440
1100.000	563.218	38.000	6.360
1100.000	551.724	38.000	5.907
1100.000	540.230	36.750	5.972
1100.000	528.736	38.000	6.170
1100.000	517.241	37.000	6.292
1100.000	505.747	37.000	6.300
1100.000	494.253	38.000	6.620
1100.000	482.759	41.000	6.110
1100.000	471.264	42.000	6.320
1100.000	459.770	47.500	6.050
1100.000	448.276	52.000	6.080
1100.000	436.782	52.000	6.415
1100.000	425.287	51.250	7.172
1100.000	413.793	53.000	7.470
1100.000	402.299	64.250	9.387
1100.000	390.805	104.000	16.142
1100.000	379.310	20.500	0.097
1100.000	367.816	-58.750	-11.947
1100.000	356.322	120.250	17.587
1100.000	344.828	75.000	9.787
1100.000	333.333	57.000	8.190
1100.000	321.839	51.000	7.165
1100.000	310.345	57.000	6.610
1100.000	298.851	61.000	6.302
1100.000	287.356	67.000	5.840
1100.000	275.862	69.500	5.782
1100.000	264.368	43.000	6.750
1100.000	252.874	47.000	6.197
1100.000	241.379	47.250	6.230
1100.000	229.885	50.000	6.397
1100.000	218.391	49.250	6.342
1100.000	206.897	49.000	6.400
1100.000	195.402	48.250	5.990
1100.000	183.908	46.750	6.055
1100.000	172.414	48.000	6.480
1100.000	160.920	44.000	7.505
1100.000	149.425	44.000	7.130
1100.000	137.931	46.000	6.640
1100.000	126.437	47.000	6.427
1100.000	114.943	46.000	5.892
1100.000	103.448	46.000	6.270
1100.000	91.954	45.750	6.170
1100.000	80.460	40.000	5.937
1100.000	68.966	45.000	5.740
1100.000	57.471	42.250	6.140
1100.000	45.977	44.250	5.870
1100.000	34.483	47.000	6.200
1100.000	22.988	47.000	6.110

1100.000	11.494	50.250	5.930
1100.000	0.000	51.000	5.920
1200.000	0.000	56.000	5.670
1200.000	11.494	60.000	6.012
1200.000	22.989	14.000	7.110
1200.000	34.483	56.500	5.705
1200.000	45.977	49.500	6.045
1200.000	57.471	43.000	6.072
1200.000	68.966	41.000	6.010
1200.000	80.460	41.000	6.020
1200.000	91.954	38.000	6.230
1200.000	103.448	36.000	6.160
1200.000	114.943	36.000	5.950
1200.000	126.437	36.000	6.050
1200.000	137.931	36.000	6.200
1200.000	149.425	36.000	6.055
1200.000	160.920	37.000	6.112
1200.000	172.414	39.000	6.090
1200.000	183.908	40.000	6.172
1200.000	195.402	40.500	6.092
1200.000	206.897	41.000	6.070
1200.000	218.391	42.000	6.290
1200.000	229.885	42.000	6.195
1200.000	241.379	42.500	6.220
1200.000	252.874	42.000	6.290
1200.000	264.368	43.000	6.200
1200.000	275.862	43.000	6.450
1200.000	287.356	45.000	6.490
1200.000	298.851	45.750	6.670
1200.000	310.345	48.000	6.900
1200.000	321.839	49.000	7.592
1200.000	333.333	57.000	8.347
1200.000	344.828	76.000	12.015
1200.000	356.322	87.250	12.850
1200.000	367.816	-109.500	-18.265
1200.000	379.310	156.250	20.477
1200.000	390.805	65.000	10.795
1200.000	402.299	43.250	8.050
1200.000	413.793	42.000	7.420
1200.000	425.287	36.250	6.610
1200.000	436.782	35.000	6.612
1200.000	448.276	35.000	6.110
1200.000	459.770	36.000	6.260
1200.000	471.264	38.000	6.460
1200.000	482.759	38.000	6.132
1200.000	494.253	39.000	6.142
1200.000	505.747	40.000	5.970
1200.000	517.241	40.000	6.300
1200.000	528.736	41.000	6.100
1200.000	540.230	41.000	6.050
1200.000	551.724	41.000	5.930
1200.000	563.218	42.000	5.990
1200.000	574.713	42.000	6.150

1200.000	586.207	42.000	5.965
1200.000	597.701	41.500	6.240
1200.000	609.195	40.500	6.330
1200.000	620.690	42.000	6.470
1200.000	632.184	42.750	6.780
1200.000	643.678	41.250	6.092
1200.000	655.172	42.000	6.185
1200.000	666.667	43.000	6.340
1200.000	678.161	43.000	6.290
1200.000	689.655	43.250	6.340
1200.000	701.149	44.000	6.660
1200.000	712.644	45.000	6.522
1200.000	724.138	42.000	6.210
1200.000	735.632	42.000	6.230
1200.000	747.126	44.000	6.220
1200.000	758.621	46.250	6.470
1200.000	770.115	49.000	6.332
1200.000	781.609	48.000	6.710
1200.000	793.103	48.000	7.010
1200.000	804.598	49.000	7.770
1200.000	816.092	53.250	8.810
1200.000	827.586	71.000	11.320
1200.000	839.081	131.250	20.210
1200.000	850.575	2.500	0.757
1200.000	862.069	-126.750	-20.435
1200.000	873.563	-17.750	-15.217
1200.000	885.057	9.500	-6.085
1200.000	896.552	127.500	20.182
1200.000	908.046	72.750	10.515
1200.000	919.540	71.000	8.685
1200.000	931.034	79.000	7.230
1200.000	942.529	70.000	6.610
1200.000	954.023	59.000	6.800
1200.000	965.517	55.000	6.510
1200.000	977.012	55.250	6.560
1200.000	988.506	50.000	6.520
1200.000	1000.000	52.000	6.330
1300.000	900.000	116.500	20.477
1300.000	888.889	9.250	20.477
1300.000	877.778	269.250	20.477
1300.000	866.667	-80.500	-2.865
1300.000	855.556	-31.250	2.285
1300.000	844.444	93.000	10.102
1300.000	833.333	57.000	7.817
1300.000	822.222	50.000	7.040
1300.000	811.111	47.000	6.822
1300.000	800.000	49.000	6.510
1300.000	788.889	48.000	6.660
1300.000	777.778	48.000	6.530
1300.000	766.667	44.250	6.637
1300.000	755.556	45.000	6.682
1300.000	744.444	48.000	6.530
1300.000	733.333	46.000	6.690

1300.000	722.222	44.000	6.445
1300.000	711.111	46.000	6.660
1300.000	700.000	46.000	6.530
1300.000	688.889	45.000	6.520
1300.000	677.778	42.000	6.547
1300.000	666.667	45.000	6.512
1300.000	655.556	41.250	6.670
1300.000	644.444	40.000	6.670
1300.000	633.333	41.000	6.990
1300.000	622.222	40.000	6.242
1300.000	611.111	40.000	6.310
1300.000	600.000	39.000	6.645
1300.000	588.889	38.250	6.400
1300.000	577.778	39.000	6.460
1300.000	566.667	39.000	6.230
1300.000	555.556	39.000	6.420
1300.000	544.444	35.250	6.710
1300.000	533.333	34.750	5.970
1300.000	522.222	38.250	6.292
1300.000	511.111	39.000	6.200
1300.000	500.000	41.000	6.242
1300.000	488.889	42.500	6.290
1300.000	477.778	46.000	6.190
1300.000	466.667	50.000	6.210
1300.000	455.556	51.000	6.840
1300.000	444.444	60.000	7.820
1300.000	433.333	97.750	10.407
1300.000	422.222	36.500	4.730
1300.000	411.111	-87.250	-3.005
1300.000	400.000	128.250	13.172
1300.000	388.889	59.500	7.665
1300.000	377.778	46.500	6.947
1300.000	366.667	56.250	6.160
1300.000	355.556	55.000	6.310
1300.000	344.444	54.000	6.270
1300.000	333.333	52.000	6.190
1300.000	322.222	50.250	6.280
1300.000	311.111	47.250	5.910
1300.000	300.000	45.250	6.060
1300.000	288.889	44.000	6.110
1300.000	277.778	47.000	5.580
1300.000	266.667	45.000	5.750
1300.000	255.556	45.000	5.620
1300.000	244.444	45.000	5.777
1300.000	233.333	40.000	6.272
1300.000	222.222	41.000	6.190
1300.000	211.111	42.500	5.917
1300.000	200.000	40.000	6.060
1300.000	188.889	42.000	6.010
1300.000	177.778	41.000	6.215
1300.000	166.667	41.000	6.237
1300.000	155.556	42.000	6.160
1300.000	144.444	44.000	5.930

1300.000	133.333	45.000	5.960
1300.000	122.222	45.000	6.060
1300.000	111.111	44.000	5.940
1300.000	100.000	45.000	5.820
1300.000	88.889	44.000	5.692
1300.000	77.778	45.000	6.010
1300.000	66.667	44.000	5.697
1300.000	55.556	46.000	6.020
1300.000	44.444	51.000	5.815
1300.000	33.333	67.000	5.480
1300.000	22.222	12.000	7.350
1300.000	11.111	41.000	6.482
1300.000	0.000	63.000	6.120

APPENDIX H

GEOPOSITIONING SATELLITE (GPS) DATA

Cherryvale Rodeo Grounds Site
Soil Sample times and GPS locations

Name	Time	Lat (N)	Long (W)
SS-1	1315	37.27418	95.56585
SS-2	1345	37.27430	95.56454
SS-3	1400	37.27421	95.56320
SS-4	1408	37.27427	95.56248
SS-5	1428	37.27331	95.56592
SS-6	1438	37.27316	95.56457
SS-7	1446	37.27305	95.56338
SS-8	1455	37.27326	95.56244
SS-9	1542	37.27201	95.56595
SS-10	1535	37.27236	95.56491
SS-11	1520	37.27250	95.56361
SS-12	1510	37.27244	95.56236
SS-13	1650	37.27415	95.56180
SS-14	1640	37.27312	95.56131
SS-15	1625	37.27238	95.56124
Rinsate	1615		

APPENDIX I

TEMPORARY WELL LOGS AND WATER LEVEL INFORMATION

Site Name: **Cherryvale Rodeo Grounds BTA**

Geologist: Randolph L. Brown **Driller/Rig:** John Cregan/B-3300
Boring #: TW-1 **Date: 03/23/01** **Location: 50 northwest of intersection of Front and Catherine Streets**

Field Screening/Analysis Utilized ? **_X_ Y ___ N**
Type of Analytical Equipment Used, Calibration, etc: Niton 733 used, XRF calibration and standards information on Niton XRF field analytical sheets

Depth (in Feet):	Lithologic Description:	Samples Obtained:	Field Screening Value:
0-2.0	Dark brown silty loam, roots, low plasticity, Fe nodules	03/23/01 0845 bagged sample 0-2	0-2: 121± 32
2.5-5.0	Fat yellowish brown silty clay, with Fe nodules	0915 bagged 2-5	2.5-5: 59 ± 29
		0945 bagged 5-8.5	5-8.5: 51.2 ± 28
5.5-6.0	Fat yellow silty clay with limestone residuum		
6.0	Refusal at 6.0 in limestone residuum		

Site Name: **Cherryvale Rodeo Grounds BTA**

Geologist: Randolph L. Brown **Driller/Rig:** John Cregan/B-3300
Boring #: TW-2 **Date: 03/22/01** **Location: 252 yards East of Gate**

Field Screening/Analysis Utilized ? **_X_ Y ___ N**
Type of Analytical Equipment Used, Calibration, etc: Niton 733 used, XRF calibration and standards information on Niton XRF field analytical sheets

Depth (in Feet):	Lithologic Description:	Samples Obtained:	Field Screening Value:
0-1.0	Dark brown silty loam, roots, low plasticity	03/22/01 1345 bagged sample 0-2 1400 bagged 2-5 1415 bagged 5-8.5	0-2: 118 ± 32 2-5: 57 ± 29 5-8.5: 49.8 ± 28
1.0-4.0	Dark brown to olive silty clay, moderate plasticity		
4.0-6.0	Brown silty clay, iron nodules, moderate plasticity, increasing Fe nodules and decreasing silt with depth		
7.0-8.5	Light brown fat clay with limestone residuum		
8.5	Refusal at 8.5 in brown fat clay and tan LS		

Site Name: **Cherryvale Rodeo Grounds BTA**			
Geologist: Randolph L. Brown **Driller/Rig:** John Cregan/B-3300 **Boring #: TW-3 Date: 03/22/01 Location: 150 yards North and 10 yards East of Gate**			
Field Screening/Analysis Utilized ? **_X_ Y ___ N** Type of Analytical Equipment Used, Calibration, etc: Niton 733 used, XRF calibration and standards information on Niton XRF field analytical sheets			
Depth (in Feet):	Lithologic Description:	Samples Obtained:	Field Screening Value:
0-1.0	Dark brown silty loam, roots, low plasticity	03/22/01 1425 bagged sample 0-2 1445 bagged 2-5 1510 bagged 5-8.5	0-2: 58 ± 32 2-5: 47 ± 29 5-8.5: 49.2 ± 28
1.0-4.5	Dark brown to olive silty clay, moderate plasticity		
4.0-8.5	Light brown mottled silty clay, iron nodules, moderate plasticity, increasing Fe nodules		
7.0-8.5	Light brown fat clay with limestone residuum		
9.5	Refusal at 8.5 in brown fat silty clay and tan LS		

Site Name: **Cherryvale Rodeo Grounds BTA**

Geologist: Randolph L. Brown **Driller/Rig:** John Cregan/B-3300
Boring #: TW-4 Date: 03/22/01 Location: 50 yards North and 15 yards East of Gate

Field Screening/Analysis Utilized ? **_X_ Y ___ N**
Type of Analytical Equipment Used, Calibration, etc: Niton 733 used, XRF calibration and standards information on Niton XRF field analytical sheets

Depth (in Feet):	Lithologic Description:	Samples Obtained:	Field Screening Value:
0-1.0	Dark brown silty loam, roots, low plasticity	03/22/01 1555 bagged sample 0-2	0-2: 97 ± 32
1.0-2.0	Dark brown to olive silty clay, moderate plasticity	1620 bagged 2-5 1650 bagged 5-8.5	2-5: 61.2 ± 29 5-8.5: 46.3 ± 28
2.0-4.5	Light brown mottled silty clay, stiff, iron nodules, moderate plasticity, increasing Fe nodules		
4.5-7.5	Light brown fat clay with limestone residuum		
7.5	Refusal at 7.5 in light brown fat silty clay and tan LS		

Water Level Measurement Data

Well I.D. #:	SWL (Feet):	TD (Feet):
TW-1	10.61	10.81
TW-2	12.08	12.28
TW-3	12.90	13.25
TW-4	12.07	12.10
All wells installed 03/22-03/23/01	All Wells measured 08/22/01	

Note: Wells were not purged or developed because of poor recharge; after five (5) months maximum water column was 0.35 feet in TW-3.

APPENDIX J

HAZARDOUS SUBSTANCE CHARACTERISTICS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ARSENIC
CAS # 7440-38-2

Division of Toxicology ToxFAQs™ July 2001

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occurs mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found at 1,014 of the 1,598 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

- Arsenic cannot be destroyed in the environment. It can only change its form.
- Arsenic in air will settle to the ground or is washed out of the air by rain.
- Many arsenic compounds can dissolve in water.
- Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful.

How might I be exposed to arsenic?

- Eating food, drinking water, or breathing air containing arsenic.
- Breathing contaminated workplace air.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living near uncontrolled hazardous waste sites containing arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the

appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

How can arsenic affect children?

We do not know if exposure to arsenic will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to inorganic arsenic.

It is likely that health effects seen in children exposed to high amounts of arsenic will be similar to the effects seen in adults.

How can families reduce the risk of exposure to arsenic?

❑ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
❑ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

Is there a medical test to show whether I've been exposed to arsenic?

There are tests to measure the level of arsenic in blood, urine, hair, or fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels or arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or canceled many uses of arsenic in pesticides. EPA has set a limit of 0.05 parts per million (ppm) for arsenic in drinking water. The EPA arsenic drinking water standard of 0.01 ppm (10 ppb) reported in the ATSDR February 2001 Arsenic ToxFAQs was based on the EPA final rule for arsenic in drinking water, published on January 22, 2001, in the *Federal Register*. However, the EPA is currently reviewing the science and cost estimate supporting this rule, and, in the interim, has reverted to the previous standard for arsenic. Thus, the current EPA arsenic drinking water standard remains at 0.05 ppm (50 ppb).

The Occupational Safety and Health Administration has set limits of 10 μg arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

LEAD

CAS # 7439-92-1

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,026 of 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is lead?

(Pronounced lĕd)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.
- Much of the lead in inner-city soils comes from old houses painted with lead-based paint.

How might I be exposed to lead?

- Eating food or drinking water that contains lead.
- Spending time in areas where lead-based paints have been used and are deteriorating.
- Working in a job where lead is used.
- Using health-care products or folk remedies that contain lead.
- Engaging in certain hobbies in which lead is used (for example, stained glass).

How can lead affect my health?

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services has determined that lead acetate and lead phosphate may reasonably

be anticipated to be carcinogens based on studies in animals. There is inadequate evidence to clearly determine lead's carcinogenicity in people.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. A large amount of lead might get into a child's body if the child ate small pieces of old paint that contained large amounts of lead. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead.

How can families reduce the risk of exposure to lead?

Avoid exposure to sources of lead. Do not allow children to chew or mouth painted surfaces that may have been painted with lead-based paint (homes built before 1978). Run your water for 15 to 30 seconds before drinking or cooking with it. This will get rid of lead that may have leached out of pipes. Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children. Wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to show whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth and bones can be measured with X-rays, but this test is not as readily available. Medical treatment may be necessary in children if the lead concentration in blood is higher than 45 micrograms per deciliter (45 μg/dL).

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that children ages 1 and 2 be screened for lead poisoning. Children who are 3 to 6 years old should be tested for lead if they have never been tested for lead before and if they receive services from public assistance programs; if they live in or regularly visit a building built before 1950; if they live in or visit a home built before 1978 that is being remodeled; or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers children to have an elevated level of lead if the amount in the blood is 10 μg/dL.

The EPA requires lead in air not to exceed 1.5 micrograms per cubic meter (1.5 $\mu g/m^3$) averaged over 3 months. EPA limits lead in drinking water to 15 μg per liter.

The Occupational Health and Safety Administration (OSHA) develops regulations for workers exposed to lead. The Clean Air Act Amendments of 1990 banned the sale of leaded gasoline. The Federal Hazardous Substance Act bans children's products that contain hazardous amounts of lead.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.