KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
FINAL CORRECTIVE ACTION DECISION
FORMER GIRARD ZINC WORKS SMELTER SITE
GIRARD, KANSAS

DECLARATION OF CORRECTIVE ACTION DECISION

SITE NAME AND LOCATION

Former Girard Zinc Works Smelter Site
Girard, Cherokee County, Kansas

STATEMENT OF BASIS AND PURPOSE

The Final Corrective Action Decision document presents the corrective action selected by the Kansas Department of Health and Environment (KDHE) for the Former Girard Zinc Works Smelter Site located in Girard, Kansas. In the Comprehensive Investigation (CI), it was determined that lead, cadmium, arsenic, and zinc are present at elevated concentrations in surface and subsurface soil at the Site, exceeding the corresponding KDHE Tier 2 Risk-Based Screening (RSK) Levels in a residential setting for soil. Zinc was detected in sediment above the Probable Effects Concentration (PEC) in Second Cow Creek, but not detected in surface water. Cadmium and zinc were detected in shallow groundwater above the corresponding RSK levels in 2004 and 2008, but below RSK levels in samples collected in 2010.

In the Corrective Action Study (CAS), various remedial action alternatives were evaluated to address contamination at the site. The remedial action selected for the site was developed on the basis of documents and information contained in the Administrative Record File.

DESCRIPTION OF THE SELECTED REMEDIAL ACTION

KDHE has determined that the selected corrective action, as described and evaluated in the Final Corrective Action Decision, meets the criteria established for selection and will be protective of human health and the environment. The remedial action selected includes excavation of approximately 7,000 to 8,000 cubic yards from the upper 0.5 to 4.0 feet of soils exceeding residential RSK levels. The extent of excavation is intended to achieve the residential RSK levels for Site contaminants to allow for unrestricted future use of property.

The excavated soils will be transported to the constructed Consolidation Cell situated within the footprint of a former 5-acre landfill at the former smelter site (former Cherokee Lanyon Smelter) located approximately 2 miles northwest of the Site. The excavated soils will be graded to blend into the surrounding topography before placement of a two-foot thick soil and vegetative cap (18 inches fill material, 6 inches top soil) to remove the potential for exposure.

The extent of contaminated sediment will be determined during pre-construction activities and excavated if PEC levels are exceeded. Surface water will be sampled periodically during and

after removal activities to ensure that installed erosion and sediment controls are effective and that no adverse impacts to water quality have occurred. Groundwater samples will be obtained during removal activities and periodically thereafter to establish a pattern of concentrations below RSK levels for metals.

DECLARATION

The selected remedial action is protective of human health and the environment; attains state, federal and local requirements that are applicable or relevant and appropriate to this corrective action; and, provides cost-effective performance. The remedial action will reduce contaminant mobility at the Former Girard Zinc Works Smelter Site. In selecting and declaring this corrective action, KDHE believes implementation of the remedial action will have a beneficial effect on heath and the environment.

Roderick L. Bremby
Secretary

9/7/2018
Date

Attachment: Final Corrective Action Decision

Curtis State Office Building
1000 SW Jackson, Suite 410
Topeka, Kansas 66612-1367

Kansas Department of Health and Environment

Final
Corrective Action Decision

Former Cherokee-Lanyon Smelter
Girard, Kansas

September 2010

Bureau of Environmental Remediation

ORIGINAL

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1.0 PURPOSE OF THE FINAL CORRECTIVE ACTION DECISION

The primary purposes of the Final Corrective Action Decision (CAD) for the former Cherokee-Lanyon Smelter Site (Site) are to: 1) summarize information from the key site documents including the Comprehensive Investigation (CI) and Corrective Action Study (CAS) reports; 2) briefly describe the alternatives for site remediation detailed in the CAS report; 3) identify and describe KDHE's selected remedy for the soil, sediment, and groundwater contamination; and 4) document comments and KDHE's responses to the public comments received regarding the draft CAD.

KDHE has selected a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period (July 13 to August 12, 2010). The public was encouraged to review and comment on the preferred remedy presented in the draft CAD. KDHE held a public availability session on July 22, 2010, at the Girard Public Library to present information regarding the preferred remedy and solicit public participation. A news release was issued in the *Pittsburg Morning Sun* on July 13, 2010.

ENTACT, LLC, the consultant for United States Steel Corporation (U.S. Steel), prepared the key documents for the Site. Work performed during the CI and CAS process followed the terms outlined in the April 2007 Consent Agreement between U.S. Steel and KDHE. The public was encouraged to review and comment on the technical information presented in the CI and CAS reports and other documents contained in the Administrative Record file. The Administrative Record file includes all pertinent documents and site information that form the basis and rationale for selecting the final remedy. KDHE encouraged the public to review the Administrative Record file, which was available for public review and copying during normal business hours at the following location:

Kansas Department of Health and Environment
Bureau of Environmental Remediation
1000 SW Jackson St., Suite 410
Topeka, Kansas 66612-1367
CONTACT: Pamela Green, Project Manager
Telephone Number: (785) 296-1935
E-mail: pgreen@kdheks.gov

For convenience to interested members of the public, copies of the CI and CAS reports, as well as the draft CAD, were also available for review and copying during normal business hours at the following location:

Girard Public Library
128 W. Prairie Ave
Girard, Kansas 66743
Telephone Number: (620) 724-4317

2.0 SITE BACKGROUND

2.1 Site Location

The Site is located in Girard, Kansas in Crawford County in a rural area, east of South 150th Street and north of East 610th Avenue, east of the Girard City limits as illustrated in Figure 1. The Site is bounded by a former Atchison-Topeka-Santa Fe railroad right-of-way to the north, East 610th Avenue to the south, and by pastureland to the east and west. Occupying approximately 7.8 acres in size, the Site is part of a 30-acre parcel owned by Eleanor and Robert Peak and the Peak Oil Company as shown in Figure 2. According to property tax records, the Site is zoned for agricultural use and is currently used for cattle grazing.

2.2 Site History

The Site was historically used for zinc smelting between the late 1890's and early 1900's. The former smelter was constructed in the late 1890's and consisted of four zinc smelting furnaces, an ore roasting plant with eight kilns, a clay mill, an ore mill, a dryer, and an office. The furnaces were built along the drainageway. Operations ceased in 1901.

While the Site is largely undeveloped and vegetated, visible smelter-related debris was observed within and around a small copse of trees, and several small slag piles were observed at the eastern portion of the Site. In addition, a black powdery material was observed on the surface near the former ore roasting plant.

A former City of Girard municipal dump is located on the western portion of the Site, west of the former smelter footprint. The former dump was covered with a clay soil cover in the 1970's and is deed-restricted to prevent residential use.

3.0 COMPREHENSIVE INVESTIGATION

U.S. Steel contracted ENTACT, LLC, to perform the CI/CAS at the Site in order to supplement the 2003 and 2004 Focused Former Smelter Assessment (FFSA) conducted by KDHE and its contractor, Burns & McDonnell. A CI Work Plan was approved by KDHE in November 2007, and CI activities were performed in December 2007 and January 2008. The objectives of the CI process include:

- identification and characterization of all source areas;
- delineation of the vertical and horizontal extent of contamination for each of the impacted environmental media at the site;
- characterization of the physical and chemical properties of the contaminants, their mobility and persistence in the environment, and their important fate and transport mechanisms;
- identification of human and environmental targets that may be threatened or affected by contaminants at the site; and

- development of an initial list of remedial alternatives.

The field activities consisted of the collection of the following samples for lead, arsenic, cadmium, and zinc:

- 88 surface soil samples
- 117 subsurface soil samples
- Eight soil samples from the drainageway bordering Highway 610
- One composite smelter waste sample
- One groundwater sample

The results of investigations are provided in the *Final Comprehensive Investigation Report*, August 2008. The following is a brief summary of the results:

- Lead, cadmium, and arsenic have been detected in soils exceeding the Risk-Based Standards for Kansas (RSK).
- Lead, cadmium, and arsenic in soils have migrated to the adjacent off-Site drainageways bordering Highway 610.
- Groundwater could not be collected due to insufficient yield.

4.0 SITE RISKS

Information collected from the investigations at the Site have documented the potential risks to human health and environment if no cleanup actions were performed at the Site. Risks are subsequently used as one of several criteria to evaluate proposed remedial alternatives and establish remedial action objectives. The general purpose of a recommended remedial action at the Site is to protect human health and the environment from exposure to contaminants of concern.

Contaminants of concern at this Site are lead, arsenic, and cadmium. The primary route of potential exposure to contaminants at the Site is through contact with dust from soil contaminated with lead, arsenic, and cadmium via inhalation or ingestion. The majority of the Site is covered with vegetation, limiting the potential for dust generation.

5.0 REMEDIAL ACTION OBJECTIVES

Based on the information collected during the CI, the following remedial action objectives (RAOs) were developed:

- Prevent human exposure via direct contact with and inhalation of contaminated soil.
- Long-term environmental use controls for the protection and maintenance of the capped area that encapsulates the impacted soil.

5.1 Cleanup Levels

The results of the CI indicate that soil contaminated with metals presents a human health risk that exceeds EPA's recommended risk range. KDHE has calculated Risk-Based Standards for Kansas (RSK) Tier 2 Levels for soil for the protection of human health. The risk-based Tier 2 Levels and methods of calculation are identified in KDHE's *Risk-Based Standards for Kansas, RSK Manual.* The highest concentrations of contaminants of concern detected at the Site and the clean-up levels for the Site (residential RSK levels) are provided in Table 1.

The conclusions of the CI, the formulation of RAOs, and the determination of cleanup levels for soil provide the basis for selecting a preferred remedial alternative.

6.0 SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

In accordance with KDHE's CI/CAS Scope of Work, several remedial action alternatives were developed and evaluated in detail. Each remedial alternative was evaluated using the following criteria: 1) overall protection of human health and the environment; 2) compliance with Federal and State ARARs (applicable or relevant and appropriate requirements); 3) long-term effectiveness and permanence; 4) reduction of toxicity, mobility, and volume through treatment; 5) short-term effectiveness; 6) implementability; and 7) cost.

The remedial alternatives that were evaluated during the CAS are presented below:

- Alternative 1: No Action
- Alternative 2: Excavation and/or Stabilization and Off-Site Disposal ($1.7 - $1.87 million, assuming 25% of material will require stabilization)
- Alternative 3: Excavation and On-Site Consolidation and Cover with Environmental Use Control Agreement (EUC) ($1.2 - $1.32 million)

7.0 DESCRIPTION OF THE SELECTED REMEDY

KDHE has determined that the selected remedy for the Site, outlined below, satisfies or meets the criteria established by both State and Federal programs and will be protective of human health and the environment. The remedial alternatives were evaluated based on the seven criteria discussed in Section 6.0.

KDHE has selected Alternative 3 as the preferred remedy for addressing the contaminated soil. Approximately 9,200 cubic yards of contaminated soil and residual smelter debris will be excavated from the upper 0.5 to 1.0 feet of soils exceeding residential RSK levels. The excavated soils and smelter residues will be placed in the 400-foot by 600-foot Consolidation Cell located over the former landfill. The excavated material will be compacted along with an additional 7,000-8,000 cubic yards of excavated materials from the Girard Zinc Works Site (a former smelter site less than two miles away) and graded to blend into the surrounding

topography before placement of a two-foot thick soil and vegetative cap (18 inches fill material, 6 inches top soil) to remove the potential for exposure.

A drainage channel will be constructed around the Consolidation Cell to divert storm water run-off to the drainageway. The cap will be engineered to minimize infiltration to prevent leaching of contaminants to surface water. The cap design will be submitted to KDHE for approval. An EUC will be placed on the consolidation cell area to prohibit future intrusive activities that may damage the cap and to ensure the land use remains nonresidential. A long-term Operations and Maintenance plan will be developed and will include routine inspections, and repairs will be conducted to ensure long-term effectiveness of the remedy. The cost estimate includes the cost of the EUC and the required long-term operation and maintenance for 30 years.

In addition, the following activities will also be conducted:

- Pre-construction sampling will be conducted to delineate the full extent of contamination to the north and to the west. The extent of soil contamination in the drainage ditch will also be determined.
- Four trenches (~10 feet by 50 feet) will be installed to investigate the northern boundary of the former landfill.
- X-Ray Fluorescence (XRF) field screening will be used to guide the lateral and vertical extents of excavation, followed by confirmatory sampling to verify that metal concentrations do not exceed residential RSK values.
- Authorization will be obtained from the KDHE Bureau of Water to discharge storm water runoff under the construction storm water general permit. Best Management Practices that control erosion and sediment discharges and reduce the potential for contamination of storm water runoff associated with construction activities will be implemented. Erosion and surface water run-off controls will be installed around excavation areas and the Consolidation Cell to minimize the potential of transport of soils and sediment during construction and to capture and contain any storm water that comes into contact with excavated soils that exceed RSK levels prior to completion of the cover. Dust control measures will be used to minimize dust generation during excavation and construction.
- All necessary site control measures, including site security and access, dust control, and sediment and erosion control, will be implemented during all removal activities to ensure that soils disturbed on Site during excavation or handling activities do not migrate off-Site via storm water or air migration.
- A fence will be constructed around the Consolidation Cell to limit access to this area.
- Excavated areas from which impacted soil is removed will be graded with clean soil and will be graded to maintain and improve existing drainage.
- Transportation of clean fill to the Consolidation Cell will be coordinated with the City of Girard. Controls will be implemented related to traffic concerns, noise, and dust generation.
- A "Disposal of Solid Waste Without a Permit" application will be filed with the Bureau of Waste Management for authorization.
- Periodic inspection and maintenance of the soil cover shall be performed to ensure cover integrity as specified in the Operation and Maintenance plan that will be appended to the EUC and Long-Term Care Agreements.

8.0 COMMUNITY INVOLVEMENT

KDHE encouraged public input and comment. Public notice of the availability of the draft Corrective Action Decision was published in the *Pittsburg Morning Sun.*

KDHE selected a final remedy after reviewing and considering all information submitted during the 30-day public comment period. The public was encouraged to review and comment on the preferred remedy presented in the draft CAD. KDHE held a public availability session during the public comment period (July 13-August 12, 2010) to present information regarding the preferred remedy and solicit public participation on July 22, 2010, at the Girard Public Library.

9.0 DOCUMENTATION OF SIGNIFICANT CHANGES

No written or verbal comments on the draft CAD were submitted to KDHE during the public comment period. No significant changes have been made to the final CAD.

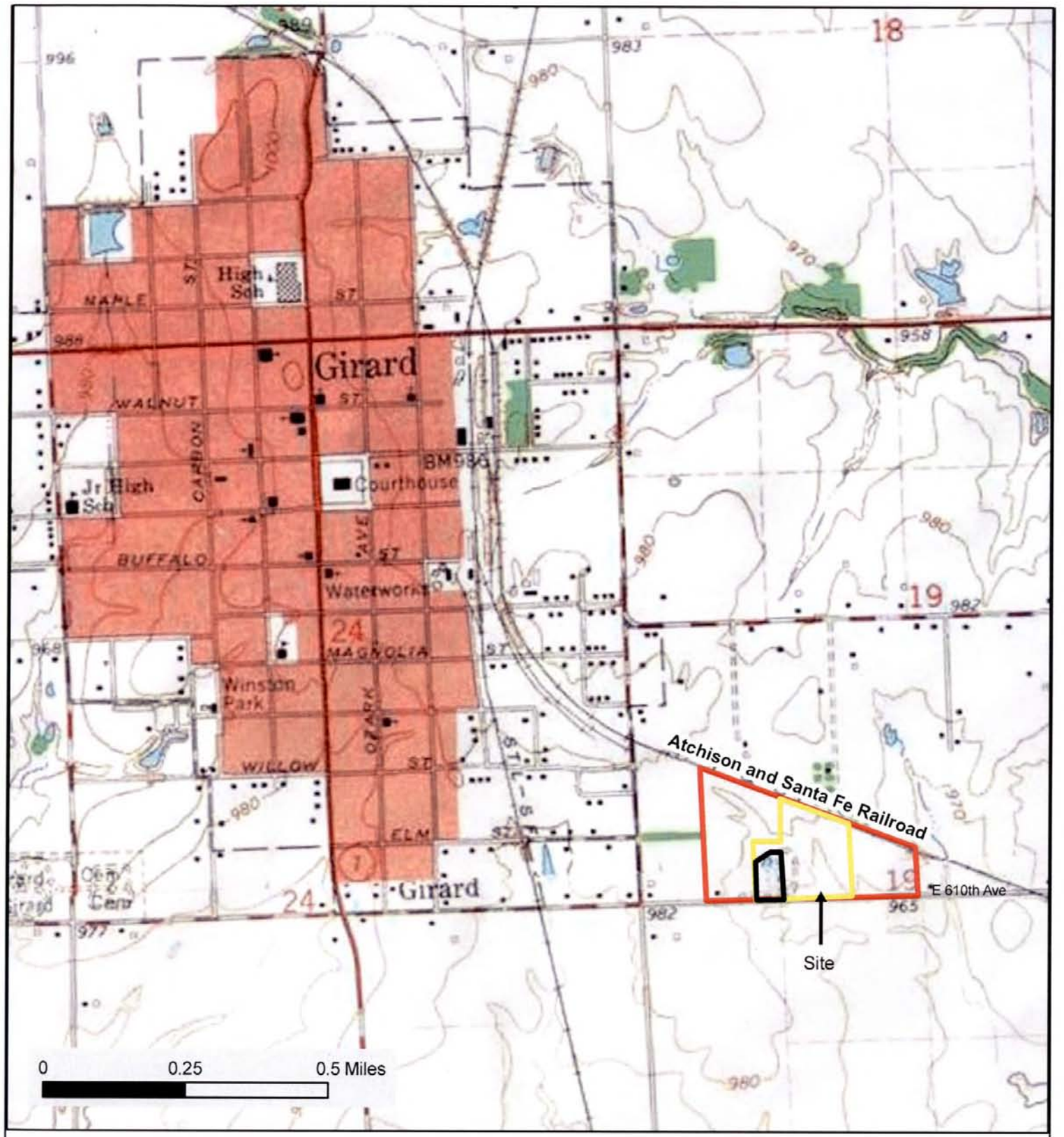
10.0 RESPONSE TO COMMENTS SUMMARY

The purpose of the Response to Comments Summary is to summarize the comments made by private citizens and other interested parties during the public comment period for the draft CAD. A public comment period was offered from July 13 to August 12, 2010. No written comments were received by KDHE during the public comment period; therefore, a response to comments has not been prepared.

Table 1: Contaminants of Concern and Clean-Up Levels for Soil Former Cherokee Lanyon Smelter

Contaminant of Concern	Residential RSK Soil (mg/kg)	Maximum Concentration Detected (mg/kg)
Arsenic	11	13
Cadmium	39	54
Lead	400	3,666
Zinc	23,000	7,300

mg/kg = milligrams per kilogram
RSK = Risk-Based Standard for Kansas



Proposed Consolidation Cell Footprint

Peak Oil Property

Site Boundary

Boundaries are approximate

N

Crawford County, KS

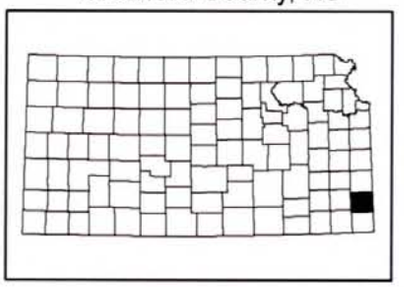
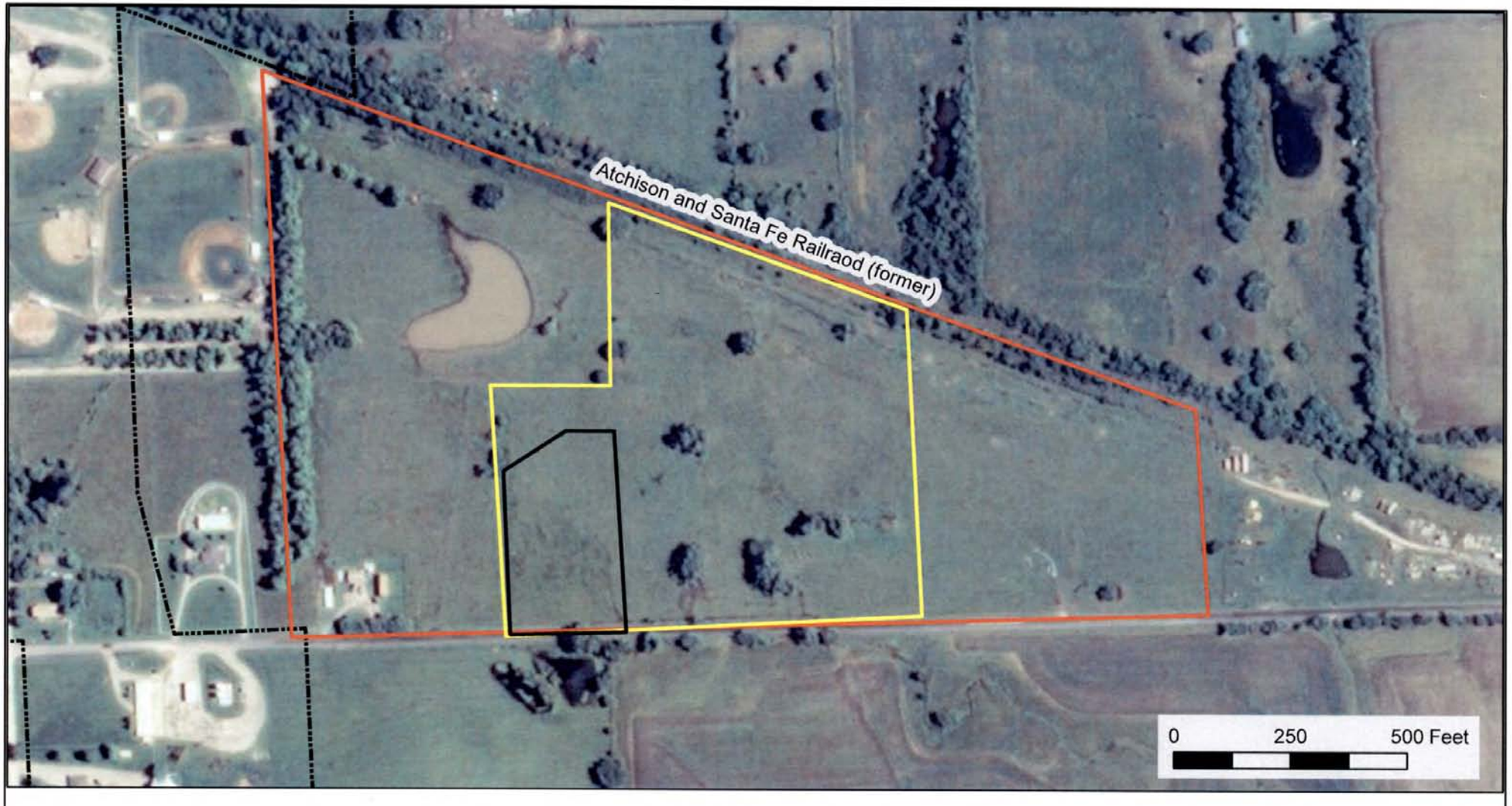


Figure 1: Site Location

Former Cherokee-Lanyon Smelter
Girard, Kansas



City Limits

Proposed Consolidation Cell Footprint

Peak Oil Property

Site Boundary

Boundaries are approximate

N

Area Map

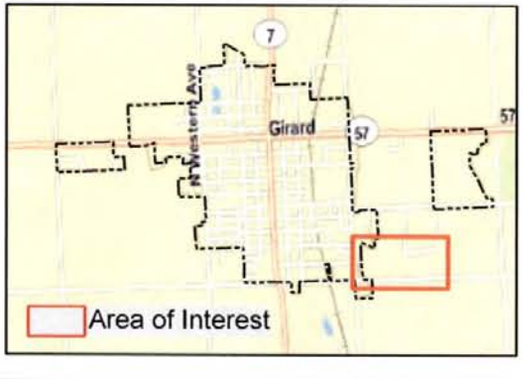


Figure 2: Site Boundary

Former Cherokee-Lanyon Smelter
Girard, Kansas

Kansas Department of Health & Environment