Soil-Waste Management Plan for National Zinc Site, Cherryvale, Kansas
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### Acronyms and Abbreviations

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<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>°F</td>
<td>degrees Fahrenheit</td>
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<tr>
<td>ADS</td>
<td>agency decision statement</td>
</tr>
<tr>
<td>BMP</td>
<td>best management practice</td>
</tr>
<tr>
<td>City</td>
<td>City of Cherryvale</td>
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<tr>
<td>DOT</td>
<td>Department of Transportation</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>ESI</td>
<td>expanded site inspection</td>
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<tr>
<td>ft</td>
<td>feet</td>
</tr>
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<td>IC</td>
<td>institutional control</td>
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<tr>
<td>in.</td>
<td>inches</td>
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<tr>
<td>KDHE</td>
<td>Kansas Department of Health and Environment</td>
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<tr>
<td>mg/kg</td>
<td>milligrams per kilogram</td>
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<tr>
<td>NOI</td>
<td>Notice of Intent</td>
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<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
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<tr>
<td>PPE</td>
<td>personal protective equipment</td>
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<tr>
<td>RAD</td>
<td>removal action design</td>
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<td>Respondents</td>
<td>United States Steel Corporation and Citigroup Global Market Holdings, Inc.</td>
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<td>ROW</td>
<td>right-of-way</td>
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<td>RSE</td>
<td>removal site evaluation</td>
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<td>RSK</td>
<td>Risk-Based Standards for Kansas</td>
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<tr>
<td>SACO</td>
<td>Second Amendment to Consent Order</td>
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<tr>
<td>Site</td>
<td>the corporate limits of the City of Cherryvale outside the former smelter property and excluding all operating and abandoned railroad rights of way</td>
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<tr>
<td>SMP</td>
<td>Soil-Waste Management Plan</td>
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<td>SRM</td>
<td>smelter residue material</td>
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<td>SSV</td>
<td>soil screening value</td>
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1 Introduction

This Soil-Waste Management Plan (SMP) for the National Zinc Site, Cherryvale, Kansas, has been prepared on behalf of United States Steel Corporation and Citigroup Global Market Holdings, Inc. (Respondents), pursuant to the Second Amendment to Consent Order (SACO) (KDHE 2013b) between the Respondents and the Kansas Department of Health and Environment (KDHE) dated May 3, 2013.

1.1 Purpose and Applicability

As required by the SACO, the purpose of this SMP is to facilitate proper and lawful management and disposal of smelter waste, including contaminated soil associated with historical smelter operations at the former National Zinc Smelter Property (former smelter property) (Figure 1) during future construction and redevelopment activities performed in Cherryvale (the Site). This SMP serves as a general guidance document to manage disturbances of smelter waste in a manner that protects human health and the environment primarily following remedy implementation. This includes the City of Cherryvale’s (the City’s) as-needed remediation of right-of-way (ROW) areas and disturbance activities in previously remediated areas and areas where smelter waste is unexpectedly encountered. Site waste and soil removed during implementation of the initial remedy will follow the more detailed protocols included in the Removal Action Design (RAD) Plan (Exponent 2017), although certain aspects of this work such as transport and disposal are included in this SMP.

This SMP is not applicable to spills and/or emergency response or releases that may occur at the Site. These incidents require appropriate reporting and coordination with local, state, and federal agencies.

1.2 Objective

The objective of this SMP is to describe the protocols for managing and disposing of smelter residue and associated impacted soil (referred to herein as smelter residue material [SRM]). These protocols include pre-work decision-making and notifications, protecting personnel and the public during disturbances or other routine work activities, meeting local, state, and federal requirements (including Excavation Permit application to the City), and maintaining the integrity of remediated areas and engineering controls. Guidelines for appropriate controls for Site features (e.g., streets, alleys, ditches, brick walkways, driveways, etc.) to minimize smelter residue exposures will be established in a separate Institutional Control (IC) Plan.

This SMP should be updated, if warranted, based on changes in Site and/or project conditions. The SMP is a general guidance document and may not be appropriate for all future projects. If meeting future project objectives requires substantive deviations from this SMP, then the proposed work must be clearly communicated to KDHE for pre-approval before implementation.
1.3 Activities under the SACO

Pursuant to the SACO (KDHE 2013b) between the Respondents and KDHE, the Respondents performed a Removal Site Evaluation (RSE) in two phases. Phase 1 of the RSE focused on determining the bioavailability of lead and arsenic (Exponent 2014a; PNL 2014), and the Phase 2 RSE assessed the nature and extent of smelter-related soil lead exceedances within the City (Exponent 2016a). Based on this work, KDHE issued the Agency Decision Statement (ADS), which recommended the final remedy for the Site (KDHE 2016a). A RAD Plan was developed to present the remedy for the Site consistent with the ADS and was submitted to KDHE in draft on July 31, 2017 (Exponent 2017). Pre-RAD sampling and analysis conducted at 91 properties in 2016 was used as a basis to guide development of the RAD Plan. This SMP has been prepared as required by KDHE in the SACO, in follow-up to the RAD Plan.

1.4 Parties Conducting Disturbance Activities

Parties who may conduct disturbance activities under this SMP include the City, City franchisees’ workers, and contractors thereof, property owners, and others (e.g., residents, lessees, landscaping contractors). The City or its designated franchisees (e.g., companies responsible for natural gas, sewer, electric, phone, cable, fiber optic, etc.) or contractors will conduct remediation in ROWs on an as-needed basis in conjunction with other projects (e.g., construction, installation, and operation and maintenance activities unrelated to the remediation). In addition, smelter residue may be encountered on City-owned and private property in the future in areas not previously identified or as a result of disturbance activities.

This plan also addresses certain SRM management protocols for remediation contractors implementing the RAD Plan, namely SRM transport and disposal. All Site remediation must meet requirements in the RAD Plan (Exponent 2017).

1.5 Report Organization

The remainder of this SMP is organized as follows:

- **Section 2**—Site Description and Background. Provides a Site description and background of the Site, including the former smelter property.
- **Section 3**—Disturbance Activities. Summarizes disturbance activities covered in this SMP.
- **Section 4**—Nature of Contamination. Discusses the nature of contamination that may be encountered during disturbance activities. Includes descriptions and photographs of the most common types of SRM that have been observed across the Site to aid in field identification.
- **Section 5**—Soil and Waste Management Procedures. Presents procedures to follow before, during, and after disturbance activities.
- **Section 6**—Health and Safety. Addresses health and safety protocols for contractors and workers conducting remediation detailed in the RAD Plan.
and provides precautions for property owners and others to prevent direct contact with SRM.

- **Section 7**—References.
2 Site Description and Background

This section presents a general Site description and background. More detailed Site information is provided in the RSE Work Plan (Exponent 2014b), Phase 2 RSE Report (Exponent 2016a), and RAD Plan (Exponent 2017).

2.1 Site Description

The Site is located in Montgomery County, Kansas (Figure 1). The former smelter property adjoins the Site in the northwest part of the City (Figure 1). The approximately 360-acre former smelter property is east of U.S. Highway 169 and bounded on three sides by County Roads 5200 and 5500 to the north and east and Martin Street (County Road 5050) to the south. The former smelter property is bounded on the north and west by rural lands, on the south by residential properties and by the former Rodeo Grounds (now used for both residential and commercial/industrial), and on the east by commercial/industrial properties.

The overall area is generally flat, with approximately 30 feet (ft) of relief across the former smelter property. The former smelter property drains to the west via an unnamed intermittent stream that enters Drum Creek 0.75 miles west of the former smelter property. Undisturbed soils at the Site are Kenoma series soils, which are generally deep, moderately well drained, very slowly permeable soils on uplands of 0–2% slope. The average depth of Kenoma soils is 60 inches (in.) or greater.

The climate in Montgomery County, Kansas, is continental, typically warm to hot in the summers (average at 79°F), and cold in the winters (average at 37°F). Most precipitation occurs in spring and early summer, with average annual precipitation of 36.95 in. per year. The prevailing winds in Montgomery County are generally from the south, with an average annual speed of 11 miles per hour.

2.2 Site Background

The town site of Cherryvale was plotted in 1871 by the Leavenworth, Lawrence & Galveston Railway and incorporated in 1880. The Edgar Zinc Company facility was built in 1898 on 40 acres northwest of town. After World War I, zinc demand dropped, and by 1921, the Edgar Zinc Company in Cherryvale was one of only two remaining zinc smelters operating in Kansas, and managed to continue operations for another 10 years. Sometime after 1928, the Edgar Zinc Company was reorganized as the National Zinc Company. The Cherryvale plant continued operating on a small scale, reprocessing smelter wastes, until 1976 (Junge and Bean 2006).

In the 1970s, the National Zinc Company conducted response actions at the former zinc smelter property. They closed the former settling ponds that had been affected by runoff from slag and roasted ore, and they encapsulated materials in a former lagoon area located on the western portion of the property (KDHE 2013a). After a restrictive covenant was issued on the property in 1989, the City of Cherryvale acquired the property. The Respondents completed remediation of the smelter facility property in 2007 (KDHE 2016a). They also removed impacted sediments
from a nearby unnamed creek and Drum Creek and installed a sediment catchment basin in Drum Creek (KDHE 2016a). The remedy installed at the former smelter property is currently in the operation and maintenance phase by the City.

Solid waste consisting of furnace cinders, broken clay cylinder retorts, and metallic slag created during the smelting process (referred to at this Site as smelter residue material or SRM) has historically been used as fill material at various locations throughout the Site. Investigation of the former smelter property and SRM at the Site has been summarized in various documents, including the Phase 1 and Phase 2 RSE reports (Exponent 2014a, 2016a; PNL 2014), and the RAD plan (Exponent 2017). A summary of relevant studies and removal actions conducted at the former smelter property and the Site is presented in Table 1.
3 Disturbance Activities

The Site is covered with soil, gravel, landscaping, and features (e.g., buildings, driveways, and brick walkways) which act as a barrier preventing contact with SRM. Subsurface activities that remove this cover have the potential to disturb these materials. The following types of disturbance activities are contemplated in this Plan:

- **Public Properties and ROWs.** Remediation conducted by the City, City franchisees, or contractors thereof, in public properties and ROWs on an as-needed basis when SRM is encountered as required in the RAD Plan (Exponent 2017), including:
  - Streets
  - Ditches
  - Brick walkways
  - Alleys

- **Parks.** Future cover disturbance in parks when SRM is known or suspected to be present following implementation of the remedy, including:
  - Driveways (soil, stone)
  - Brick walkways

- **Private Properties.** Removal or cover of SRM that was not visible and previously removed in prior actions. Also, future cover disturbance on residential and commercial/industrial properties when SRM is known or suspected to be present below the surface following implementation of the remedy, including:
  - Driveways
  - Brick walkways
  - Yards
  - Drip lines

- **Remediated Areas with Residual SRM.** Future cover disturbance in previously remediated Site areas (e.g., yards and parks), where residual SRM remains beneath orange demarcation material placed as a warning.

This plan also addresses certain SRM management protocols for remediation contractors implementing the RAD Plan, namely SRM transport and disposal. All Site remediation must meet requirements in the RAD Plan (Exponent 2017).
4 Nature of Contamination

SRM from historical smelter operations is the source of Site impacts. Small-scale reprocessing of smelter wastes at the former smelter permanently ceased operations in 1976, and remediation of the smelter facility property was completed in 2007 (KDHE 2016a). Contaminants in soils from air deposition have been previously remediated. However, solid waste consisting of furnace cinders, broken clay cylinder retorts, and metallic slag created during the smelting process (referred to at this Site as SRM) has historically been used as fill material at various locations throughout the Site. Numerous investigations have been conducted to evaluate the nature and extent of SRM at the Site and these reports (e.g., Exponent 2014a, 2016a; PNL 2014) are available from the KDHE website1 or by request from KDHE or the City.

Lead in SRM and soil is the primary driver for the Site. Other contaminants include arsenic, cadmium, and zinc. Previous Site investigations have demonstrated that remediation of lead in soil to KDHE’s risk-based standards (Tier 2 Risk-Based Standards for Kansas [RSK]; KDHE 2015) addresses exceedances of the other few chemicals of concern at the Site. KDHE’s RSK for lead include a residential soil screening value (SSV) of 400 milligrams per kilogram (mg/kg) and a non-residential (i.e., commercial and industrial) SSV of 1,000 mg/kg. This SMP has been prepared to present procedures for handling SRM above SSVs. The routes of potential exposure during SRM handling include dermal contact and incidental ingestion and inhalation of particulates (dust).

Past investigations have shown that areas with visible SRM can exceed the SSVs. Therefore, visual identification of this material will be used as a guide for all parties and work conducted under this SMP, except for remediation conducted by the Respondents (whose contractors will use direct soil analyses). If material is visually identified as SRM or soil containing SRM, the soil and waste management protocols in this SMP must be implemented. This does not include areas where SRM has already been tested. To aid users of this SMP in making visual identifications, a description of the appearance of SRM commonly encountered across the Site is provided below along with photographs provided in Figure 2.

4.1 Identified Smelter Residue Material

Various types of SRM have been observed on the former smelter property and Site-wide. SRM was used over the decades by the City as a base for some roads and walkways, as gravel for some alleys, and as riprap for some ditches. Property owners also reportedly used this material as fill and/or gravel around some building foundations or for certain driveways and parking areas. The material consists of granular slag or cinder waste, which can be present ranging from sand-size to gravel-size. Other common SRM is crushed retort. Larger pieces of hard slag are also observed in fill locations throughout the City. The most common types of SRM that have been observed across the Site are described below and shown on Figure 2.

1 http://www.kdheks.gov/remedial/site_remediation/national_zinc.html
4.1.1 Slag and Retort Fragments

These are gravel- to larger-size fragments that are typically black, gray, red, or purple, and often display hard, black, glassy crust with air bubbles on one or more surfaces (Figure 2, Photo A). The fragments may have a curved, flat, or blocky appearance with white or gray inclusions. They may appear fused, baked, burned, or rusty. These fragments have been observed in ditches, alleys, under roads, and in isolated areas. They can be found with brick, glass, wood, or metal debris and have sometimes been used as construction fill. They can be distinguished from local lime rock, shale, and sandstone by dark color, glassy crust, and irregular appearance.

4.1.2 Granular Slag

Granular slag is sand- to gravel-sized material that is black to red (Figure 2, Photo B). The particles may appear rounded or angular and look like cinders but are harder. They are typically hard and glassy with small air bubbles and white inclusions. However, they can be softer where weathered. Granular slag may have been used as a gravel surrogate in driveways, alleys, parking areas, and building foundations. It was also used as a base for brick walkways (Figure 2, Photo C) and probably paved or brick streets. SRM used as base for brick is typically gray-to-black colored ashy material with fines (finely crushed gray or black powdery or ashy looking material), and commonly has a charcoal-like appearance. SRM can be distinguished from common gravel by its dark color, ashy and/or hard glassy appearance with air bubbles. Grass in areas where granular slag is present may be thin or patchy.

4.1.3 Isolated Slag Fragments

This category refers to occurrences of isolated slag fragments (Figure 2, Photo D) that do not occur as a large collection, as in the “Slag and Retort Fragments” category. These are broken fragments with hard, black, glassy crusts, sometimes with air bubbles on one or more surfaces. They have a curved, flat, or blocky appearance and are up to several inches in size. They may contain hard white or gray inclusions and have the appearance similar to ceramic or fire brick. On fresh surfaces, the color is tan, gray, purple, or reddish. Isolated slag fragments have been observed in ditches, along alleys, under roads, and in isolated areas used as construction fill. The fragments can be distinguished from local lime rock, shale, and sandstone by their dark color, glassy crust, and irregular appearance.
5 Soil and Waste Management Procedures

This section presents soil and waste management procedures that will be implemented in the future when the Site cover is disturbed. Substantive deviations from this KDHE-approved SMP must be clearly proposed and pre-approved by KDHE before implementation.

5.1 Consistency with Institutional Controls

Soil and waste management procedures must be consistent with the ICs discussed in the RAD Plan (Exponent 2017) and detailed in a separate IC Plan. This IC Plan will include guidelines for appropriate controls for Site features (e.g., streets, alleys, ditches, brick walkways, driveways, etc.) to minimize SRM exposures. As part of this IC Plan, the City will adopt revisions to the following City Ordinances requiring ICs for certain activities:

- Chapter XIII, Article 2, Section 13-201 (amended), “Excavation Permit”
- Chapter XV, Article 2, Section 15-214 (amended), Subsection (a), “Excavation”
- Chapter XV, Article 5, Section 15-213 (amended), “Excavation”
- Chapter VIII, Article 9 (new), “Miscellaneous”
  - Section 8-901 (new), “Excavating in or under sidewalks and driveways on private property”
  - Section 8-902 (new), “Excavating in or under abandoned railroad right-of-way”
  - Section 8-903 (new), “Excavating below orange marker fabric”
  - Section 8-904 (new), “Excavation on private property”
  - Section 8-905 (new), “Collection and Disposal of Smelter Residue Material Found on the Surface of Private Property”

This SMP is consistent with ICs established by the City in its revised Ordinances.

5.2 Procedures for Pre-Disturbance Activities

Before handling SRM, preparatory activities must be completed as discussed below.

5.2.1 Required Notifications

Required notifications are summarized below for all parties who may conduct work under this SMP. Notifications will include a description of the planned work, contact information for persons responsible for the work, the location of disturbance activities, and the work schedule.
Notifications may also include dimensions of planned disturbance (depth, size, and volume of material disturbed) and other pertinent information.

**Remediation Contractors**

The contractors conducting remediation under the RAD Plan (Exponent 2017) with KDHE oversight will establish notification and reporting protocols separately with KDHE. This will likely include overall project notification using the KDHE online form available at: http://www.kdheks.gov/remedial/fieldactivities_notification.html. Remediation contractors will also make notifications required by local, state, and federal regulations, including utility clearance (natural gas, sewer, electric, phone, cable, fiber optic, etc.) and notifications required in Access Agreements for remediation on City-owned (February 5, 2007) and private property. Notification of the intended work will be provided to property owners in accordance with established Access Agreements.

Before implementing the remedy, the remediation contractors will meet with the City to discuss the nature of the work and notification and permitting requirements for the entire project and individual properties. Remedial action activities will be coordinated with the City’s Department of Public Works as needed “to maintain smooth traffic flow and vehicular and pedestrian safety in City work areas” (Cherryvale 2007).

Remediation contractors must request a utility clearance through “Kansas One-Call” before work begins, at which time the City will be made aware of work at specific locations. Property owners (or residents) will be consulted about the location and presence of utilities on their properties. Utilities must be located and marked in the work areas before any excavation. If work is to be conducted within 15 feet of a railroad ROW or natural gas line, then remediation contractors will separately notify these entities.

**The City and City Franchisees**

The City, City franchisees, and contractors thereof will notify KDHE before beginning their work using the KDHE online form shown on Figure 3 and available electronically at: http://www.kdheks.gov/remedial/fieldactivities_notification.html. In addition, they will notify the City Clerk, since even though they will not be required to obtain a permit from the City, they will be subject to the requirements of Sections 5.3, 5.4 and 6 of this SMP. Further, the City may consult with its departments and/or with KDHE as needed to discuss its work protocols or work proposed by others (e.g., property owners and others applying for an Excavation Permit).

The City, City franchisees, and contractors thereof are responsible for making any notifications required by other local, state, and federal regulations.

**Property Owners and Others**

Property owners and others (e.g., residents, lessees, landscaping contractors) must notify the City before starting work when a project may involve an activity that requires a permit from the City under any of the Ordinances listed in Section 5.1 of this SMP. This notification will be completed through an Excavation Permit application shown on Figure 4.
It is recommended that permit applications are made early in the project preparation phase to minimize delays. The current City contact for Excavation Permit applications and notifications is:

**City Clerk**
Karen Davis *(or subsequent party appointed by Mayor)*
The City of Cherryvale
123 West Main Street
Cherryvale, Kansas  67335
(620) 336-2776
email:  kseifert@cherryvaleusa.com *(or email for subsequent party appointed by Mayor)*

The City will review the scope of work, and, if approved, issue an “Excavation Permit” in accordance with the amended and new City Ordinances listed in Section 5.1 of this SMP.

If SRM is encountered unexpectedly, property owners and others must notify the City afterwards as required in the following Ordinances: Chapter VIII, Article 9, 8-904, and when requesting use of a plastic bin or bins from the City, in accordance with Chapter VIII, Article 9, Section 8-905.

Property owners and others are responsible for making any notifications required by local, state, or federal regulations, including utility clearance.

**KDHE**

The remediation contractor will work under KDHE oversight, and the City will consult with KDHE as needed. KDHE is also available as a resource for property owners and others with questions about subsurface work with the potential to encounter SRM at the Site. KDHE must pre-approve any substantive deviations from this KDHE-approved SMP before implementation.

This will require submission of a clear proposal describing the planned work and reasons for the deviation(s) from this approved SMP.

The current KDHE contact for notification is:

**KDHE Site Manager**
Pamela Green *(or subsequent party designated by KDHE)*
Bureau of Environmental Remediation
Kansas Department of Health & Environment
1000 SW Jackson Street, Suite 410
Topeka, Kansas  66612-1367
(785) 296-1935
email:  Pamela.Green@ks.gov *(or email for subsequent party designated by KDHE)*

### 5.2.2 Permits and Approvals

The party conducting work is responsible for identifying and obtaining all necessary and applicable local, state, and federal permits and approvals before conducting work. Permitting
and approvals for remediation contractors and workers are discussed in the RAD Plan (Exponent 2017) and in Section 5.2.1.

The City will issue an Excavation Permit for excavation in areas of known or suspected SRM occurrence, except for work conducted by remediation contractors under the RAD Plan (Exponent 2017) or by the City, City franchisees, or contractors thereof. However, the City, City franchisees, and their contractors, must comply with requirements of Sections 5.3, 5.4, and 6 hereof. The permit will serve as the City’s approval and will include conditions that the permit holder must abide by. These conditions may include traffic control, stormwater pollution prevention controls and permitting, maintaining clean roadways, and other requirements as set out in Sections 5.3, 5.4, and 6 of this SMP. Any work that deviates substantively from this KDHE-approved SMP requires pre-approval by KDHE following submission of a proposal as discussed above.

5.3 Procedures for Disturbance Activities

Soil and waste management procedures that must be employed during disturbance of the Site cover and SRM are discussed in this section.

5.3.1 Contaminated Media Management

Contaminated media will be managed in accordance with this SMP and as required by appropriate regulations, including the revised City Ordinances discussed in Section 5.1, which may include an Excavation Permit with conditions issued by the City. In addition, contractors completing initial Site remediation and City and City franchisees’ workers, including contractors thereof, managing SRM in public ROWs will also conduct work in accordance with the RAD Plan (Exponent 2017). Contaminated media may be encountered in areas of known SRM occurrence (e.g., beneath orange demarcation fabric placed during remediation), in areas of suspected SRM occurrence (e.g., beneath brick walkways and driveways), and may be encountered unexpectedly and visually identified as SRM, including soils containing SRM. Visual identification is discussed in Section 4.1, including photographs to aid in making this determination.

The following general procedures must be considered, and followed as applicable, when handling contaminated media:

- Before disturbance activities that require SRM management, ensure all applicable pre-disturbance activities have been completed. This includes, but is not limited to, making notifications, obtaining necessary permits and approvals, and locating and marking all utilities. It is important to identify sensitive areas, if any, before field work to avoid delays related to additional planning and requirements. These sensitive areas may include work within 15 feet of a railroad line or natural gas line, requiring additional notifications to these franchisees, work near or potentially affecting stormwater drainages, or other areas. Pre-work site visits may be required or necessary to visually inspect the work area, meet with stakeholders, and coordinate work (e.g., utility clearances).
- Restrict the work area as needed to prevent entry by the public in areas of exposed SRM. This may include placement of barricades and/or traffic control as deemed necessary or as required by revised City Ordinances.

- Manage all SRM, including soils containing SRM, removed from the Site in a manner consistent with the RAD Plan (Exponent 2017), and the revised City Ordinances. If SRM is known or suspected to be present, the City requires an Excavation Permit to conduct excavation work for all parties except remediation contractors, City and City franchisees’ workers, and contractors thereof. For SRM that is unexpectedly encountered in an excavation on private property, City Ordinances require the following soil and waste management procedures, which will be similar to the procedures required in an approved Excavation Permit:

  - Segregate and set aside SRM and/or soils containing SRM.

  - Upon completion of the excavation, take the following actions:

    1. Place SRM in the bottom of the excavation at least 12 in. below ground surface, except in gardens or play areas, where SRM must be placed at least 24 in. below ground surface.

    2. Obtain free orange marker fabric from the City and place on top of SRM.

    3. Backfill the excavation with clean soil that does not contain any SRM.

    4. Notify the City Clerk in writing within 30 days of the orange fabric placement, including the approximate location and date it was placed.

    5. Alternatively, arrange for transportation of SRM to a disposal location approved by KDHE and designated by the City. The person arranging for the hauling shall notify the City Clerk in writing within 30 days of the disposal, the date and approximate volume thereof.

- Excavated SRM and soil containing SRM should be placed directly into a container and sealed, or loaded directly onto trucks with plastic liners and covered for hauling to the KDHE-approved waste disposal location. Protect the loading area to ensure SRM does not spill onto clean surfaces during loading (e.g., load over plastic sheeting).

- All work areas exposing SRM must be restored as discussed in Section 5.4.1.

- If orange demarcation fabric is disturbed, removed or displaced, it shall be replaced using fabric available free of charge from the City and placed where the original material was located in accordance with revised City Ordinances.
- Remove SRM and soil containing SRM from reusable equipment (e.g., dry brushing) before re-use, and dispose of this residual with the excavated SRM waste.

- SRM can be placed at the bottom of a completed excavation in accordance with the procedures noted above, and specified in revised City Ordinances, or can be disposed of at the location approved by KDHE for Site-specific SRM waste. SRM and soils containing SRM cannot be reused in any other manner and cannot be disposed of or moved to another location without the approval of KDHE.

The focus of this SMP is to prevent exposure to SRM at the Site; soil and waste management procedures that do not relate to this issue have not been comprehensively identified and discussed herein. Therefore, in addition to the precautions and procedures identified in this SMP, general safety procedures and precautions should also be followed, such as excavation safety guidelines (shoring, confined space entry, etc.).

Soil and waste management protocols for the disposal location, including stockpile management, will be prepared under separate cover and are referenced in Section 5.3.3 below.

### 5.3.2 Environmental Protection

Engineering controls should be identified and implemented, as appropriate, to protect the environment and reduce exposure to SRM during management of these materials. This includes, but is not limited to, the following:

- Minimize soil excavations and areas of vegetation removal.

- Contain and control all SRM and soils containing SRM in a manner that minimizes or prevents dust formation and erosion (e.g., containerize with a sealed lid, load into a lined and covered truck, or, if temporarily stockpiling, cover with clean soil, plastic, blankets, or similar materials that are secured in place).

- Suppress/control dust during excavation, which may include spraying water onto the ground during work.

- Wear appropriate personal protective equipment (PPE) during handling and management as discussed in Section 6. This includes disposable gloves to prevent contact at all times when handling SRM and soils containing SRM, a dust mask during dry and windy conditions, and other equipment. Remediation contractors and workers conducting ongoing excavation work may need to employ monitoring in the work area.

- Employ appropriate best management practices (BMPs) to avoid stormwater pollution. A stormwater permit may be required; the party conducting work is responsible for identifying and obtaining all required permits. In general, take precautions to avoid 1) water accumulation in excavations, 2) disturbances of drainages (e.g., clogging), and 3) degradation of water quality (exposure to
SRM). BMPs should be used if deemed necessary, and, as allowed or required by law, may include diversion ditches, dikes, silt fences, settling ponds, or other features.

5.3.3 Transport

Remediation contractors and City and City franchisees’ workers, as well as the contractors thereof, will transport SRM and impacted soil to the disposal location discussed below. The following general procedures must be considered, and followed as applicable, when transporting Site wastes:

- The transporter is responsible for identifying and following all local, state and federal requirements for waste transport (e.g., U.S. Environmental Protection Agency [EPA] and Department of Transportation [DOT] regulations, etc.).
- Cover all waste to prevent spillage during transport. Close and seal containers for materials collected pursuant to City Ordinance Chapter VIII, Article 9, Section 8-905. Line trucks and trailers and properly cover in accordance with all applicable DOT regulations. Ensure no liquid is allowed to drain during transport (e.g., from dewatering of wet SRM or soil).
- Ensure SRM is not tracked outside the excavation area. Remove loose SRM-impacted debris from truck body and tires by dry brushing before transport.
- Minimize the number of vehicles used for waste loading and transport.
- Follow transportation routes that minimize, to the extent possible, driving in residential areas and areas where daycares and schools are located.
- Utilize street sweeping and washing as necessary to prevent dusting and/or tracking of SRM on streets.

Per the revised City Ordinances, the City will provide property owners with special bins—if requested—for these waste materials removed from the surfaces of individual properties. The City will pick up these bins and transport wastes to the disposal location discussed below. There may also be a provision by the City for property owners and others to drop off containerized Site waste at a central disposal location. If allowed, the City will issue any special transport procedures in addition to those provided in this SMP.

5.3.4 Disposal Location

During the remediation program, SRM and impacted soil must be disposed of at a location approved by KDHE. This location will also be designated by the City for disposal of Site SRM and soils containing SRM removed in accordance with the City Ordinances discussed in Section 5.1. This includes SRM collected from the surface of private property and containerized in special bins provided by the City that will be picked up by the City, SRM removed from public and private properties during excavation activities, and SRM collected by City Department of
Public Works field crews from time to time from the surface (bottom and sidewalls) of ditches along City streets.

The disposal location will likely be the current EPA repository on the former smelter property, an expansion of this current EPA repository, a new repository built on the former smelter property, or an alternative permitted facility. Work is underway to design and obtain approval for the disposal location(s), and an appropriate design plan will be submitted to KDHE for approval. The KDHE-approved disposal location will be communicated to the public and will be designated by the City in Excavation Permits issued under its revised Ordinances.

If wastes are disposed of at the former smelter property EPA repository (including an expansion of the current cell or a new location on the former smelter property), this disposal will be conducted in accordance with the disposal site design plan, with any Stockpile Management Plan, Stormwater Management permits, and/or other existing and/or updated or new permits that may be required (PNL 2013, PNL 2015, KDHE 2016b).

5.4 Procedures for Post-Disturbance Activities

Following disturbance, the Site cover must be restored, and inspections and surveys may be conducted. These post-disturbance activities are discussed below, along with recordkeeping and follow-up reporting.

5.4.1 Restoration

Following disturbance of the Site cover and SRM, work areas must be restored to prevent future exposure.

Remediation contractors, the City and City franchisees’ workers, and contractors thereof, must restore areas disturbed during remedy implementation to approximately pre-remedy conditions, as required by the RAD Plan. Driveways will be replaced with compacted gravel or pavement, if removed. Brick walkways will be replaced with concrete. Surfaces in the area of drip lines, typically soil or gravel, will be restored. Areas in parks will be restored by covering or filling with soil or gravel, depending on the use. Excavations will be filled with clean soil and lightly compacted to approximate pre-excavation elevations. For yards, topsoil will be replaced and the soil removal area will be revegetated with sod or reseeded with grasses. Fences, yard fixtures, play structures, and other items removed during the course of work will be put back. These general guidelines will also be used for future maintenance and other projects requiring disturbance and restoration in these areas. Public property (e.g., streets, sidewalks, and ROWs) shall be restored in a manner satisfactory to the City in accordance with revisions to City Ordinances.

Property owners and others who apply for a City Excavation Permit will follow restoration requirements specified in permit conditions and, if they unexpectedly encounter SRM, will follow restoration included in revisions to the City Ordinances. This may include placement of SRM if not disposed at 12 in. or lower below ground surface (24 in. for play areas and gardens), laying orange fabric on top of the SRM, and backfilling with clean soil that does not contain...
visible SRM. Restoration of walkways and driveways is the same as required for remediation contractors, the City, and City franchisees as discussed above.

5.4.2 Inspection and Survey

The City may conduct inspections as part of its Excavation Permit program. If KDHE approves disposal at the former smelter property, then routine inspections will also be conducted by operators as required in permits. Examples include disposal site cover inspections and inspections of stormwater pollution prevention measures required by a National Pollutant Discharge Elimination System (NPDES) permit for discharging stormwater runoff from construction activities.

The repository will be surveyed as required in an agreement with KDHE following submission of the disposal site design plan and supporting documents. The surveying must be conducted by a surveyor licensed in the State of Kansas and completed in accordance with regulatory requirements.

5.4.3 Records and Reporting

The City is the repository for property information and records, which can be accessed to identify properties where SRM has been encountered. The City will receive information via the Excavation Permit process for known or suspected areas of SRM occurrence and by required follow-up reporting for areas where SRM is unexpectedly encountered. The City will in turn, submit periodic reports to the KDHE Site Manager identified in Section 5.2.1, transmitting information received via the Excavation Permit process. These procedures are required for all parties except the remediation contractors working under KDHE oversight, and City and City franchisees’ workers, as well as contractors thereof. Even though they will not be required to obtain a permit from the City, they will promptly notify the City Clerk if SRM is encountered in any disturbance per revised City Ordinances. Remediation contractors will maintain records and complete reporting as required by KDHE. City and City franchisees’ workers, as well as contractors thereof, will keep records and report as required by KDHE and the City’s governance.
6 Health and Safety

Remediation contractors, City and City franchisees’ workers, and contractors thereof will follow health and safety requirements specified in the RAD Plan (Exponent 2017) and comply with all local, state, and federal health and safety requirements. This will include preparation of a health and safety plan, and, depending on the activity, may include training and personal monitoring during work activities. A detailed discussion of health and safety protocols for these contractors and workers conducting remedy implementation or maintaining ROWs following remedy implementation is provided in the RAD Plan (Exponent 2017).

Property owners and others (e.g., residents, lessees, landscaping contractors) will not be routinely managing SRM, and, therefore, have a much lower potential for exposure than remediation contractors and workers. They may encounter SRM during work on driveways, brick walkways, or in excavations at previously remediated areas (e.g., yards) with residual impacts at depth where orange demarcation material was placed during the remedy to serve as a warning. Work on these features requires City notification and an Excavation Permit (approval) from the City before conducting the work. Property owners and others may also encounter SRM on private property unexpectedly, in areas where SRM was not observed in past site inspections. In this case, follow-up written notification to the City is required. They may also occasionally encounter SRM on the surface of their property, and in such cases, if they request use of a plastic collection bin from the City, notice to the City will automatically occur when use of the bin is requested.

Revised City Ordinances allow property owners and others to place SRM encountered in an excavation at the bottom of the completed excavation in accordance with the procedures outlined in Section 5.3.1., or to pick up SRM found on the surface and containerize and properly dispose of it at the KDHE-approved disposal location(s). General precautions are summarized below for property owners and others who may encounter SRM. Each scenario will likely have unique considerations, and these parties must comply with all pertinent local, state, and federal requirements.

General Work Precautions

- Wear disposable gloves when picking up and containerizing SRM and soil containing SRM.
- Dispose of gloves immediately following use in a trash receptacle.
- Do not clean and reuse disposable gloves. Disposable equipment is not intended to be cleaned and reused.
- Avoid eating, drinking, and smoking when handling SRM and soil containing SRM.
- Dampen soils and SRM to limit dust formation in the work area.
- Avoid working on windy days when dust can be mobilized.
- Wear a mask if conditions are dusty, resulting in airborne particulates from SRM and soil containing SRM.
- Remove residual SRM from reusable equipment (e.g., shovel) by dry brushing, and reuse or dispose of the residual in the same manner as the removed SRM.
- Keep children and pets away from the work area when SRM is exposed.
- Wash hands thoroughly after removing and disposing of gloves.
- Wash work clothes that may have encountered SRM. Wash clothes in a separate, individual load. Do not mix with other laundry.
- Remove shoes after work is completed and before entering a residence or work place. Dry scrub and/or wash shoes to avoid tracking SRM into indoor spaces.
- Abide by City requirements to cover or otherwise restore work areas.
- Dispose of SRM and soil containing SRM only at a disposal location approved by KDHE and designated by the City for this specific waste.
- Contact KDHE or the City (see contacts in Section 5.2.1) with any questions or concerns regarding SRM handling.
7 References

Cherryvale. 2007. Access agreement and easement of Section 8, Township 32, Range 17, granted by the City of Cherryvale, Kansas to United States Steel Corporation and Salomon Smith Barney Holdings, Inc. City of Cherryvale, Cherryvale, KS.


KDHE. 2016b. Notice of Intent (NOI) For Authorization to Discharge Stormwater Runoff from Construction Activities In accordance with the Kansas Water Pollution Control General Permit Under the National Pollutant Discharge Elimination System (NPDES), KS Permit No. S-VE07-0011, Federal Permit No. KSR111980. Reviewed May 10, 2016.


Figures
Figure 1. Cherryvale city limits and boundary of former National Zinc Smelter property

Source: KDHE (2013), City limits boundary from http://kansasgis.org
Figure 2. Photographs of SRM encountered in the City of Cherryvale

A) Slag and retort fragments
B) Granular slag
C) Granular slag underlying brick sidewalk
D) Isolated slag fragments

Source: Mark Landress, PNL
Bureau of Environmental Remediation Field Activities Notification Form

This is a new notification

*Project Name: ________________________________
*KDHE Project Manager: -Select-  

Location of work:
*County: -Select-  
City (or nearest city): ________________________________

Anticipated dates and duration of work:
*Start Date (mm/dd/yy): ________________________________
*Duration of work (days): ________________________________
☐ Check this box if work is expected to occur on any weekend or holiday days.

Primary Field Contact:
*Name: ________________________________
*Affiliation/Company: ________________________________
*Primary Phone Number: ________________________________
Alternate Phone Number(s): ________________________________
Email Address: ________________________________

Alternate Contact:
*Name: ________________________________
*Affiliation/Company: ________________________________
*Primary Phone Number: ________________________________
Alternate Phone Number(s): ________________________________
Email Address: ________________________________

*Brief Description of Work to Be Performed
(Include persons, nature of activities, general location information, and anticipated schedule of activities):

Submit  Reset Form

If you have any problems using this form, please call 785-296-1673
* Indicates a required field.

Source:  http://kansas.kdhe.state.ks.us/plsISL/bow_adminl.fldnotif_edit

Figure 3. KDEH Field Activities Notification Form
<table>
<thead>
<tr>
<th>EXCAVATION PERMIT</th>
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</thead>
<tbody>
<tr>
<td>CITY OF CHERRYVALE, KANSAS</td>
</tr>
<tr>
<td>NO.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>OWNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOB ADDRESS</td>
</tr>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>MAILING ADDRESS</td>
</tr>
<tr>
<td>CITY</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>CONTRACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>ADDRESS</td>
</tr>
<tr>
<td>CITY</td>
</tr>
</tbody>
</table>

| 0 | NEW |
| 0 | ADD |
| 0 | ALTER |
| 0 | REPAIR |
| 0 | DEMOLISH |
| 0 | MOVE |

| PLOT PLAN (INDICATE BUILDING SETBACKS, ABUTTING STREET, ALLEY, ETC.) |

<table>
<thead>
<tr>
<th>SIGNATURE OF APPLICANT</th>
<th>DATE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>APPROVED BY</th>
<th>DATE</th>
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</thead>
</table>

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<tr>
<th>CITY CLERK</th>
</tr>
</thead>
</table>

Figure 4. City of Cherryvale Excavation Permit Application
Table
Table 1. Summary of investigations and removal actions

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Location</th>
<th>Entity Performing Work</th>
<th>Item</th>
<th>Action/Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976–1983</td>
<td>Former Smelter Property</td>
<td>National Zinc Company</td>
<td>In 1976, KDHE identified heavy metals in sludge and liquid waste in the former smelter settling ponds.</td>
<td>Cleanup, including treatment and dewatering of approximately 95 million gallons of liquid from the settling ponds, removing ore and sludge from the former facility, and encapsulating approximately 300 tons of remaining ore and sludge in a former lagoon area onsite. Former smelter property considered “remediated” in 1983 with a restrictive covenant on its future use.</td>
</tr>
<tr>
<td>1995-1999</td>
<td>Former Smelter Property</td>
<td>KDHE</td>
<td>In 1995, KDHE determined that prior encapsulation efforts had failed, and significant concentrations of heavy metals were present in sludge, soil, and sediment.</td>
<td>In 1999, approximately 659 in situ soil samples were screened with XRF, and 19 samples were collected to evaluate the leachability of lead and cadmium using the TCLP. Groundwater, surface water, and sediment samples were also collected.</td>
</tr>
<tr>
<td>2003-2007</td>
<td>Former Smelter Property</td>
<td>Respondents</td>
<td>The Respondents investigated the smelter property further.</td>
<td>In 2007, soils and sediments at the former smelter property with heavy metal concentrations above commercial/industrial standards were excavated, consolidated, and capped onsite. Visibly affected sediments from segments of a nearby unnamed creek and Drum Creek were also excavated. A sediment catchment basin was installed downstream in Drum Creek.</td>
</tr>
<tr>
<td>2001</td>
<td>Residential Yards</td>
<td>KDHE</td>
<td>KDHE conducted an RSE.</td>
<td>Samples were collected in 11 residential yards, in adjacent alleys and ROWs, and likely in roadside ditches or sidewalks. TCLP results indicated that the soils would not be considered hazardous waste when excavated.</td>
</tr>
<tr>
<td>2001</td>
<td>Residential Yards</td>
<td>KDHE</td>
<td>KDHE conducted a Phase 2 RSE.</td>
<td>Additional residential yards sampled. The survey area was expanded beyond the previous RSE area to the south and east.</td>
</tr>
<tr>
<td>2001-2002</td>
<td>Residential Yards</td>
<td>EPA</td>
<td>EPA conducted a Time-Critical Removal Action.</td>
<td>35 of 67 residential properties were flagged as having some excavation, but excavation did not include alleys or ROWs.</td>
</tr>
<tr>
<td>2011</td>
<td>Residential Yards</td>
<td>Respondents</td>
<td>KDHE notified the Respondents regarding slag fragments observed at residential properties.</td>
<td>8 residential properties sampled.</td>
</tr>
<tr>
<td>2012</td>
<td>Residential Yards</td>
<td>Respondents</td>
<td>The Respondents conducted a Removal Action.</td>
<td>Soils removed from the 8 residential properties sampled.</td>
</tr>
<tr>
<td>2012</td>
<td>Residential Yards and City properties</td>
<td>KDHE</td>
<td>Residents reported slag on or near their properties.</td>
<td>KDHE inspected soils in various parts of town, including some city streets, parks, schools, and preschools, and collected samples at or near these sites.</td>
</tr>
<tr>
<td>2013</td>
<td>Residential Yards and City properties</td>
<td>Respondents</td>
<td>The Respondents conducted a Phase 1 RSE.</td>
<td>The Respondents’ contractor collected soil samples at select locations in Cherryvale for evaluation of the bioavailability of lead and arsenic.</td>
</tr>
</tbody>
</table>

Page 1 of 2
<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Location</th>
<th>Entity Performing Work</th>
<th>Item</th>
<th>Action/Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Residents of Montgomery County</td>
<td>KDHE</td>
<td>KDHE’s Kansas Healthy Homes and Lead Hazard Prevention Program, in partnership with the Bureau of Epidemiology and Public Health Informatics, Bureau of Environmental Remediation, the City of Cherryvale, and the Montgomery County Health Department, held a free county-wide blood lead screening clinic.</td>
<td>47 children were screened, of whom 2 had blood lead levels at or above the level (10 µg/dL) recommended for case management by a health-care professional. 85 adults were screened, of whom 0 (zero) had blood lead levels at or above the level (25 µg/dL) recommended for case management by a health-care professional.</td>
</tr>
<tr>
<td>2014</td>
<td>Schools</td>
<td>Respondents</td>
<td>The Respondents sampled schools as part of an early Phase 2 RSE.</td>
<td>Soil samples were collected from three schools, the former McKinley School, Lincoln Elementary School, and Cherryvale Middle/High School. Trace amounts of SRM were observed at each school location. Only one sample exceeded the residential SSV, and that was in an isolated location at the former McKinley School, which is not currently used by the City.</td>
</tr>
<tr>
<td>2014</td>
<td>City-Wide</td>
<td>Respondents</td>
<td>The Respondents conducted soil sampling as part of the Phase 2 RSE.</td>
<td>SRM class verification sampling performed on residential yards, daycares, parks, City ditches, City alleys, commercial/industrial properties, and parks.</td>
</tr>
<tr>
<td>2015</td>
<td>Parks</td>
<td>Respondents</td>
<td>The Respondents conducted an Early Action Removal.</td>
<td>Removal actions were performed at one park property, and an isolated area of exposed brick next to the Logan Park gazebo.</td>
</tr>
<tr>
<td>2015</td>
<td>Daycares, Residential Yards</td>
<td>Respondents</td>
<td>The Respondents conducted an Early Action Removal.</td>
<td>Removal actions were performed at a small group of high-priority properties including five daycare facilities (housed at residences), and one owner-occupied single-family residence.</td>
</tr>
<tr>
<td>2015</td>
<td>City-Wide</td>
<td>Respondents</td>
<td>The Respondents conducted a Phase 2 RSE.</td>
<td>City-wide SRM visual survey was completed on properties and public ditches, walkways, and alley ROWs within the City limits of Cherryvale. During the City-wide survey, 1,113 properties were evaluated.</td>
</tr>
<tr>
<td>2016</td>
<td>City-Wide</td>
<td>Respondents</td>
<td>The Respondents collected soil samples as part of a Pre-RAD Sampling Program.</td>
<td>Soil sampling was completed for 87 yards, 54 drip lines, 30 driveways, and 18 walkways in an effort to provide better information regarding the number of properties that require remediation and for development of the RAD Plan.</td>
</tr>
</tbody>
</table>

Notes:
- EPA - U.S. Environmental Protection Agency
- KDHE - Kansas Department of Health and Environment
- RAD - removal action design
- ROW - right-of-way
- RSE - removal site evaluation
- SRM - smelter residue material
- SSV - soil screening value
- TCLP - toxicity characteristic leaching procedure
- µg/dL - micrograms per deciliter
- XRF - x-ray fluorescence