

FIVE-YEAR REVIEW REPORT  
FIRST FIVE-YEAR REVIEW REPORT

FOR

JACOBS SMELTER SUPERFUND SITE  
STOCKTON, UTAH

September 2005

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For:

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## **EXECUTIVE SUMMARY**

The Utah Department of Environmental Quality, Division of Environmental Response and Remediation, in cooperation with EPA Region 8 has conducted the first five-year review of the remedial actions implemented at the Jacobs Smelter Superfund Site located in Stockton, Utah.

The Jacobs Smelter Superfund Site is divided into three operable Units. Operable Unit 1 (OU1) consists of residential properties within the Town of Stockton that had contamination attributable to the former Jacobs Smelter. Operable Unit 2 (OU2) consists of lead and arsenic contaminated soil outside of the Town of Stockton (attributable to the Waterman, Chicago and Carson Buzzo Smelters), ground water, and ecological impacts. Operable unit 3 (OU3) consists of contaminated soil located on the Stockton Rail yard owned by Union Pacific. In addition to the three operable units, a subdivision outside of the town limits of Stockton known as the Rawhide Ranchettes was cleaned up by the property developer under an Administrative Order on Consent.

The review was conducted from July through September 2005. The results of the five-year review indicate that the cleanup performed on OU1, OU3 and the Rawhide Ranchettes is expected to remain protective of human health and the environment, and all immediate threats associated with these areas of the Site have been addressed. Institutional controls to address excavation and development within OU1 have been prepared and adopted by the Town of Stockton as an ordinance. However, recent evaluation of Stockton's ordinance found that it is difficult to understand, and does not accurately reflect the post cleanup status of OU1. Contamination associated with OU2 has not been addressed at this time and continues to pose a threat to human health and the environment.

**FIVE-YEAR REVIEW SUMMARY FORM**

SITE IDENTIFICATION		
Site name (from WasteLAN): Jacobs Smelter		
EPA ID (from WasteLAN): UT0002391472		
Region: 8	State: UT	City/County: Stockton/Tooele
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted		
Remediation status (choose all that apply): <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: March 2001 (OU1) August 2005 (OU3)	
Has Site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Reviewing agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other		
Author name: Thomas D. Daniels		
Author title: Environmental Engineer	Author affiliation: UDEQ/DERR	
Review period: July through September 2005		
Date(s) of Site inspection: September 7, 2005		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy ( <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-Sara <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input checked="" type="checkbox"/> Actual RA OnSite Construction at OU 1 <input type="checkbox"/> Actual RA Start at OU# ____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): 5/03/00		
Due date (five-years after triggering action date): 9/30/05		

## Five-Year Review Summary Form

### Deficiencies:

- The Town of Stockton's ordinance governing excavation and development within the Jacobs Smelter cleanup area is difficult to understand and enforce and does not accurately reflect the post cleanup status of OU1.
- OU2 has not been cleaned up at this time and the lead and arsenic contamination associated with the Waterman, Chicago, and Carson-Buzzo Smelters as well as lead and arsenic contamination on other surrounding properties poses a significant threat to human health and the environment.

### Recommendations and Follow-up Actions:

In consultation with the EPA the following actions are recommended:

- The Stockton Ordinance should be evaluated and rewritten to more accurately reflect post remedial conditions and to be more workable and easier to understand.
- The Remedial Action for OU2 should be performed to alleviate the threat to human health and the environment posed by the remaining lead and arsenic contamination.

### Protectiveness Statement(s):

The remedies performed on OU1, OU3 and the Rawhide Ranchettes subdivision are protective of human health and the environment. The immediate threats posed by the contamination associated with these operable units have been addressed. The excavation and off Site disposal of the top 18 inches of contaminated soil performed during the Emergency Removal and Remedial Action construction activities for OU1 have effectively eliminated the majority of the risk associated with the Jacobs Smelter. The risk associated with the contaminated soil remaining after excavation is effectively reduced by the 18 inches of clean fill and topsoil and the landscaping placed on each property. The cap, vegetative cover and fence installed on the Stockton Rail Yard provide an adequate barrier to exposure to contaminated soil in OU3. The removal action cleanup performed at the Rawhide Ranchettes subdivision has likewise reduced risk of exposure to human health and the environment. The threats to human health and the environment posed by OU2 have yet to be addressed.

# JACOBS SMELTER SUPERFUND SITE FIRST FIVE-YEAR REVIEW REPORT

## I. INTRODUCTION

The Utah Department of Environmental Quality (UDEQ), Division of Environmental Response and Remediation (DERR) has been tasked by the United States Environmental Protection Agency, Region 8 to conduct a five-year review of the remedial and removal actions implemented at the Jacobs Smelter Superfund Site located in and around the Town of Stockton in Tooele County, Utah. This review was conducted from July 2005 to September 2005. This report documents the results of the review. The purpose of the five-year review is to determine whether the remedy at the Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them. This report was prepared using EPA's Comprehensive Five-Year Review Guidance, EPA document number 540-R-01-007.

This review is required by statute. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) require that reviews be conducted every five-years to assure that the remedial action implemented remains protective of human health and the environment. CERCLA Section 121(c), as amended, states:

*If the President selects a remedial action that results in any hazardous substance, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than every five-years after the initiation of such remedial action being implemented.*

The NCP, Part 300.430(f)(4)(ii) of the code of Federal Regulations (CFR), states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five-years after the initiation of the selected remedial action.*

This is the first five-year review for the Jacobs Smelter Site. The triggering action for this review is the initiation of remedial action associated with Operable Unit 1 (OU1). Because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure, a five-year review is required.

## II. SITE CHRONOLOGY

- April 1864 Volunteer soldiers discovered silver ore east of the Town of Stockton and organized the first mining district. The area around the military reservation became the base for small-scale milling and smelting activities. The Town of Stockton was laid out in 1864 and contained over 400 residents by 1866.
- 1866-1868 Several small smelting furnaces were built in the area, operated for a short time with marginal results and then shut down. The exact locations of most of these smelters remain unknown.
- 1871-1886 The Waterman Smelting works was constructed on the north shore of Rush Lake about ½ mile west of Stockton and operated continuously until 1886. The smelter reportedly produced a total of approximately 3,300 tons of flue dust and nearly 15,000 tons of smelter slag.
- 1872 The Jacobs Smelter began operation within the limits of Stockton. The smelter processed ore from the Ophir Mining District, located 10 miles south of Stockton, in three vertical blast furnaces. By 1880, each of these furnaces could reduce 25 tons of ore per day producing 19.5 tons of smelter slag and flue dust per day.
- 1873-1880 The Chicago smelter opened in 1873 on the eastern shore of Rush Lake two miles south of Stockton. It was built by the Chicago Silver Mining Company, a British firm that also operated two nearby mines. The smelter operated sporadically through 1880. The Carson & Buzzo smelter was located about a ½ mile south of the Chicago smelter, also on the shore of Rush Lake. The production rate of these smelters is unknown.
- 1880-1995 At least nine smelting/milling operations are reported to have existed in the Stockton area, over the ensuing century. Nearly all traces of these operations have vanished. Buried timbers, stained soils, and some foundations are virtually all of the physical evidence that remains. Homes were built upon a portion of the former Jacobs Smelter location. Much of the slag produced was likely reprocessed in other smelters located in the Tooele Valley or the Salt Lake Valley. Through historical research and direct observation, the exact locations of the Jacobs, Waterman, Chicago and Carson & Buzzo Smelters have been found. The locations of other unnamed operations can only be speculated based upon sampling of soils to test for the presence of heavy metals.
- 1995 The Stockton Area was added to the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) under the name of “Stockton Smelters.”

- 1998 A Preliminary Assessment and Site Investigation (PA/SI) was completed and the name of the entire Site was changed to Jacobs Smelter. The Site was divided into three operable units. Operable Unit 1 (OU1) addressed the residential properties within the Town of Stockton. Operable Unit 2 (OU2) addressed the portion of the Site outside of the town boundaries. Operable Unit 3 (OU3) addressed the contaminated soil within the Union Pacific right-of-way.
- March 1999 An emergency response action was initiated to address soil contamination of residential properties located in Stockton.
- June 1999 A Remedial Investigation/Focused Feasibility Study (RI/FFS) for OU1 was completed. The RI/FFS identified approximately 125 residential properties within the Town of Stockton that required cleanup.
- April 1999 EPA notified Union Pacific of contamination on their right-of-way and requested a time critical removal be performed to address the contamination.
- Summer 1999 Contaminated soils in OU3 were remediated by Union Pacific. Soil cover was selected as the remedy.
- July 29, 1999 A Record of Decision (ROD) was issued for OU1.
- Feb 4, 2000 The entire Site is listed on the National Priorities List (NPL)
- May 2000 Lead and arsenic contamination identified in the Rawhide Ranchettes subdivision.
- May 5, 2000 Remedial Action for OU1 started.
- July 2000 A Contaminant Screening Study was performed for OU2.
- October 2000 Physical construction completed for OU1 Remedial Action.
- July 2001 A Pre-Remedial Investigation was performed for OU2.
- August 2001 A Non-Time-Critical-Removal-Action for five contaminated lots in the Rawhide Ranchettes subdivision was completed.
- Sep 2001 EPA conducted a land re-use assessment.
- July 2003 A Remedial Investigation (RI) was conducted and finalized for OU2.
- July 2004 A Revised Feasibility Study was conducted and finalized for OU2.

August 2004 A Proposed Plan was published for OU2.

### **III. BACKGROUND**

#### **Site Description**

The Jacobs Smelter Site is located in and around the Town of Stockton, Utah, approximately 25 miles southwest of Salt Lake City, Utah and five miles south of Tooele, Utah. Approximate Site boundaries are shown in Figure 1. The Site is bounded by the Stockton Bar (a gravel hill) to the north, Rush Lake to the west, and the Oquirrh Mountains to the east. The entire Site is referred to as “Jacobs Smelter,” after the name of a former smelting operation located in Stockton, Utah. Reports of up to nine former smelters with milling operations within the Site boundaries have been documented. The Jacobs Smelter was one of these historic smelters. The entire Superfund Site was named Jacobs Smelter as a matter of convenience.

The area around Stockton is generally open grassland and is used primarily for grazing. The topography of the area is gently sloping from east to west towards Rush Lake. Several single-family dwellings and farms exist in the area. The Town of Stockton is mostly residential, with only a few small businesses. Approximately 500 persons reside within a four-mile radius in and around Stockton. Due to its location near the town of Tooele, the area is prime for growth and residential development.

Rush Lake is the dominant surface water feature in the area. The lake is recharged primarily through ground water flow and several springs, which empty into the lake. Discharge from the lake is through evaporation and ground water loss to the north. Water levels in the lake have fluctuated greatly over the years, with the lake size changing drastically. In the summer of 2002, there was virtually no standing water. Soldier Creek flows west from the Oquirrh Mountains and serves as the source of drinking water for Stockton.

Ground water at the Site consists of a shallow aquifer that feeds into Rush Lake, perennial springs and a deep aquifer. The shallow aquifer in Rush Valley is of poor quality and is not anticipated to be used as a drinking water source. The deep aquifer lies at a depth of at least 200 feet and is used as a drinking water source for private residences. There is no evidence that the shallow and deep aquifers are hydraulically connected.

The risks posed by the Site derive from smelting and mining activity, which occurred primarily in the 1860’s and 1870’s. Wastes in the form of heavy metal contaminated soil; mill tailings and smelter wastes are known to exist at several locations within the Site boundaries. The primary contaminants are lead and arsenic. Little visible evidence exists of the former smelting operations.

There are three operable units associated with the Site. Operable Unit One (OU1) addresses residential soil contamination within the Town of Stockton, attributable

primarily to the former Jacobs Smelter. Operable Unit Two (OU2) addresses soil and sediment contamination outside of the Town of Stockton (attributable to the other smelter operations), ground water, and ecological impacts. Operable Unit Three (OU3) addresses soil contamination on Union Pacific Property, also attributable to the Jacobs Smelter.

## **Site History**

The Rush Lake/Stockton area was first settled in 1855 by the U. S. Army on a military reservation called Camp Floyd. The camp was abandoned shortly after. During the Civil war, the camp was reoccupied by California Calvary volunteers and renamed Camp Relief.

In April 1864, volunteer soldiers discovered silver ore east of Stockton and organized the first mining district in the area. The area around the military reservation became the base for small-scale milling and smelting activities. The Town of Stockton was established in 1864. By 1866, the town contained over 400 inhabitants. Several smelting furnaces were built in the area, operated for a short time with marginal results, and then were shut down. The exact locations of most of these smelters remain unknown.

By 1870, mining in the area had expanded and smelting technology had improved to the point that metals extraction was profitable. The largest smelter in the Stockton area was the Waterman Smelting Works, which opened in 1871 on the northern shore of Rush Lake, about ½ mile west of Stockton. The Smelter operated through 1886 and produced approximately 3,300 tons of flue dust and nearly 15,000 tons of smelter slag.

In 1872, the Jacobs Smelter, owned by Lilly, Liesenring & Company, began operation within the town limits of Stockton. The smelter processed ore from the Ophir Mining District, located 10 miles south of Stockton in three vertical blast furnaces. By 1880, each of these furnaces could reduce 25 tons of ore per day. In 1879, the great Basin concentrator was constructed adjacent to the Jacobs Smelter and by 1880 was milling 100 tons of ore per day with approximately 80 tons of mill tailings produced as waste.

The Chicago Smelter opened in 1873 on the eastern shore of Rush Lake two miles south of Stockton, within the boundary of the former military camp. It was owned and operated by the Chicago Silver Mining Company, a British firm that also operated two nearby mines. The smelter operated sporadically through 1880. The Carson & Buzzo Smelter was located about ½ mile south of the Chicago Smelter, also on the eastern shore of Rush Lake. The production rate of these smelters is unknown.

A total of at least nine smelting/milling operations are reported to have been in operation in the Stockton area, including the four mentioned here. Nearly all traces of these smelting operations have vanished. Buried timbers, stained soils, and some foundations are virtually all of the physical evidence that remain. Homes were built upon a portion of the former Jacobs Smelter location. Much of the slag produced was likely reprocessed at other smelters located in Tooele Valley or the Salt Lake Valley.

In 1995, the Site was added to the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) under the name Stockton Smelters. A Preliminary Assessment and Site Investigation (PA/SI) detected lead and arsenic in Site soils in December 1998 and the name of the entire Site was changed to Jacobs Smelter. Based upon a removal assessment conducted in late 1998 that discovered lead and arsenic at concentrations that represented a significant risk to human health and the environment, an Emergency Response Action was initiated in March 1999 that cleaned up 29 of the most contaminated residential properties in Stockton. A Record of Decision (ROD) for OU1 was signed on July 29, 1999. In 2000, an additional 126 residential properties were cleaned up as a Remedial Action. The residential properties cleaned up during the Emergency Response and the Remedial Action for OU1 were deleted from the National Priorities List (NPL) in 2001.

In 1999, the Union Pacific Railroad (UPRR), under agreement with EPA, addressed the contamination on OU3 by placing a 16-inch soil cover over the contaminated soils in the railroad right-of-way through Stockton. It is anticipated that OU3 will be deleted from the NPL in 2006.

Remedial Investigations for OU2 began in 1999. Due to the large geographic extent of OU2 and the relatively small amount of data available, a Contaminant Screening Study (CSS) was conducted to identify the general areas of contamination in OU2 and to establish a geographic boundary for future study. During the CSS, elevated concentrations of heavy metals were found in the soils of a proposed subdivision known as the Rawhide Ranchettes Subdivision.

A focused investigation of the Rawhide Ranchettes Subdivision in May 2000 indicated that five of the 30 lots within the subdivision exceeded residential lead-screening levels. A Non-Time-Critical Removal Action for the five contaminated lots was completed by the developer by August 31, 2001. The Removal Action consisted of excavating the top 18 inches of contaminated soil from the identified lots and placing the contaminated soil within the roadbed and in a covered "repository" located within the subdivision that remains deeded to the subdivision's developer.

In order to address data gaps identified by the CSS and the Rawhide Ranchettes subdivision investigation and to focus Remedial Investigation for OU2 activities, a Pre-Remedial Investigation study was conducted in early 2001.

In 2001 a Human Health Risk Assessment (HHRA) along with ecological clean-up goals were developed for OU2.

A land re-use assessment was finalized in 2001. The land re-use assessment looked at current land use and habitat types as well as reasonably anticipated future land use for the area encompassed by OU2.

A Remedial Investigation (RI) that characterized lead and arsenic contaminated soil was performed for OU2 in 2002. Based on the data collected during the RI and the results of the HHRA and ecological studies, cleanup levels were established for OU2.

A revised Feasibility Study (FS) was developed in 2004. The revised FS identified and evaluated several different alternatives for cleaning up contaminated soil.

#### **IV. REMEDIAL ACTIONS**

##### **Remedy Selection**

##### **OU1**

Initially an Action Memorandum requesting a time-critical removal action at the Jacobs Smelter Site was approved on February 2, 1999. The action, as described in the Action Memorandum included:

- Excavation to a depth of 18 inches of all properties with average surface soil concentrations exceeding 3000 mg/kg for lead;
- Off-site disposal of contaminated soils; and
- Replacement of contaminated soil with 12 inches of clean soil and 6 inches of topsoil.

Following the time critical removal, the Record of Decision (ROD) for the remainder of OU1 was signed on July 29, 1999. The ROD identified Excavation and Off-site disposal as the selected remedy for OU1. The selected remedy involved the excavation of approximately 150,000 tons of lead and arsenic contaminated soil from identified properties and the disposal of excavated soil in a suitable landfill based on the classification of the soil as hazardous or non-hazardous in accordance with Subtitle C of the Resource Conservation and Recovery Act (RCRA). The following are the major components of the OU1 remedy as described in the ROD:

- Excavation of soils within the Town of Stockton exhibiting mean surface lead concentrations greater than 500 ppm, mean subsurface lead concentrations greater than 800 ppm, or mean surface arsenic concentrations greater than 100 ppm to a depth of 18 inches or to a depth at which mean concentrations are below 500 ppm lead and 100 ppm arsenic.
- The testing of excavated material for hazardous waste characteristics with off-Site treatment and disposal of characteristic hazardous material in a Subtitle C landfill, and off-Site disposal of non-hazardous material in a Subtitle D landfill.
- Replacement of excavated soil with up to twelve inches of clean backfill and six inches of clean topsoil and the re-landscaping of affected properties.
- Interior cleaning of affected properties to remove contaminated indoor dust.
- The development and implementation of institutional controls to restrict exposure to residual contamination below eighteen inches and below existing structures.

## **OU2**

The Proposed Plan for OU2 follows much the same outline as the OU1 ROD. The Proposed Plan identified: (1) excavation and off-site disposal of all surface soils with a surface lead concentration greater than 500 ppm and all subsurface soils in excess of 800 ppm lead as the preferred remedy for residential properties within OU2; and (2) excavation and off-site disposal of soils with lead concentrations over 10,000 ppm to a maximum depth of 18 inches and soil cover over lead concentrations between 3,000 and 10,000 ppm lead as the preferred remedy for non-residential areas. A ROD has not yet been developed for OU2.

## **OU3**

An Administrative Order on Consent and an Action Memorandum for OU3 were signed on August 2, 1999. The Order approved of a remedial work plan that identified the following minimum actions:

- Construction of a soil cover consisting of a minimum of 12 inches of clean fill and 4 inches of topsoil;
- Seeding of the covered area with native vegetation;
- Construction of an access road within the capped area;
- Construction of a six-foot high chain link fence along the east side of the Site.

## **Rawhide Ranchettes**

In addition to the three operable units, an Administrative Order on Consent and Action Memorandum were issued for the Rawhide Ranchettes Subdivision located within OU2. The Administrative Order on Consent was signed on August 2, 2001. The Order identified the following minimum actions:

- Removal of contaminated soils and other material from the areas designated as future residential Sites.
- Relocation of contaminated material to other areas of the property based upon whether the material meets the criteria for a hazardous waste.
- Construction and maintenance of an on-site repository for contaminated material.

## **Remedy Implementation**

### **OU1**

#### **Removal Activities**

During the summer of 1999, removal activities were completed on 29 properties in the Town of Stockton, where there was evidence of high concentrations of lead in the soil (Figure 2), Removal activities were completed by Environmental Chemical Corporation (ECC) as contracted by the Department of Transportation (USDOT) in conjunction with

EPA. Field operations were generally conducted on a property-by-property basis with the exception of the properties J127, J132, J134, J135, J136 and J137, which were located where the Jacobs Smelter had been. Properties J117 and J118 were also cleaned up as one property. Before cleanup activities commenced, the property design map was reviewed by each property owner.

Once the design was approved by the property owner, EPA's contractor cleared and removed specified shrubs, trees and debris from the property. Upon completion of all clearing work, approximately 18 inches of contaminated soil was removed from each property and stockpiled at a staging area north of Stockton. After excavation, confirmation samples were taken from the base of each excavation. Post excavation results for each of the properties cleaned up can be found in Appendix D of the START Removal Summary Report for Jacobs Smelter, Stockton, Utah.

Following excavation, 12 inches of clean fill and 6 inches of topsoil were placed on each property. After placement of topsoil, sod, plants, trees, sprinkler systems and fences that were removed in order to perform the cleanup were replaced.

A total of 52,000 tons of material was excavated during this cleanup. Cleanup activities generated 25,470 tons of contaminated non-hazardous material, 14,001 tons of hazardous material that was treated and stabilized on-site prior to off-site disposal, and 1,180 tons of hazardous material requiring off-site treatment and disposal. The treated and untreated hazardous material was disposed at the Grassy Mountain Disposal Facility.

### **Remedial Action Activities**

During the summer of 2000, the remaining contaminated properties in OU1 were cleaned up per the ROD as part of a Superfund Remedial Action.

Individual properties were excavated to depths of 6, 12, or 18 inches depending on lead and arsenic concentrations. Excavation activities were performed using a variety of equipment; including bobcats, small backhoes and large track hoes. Approximately 60,000 cubic yards of contaminated soil were excavated from residential yards, vacant lots, rights of way and unpaved streets and sidewalks within the Town of Stockton.

Excavated material was characterized to determine if it exhibited a characteristic of hazardous waste prior to disposal. Non-hazardous contaminated soil was disposed at a specially constructed disposal cell at the Toole County landfill, located approximately 3 miles south of the Site. Approximately 58,670 cubic yards of contaminated soil were disposed at the Tooele County facility. Hazardous contaminated soil was disposed at the EnviroSAFE, RCRA Subtitle C hazardous waste landfill located in Grandview, Idaho. Approximately 1,974 tons of hazardous contaminated soil were transported and disposed.

After excavation, indicator sampling was performed on all properties that were excavated to a depth of 18 inches to determine the concentrations of lead and arsenic remaining on

each property. Post excavation results can be found in Table 3-1 of the Final OU1 Remedial Action Completion Report.

The excavated soil on each lot was replaced with up to 12 inches of common backfill and six inches of topsoil. The source of common backfill was the northern and central portions of the Tooele County Landfill property. Envirocon performed tests on the borrow sources and certified that it did not contain hazardous waste or substances defined in 40 CFR Part 261, Subpart D and CERCLA Section 101(4), as amended.

The topsoil for each lot was developed from the topsoil present at the borrow source. The topsoil was screened to remove particles greater than  $\frac{3}{4}$  inch and was amended with organic material to meet specification requirements. Topsoil was placed on the top six inches of each of the lots cleaned up.

After placement of topsoil, sod, plants, trees, sprinkler systems and fences that were removed in order to perform the cleanup were restored.

## **OU2**

The remedy for OU2 has not been implemented at this time.

## **OU3**

A Remedial Work Plan was developed for OU3 and submitted to EPA and UDEQ for approval on July 28, 1999. The Remedial Work plan proposed the construction of a soil cap over contaminated areas of the Union Pacific Rail Road right-of-way. The proposed cap would be at least 12 inches thick with a 4-inch layer of topsoil to be placed over the compacted cap. The plan also called for the seeding of the cap with an indigenous seed mix.

The plan also proposed the construction of a gravel access road along the length of the east and west sides of the railroad track within the capped area and the construction of a six-foot high chain link fence to control access to the property.

The Remedial Actions Report for the Union Pacific Railroad right-of-way, dated January 28, 2000, describes the remedial actions that took place on OU3. According to this report, soil for construction of the soil cap was obtained from England Construction's Borrow Pit located in Bauer, Utah. The soil cap was sloped at the sides to provide a gentle, even slope to the natural grade. Twelve-inches of clean soil and an additional 4 inches of topsoil were placed over sections of the Site that contained lead concentrations greater 1,200 ppm. The areas of the Site that were capped are shown on Figure 3. A 16-foot wide gravel access road was constructed along the length of the east and west sides of the railroad track within the capped area. The road was constructed using a 4-in. layer of crushed rock with a maximum size of 2-in. The road extends from the railroad ballast on the west side of the Site and joins the soil cap on the east. A 6-foot-high chain link

fence was also erected on the west side of the Site. Figure 4 shows a typical cross section of the cap.

### **Rawhide Ranchettes**

A Remedial Action Work Plan for the Rawhide Ranchettes Subdivision was submitted for review and approval in July 2000. The work plan proposed the excavation of non-hazardous soils from contaminated lots within the subdivision to depths ranging from a minimum depth of 6 inches to a maximum depth of 18 inches. Non-hazardous contaminated soil was to be placed in an excavation underneath a road within the subdivision. The work plan also proposed excavating hazardous soils from three of the lots within the subdivision to a maximum depth of 18 inches and placing them in an on-site repository. The proposed on-site repository was to be excavated to a depth of 9 feet and lined and capped with 60-mil high-density polyethylene (HDPE) flexible membrane liner with 18 inches of cover over the liner. The cover was to be sloped and seeded to prevent runoff and erosion.

The Closure Report – Contamination Remediation, Rawhide Ranchettes, Stockton, Utah prepared by GEO Company states that the top six inches of surface soils were excavated from Lots 2 and 3 (see Figure 5) and placed in a repository located directly south of Lot 18 of the Rawhide Ranchettes Subdivision. Approximately 1,250 cubic yards of hazardous materials were removed from these three lots and placed in the repository.

The hazardous materials in the repository were capped with a 60-millimeter HDPE flexible membrane liner. The cap was inspected by a DERR representative to ensure that the liner was installed according to the manufacturer's recommendations. The HDPE liner was then covered with 24 inches of uncontaminated soil followed by topsoil that has been seeded with native grasses and wildflowers. The entire repository has been enclosed with a 4-foot high chain link fence. The developer has retained ownership and responsibility for operation and maintenance.

Non-hazardous contaminated soil was removed from lots 1, 2, 21 and 22. The contaminated soil was placed underneath a section of roadway within the subdivision. The roadway excavation was approximately 5 feet deep and approximately 15 feet wide. Excavation was interrupted for water line laterals and utility lines for each lot. Approximately 3,650 cubic yards of contaminated, non-hazardous material was placed within the subdivision roadway. The contaminated, non-hazardous material was covered with 1.5 feet of uncontaminated soil, 8 inches of road base and 2.5 inches of asphalt.

Confirmation sampling of remediated lots was performed by DERR using a portable XRF. The confirmation sampling demonstrated that the contaminated materials had been removed from the targeted lots.

## **V. FIVE-YEAR REVIEW PROCESS**

### **Administrative Components**

Activities related to the Jacobs Smelter superfund Site Five-year Review were led by Thomas Daniels, UDEQ Project Manager of Operable Unit 2 of the Site. The following team members assisted in the review:

Bob O'Brien, Former UDEQ Project Manager  
Elizabeth Yeoman's, Former UDEQ Project Manager  
Dave Allison, UDEQ Community Affairs Specialist

The five-year review consisted of the following activities: a review of relevant documents; interviews with representatives of UDEQ and current property owners; review of ARARs and Site visits.

### **Community Involvement**

EPA's comprehensive Five-Year Review Guidance states that at a minimum the community should be notified that a five-year review will be completed and again notified when the review is completed.

The five-year review public notice was advertised in the Tooele Transcript Bulletin newspaper on Thursday, August 11, 2005. A letter inviting comments on the Five-Year review was sent to a list of interested parties on Friday, August 12, 2005. Neither EPA nor UDEQ received any comments or concerns from the public regarding the Five-Year review.

Community interviews were conducted by UDEQ from September 1 through September 23, 2005. The elected officials contacted said that the remediation efforts were effective, continue to be affective, and the cleanup is viewed as a successful endeavor. The elected officials commented that the cleanup not only continues to protect the health of the community but also provides a beautification benefit to the Town of Stockton by providing landscaped yards and fences. The elected officials expressed concern about the ability of the Town's land use ordinance to address the future development of undeveloped land and the proposed sewer system project.

Most of the property owners interviewed are life-long residents of Stockton and were familiar with the area's mining history. These residents expressed little concern about exposure to lead and arsenic contaminated soil. However, a number of property owners were not satisfied with the replacement landscaping provided as part of the cleanup. Many property owners claimed that it is difficult to maintain or grow lawns and that many trees and bushes have died after the landscaping took place. Some property owners said they fertilize regularly and spend substantial amounts of money using culinary water to promote growth without much success.

Copies of the public notices and the interviews are included in Appendix A.

## **VI. FIVE-YEAR REVIEW FINDINGS**

### **Site Inspection**

An inspection of the Site was conducted September 7, 2005 by Thomas Daniels. The purpose of the inspection was to assess the protectiveness of the remedy for OU1, OU3 and the Rawhide Ranchettes subdivision.

Inspection of the properties within OU1 cleaned up through both the Emergency Removal and the Remedial Action showed that the clean fill and landscaping remained intact throughout the Site (see Site Photos, Appendix B).

Inspection of OU3 showed that the 16-inch cap is still intact and its integrity had not been breached. The vegetated cover on the southern portion of OU3 was not well established but showed signs of recent seeding. The vegetated cover on the northern portion of OU3 was well established. The fencing on OU3 is in place and intact.

Inspection of the Rawhide Ranchettes subdivision showed that the clean fill and landscaping also remains intact as well as the fencing surrounding the repository.

Inspection of properties within OU2 showed that a fence has been erected to limit access to property owned by BLM. The remainder of OU2 remains uncovered, and is easily accessible.

### **Institutional Controls**

In order to inform current and future property owners about contamination remaining below 18 inches on properties cleaned up as part of OU1, Institutional Controls were developed by UDEQ and submitted to the Town of Stockton for approval and enactment. The ICs were designed to protect property owners from exposure to contaminated soil and allow them to manage contaminated soils disturbed during household gardening and landscaping activities and to protect workers and residents during construction activities on residential and public property within OU1.

The Town of Stockton adopted Ordinance # 2000-4 to address excavation and development within OU1 of the Jacobs Smelter Site on May 8, 2001. The Ordinance requires permit applications for all construction work that requires excavation below 18 inches, to ensure excavated material is tested and handled according to appropriate state and federal regulations.

In 2004 the Town of Stockton started investigating the feasibility of installing a municipal sanitary sewer system and requested UDEQ's and EPA's assistance in evaluating the effectiveness of Ordinance #2000-4 and it's impact on the installation of

the sewer. During this evaluation it was found that several items and actions described in the Ordinance had not been implemented and that the pollution prevention plan prepared to address contaminated material encountered during the sewer installation did not comply with the actions described in the ordinance.

The Town of Stockton requested assistance from UDEQ and EPA to develop a new ordinance that would more accurately reflect post construction conditions and be consistent with the pollution prevention plan for the sewer.

Due to funding issues and changes in public support, the sewer project has been postponed indefinitely. UDEQ is in the process of assisting the town with the development of a new ordinance.

Since remedial activities have yet to be performed for OU2, Institutional Controls have not been developed.

UPRR filed a Declaration of Restrictions with Tooele County on September 17, 2001 on its OU3 property.

The developer of the Rawhide Ranchettes was required to record a certified copy of the Administrative Order on Consent with the Tooele County Recorder's Office for any property that contained lead and arsenic levels in excess of the established action levels, including the repository. The Order also required that the developer conduct monthly inspection reports of the repository and roadways for one year after the completion of the Removal Action and yearly inspections thereafter.

## **VII. TECHNICAL ASSESSMENT**

### **Question A: Is the remedy functioning as intended by the decision documents?**

The review of documents, ARARs, risk assumptions, and the results of the Site inspections indicates that the remedy is functioning as intended by the ROD and Action Memorandum for OU1 and the Action Memorandums for OU3 and the Rawhide Ranchettes subdivision.

The excavation of the lead and arsenic contaminated soil associated with the Emergency Removal Action, and the Remedial Action associated with OU1 and the subsequent backfilling and landscaping has achieved the remedial objectives necessary to minimize direct contact with or ingestion of contaminants in soil. The fill and landscaping on the cleaned properties appear to be in good condition.

The soil cap, vegetative cover, and fencing installed at OU3 has achieved the objectives described in the action memorandum and remain protective of human health and the environment. The soil cap appears to be in good condition. The vegetative cover on the northern portion of OU3 is well established. The vegetative cover on the southern

portion of OU3 is not as well established as that to the north but showed signs of recent seeding. The fencing is in good condition and effectively controls access.

The Removal Action performed at the Rawhide Ranchettes subdivision has also achieved the objectives described in the action. The fill and landscaping on the cleaned up properties appear to be in good condition. The asphalt paving placed over the contaminated non-hazardous soil remains in place and appears to be in good condition. The fencing around the repository remains intact and the cap and vegetated cover appear to be in good condition as well.

The lead and arsenic contamination associated with the Waterman, Chicago and Carson Buzzo Smelters, as well as the lead and arsenic contamination on the BLM land and other parts of OU2 still pose a significant threat to human health and the environment.

**Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?**

As part of the five-year review State, and Federal Applicable and Relevant and Appropriate Requirements (ARARs) were reviewed by DERR staff. The primary purpose of this review was to determine if any newly promulgated or modified requirements of federal and state laws have significantly changed the protectiveness of the remedies implemented at the Site. The ARARs reviewed were those included in the OU1 ROD and the OU2 Revised Feasibility Study. The OU3 and Rawhide Ranchettes Action Memorandums referenced the ARARs from the OU1 ROD.

Overall, the review does not indicate any substantive changes to regulations that would affect the remedies performed at this Site nor its protectiveness. EPA and UDEQ will continue to monitor this and any future changes in ARARs will be reported in the next five-year review.

There have been no changes in the physical condition of the Site that would affect the protectiveness of the remedy.

Changes in standards: No newly promulgated or modified ARARs that would significantly change the protectiveness of the remedies implemented at the Site were found.

Changes in exposure pathways: No changes in the condition that affect exposure pathways were identified as part of the five-year review. There have been no changes in land use. No new contaminants, sources or routes of exposure were identified as part of this five-year review.

Changes in toxicity and other contamination characteristics: There have been no changes in the toxicity factors for the contaminants of concern that were used in the base line risk assessment.

Changes in risk assessment methodologies: Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

**Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

No additional information has been identified that would call into question the protectiveness of the remedy.

**VIII. DEFICIENCIES**

Some deficiencies were discovered during the five-year review. The following are the discovered deficiencies:

- Institutional Controls: The Town of Stockton's ordinance governing excavation and development within the Jacobs Smelter cleanup area is difficult to understand and enforce nor does it accurately reflect the post-cleanup status of OU1. These deficiencies are not sufficient to warrant a finding of non-protective.
- OU2: OU2 has not been cleaned up at this time and the lead and arsenic contamination associated with the Waterman, Chicago, and Carson-Buzzo Smelters as well as lead and arsenic contamination on other surrounding properties poses a significant threat to human health and the environment

**IX. RECOMMENDATIONS AND FOLLOW UP ACTIONS**

The corresponding recommendations/follow up actions are as follows:

- Institutional Controls: The Stockton Ordinance should be evaluated and rewritten to more accurately reflect post remedial conditions and to be more workable and easier to understand.
- OU2: The Remedial Action for OU2 should be performed to alleviate the threat to human health and the environment posed by the remaining lead and arsenic contamination.

**X. PROTECTIVENESS STATEMENTS**

The risk assessments for OU1, OU3 and the Rawhide Ranchettes are still valid and thus the remedies performed on OU1, OU3 and the Rawhide Ranchettes subdivision are expected to be protective on human health and the environment. The immediate threats posed by the contamination associated with these operable units have been addressed. The excavation and off-site disposal of the top 18 inches of contaminated soil performed during the Emergency Removal and Remedial Action construction activities have effectively eliminated the majority of the risk associated with Jacobs Smelter OU1. The risk associated with the contaminated soil remaining after excavation is effectively reduced by the 18 inches of clean fill and top soil and the landscaping placed on each property. The cap, vegetative cover and fence installed on the Stockton Yard provide an

adequate barrier to exposure to contaminated soil in OU3. The cleanup activities performed at the Rawhide Ranchettes subdivision is likewise protective of human health and the environment. The threats to human health and the environment posed by OU2 have yet to be addressed.

## **XI. NEXT REVIEW**

This statutory Site requires ongoing five-year reviews. The next review will be conducted within five-years of the completion of this five-year review report. The completion date is the date of the signature shown on the signature cover sheet attached to the front of this report.