

**FINAL CLOSE-OUT REPORT
MIDVALE SLAG SUPERFUND SITE
MIDVALE, UTAH**

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September 2014

Table of Contents

1.0 INTRODUCTION	3
2.0 SUMMARY OF SITE CONDITIONS	3
2.1 Site Background	3
2.2 Initial Response	4
2.3 Removal Actions	4
2.4 Remedial Investigation/Feasibility Studies	4
2.5 Record of Decision	5
2.5.1 Operable Unit 1	5
2.5.2 Operable Unit 2	6
2.6 Remedial Activities	7
2.6.1 Operable Unit 1	7
2.6.2 Operable Unit 2	8
2.6.3 Operable Units 1 and 2	8
2.7 Institutional Controls	9
3.0 GROUNDWATER MONITORING RESULTS	9
4.0 REUSE /REDEVELOPMENT	10
5.0 OPERATION AND MAINTAINENCE	10
6.0 DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE/QUALITY CONTROL	11
7.0 FIVE-YEAR REVIEWS	11
8.0 SITE COMPLETION CRITERIA	11
BIBLIOGRAPHY	B1

1.0 INTRODUCTION

This Final Close Out Report documents that the U.S. Environmental Protection Agency (EPA) has determined in accordance with Close Out Procedures for National Priorities List Sites (OSWER Directive 9320.2-22, May 2011) that all appropriate response actions at the Midvale Slag Superfund Site (UTD08134277) (Site) have been successfully implemented by the EPA and the Utah Department of Environmental Quality (UDEQ) in accordance with the Records of Decision (RODs) and Explanations of Significant Differences (ESDs) issued for Site.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site Background

The 446-acre Midvale Slag Superfund Site is located 12 miles south of Salt Lake City in the city of Midvale, with a small portion extending into the adjacent city of Murray. The Site is divided into two operable units. Midvale Slag Operable Unit 1 (OU1) encompasses approximately 266 acres in the northern portion of the Site, and primarily consisted of buffer land where minimal smelter operations occurred. Operable Unit 2 (OU2) encompasses approximately 180 acres in the southern portion of the Site and was the location of the smelter buildings and operations. The Site is bordered to the south by 7800 South Street, to the west by the Jordan River, to the north by 6400 South Street (Winchester Avenue), to the northeast and east by 700 West Street and to the southeast by Holden Street. Ore processing and smelting operations were conducted at the Site and the adjacent Sharon Steel Superfund Site, located immediately south of OU2. The Sharon Steel Superfund Site and the Midvale Slag Superfund Site have been historically linked, particularly from an environmental perspective. During the operational time of the facility, five different lead and copper smelters occupied the Site. The milled ores were smelted at the Site to produce lead, arsenic, copper, and other metals. Smelting operations at the Site ceased in 1958.

Contamination at the Site is associated with smelter and mill waste deposits on OU2 as well as small amounts of surface and subsurface slag and contaminated soils on OU1. Contaminants of concern (COCs) at the Site include arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc.

The EPA listed the Midvale Slag Superfund Site on the National Priorities List (NPL) in 1991 based on studies conducted between 1982 and 1985 that found groundwater, soil and sediments contaminated with heavy metals. Potential human health threats included drinking contaminated groundwater or ingesting, inhaling, or handling contaminated soils, wastes or sediments.

The cleanup for this Site includes the following areas:

- 1) The former smelter property including buffer land (OU1 and OU2), currently known as Bingham Junction, which is owned by individual property owners
- 2) Portions of the Jordan River riparian corridor which are adjacent to the former smelter property included in both OU1 and OU2
- 3) Portions of residential properties in the northern portion of the Site including the Winchester Estates, all part of OU1
- 4) Groundwater beneath the Site for both OU1 and OU2.

In 1990, the United States settled its claims against several parties involved in smelting operations at the Site. The EPA deposited the funds recovered from Sharon Steel Corporation, UV Industries, Inc., the UV Liquidating Trust, and Atlantic Richfield Company into two special accounts, for use in the cleanup of the adjacent Sharon Steel Site and at the Midvale Slag Site.

2.2 Initial Response

The EPA proposed the Site to the NPL based on studies conducted between 1982 and 1985 that found groundwater, soil and sediments contaminated with heavy metals and arsenic.

2.3 Removal Actions

The EPA and the UDEQ conducted investigative work and a series of removal actions. The removal actions conducted at the Site include:

- March 1990, Removal Action for installation of a fence around both operable units.
- December 1990, Emergency Removal Action to dispose of lab chemicals and explosives remaining onsite from abandoned laboratories.
- April 1995, Time Critical Removal Action to install a fence between OU1 and OU2
- June 1996, Time Critical Removal Action to properly abandon onsite water supply wells remaining from the smelter operations.
- September 1996, Time Critical Removal Action to address contamination at the Butterfield Lumber Company property by excavating contaminated soils and backfilling with clean soils.
- October 1996, Time Critical Removal Action at the Pioneer Cemetery to excavate contaminated soils, backfill with clean soils and install fencing around this historic area.
- October 2001, Time Critical Removal Action to remove approximately 90 deteriorated drums and associated debris located in OU1.

2.4 Remedial Investigation/Feasibility Studies

OU1: The suspected waste areas within OU1 were a small landfill and an abandoned waste water treatment plant with its associated lagoons. Analysis of sample data determined that neither area contributed to the contaminants of concern detected in OU1 soils. Soil contamination was caused by smelter waste from OU2 transported by wind and surface water as well as deliberate use of waste as fill. The Baseline Risk Assessment identified arsenic, cadmium and lead as the contaminants of concern for soil at OU1. The initial OU1 Feasibility Studies (FS) were completed in 1995 for the North West and South East Winchester Estates, a trailer park located on the northern end of the Site, and in 1998 for the remaining portions of OU1. These reports were conducted to consider remedial alternatives for the contaminants of concern in soils.

OU2: The Site investigations for OU2 focused on mixed smelter waste, slag and groundwater. These were evaluated during Site investigations conducted for the Engineering Evaluation/Cost Analysis (EE/CA) prepared in 1993, the Supplemental Remedial Investigation in 1997 and 1998, and additional characterizations performed in 2001 and 2002. Surface and subsurface soil samples were analyzed in five mixed smelter waste areas, calcine waste, silver refinery waste and contaminated soils.

Metals analysis of samples in the former baghouse dust pond area showed high levels of arsenic trioxide which was determined to be principal-threat waste (later classified as Category I waste). Four areas of slag-covered surfaces were also sampled for the EE/CA: air-cooled slag, water-quenched slag, copper slag, and iron slag. Analysis of the slag in these areas found high levels of lead.

These studies also determined that the area primarily beneath OU2 was heavily contaminated with COCs.

The April 2002 OU2 FS addressed the groundwater and the May 2002 OU2 FS addressed mixed smelter waste. Many remedial options were considered, including no action, institutional controls, treatment and disposal. Alternatives from each study were combined to form the selected remedy. The smelter waste and soil maximum contaminant concentration was 20,400 mg/kg for arsenic and 26,300 mg/kg for lead. The sediment maximum contaminant concentration was 96 mg/kg for arsenic and 721 mg/kg for lead.

2.5 Record of Decision

2.5.1 Operable Unit 1

On April 28, 1995, the EPA issued a Record of Decision for OU1 selecting the following remedy:

- Excavation of a minimum of 18 inches of soil in 14 residential yards in the Winchester Estates development, placement of clean fill and off-site disposal of soils.
- Placement of a 2-foot thick monolayer soil cover over an undeveloped portion of the Winchester Estates.
- Institutional controls for the area receiving the soil cover.
- Institutional controls (ICs) for four other parcels prohibiting future residential land use without additional remediation.
- Groundwater monitoring at the hydraulically downgradient Site boundary for a minimum of 5 years.

In May 1998 and also in February 2006, the EPA and UDEQ issued ESDs which changed the remedy called for in the 1995 OU1 ROD. The 1998 ESD required the excavation of contaminated soils on one parcel of land, rather than capping, and thus eliminated the need for ICs on that parcel. The 2006 ESD changed land use restrictions to accommodate multiple land uses, created a consistent approach for both operable units, included riparian management (both sides of the river) and contained a comprehensive groundwater monitoring plan in coordination with the OU2 remedy. The 2006 ESD identified the lack of remedial action objectives for groundwater in the OU1 ROD and adopted the remedial objectives selected for groundwater in the OU2 ROD. A final ESD was issued in October, 2013, clarifying the groundwater Remedial Action Objectives (RAOs) for OU1 and OU2.

The RAOs for OU1, as amended, are as follows:

- Soil RAO
Prevent unacceptable exposure risks to current and future human populations presented by contact, ingestion, or inhalation of smelter materials, associated contaminated materials, or COCs derived from the smelter wastes.

- Groundwater RAOs
 - Prevent unacceptable exposure risk to current and future human populations presented by direct contact, inhalation, or ingestion of contaminated groundwater.
 - Provide that future migration of COCs into previously uncontaminated portions of the US&G Aquifer and into the Deep Principal Aquifer is protective of these aquifers as sources of drinking water.
 - Provide that future discharge of contaminated groundwater from the Site to the Jordan River is protective of the aquatic environment and designated use.

2.5.2 Operable Unit 2

The EPA signed the OU2 ROD on October 29, 2002. The OU2 ROD defined four categories of smelter wastes found throughout OU2. Principal threat wastes such as crude arsenic trioxide were designated as Category I waste. Category II wastes included non-slag soils and smelter waste failing Toxicity Characteristic Leaching Procedure (TCLP) and containing COCs above commercial land use-based remediation goals. Category III wastes included non-slag soils and smelter wastes passing TCLP and containing COCs below residential land use-based remediation goals. EPA classified slag as Category IV waste.

The major components of the selected remedy include:

- Groundwater: The Deep Principal Aquifer which is a primary source of drinking water in the Salt Lake Valley, is not impacted by the Site, although the shallower Upper Sand and Gravel Aquifer is impacted by the Site. The limited action remedy for groundwater does not actively attempt to restore the Upper Sand and Gravel Aquifer (US&G), but provides compliance points for monitoring and assessing as well as institutional controls. The limited action approach relies on groundwater and surface water monitoring to assess whether groundwater and surface water criteria are being met for selected COCs. These selected COCs were established as a result of using alternate concentration limit (ACL) calculations and site-specific analyses to be protective of surface water quality criteria for the Jordan River. An IC to restrict well installation was also selected as a part of the remedy.

The ACLs for the four groundwater COCs were set at the following:

- Arsenic 7,000 µg/L
- Cadmium 1,560 µg/L
- Selenium 900 µg/L
- Antimony 380 µg/L.
- Mixed Smelter Waste: The selected remedy for mixed smelter waste required the excavation and off-site disposal of Category I Material, if found, and the installation of appropriate covers over the remainder of the Category II and III Materials.
- Slag: The selected remedy for the slag (Category IV Material) required re-grading of the slag piles and the installation of appropriate covers.
- Land use controls (ICs) were also selected for OU2 to restrict future excavations and guide future use of the property.

During the Site investigations in 2001 and 2002, a PCE plume crossing the Site was identified and referred to UDEQ for further investigation. Since the PCE plume was determined to be unrelated to the Site, CERCLA action was not deemed appropriate.

The 2013 ESD clarified the RAOs for groundwater for both OU1 and OU2. This clarification removed the groundwater restoration RAO for both OUs.

The RAOs for OU2, as amended, are as follows:

- Groundwater RAOs
 - Prevent unacceptable exposure risk to current and future human populations presented by direct contact, inhalation, or ingestion of contaminated groundwater.
 - Provide that future migration of COCs into previously uncontaminated portions of the US&G Aquifer and into the Deep Principal Aquifer is protective of these aquifers as sources of drinking water.
 - Provide that future discharge of contaminated groundwater from the Site to the Jordan River is protective of the aquatic environment and designated use.
- Mixed Smelter Waste RAOs
 - Prevent unacceptable exposure risks to current and future human populations presented by contact, ingestion, or inhalation of smelter materials, associated contaminated materials, or COCs derived from the smelter areas.
 - Prevent unacceptable exposure risks to current and future ecological receptors presented by contact, ingestion, inhalation, or uptake from smelter materials, associated contaminated materials, or COCs derived from the smelter areas.
 - Provide that the future migration of contaminants from the smelter materials is within limits considered protective of groundwater.
 - Prevent smelter materials from entering the Jordan River via surface water flow.
- Slag RAOs
 - Prevent unacceptable exposure risks to current and future human populations presented by contact, ingestion, or inhalation of slag or associated contaminated materials.
 - Prevent unacceptable exposure risks to current and future ecological receptors presented by uptake from slag, associated contaminated materials within slag, or COCs derived from the slag areas.
 - Provide that the future migration of contaminants from the slag or contaminated materials within slag is within limits considered protective of groundwater.
 - Prevent slag or contaminated materials within slag from entering the Jordan River via surface water flow.

2.6 Remedial Activities

2.6.1 Operable Unit 1

UDEQ was the lead agency for the OU1 remediation as defined in a cooperative agreement between the EPA and UDEQ. Remediation work was conducted in two phases, with the Winchester Estates portion of the remediation beginning in September 1995 and ending in April 1996. The second phase of the OU1 remediation began in July 1998. The final inspection of the

OU1 remedial action occurred in January 1999 and the RA report for OU1 was signed in March 1999. The EPA and UDEQ installed the groundwater monitoring system and performed the riparian remediation selected in the 2006 ESD during the implementation of the OU2 remedy.

2.6.2 Operable Unit 2

A consent decree governed work conducted by the main property owner, Littleton, Inc. In the consent decree signed with the EPA, Midvale City, and the Union Pacific Railroad, the property owner, Littleton, Inc., agreed to perform the remedial design/remedial action (RD/RA) for the smelter wastes, slags and impacted soils components of the 2002 ROD remedy. In the consent decree, Midvale City agreed to enact and enforce ICs in the form of an ordinance. This consent decree was entered on November 16, 2004.

UDEQ was the lead for the groundwater portion of the 2002 ROD remedy as well as the 2006 ESD for OU1. This work was performed under a cooperative agreement with the EPA. The EPA was the primary lead for the riparian portion of the 2002 ROD remedy.

Smelter Wastes, Slags, and Impacted Soils

Littleton, Inc., completed all remedial activities as planned, and no additional areas of contamination were identified. The EPA, UDEQ and Midvale City conducted a final inspection of the work upon completion of the physical construction on June 26, 2006. A one-year warranty period began on July 6, 2006, to ensure that the remedy continued to operate as designed. On May 15, 2007, the EPA, UDEQ and Midvale City representatives conducted a second final inspection to verify that the remedy remained effective. This remedy was declared operational and functional on August 13, 2007 when the EPA approved the Remedial Action Report. On the same day, the EPA certified the completion of the construction work required under the consent decree.

2.6.3 Operable Units 1 and 2

Riparian Zone

The EPA and UDEQ conducted the RD/RA work along 6,800 feet of the Jordan River riparian corridor adjacent to the western boundary of the Site. The objective for this work included the reduction and elimination of river bank erosion that could release smelter waste from the Site into the river. This work was conducted in four phases, with the final phase being completed in August 2011. Salt Lake County conducted the Phase 3 portion of this work under the EPA and UDEQ oversight. Phase 3 involved completing the riparian work from Winchester Estates south along the eastern bank of the Jordan River and was funded through a grant from the EPA using special account money.

The EPA, UDEQ and Salt Lake County completed all remedial activities as planned. The EPA and UDEQ conducted a pre-final inspection on August 10, 2011, which resulted in a schedule for the contractor to correct minor items. The remaining "punch" list item was replacement of some damaged vegetation. The EPA and the State determined that all Riparian Zone work was constructed and/or completed according to the ROD and design specifications.

Groundwater

UDEQ completed the installation of the groundwater monitoring system in December 2008. Construction of the system was completed under a cooperative agreement established between the EPA and UDEQ. Under this cooperative agreement, UDEQ implemented the groundwater monitoring system design developed by the EPA and conducts quarterly monitoring. In

September 2009, the EPA approved the groundwater Remedial Action Report in which the EPA determined that construction of the monitoring system was complete in accordance with the ROD and design specifications.

2.7 Institutional Controls

The RODs for OU1 & OU2 selected the use of ICs to: prevent excavation of the areas receiving the soil cover; restrict well installation; and guide future land use. In 2004, Midvale City established ICs in the form of an ordinance for the Bingham Junction Zone (Midvale City Code Section 17-7-9.11, Institutional Controls) to prevent exposure to contaminated materials and to restrict future excavations. In addition, Midvale local land use controls restrict surface water management and irrigation practices to limit infiltration in the plume area. The ICs also provide for periodic inspection and long-term maintenance of covers.

On June 26, 2007 Midvale City adopted ordinance No. 6/26/2007 0-8 to restrict groundwater use, to regulate surface water management and irrigation practices, and to require vapor mitigation systems for buildings constructed over the PCE plume. This ordinance amends and replaces the ordinance adopted by Midvale City in 2004. Groundwater use at the Site is also restricted through the Sharon Steel Restricted Area which the Utah Division of Water Rights (UDWR) administers through the Salt Lake Valley Groundwater Management Plan.

Restrictive covenants are also in place on the former Littleton and Union Pacific Railroad properties.

Littleton implemented the smelter waste and slag RD/RA with an eye towards redevelopment. The Bingham Junction plan envisioned commercial, industrial, retail and both single and multi-family homes at the Site. Today a large-scale, mixed-use development is being constructed on both OU1 and OU2.

3.0 GROUNDWATER MONITORING RESULTS

UDEQ conducts semi-annual groundwater and surface water monitoring at the Site using a plan developed during the remedial design. The monitoring system at the Site currently consists of co-located wells at 15 locations (a total of 30 wells) and two surface water sampling locations. Each well pair consists of one shallow monitoring well, screened in the upper interval of the US&G Aquifer, and one intermediate monitoring well, screened at a lower interval within the US&G Aquifer. The monitoring system is divided into four groups and consists of up-gradient, down-gradient, plume core and ACL monitoring wells. The process for developing ACLs is discussed in the OU2 ROD with supporting documentation provided in the Administrative Record.

Although the selected remedy did not attempt to actively restore the US&G aquifer, it provided for the monitoring of groundwater and surface water to assess whether applicable groundwater and surface water quality criteria are being met for the selected COCs. It also provided for the creation of ICs to prevent exposure to the contaminated US&G aquifer.

Point of assessment locations for monitoring the US&G aquifer were selected based on the location and movement of arsenic contamination on the Site. Arsenic was selected as the indicator chemical since it is the most mobile and widespread of the COCs in this aquifer. Monitoring wells for points of assessment were installed in the shallow and deep portions of the US&G aquifer in accordance with plans and specifications developed during the remedial design.

The specific monitoring objectives are as follows:

- Conduct groundwater and surface water monitoring to assess if applicable groundwater and surface water quality criteria are being met for COCs (antimony, arsenic, cadmium and selenium).
- Assess monitoring data and determine if contamination is moving laterally or vertically within the boundaries of the Site.

The UDEQ's Semi-Annual Groundwater and Surface Water Monitoring Report – Midvale Slag Superfund Site dated May 24, 2013 states that “COC concentrations in the ACL monitoring wells have not exceeded their respective ACL values and that COC concentrations in surface water have not exceeded established surface water quality criteria values for the Jordan River in monitoring results from 2008 to present.”

4.0 REUSE /REDEVELOPMENT

Because the community requested future land use be considered in the remedy selection, slag piles were graded to better support redevelopment and appropriate soil covers were designed as an interim measure to facilitate future redevelopment. The Site is located right off the I-15 and I-215 freeways, within 20 minutes of most Salt Lake County locations. On August 29, 2006, Midvale Mayor Joanne Seghini said, “The land constitutes 20 percent of Midvale and is one of the last pieces of undeveloped property in the city and was a discouraging blight.” Re-development began once the institutional controls were established and the Ready for Re-use Determination was issued on May 23, 2008.

Today, approximately 65 percent of the Site has been fully developed for mixed-use that incorporates major retail and office space, along with needed housing for Midvale City. The Utah Transit Authority mass transit train system opened a station at the Site which serves the new “green sustainable community.” The successful revitalization of the Midvale community is sustainable, provides mixed use, and elevates the quality of life with revitalization for years to come. Improvement of the riparian corridor and bike trail along the Jordan River has also helped this area thrive. These successful efforts have resulted in the influx of new residents now inhabiting the Site fulfilling the initiative for revitalization envisioned years ago by Midvale City, UDEQ and the EPA.

5.0 OPERATION AND MAINTAINENCE

Maintaining appropriate soil cover and drainage is a required operation and maintenance IC. Midvale City is responsible for enforcing the cap and soil ICs through conducting the following activities: inspection/observation during redevelopment construction; review of development construction plans and specifications for conformance with cover requirements; storm water management and irrigation restrictions; and temporary stockpile and covering of soil and slag. UDEQ conducts semi-annual groundwater and surface water monitoring at this Site. In monitoring results from 2008 to present, COC concentrations in the ACL monitoring wells have not exceeded their respective ACL values and COC concentrations in surface water have not exceeded established surface water quality criteria values for the Jordan River.

6.0 DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE/ QUALITY CONTROL

The Site was remediated using funds from a special account. The 2004 Consent Decree governed work conducted by the property owner, Littleton, Inc. The EPA and UDEQ implemented the riparian work and groundwater monitoring, respectively. The EPA and UDEQ conducted regularly scheduled Site inspections and visits to review progress of the remediation and ensure the QA/QC plan was being complied with.

The Quality Assurance Project Plan for the Site incorporated the EPA QA/QC procedures and protocols. The EPA analytical methods were used for all confirmation and monitoring samples during removal and remediation activities. The EPA and UDEQ determined that QA/QC protocols and procedures were adhered to in order to assure satisfactory execution of the response actions.

7.0 FIVE-YEAR REVIEWS

Three statutory five-year reviews have been conducted at the Site, the first in October 2003, the second in December 2008 and the latest in April 2014. No issues were identified in the 2014 five year review. The Site-wide remedy protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled through the completed remedial activities and effective ICs. The next five-year review is scheduled for completion in April 2018.

8.0 SITE COMPLETION CRITERIA

This Site meets all the Site completion requirements as specified in the OSWER Directive 9320.2-22, Close-Out Procedures for National Priorities List Sites. All remedial activities at the Midvale Slag Site are consistent with agency policy and guidance. The only remaining CERCLA activities to be performed at the Site are O&M and five-year reviews. Therefore, the EPA has determined that no further response action is necessary at the Midvale Slag Site to protect human health and the environment.

Approved by:



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