NORTHERN SLAG AREA OPERABLE UNIT TWO

SHARON STEEL FARRELL WORKS SUPERFUND SITE
CITY OF FARRELL, MERCER COUNTY, PENNSYLVANIA

RECORD OF DECISION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 3
PHILADELPHIA, PENNSYLVANIA
December 2013

TABLE OF CONTENTS

GLOSSARY: Highlighted Terms in Record of Decision are in the Glossary

FIGURES, TABLES, AND APPENDICES

LIST OF ACRONYMS

AR	Administrative Record
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESL	Ecological Screening Level
FS	Feasibility Study
FFS	Focused Feasibility Study
GAC	Granular Activated Carbon
gpm	Gallons per Minute
HHRA	Human Health Risk Assessment
HI	Hazard Index
ICs	Institutional Controls
LNAPL	Light Non-Aqueous Phase Liquid
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Non-Detect
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	Operable Unit
O&M	Operation and Maintenance
PCE	Tetrachloroethylene
ppb	Parts per Billion
ppm	Parts per Million
PDI	Pre-Design Investigation
RA	Remedial Action
RAO	Remedial Action Objective
RBC	Risk Based Concentration
RI	Remedial Investigation
ROD	Interim Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SI/GWTS	Stream Isolation and Groundwater Treatment System
SLERA	Screening Level Ecological Risk Assessment
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TS	Treatability Study
μg/L	Micrograms per Liter

VI	Vapor Intrusion
VOC	Volatile Organic Compound

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PART I – THE DECLARATION

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I. THE DECLARATION

A. Site Name and Location

The Site is called the Sharon Steel Farrell Works Superfund Site. The entire Site is approximately 300 acres in size and is located approximately one (1) mile southwest of the City of Farrell, Mercer County, Pennsylvania (Figure 1) and 300 hundred feet east of the Pennsylvania/Ohio border. Land use in the area is industrial to the north and east and rural to the west and south. The National Superfund Database Identification Number is PAD001933175. This Record of Decision for interim action addresses the Operable Unit 2 (OU2), area where two businesses are located. A Site Location Map is attached as Figure 1 and the Site Layout is attached as Figure 2.

OU2 is located between OU1 North of Ohio Street and OU1 South of Ohio Street. OU2 consists of two parcels totaling 33 acres owned by Dunbar Asphalt Products, Inc. ("Dunbar") and William Brothers. The companies operate an asphalt plant and a trucking operation respectively.

B. Statement of Basis and Purpose

This decision document presents the interim action for the Selected Remedy for the Sharon Steel Farrell Works Superfund Site in Farrell, Pennsylvania, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9601 et seq, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, as amended.

This ROD describes EPA's selected interim action for OU2 which is the construction of an asphalt cap or asphalt-equivalent cap. See Figure 2 for a map showing the OU2 area.

This decision document is based on the Administrative Record for the Site, which was developed in accordance with Section 113 (k) of CERCLA (42 U.S.C. § 9613(k)). This Administrative Record file is available for review online at http://www.epa.gov/arweb, at the U.S. Environmental Protection Agency Region III Records Center in Philadelphia, Pennsylvania, and at the Stey-Nevant Public Library in Farrell, Pennsylvania. The Administrative Record Index (Appendix A) identifies each document contained in the Administrative Record upon which the selection of the remedy is based.

The Commonwealth of Pennsylvania concurs with the Selected Remedy (Appendix B).

C. Assessment of the Site

Pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, the response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Pollutants or contaminants from this Site may present an imminent and substantial endangerment to public health, welfare, or the environment.

D. Description of the Selected Interim Remedy

The selected interim action in this ROD is the construction of a protective asphalt cap, or asphalt equivalent cap, to cover and prevent exposure to the contaminated soils and slag on OU2. A final ROD will be issued for OU2 in the future which will select a final remedy for cleanup of the contaminated soil and slag.

Under the selected cleanup, the area consisting of OU2 will be re-graded and the asphalt cap, or asphalt equivalent will be installed over the surface of OU2 in order to reduce dermal, ingestion, and inhalation risk and prevent percolation of rainwater into the groundwater so as to not negatively affect the groundwater remedy in the OU1 ROD. The asphalt cap or asphalt equivalent cap will reduce contaminants from entering the groundwater and the Shenango River. The selected interim action for OU2 consists of the following:

1. Capping OU2 to prevent erosion of slag from the Site negatively impacting the Shenango River and adjacent habitats.

2. Asphalt will be used in pavement of the estimated six acres on the Dunbar Property (6 acres of the 27 acres) and estimated one acre on the William Brothers property (1 acre of the 6 acres).

3. Confirmation sampling of the capped areas for the other estimated 21 acres on the Dunbar property and estimated 5 acres on the William Brothers property will be conducted through boring sampling outlined in section M.2 of this ROD to determine if there is additional slag present. All slag will be covered by an asphalt or asphalt equivalent cap (See Figure 3 and 4). The elevation and grade of the capped areas and non-capped areas in OU2 shall promote site drainage and minimize erosion.

4. An Operation and Maintenance Plan will be included as part of the design determining storm water control, the frequency of inspection of the capped areas and what time period is necessary to correct a breach with any component of the cap. This alternative shall (1) prevent contact with the slag and contaminated soil, (2) prevent the migration of slag dust from the Site, and (3) reduce groundwater infiltration and leaching of contamination from the slag which would reduce surface water contaminated runoff and shallow contaminated groundwater to the Shenango River so as to not negatively affect the groundwater remedy in OU1 for the Site.

5. Land use restrictions and institutional controls will be documented in a Land Use Control Assurance Plan ("LUCAP") to protect the integrity of the asphalt cap or asphalt equivalent cap. The LUCAP will include controls for OU2.

6. The OU2 institutional controls are for land use restrictions to protect the asphalt cap or asphalt equivalent cap.

The estimated cost to implement the selected interim action is $2,848,449.

D.1.1 Land Use Restrictions

The remedy will implement certain institutional controls as part of the interim action within the OU2 area in conjunction with institutional controls for OU1. A Land Use Control Assurance Plan ("LUCAP") shall be prepared to develop and document the mechanisms for implementing the institutional controls in the OU2 area. The institutional controls shall achieve the following restrictions:

1. Activities within the OU2 Area (Figure 2), that would damage the asphalt or asphalt equivalent type of cap shall be prohibited without EPA approval.

D.1.2 Results for Slag, Placement Under the OU-2 Asphalt (or Asphalt Equivalent) Cap

Placement of the asphalt cap or asphalt equivalent cap as described in Section D in the Description of the Selected Remedy is to address the risks of all the slag in OU2 because all slag exceeds one or more of the following:

1. The human health risk standards presented in Human Health Risk Summary Table 1 in the Northern Slag Area.
2. The ecological risk standards presented in Table 3 Contaminants of Concern and their Ecological Risk Based Critical Concentrations in Surface Soil OU2 Forested Riverine Floodplain Habitat.
3. The ecological risk standards presented in Table 4 Contaminants of Concern and their Ecological Risk Based Critical Concentrations in Surface Soil OU2 Scrub Shrub Upland Habitat.

E. Statutory Determinations

This selected interim action is protective of human health and the environment and is intended to provide adequate protection until a final ROD for the Site is signed, complies with Federal and State requirements that are applicable or relevant and appropriate (ARARs for the selected remedy are presented in Table 5) to this limited-scope action, and is cost-effective. The OU2 area at the Sharon Steel Site will be implemented as an interim remedy in order to address the current exposure of the on Site workers to slag and contaminated soil material. EPA will issue a final remedy for OU2 in the future.

This action is an interim solution only, and is not intended to utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this operable unit. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element may be addressed by the final response action.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the selected interim remedy continues to be protective of human health.

F. ROD Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for the Site.

- Baseline human health and ecological risk represented by the chemicals of concern (COCs); (Table 1, 3, and 4);
- Chemicals of concern and their respective concentrations;
- How source materials constituting principal threats are addressed;
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD;
- Potential land and groundwater use that will be available at the Site as a result of the Selected Remedy;
- Estimated capital, annual O&M, and total present worth costs, discount rate, and the number of years over which the interim remedy cost estimates are projected; and
- Key factors that led to selecting the interim remedy.

G. Authorizing Signature

This Interim ROD selects the remedy for OU2 at the Sharon Steel Farrell Works Superfund Site, and is based on the Administrative Record for the Site. EPA selected this interim action remedy with the concurrence of the Pennsylvania Department of the Environment ("PADEP").

Approved by: K. Hodgkiss　　　　Date: 12/19/2013

Kathryn A. Hodgkiss, Acting Director
Hazardous Site Cleanup Division

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PART II- THE DECISION SUMMARY

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II. THE DECISION SUMMARY

A. Site Name, Location and Description

The Sharon Steel Farrell Works Superfund Site (the "Site"), (CERCLIS Identification No. PAD001933175), has been separated into two operable units (See Figures 1, 2, 3 and 4) for the purpose of remedy implementation. The entire Site is approximately 300 acres in size and is located approximately one (1) mile southwest of the City of Farrell, Mercer County, Pennsylvania (Figure 1) and 300 hundred feet east of the Pennsylvania/Ohio border.

Operable Unit 1: OU1 consists of a total of 292 acres, and has been divided into two sections: OU1 North, consisting of 61 acres North of Ohio Street and OU1 South consisting of 231 acres South of Ohio Street. The final cleanup plan for OU1 was selected in a 2006 ROD and includes construction of a biosolid vegetative cap. The biosolid cap was the most cost effective cleanup for the 292 acre and the reasoning for being selected for OU1. The groundwater and floodplain on the whole Site will be addressed as part of the OU1 remedy including the groundwater under OU2 and floodplain adjacent to OU2. The Remedial Design for OU1 was completed in February 2012. The remedy will be constructed in phases: Phase 1 will be constructed at OU1 North and then Phase II at OU1 South. The EPA Region 3 is waiting for funding to proceed with the remedial action for OU1 North.

Operable Unit 2: OU2 is located between OU1 North and OU1 South and consists of two parcels totaling 33 acres owned by Dunbar (27 acres) and William Brothers (6 acres), where the companies operate an asphalt plant, and trucking operation, respectively. This ROD describes EPA's selected cleanup for OU2.

The former Sharon Steel Plant, located across the Shenango River to the northeast of the Site, was founded in 1900 and manufactured a variety of steel products but is not part of the Superfund Site.

EPA is the lead Agency for the Site and PADEP is the support agency.

B. Site History and Enforcement Activities

B.1. History of Activities Leading to Contamination

The former Sharon Steel Plant, located across the Shenango River to the northeast of the Site, was founded in 1900 and manufactured a variety of steel products. Throughout the operating history of the plant, waste and byproducts of the manufacturing process were transported by rail cars across the Shenango River and discarded on embankments or piled into large mounds in several areas on the Site adjacent to the Shenango River. From 1949 to 1981, waste liquids (acids and oils) were poured onto the hot slag wastes, which were subsequently disposed of at the Site. This practice continued until 1981, when Sharon Steel was ordered by PADEP to stop disposing the waste liquids in this manner. Although the disposal of waste liquids stopped in 1981, Sharon Steel continued to stockpile slag at the Site until operations at the plant ended in 1992. There are two businesses at OU2, the Dunbar Asphalt Products, Inc. is a current owner of an asphalt plant and the William Brothers Trucking Company is a current owner of a trucking company. These businesses originally leased the property from Sharon Steel Inc. prior to their purchasing properties in the OU2 area.

Three types of slag were disposed of on Site. These included basic oxygen furnace slag, blast furnace slag, and electric arc furnace slag. Basic oxygen furnace slag and blast furnace slag from carbon steel production are Bevill exempt under RCRA 40 CFR Part 261.4(b)(ii)(R).[1] Electric arc furnace slag is not a listed hazardous waste under 40 CFR Part 261, Subpart D. Additionally, electric arc furnace slag did not exhibit a hazardous waste characteristic under 40 CFR 261 Subpart C from the total concentrations for the eight RCRA metals.

PADEP conducted several inspections of the waste disposal areas in the 1970's and concluded that the contamination from the byproducts at the Sharon Steel Plant was responsible for the lack of a biological community along at least 11.5 miles of the Shenango River.

In 1992, Sharon Steel Corporation filed for bankruptcy.

The Sharon Steel Plant is not part of the Site. The environmental contamination resulting from plant operations at the Sharon Steel Plant on the east side of the Shenango River is being addressed by PADEP in accordance with the requirements of Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2 Cleanup Program).

B.2. History of Previous Environmental Investigations and Response Actions

The large mounds of slag wastes placed on the west side of the Shenango River and the contamination resulting from the slag wastes were evaluated under CERCLA. In August 1993, samples of groundwater, soil, ***sediment***, and surface water were collected by EPA. The samples were analyzed during an Expanded Site Investigation ("ESI") to assess Site conditions. EPA subsequently recommended the preparation of a ***Hazard Ranking System (HRS)*** score. The investigation identified

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[1] In October, 1980, RCRA was amended by adding section 3001(b)(3)(A)(ii), known as the Bevill exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals," slag from regulation as hazardous waste under Subtitle C of RCRA.

metals and ***organic compounds*** at the Site. Based on the findings of the ESI, the Site was recommended for HRS scoring in 1995. The HRS scoring package was completed in February 1998, and the Site scored high enough to warrant listing on the ***National Priorities List ("NPL")***. The Site was proposed to the NPL on March 6, 1998. It was formally added to the NPL on July 28, 1998, making it eligible for Federal cleanup funds.

In October 1999, EPA initiated an RI/FS for the Site to evaluate existing data; collect additional data, as necessary; and assess and consider appropriate actions. Due to the size and complexity of the Site, the RI was conducted in two phases. Phase 1, included monitoring well installation, groundwater evaluation; groundwater sampling; surface water and sediment sampling; slag and sludge sampling; preliminary ***air/dust dispersion modeling***; and preliminary ***risk assessments.*** Phase 1 was completed in early June 2001.

Phase 2 was completed in early 2004. Phase 2 included additional groundwater sampling; surface and subsurface soil sampling; residential well sampling; surface water and sediment sampling; biota sampling (fish, crayfish, amphibians, mammals, and reptiles); slag/sludge sampling in disposal areas; and the final human health and ecological risk assessments. The results of the Phase 1 and 2 investigations are summarized in the Final RI report, dated June 2005. The Final RI report indicated that the Site presents unacceptable risks to human health and the environment; therefore, remedial actions are required to control, reduce, or eliminate these risks.

An FS report for OU1 was prepared in April 2006 to develop an appropriate range of remedial actions for managing wastes and contaminated areas on the Site in a manner that will protect human health and the environment and meet applicable or relevant and appropriate requirements ("ARARs").

The remedial action for OU1 addresses all the remedial activities that are necessary to remediate OU1. The OU1 includes:

1) The Northern Area, which consists of approximately sixty one acres and includes those portions of the Site which are north of Ohio Street-the Northern Slag Source Pile, the Basic Oxygen Furnace (BOF) Sludge Source Area; and

2) The Southern Area, which consists of approximately two hundred and thirty one acres and includes those areas south of Ohio Street-the Southern Slag Source Pile which is currently being mined by a Prospective Purchaser Party, and the wetlands/floodplain located between the slag piles and the Shenango River (to the east) and the unnamed tributary (to the south).

The EPA selected remedy for OU1 is a Biosolid-Enhanced Cap and Passive Vegetated Groundwater Barrier with Institutional Controls and Long-Term Groundwater Monitoring. This will include re-grading and contouring the Site to prevent erosion of slag materials from the Site into the Shenango River and adjacent habitats.

Class A biosolids were blended with the top layer to create a protective cover over small plots of the contaminated slag and sludge in a treatability study for the OU1 parcel. The initial results from the treatability study were positive. The biosolid cover in the OU1 area will prevent contact with the slag and sludge material and prevent the migration of slag dust from the Site. The biosolids cap in the OU1 area will also minimize infiltration of metals to the groundwater through the treatment of the slag and sludge with biosolids binding with the metals. This treatment will reduce the mobility of the metals to the groundwater. Long-term monitoring of contaminants shall be conducted throughout the extent of the groundwater plume to determine if the biosolid source control measures are effective in reducing contaminant concentrations in groundwater to drinking water standards. A primary reason that the biosolid cap was selected for the OU1 area was that it was the most cost effective cleanup for the 292 acre portion of the Site.

In addition, there will be an installation of a passive vegetated groundwater barrier to reduce the volume of contaminated shallow groundwater currently being discharged into the Shenango River which will reduce the contaminant concentrations in surface sediment. There will be a re-establishment of a more natural floodplain along the Shenango River and implementation of erosion protection to prevent erosion of waste slag and sludge into the Shenango River and wetland/pond area to protect surface water and sediment adjacent to the Site.

In the OU1 ROD, institutional controls were selected to minimize health exposure risks so that the biosolid cap is not damaged and to prohibit shallow contaminated groundwater (0 ft-120 ft) under the Site from being used for drinking water on Site.

For the purposes of implementation, OU2 includes the asphalt plant and trucking storage company properties totaling approximately 33 acres. This portion of the Site will be addressed by this separate, additional remedial action (OU2). In the 2006 Record of Decision for the Site, EPA deferred the selection of a remedy for the OU2 portion of the Site because EPA could not implement a biosolid cap on this portion of the Site without negatively impacting Dunbar and the William Brothers' business operations. An FS report for OU2 was prepared in September 2007 to develop an appropriate range of remedial actions for addressing wastes and contaminated areas on OU2 in a manner that will protect human health and the environment and meet ***applicable or relevant and appropriate requirements*** (***ARARs***).

This selected remedy will address the 33 acre OU2 area by placing an asphalt cap or asphalt equivalent cap to address metal contamination in the slag and soil. In addition, certain institutional controls shall be implemented to restrict land use which shall prevent damage to the asphalt or asphalt-equivalent caps for OU2.

EPA accepted public comments on the proposed remedial action plan for OU2. The initial comment period began on September 17, 2012 and concluded on October 16, 2012. The comment period was then extended to November 19, 2012. A public meeting on the Proposed Plan for OU2 was held on October 4, 2012 at 6:30 pm at the Farrell City Building at 500 Roemer Blvd in Farrell, Pennsylvania.

The institutional controls for the groundwater for the whole Site are in the 2006 OU1 ROD and apply to the groundwater that also underlies the OU2 area. The groundwater institutional controls prohibit shallow contaminated groundwater (0 ft-120 ft) under the entire Site from being used for drinking water.

C. Community Participation

The Proposed Plan was released for public comment on October 4, 2012 and the RI/FS for OU2 was made available to the public in November 2012. These documents can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region III or at the following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp and at the Stey-Nevant Public Library in Farrell, Pennsylvania. The notice of the availability of these documents was published in the Sharon Steel Herald and Sharon Steel Vindicator on September 17, 2012 and November 5, 2012 respectively. The public comment period was held from September 17, 2012 to November 19, 2012. EPA hosted a Public Meeting on October 4, 2012 from 6:30 p.m. - 8:30 p.m. in the Council Chambers of the City Building located at 500 Roemer Boulevard, Farrell, PA 16121 to present the Proposed Plan and take public comments. At this meeting, representatives from EPA and PADEP answered questions about the Site and the remedial alternatives. EPA's responses to comments received during this period are included in the Responsiveness Summary, which is included as Part III of this Interim ROD.

These community participation activities meet the public participation requirements in CERCLA (42 U.S.C. § 9617) and the NCP (40 C.F.R. § 300.430 (f)(3)).

D. Scope and Role of Operable Unit

EPA has organized the work at the Site into two Operable Units (OUs).

- Operable Unit 1: Northern and Southern Slag, Sludge and Soil Areas Excluding Dunbar Asphalt and William Brothers Property, Floodplain on Site, Surface Water and Sediment Adjacent to the Site
- Operable Unit 2: Dunbar Asphalt and William Brothers Soil and Slag

EPA selected a remedy for OU1 in a ROD signed on September 16, 2006.

The Sharon Steel Farrell Works Site (See Figure 2) is comprised of three main areas:

1) The Northern Area, which consists of approximately sixty-one (61) acres and includes those portions of the Site which are north of Ohio Street - the Northern Slag Source Pile, the Basic Oxygen Furnace (BOF) Sludge Source Area (OU1);

2) An Asphalt Plant Property, approximately twenty-seven (27) acre area which includes an approximately eight (8) acre work area under the asphalt plant and an approximately six (6) acre property owned by a Trucking Company (OU2); and,

3) The Southern Area, which consists of approximately two hundred and thirty-one (231) acres and includes those areas south of Ohio Street (also OU1) - the Southern Slag Source Pile, which is currently being mined by a Prospective Purchaser Party, and the wetlands/floodplain located between the slag piles and the Shenango River (to the east) and the unnamed tributary (to the south) (see Figure 2).

The Prospective Purchaser Party operates an active slag mining operation on the Southern portion of the Site permitted by Pennsylvania Department of Environmental Protection (PADEP) and authorized by EPA pursuant to a Prospective Purchasers Agreement. The Prospective Purchaser Party will reduce the volume of contaminated waste slag at the Site by continuing to mine and remove slag from the Southern

Area. Mining is expected to remove over 3 million cubic yards of slag from the Site which is beneficially reused to make road aggregate. However, due to technical limitations (groundwater dewatering) and cost/benefit considerations, the Prospective Purchaser Party will not remove the last four feet of slag vertically. Four feet of slag will be left over the original native soil in the Southern Area. EPA will implement Phase 2 of the OU1 remedy and place a biosolid cap on the Southern property of the Site after the Prospective Purchaser Party completes mining the slag.

EPA Region 3 is waiting for funding to proceed with the remedial action for OU1 North. Groundwater treatment for the entire Site including groundwater under OU1 and OU2 and monitoring for site wide groundwater is under the 2006 OU1 ROD. In addition, shallow groundwater use for the entire Site including groundwater under the OU1 and OU2 areas will be restricted by institutional controls as required in the 2006 ROD for OU1. The groundwater institutional controls will prohibit shallow contaminated groundwater under the entire Site from being used for drinking water.

The alternatives for the floodplain were evaluated and selected as part of the OU1 Record of Decision; the floodplain will be covered with compost and vegetated. Upon completion of remedial actions, the restored floodplain will prevent erosion of slag and sludge into the Shenango River to protect surface water and sediment adjacent to the Site.

The OU2 area includes the asphalt plant and trucking storage company properties totaling approximately 33 acres. The Dunbar Asphalt Plant stores 12 different types of aggregate piles on an estimated 21 acres of their 27-acre parcel before the aggregate is made into asphalt at the plant and trucked off Site. The William Brothers Trucking Company parks trucks on their six acre parcel. This Interim Record of Decision describes the contamination at OU2, the risks associated with the exposure to the contamination, explains clean up alternatives assessed by EPA, and EPA's selected clean up alternative. The goal of the remediation of OU2 is (1) to prevent any kind of contact with metals in the slag including direct contact via ingestion and dermal contact; and indirect contact via inhalation of windborne dust and (2) to reduce the concentration of contaminants entering the groundwater and discharging into the Shenango River and the wetland/unnamed tributary so as to not negatively affect the OU1 groundwater remedy. Ultimately, this interim ***remedial action*** should reduce the overall amount of contamination entering the Shenango River from the Site.

E. Site Characteristics

This section of the interim ROD provides an overview of the Site's geology and hydrogeology, the sampling strategy used during Site investigations, and the nature and extent of contamination. Additional information regarding the nature and extent of contamination can be found in the Administrative Record.

E.1. Overview of the Site

The Sharon Steel Site is approximately 300 acres in size and is located approximately one mile southwest of the City of Farrell, Mercer County, Pennsylvania. The Site is located approximately 300 hundred feet east of the Pennsylvania/Ohio border. Land use in the area is industrial to the north and east and rural to the west and south. Please refer to Figure 1 for a Site Location Map and Figure 2 presents the Site Layout showing the extent of the OU2 study area.

E.2. Geology and Hydrogeology

E.2.1 *Geology*

The Site is located within the ***glaciated*** section of the Appalachian Plateaus Physiographic Province in Mercer County, Pennsylvania. Regional topography consists of hilly uplands and broad deep valleys cut by the Shenango River. The Shenango River valley contains Quaternary glacial and alluvial deposits, and the upland areas consist of glacial till. Regionally, glacial deposits are underlain by Mississippian and Pennsylvanian aged bedrock consisting of shale and sandstone with some thin beds of limestone, coal, and fireclay. At the Site, the Shenango River has completely eroded the Pennsylvanian bedrock, and as a result, the glacial and alluvial deposits beneath the Site are directly underlain by Upper Mississippian bedrock of the Pocono Group. The Site is located on the western ***floodplain*** of the Shenango River between the river and the Ohio and Pennsylvania state border.

The slag and sludge are extremely ***porous***. Most rainfall infiltrates the wastes and becomes groundwater. The limited surface runoff from OU-1 North and the Dunbar Asphalt Plant portion of OU-2 flows overland and eastward into the Shenango River within OU-1 North. Drainage from the northern portion of OU-1 South flows overland in a northward direction into a wetland area bisected by Ohio Street. There is no direct surface connection between this wetland area and nearby surface water ponds. Any hydraulic connection to nearby surface waters is through groundwater. Drainage from the southern portion of the Site area (south of Ohio Street) flows overland in a southward direction into the emergent wetland/pond area or into the unnamed tributary. Both the emergent wetland/pond complex and the unnamed tributary ultimately flow into the Shenango River.

E.2.2 *Source Areas*

Data from on Site soil and groundwater samples, as well as observations made during drilling operations, were compiled in the Remedial Investigation ("RI") report to develop an understanding of the nature of the soils, geology, and groundwater at the Site. The RI information provides an insight into the nature and extent of contamination at the Site and the direction that contamination may travel. Analysis of soil borings at the Site indicates that the waste piles of slag and sludge range in thickness from 5 to over 40 feet. The Northern Area contains two sources of contamination: the basic oxygen furnace (BOF) Sludge Disposal Area, and the Northern Slag Pile. The contamination from these areas is transported by rain water run-off onto OU2. The BOF Sludge Pile at OU1 North contains the most contamination. Risks in this area were driven by metals (arsenic, barium, cadmium, chromium, iron, lead, manganese, nickel, thallium, vanadium, and zinc). The Northern Slag Pile in OU1 North was the least contaminated source/slag area and contained metals, polyaromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). These contaminants were the most frequently detected constituents and were detected in all depth intervals.

E.2.3 *Groundwater*

Site-related contamination was detected in the groundwater, which flows beneath both operable units beneath the Site. There are four geologic units underlying the Site. Groundwater occurs in three aquifers underlying the Site. The four geologic units that underlie the Site: (1) an uppermost or "shallow" silty sand aquifer, which ranges in thickness from 0 to 30 feet; (2) an underlying silt and clay ***low permeability*** unit called the "glacial till," approximately 30 to 70 feet thick (not an aquifer); (3) a sand and gravel aquifer ("gravel zone" aquifer), approximately 70 to 120 feet thick; and (4) an underlying bedrock aquifer.

The two uppermost aquifers contain elevated levels of metals and organic chemicals above the levels of concern for risks. Groundwater in these areas moves towards the east and southeast. Depth to groundwater is approximately three to five feet below ground surface. At the BOF Sludge and the Northern Slag disposal areas, groundwater flow discharges to the Shenango River. Groundwater in the two lower geological units flows towards the north with some discharge to the Shenango River. Concentrations of Site-related constituents in the gravel and bedrock aquifers are generally consistent with regional ***background levels*** except for barium and thallium in the gravel zone. These observations suggest that there is little or no downward flow of contamination into the deeper confined aquifers. Flow in the confined aquifers (the shallow silty-sand aquifer and the glacial till aquifer) is generally to the north and east and does not discharge into the Shenango River. Wells in the confined aquifers indicated ***artesian conditions***.

E.2.4 *Residential Wells*

The majority of residences in the area surrounding the Site receive drinking water from the Aqua America Company, which has two surface water intakes along the Shenango River at 3.5 miles upstream and 18 miles downstream of the Site.

Drinking water wells for some of the residents along Stateline and Wansack Roads (west and southwest of the Site, respectively) contained levels of arsenic exceeding drinking water ***maximum contaminant levels*** ("MCLs"). Thallium was also detected at levels of potential concern. Based on the well surveys, these wells were ***screened*** in the gravel zone or bedrock aquifers. Data evaluated in the RI indicate that the aquifers which supply these local residents have a groundwater flow in the north or northeast, towards the Shenango River and away from residential wells. Based on this information, contaminated groundwater from the Site is not impacting these residential well users. Additionally, groundwater on Site is contaminated with metals and volatile organic compounds in the upper two aquifers on Site while the current residents have their drinking water wells in the lower bedrock aquifer, which has not been impacted by the Site.

E.2.5 *Shenango River*

Site-related contamination has resulted in some contamination of adjacent floodplain soils located between the disposal areas and the Shenango River. While contamination is not widespread, there are isolated depressions that contain elevated levels of metals and organic compounds. Shallow groundwater from the waste areas of the Site discharges into the Shenango River. The Site groundwater is the most significant source of Site contamination in the river and adjacent floodplains. The contamination was detected in sediment and surface water one kilometer downstream of the Site. According to the RI, benzo[a]pyrene, chromium, iron, manganese, nickel, and vanadium were detected in the floodplain soil. Benzo[a]pyrene and dibenz[a,h]anthracene were detected in the river sediment.

F. Sampling Activities and Extent of Contamination

1. Slag and Sludge Areas

The three source areas at the Sharon Steel Farrell Site [BOF Sludge Disposal Area (OU-1), Northern Slag Pile Area (OU2), and Southern Slag Pile Area (OU-1)] contain similar types of contaminants in soils, including metals, poly-aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. Some semi-volatile organic compounds (SVOCs): such as dibenzofuran, and others which are typically associated with PAH contamination were also detected at elevated concentrations in the source areas.

The BOF Sludge Disposal Area (OU1) is generally the most contaminated source area. In particular, 2-methylnaphthalene and several metals (cadmium, chromium, lead, and zinc) were detected at higher concentrations than in the Southern Slag Pile Area. PAHs were detected at significant concentrations in the northern and southern ends of the BOF Sludge Disposal Area. Most of the contaminants detected in the BOF Sludge Disposal Area were also detected in down gradient Shenango River floodplain soils and in sediment in the Shenango River. This finding indicates that contamination migrates from the BOF Sludge Disposal Area to low-lying areas via surface runoff and flooding.

The Northern Slag Pile Area is generally the least contaminated source area in terms of number of detected constituents and the concentrations of those constituents. Metals, PAHs, and PCBs were the most frequently detected constituents and were detected in all depth intervals in the soil (thus defining the vertical extent of contamination). The southern end of the Northern Slag Pile Area contained notably high concentrations of metals. Most of the contaminants detected in the Northern Slag Pile Area were also detected in downgradient Shenango River floodplain soils, southeast floodplain soils, and in sediment in the Shenango River. This finding indicates that contamination migrates from the Northern Slag Pile Area to these low-lying areas via surface runoff and flooding.

Metals, PAHs, pesticides, and PCBs were the most frequently detected constituents in all depth intervals in the Southern Slag Pile Area (OU1). This area also contained contaminants (VOCs and pesticides) not detected in other source areas; however, these were detected relatively infrequently and at relatively low concentrations. The Southern Slag Pile Area, particularly the central portion of the area, contains concentrations of most PAHs, Aroclor-1248, Dichloro-diphenyl-trichloroethane (DDT) metabolites, and heptachlor epoxide that are notably higher than concentrations in the other two source areas. Most of the contaminants detected in the Southern Slag Pile Area were also detected in downgradient southeast floodplain soils, unnamed tributary floodplain soils and sediment, wetland ponds, and the Ohio Street wetlands. These findings suggest that contamination likely migrates from the Southern Slag Pile Area to these low-lying areas via surface runoff and flooding.

2. Soil-to-Surface Water/Sediment Migration

Contaminants from source areas may be transported by wind or storm runoff, to be deposited on downgradient floodplains, surface water, and riverbed/streambed sediment. Soils from the BOF Sludge Area and the Northern Slag Pile Area can travel downslope into the Shenango River floodplain and ultimately into the Shenango River. Soils from the Southern Slag Pile Area can travel downslope into the Ohio Street wetland area or into the wetland complex south of the pile, into the wetland ponds, the unnamed tributary and ultimately into the Shenango River. Soils from the Southern Slag Pile Area also can travel downslope and into the western floodplain of the Shenango River and then into the Shenango River.

The analytical data generated in the RI revealed a spatial relationship between the nature of contaminants observed in the source areas and the distribution of these same contaminants in downgradient areas. In general, downgradient areas of floodplain soil associated with topographic depressions contained Site-related contaminants at relatively high concentrations. Downgradient riverbed or streambed sediment depositional areas also contained source-related contaminants at relatively high concentrations. These observations suggest a high likelihood that contaminants from the Site areas are moving downgradient into adjacent floodplains, wetlands, and surface waters.

3. Soil-to-Groundwater Migration

Based on the evaluation of Site characteristics and monitoring data, groundwater is one of the more important modes of transport for contaminants at the Site. During the field investigation, the sampling crew observed that water levels in the ponds located in the Southern Slag Pile Area would rise approximately 2 to 3 days after a steady rain. During periods of rainfall, water infiltrates the source areas containing contaminants and carries with it dissolved organic and inorganic constituents into the groundwater.

The analytical data for groundwater in the unconfined aquifers below the source areas (the surface and glacial till aquifers) indicated significantly high levels of the same metals detected in the source areas. In some areas, PAHs were detected in both source area soils and in underlying groundwater. The grain size and total organic carbon data provide an additional line of evidence that migration from soil-to-groundwater occurs rapidly at the Site. These observations indicate a high likelihood that contaminants from the source areas are leaching into groundwater in the unconfined aquifers.

The potential for contaminants to move into groundwater from source material is dependent on several physical and chemical properties of the particular contaminants. The ability for a contaminant to move from soil into water is affected by the organic carbon-normalized partition coefficient (K_{oc}) for contaminants in the soil/slag. Contaminants with high K_{oc} are likely to strongly adsorb to soil particles and will resist leaching into groundwater. These chemicals generally include SVOCs, PCBs, PAHs and pesticides.

Metals present as soluble salts can dissolve in percolating precipitation and can contaminate the groundwater. Metals present as insoluble minerals will be more resistant to migration in dissolved form. Contaminant migration is also expected to be slower than groundwater flow due to retardation as a result of adsorption to soil particles. Retardation may be negligible for the highly mobile constituents (such as the metals) and significant for the relatively immobile compounds (such as large, hydrophobic organic contaminants). Constituents also disperse laterally as they are transported downgradient and are diluted by adjacent, uncontaminated groundwater.

4. Groundwater-to-Surface Water Migration

Based on the hydrogeologic assessment conducted in the RI, groundwater in the unconfined aquifers at the Site (the surficial and the glacial till) generally flows to the east and southeast and discharges into adjacent surface water bodies. At the BOF Sludge and the Northern Slag Disposal Areas, groundwater flow in these surface aquifers discharges into the Shenango River. At the Southern Slag Disposal Area, groundwater flow in the surficial aquifers discharges into the wetland/pond complex, the unnamed tributary, and the Shenango River. Ultimately, all groundwater that interacts with source area material will discharge into the Shenango River.

The concentrations of Site-related constituents in the groundwater are significant at the source areas. However, as groundwater migrates toward distant surface discharge points, concentrations generally decrease due to retardation, adsorption, and dilution. Groundwater is expected to flow downward from the surficial aquifer into the glacial till as evidenced by the generally consistent concentrations of Site related metals in both aquifers. Glacial sediments on-Site are extensive enough to produce a confining bed above the gravel zone and underlying bedrock that results in artesian conditions in the vicinity.

Concentrations of most detected constituents in the gravel and bedrock aquifers, below and downgradient of the source areas, are generally consistent with regional background levels. In addition, the concentrations of these constituents decrease with depth. The contaminant concentrations and the confined aquifer (indicating upward flow from the deeper aquifers into the shallow aquifers and the Shenango River), suggest that there is no substantial downward flow into the deeper confined aquifers.

5. Food Chain Effect

Contaminant migration through biological organisms may occur through direct exposure to contaminated media, **bioaccumulation** through ingestion of contaminated media, and food-chain transfer from prey to predator. EPA recognizes the contaminants listed in Table 4-2 of *Bioaccumulative Testing and Interpretation for the Purposes of Sediment Quality Assessment, Status and Needs* (EPA, 2000a) as highly susceptible to transport by these biological or ecological mechanisms. Bioaccumulative contaminants from this list detected in media at the SSFW Site include: arsenic, cadmium, chromium (as hexavalent chromium), copper, lead, mercury (as methyl mercury), nickel, silver, zinc, PAHs, pesticides, PCBs (Aroclors), and dioxin/furans.

6. Soil-to-Air Migration

Fine-grained material from source areas may be transported by the wind and released to the atmosphere. Constituents bound to surface soils may be transported as low-density or small diameter particulates and dust, which are suspended by wind energy, then blown to downwind locations. Although some portions of the source areas are covered with vegetation, most of the material at the source areas have little or no cover. Dust formation, and therefore soil-to-air migration of contaminants, may be significant during extended periods of dry weather.

An air dispersion model is a computer model used to study and predict the transport of air and pollutants in the air. Air dispersion modeling was conducted as part of the RI and the associated human health risk assessment (MACTEC, 2004) to calculate the concentration of non-volatile and semi-volatile contaminants in the air due to the surface soil contamination of the Site. The results of the air modeling analysis are presented in the *Air Dispersion Modeling Analysis and Identification of Chemicals of Potential Concern for Inhalation Exposure* report (Phase 1 and Phase 2; MACTEC, 2004). Contaminant concentrations in the air were predicted using EPA's air dispersion model, Industrial Source Complex Short Term version 3 (ISCST3) with Site-specific assumptions regarding emissions of the erodible surface material of the Site.

To evaluate air migration, seven on-Site exposure areas were identified. The areas are (1) Northern Slag Pile, (2) the BOF Sludge Area, (3) the Southern Slag Area, (4) the Shenango River Floodplain, (5) the Unnamed Tributary Floodplain, (6) the Southeast Floodplain, and (7) the Ohio Street Wetlands. Four potential exposure areas located beyond the property boundaries were also identified. The four other areas are: (1) the State Line Residential Area, (2) the Wansack Residential Area, (3) the Ohio Street Industrial Area, and (4) the Farrell Residential Area. A fifth potential exposure area was identified for areas not encompassed by any of the other exposure zones.

Details of the constituents and predicted air concentrations for all areas are presented in the Phase 2 report (see Appendix H of the RI report; Black and Veatch 2005). Dust-borne contaminants of concern include PAHs, pesticides, PCBs, total 2,3,7,8-tetrachlorodibenzodioxin ("TCDD") toxic equivalent quotient ("TEQ") and inorganic contaminants. The surface soils at the Site have experienced long-term natural weathering and very likely have lost the bulk of volatile constituents as a result of volatilization, leaching to groundwater, and/or runoff to surface water. Therefore, air transport of volatile organics likely is not an important migration process at the Site. The locations of the highest concentrations varied among the constituents. However, the model estimated that the highest dust-borne contaminant concentrations would be located within the boundaries of the three source areas (Northern Slag Pile, BOF Sludge Area, Southern Slag Area) and would decrease rapidly with distance from the sources. The air modeling indicated that there is a potential for dust-borne contamination from the source areas to move from the Site to adjacent areas, primarily toward the east-northeast. However, the distribution of dust-borne contaminants at levels of concern is general limited to areas within 500 feet of the Site (See Black and Veatch Final Feasibility Study Report June 2006). These documents can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region III or at the following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp.

G. Conceptual Site Models

A Conceptual Site Model was developed to identify which human exposure pathways were complete or could be potentially complete in the future. The following discussion identifies complete pathways for potential on-Site and off-Site receptors as identified in the Conceptual Site Model.

The primary sources of Site-related contamination are the slag and soil located at the Northern and Southern Areas for OU1 and OU2 which were placed during the operation of the former Sharon Steel Plant. Site-related contaminants are released by leaching from slag and sludge to groundwater and by erosion combined with overland runoff into the Shenango River. Groundwater contamination impacts the shallow aquifer on Site, and as a secondary source, impacts surface water and sediments, which in turn affect bio-uptake in certain plants and animals off Site. Erosion of slag and sludge and overland runoff also contribute contamination to surface water and sediments. Wind erosion of slag and sludge will also release contamination into the air. (See conceptual Site model in Section 1.3 and 1.4 in the Final Feasibility Study Report for the Sharon Steel Farrell Works OU2, September 2007). These documents can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region III or at the following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp.

The ecological Conceptual Site Model predicts relationships between stressors and ecological entities. It evaluates contaminants, potential ecological receptors and exposure pathways. The primary exposure medium to ecological receptors is slag and sludge waste and contaminated soils. Plants, vertebrates and invertebrates in floodplain habitats and wetlands habitats have been exposed to contaminated soils. (See conceptual Site model in Section 5 in the Final Ecological Risk Assessment Report for the Sharon Steel Farrell Works Site, June 2005). These documents can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region III or at the following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp.

H. Current and Potential Future Land Use and Water Use

The Northern and Southern portions of the Site are currently located within an industrial area. The Northern Area is approximately sixty-one acres and includes those portions of the Site which are north of Ohio Street (See Figure 2). The Northern portion of the Site includes an asphalt plant property (OU2) (see Figure 3): a twenty-seven acre area which includes an asphalt plant and a six acre property owned by a trucking company currently used as a garage and truck storage area (see Figure 4). The Southern Slag (OU1) pile consists of approximately two hundred and thirty one acres and includes those areas south of Ohio Street; the Southern Slag Pile which is currently being mined by a prospective purchaser party (231 acres), and the wetlands/***floodplain*** located between the slag piles and the Shenango River (to the east) and the unnamed tributary (to the south) (See Figure 2). The Prospective Purchaser Party operates an active slag mining operation on the Southern portion of the Site permitted by Pennsylvania Department of Environmental Protection (PADEP) and authorized by EPA pursuant to the Prospective Purchasers Agreement ("PPA").

As discussed earlier in Section D, Scope and Role of Operable Unit, the Prospective Purchaser Party will reduce the volume of contaminated waste slag at the Site by continuing to mine and remove slag from the OU1 Southern Area. Mining is expected to remove over 3 million cubic yards of slag from the Site, which is beneficially reused to make road aggregate mixed in asphalt. The PPA Party will leave four feet of slag over the original native soil in the OU1 Southern Area and then the biosolid cap remedy from the OU1 ROD will be completed in this area.

Protection of groundwater and surface water is provided by the OU1 ROD, please see the OU1 ROD for the evaluation of surface water and groundwater impacts from the Site and for current use, and future use of water for the Site. The Site groundwater is not currently being used for drinking water for OU1 and OU2.

In the public official briefing and the public meeting for the proposed plan, EPA solicited the public's and local officials' preference for future use of the Site. There was interest from the officials and the public to put in a road through the Site for access from Pennsylvania to Ohio. Other possibilities for use of the Site included open space and developing industrial facilities on the Site.

I. Summary of Site Risks

The ***Risk Assessment*** for the Site was conducted before the Site was separated into two operable units. Potential risks to human health were determined by a Baseline Human Health Risk Assessment (HHRA). Risks to the environment were determined by a Baseline Ecological Risk Assessment (ERA). The risk assessments estimated the likelihood of adverse effects if no cleanup action were taken at a Site. The HHRA and ERA reports are part of the RI report. The HHRA and the ERA indicated that contamination in soils, groundwater, sediment, surface water and fish tissue at, or impacted by, the Site pose an unacceptable level of risk to human health. It is EPA's current judgment that the selected cleanup identified in this Interim Record of Decision, or one of the other active measures considered in the FS and described in this Interim Record of Decision, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The OU2 area at the Sharon Steel Site will be implemented as an interim remedy in order to address the current exposure of the on Site workers to slag and contaminated soil material. For more detailed human health and ecological risk information, please refer to the November 2012 OU2 Human Health Risk Assessment (HHRA) and August 2007 OU2 Screening-Level Ecological Risk Assessment (SLERA) available in the Administrative Record for the Site.

HOW IS HUMAN HEALTH RISK CALCULATED?

A Superfund human health risk assessment estimates the baseline risk. The baseline risk is an estimate of the likelihood of developing cancer or non-cancer health effects if no cleanup action were taken at a Site. To estimate baseline risk at a Superfund Site, EPA undertakes a four-step process:

Step 1: Analyze Contamination (Data Evaluation; Identify Chemicals of Potential Concern)
Step 2: Estimate Exposure (Exposure Assessment)
Step 3: Assess Potential Health Dangers (Toxicity Assessment)
Step 4: Characterize Site Risk (Risk Characterization)

In Step 1, EPA looks at the concentrations of contaminants found at a Site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparison between Site-specific concentrations and concentrations reported in past studies helps EPA to determine which concentrations are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a "reasonable maximum exposure" scenario, which portrays the highest level of exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential risks. EPA considers two types of risk: cancer and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund Site is generally expressed as an upper bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to Site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected from all other causes. For non-cancer health effects, EPA calculates a "hazard index." The key concept here is that a "threshold level" (measured as a Hazard Index (HI) of less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, EPA determines whether Site risks are great enough to cause health problems for people at or near the Superfund Site. The results of the three previous steps are combined, evaluated, and summarized. EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total Site risk. Generally, cancer risks between 10^{-4} and 10^{-6}, and a non-cancer hazard index of 1 or less are considered acceptable for EPA Superfund Sites.

I.1 Summary of Human Health Risk Assessment

The Baseline Human Health Risk Assessment ("BHHRA") for the Site was updated for OU-2 and is found in the February 7, 2012 Sharon Steel Farrell OU-2 Risk Update Human Health Risk Assessment

("HHRA") available in the Administrative Record for the Site. The Baseline Human Health Risk Assessment was prepared in order to determine the current and potential future effects of slag in the absence of further cleanup actions at the Site. The BHHRA consisted of a four step process: (1) the identification of chemicals of potential concern ("COPCs"), i.e., those that have the potential to cause adverse health effects; (2) an exposure assessment, which identified actual and potential exposure pathways, potentially exposed populations, and the magnitude of possible exposure; (3) a toxicity assessment, which identified the adverse health effects associated with exposure to each COPC and the relationship between the extent of exposure and the likelihood or severity of adverse effects; and (4) a risk characterization, which integrated the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the Site, including carcinogenic and non-carcinogenic risks. A summary of the four parts of the human health risk assessment, which support the need for this interim remedial action, is discussed below.

I.1.1 Chemicals of Potential Concern

During the Remedial Investigation, a number of inorganic chemicals were detected in on-Site soils, slag, and dust. The soil/slag/dust data for the Northern Slag Pile area were used as the most representative of OU2 soils, due to their respective locations (see Figures 2 & 3 of the 2006 OU1 ROD). The 2012 update focused on the Reasonable Maximum Exposure ("RME") assessment, since that typically serves as the basis for action. First, RI data for the Northern Slag area were rescreened to verify the chemicals of potential concern ("COPCs"). For chronic exposures, the new screening criteria were the November 2011 Regional Screening Level Tables. For acute exposures, the original cited sources were checked and updated values as of February 2011 were used. The updated COPCs, along with their maximum concentrations and the exposure point concentrations ("EPCs") that were used in the risk assessment, are shown below:

Chemical	Maximum conc.	EPC
Surface soil (mg/kg)		
Benz[a]anthracene	1.4	0.818
Benzo[a]pyrene	0.69	0.357
Benzo[b]fluoranthene	1	0.332
Dibenz[a,h]anthracene	0.2	0.2
Indeno[1,2,3-c,d]pyrene	0.44	0.3
Dieldrin	0.035	0.0076
Aroclor 1248	0.48	0.135
Aroclor 1254	0.24	0.0974
Aroclor 1260	0.36	0.127
Aluminum	44300	25300
Arsenic	23	10.4
Chromium	1230	292
Cobalt	10	6.2
Iron (See Section I.1.4.2	275000	51400

Chemical	Maximum conc.	EPC
for information on iron)		
Manganese	18000	5040
Vanadium	404	93.7
Deep subsurface soil (mg/kg)		
Benz[a]anthracene	0.17	0.129
Benzo[a]pyrene	0.27	0.232
Aluminum	54300	29900
Arsenic	13.6	8.74
Total Chromium	37.9	17.7
Cobalt	14.6	8.7
Iron	33300	18800
Manganese	4390	1640
Dust emissions (chronic scenario) (ug/m^3)		
Aluminum	4.01	4.01
Arsenic	0.0018	0.0018
Cadmium	2.68E-3	2.68E-3
Chromium	0.168	0.168
Cobalt	1.07E-3	1.07E-3
Manganese	1.8	1.8
Dust emissions (acute scenario) (ug/m^3)		
Aluminum	1070	1070
Arsenic	0.572	0.572
Barium	10.7	10.7
Iron	6220	6220
Nickel	3.91	3.91
Vanadium	10.2	10.2
Zinc	883	883

I.1.2 Exposure Assessment

The Baseline Risk Assessment was conducted in order to determine the current and potential future effects (if no cleanup actions were taken at the Site) of contaminants in slag and on-Site soils on human health and the environment. The current and potential future land use plays a key role when EPA determines the exposure scenarios to be evaluated in the Baseline Risk Assessment. The Site was historically used for industrial purposes and is currently zoned as industrial.

Potential human health effects associated with exposure to the COPCs were estimated quantitatively or qualitatively through the evaluation of several actual or potential exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances at the Site. Demographics and land use were evaluated to assess present and potential future populations working or otherwise spending time at the Site. The exposure scenarios evaluated in the Baseline Risk Assessment included: 1) construction worker, 2) visitor /trespasser, 3) industrial worker, 4) adult resident, 5) child resident and 6) total adult and child. The Baseline Risk Assessment considered the following effects: 1) incidental ingestion of slag and on-Site soils; 2) dermal contact with slag and on-Site soils; and 3) inhalation of air and fugitive dust from slag and on-Site soils. Infiltration of slag and soil into shallow groundwater was identified as a Site-wide issue in OU1, as was runoff into surface water and sediment. A number of assumptions were used in the risk assessment process to calculate the dose for each exposure pathway since it is seldom possible to measure a specific dose.

I.1.3 Toxicity Assessment

Excess lifetime cancer risks were determined for each exposure pathway by incorporating the chemical-specific cancer slope factor ("CSF") or inhalation unit risk ("IUR"). CSFs and IURs have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic substances. The resulting risk estimates are expressed in scientific notation as a probability (e.g., $1x10^{-6}$ or 1/1,000,000) and indicate, using this example, that an average individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of Site-related exposure to the compound at the stated concentrations. All risks estimated represent an "excess lifetime cancer risk," or the additional cancer risk on top of that which we all face from other causes such as genetic and lifestyle factors.

In assessing the potential for exposure to a chemical to cause adverse health effects other than cancer (referred to as non-cancer effects), a hazard quotient ("HQ") is calculated by dividing the daily intake level by the Reference Dose ("RfD"), Reference Concentration ("RfC"), or other suitable benchmark. EPA has developed RfDs and RfCs for many chemicals which represent a level of exposure that is expected to result in no adverse health effects. RfDs and RfCs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that the potential for adverse health effects will not be underestimated.

At this Site, acute toxicity factors were also used to evaluate acute exposures to dust (airborne slag/contaminated soil emissions). The acute toxicity values were referenced by the EPA Air Toxics program from a variety of sources (which are listed in the risk assessment document), and they tend to be used for high-concentration, short-duration events.

Site Groundwater

All risks for the groundwater on Site are outlined in the Final Baseline Human Health Risk Assessment Report dated June 2005 and addressed by the OU1 ROD dated November 2006. Groundwater at the Site is contaminated above drinking water standards. However, there are no current users of contaminated groundwater at the Site. The groundwater data demonstrates a groundwater risk to prohibit groundwater being utilized as a future drinking water supply and (See Record of Decision for OU-1, 11/06 -Table 1 Summary of Potential Risks and Hazards of Concern Sharon Steel Works for Shallow Aquifer, Glacial Till Aquifer, and Gravel Zone in Groundwater) indicate a potential unacceptable cancer risk associated with the use of shallow zone (0 Ft- 30 Ft) or glacial till zone (30 Ft- 70 Ft), and an unacceptable non-cancer hazard in the gravel zone (70 Ft- 120 Ft). As part of the OU1 remedy institutional controls prohibit shallow contaminated groundwater under the entire Site (groundwater underlying OU1 and OU2 areas) from being used for drinking water purposes on Site.

I.1.4 Risk Characterization

In the risk characterization step of the risk assessment, the Site concentrations, exposure assumptions and toxicity factors are combined to produce quantitative estimates of risk.

For acute exposures to dust, those quantitative estimates of risk took the form of margins of exposure ("MOEs"), in which the modeled dust concentrations were divided by the acute toxicity criteria. If an MOE exceeds 1, then the dust exceeds the acute toxicity factor. The MOEs for arsenic, barium, iron, vanadium and nickel ranged from 2 to 20. None of these constituents could be attributed to background. Although the MOE estimates associated with these metals exceed 1, it is important to acknowledge some of the uncertainties associated with the analysis, such as the estimates of exposure (e.g., dispersion modeling rather than direct measurement) and toxicity (e.g., the varying bases of the acute toxicity criteria). The MOE assessment basically indicates that if there were a worst-case, short-term, high-dust event (such as from an extreme weather event), the dust could reach levels of acute concern. While unlikely, this possibility cannot be completely ruled out.

For long-term cancer risks, the quantitative risk estimate is a cancer risk expressed as a probability, as described above. EPA's generally acceptable risk range for Site-related exposure is $1x10^{-4}$ to $1x10^{-6}$. A $1x10^{-4}$ carcinogenic risk means that 1 person in 10,000 would have an increased risk for cancer, while a $1x10^{-6}$ carcinogenic risk means that 1 person in 1,000,000 would have an increased risk for cancer. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to multiple hazardous substances or exposure via multiple pathways.

For long-term non-cancer risks, the quantitative estimates are Hazard Quotients ("HQs") and Hazard Indices ("HIs"). The HQ was defined above. An HQ of 1 or less indicates that a receptor's dose of a single contaminant is less than the RfD or RfC, and that harmful non-cancer effects from a chemical are unlikely. The Hazard Index ("HI") is generated by adding the HQs for all COPCs that affect the same target organ (e.g., liver) within or across those pathways by which the same individual may reasonably be exposed. An HI of 1 or less indicates that harmful non-cancer health effects are not expected as a result of exposure to all of the COPCs within a single or multiple exposure pathway(s). Exceeding an HI of 1 does not necessarily mean that adverse effects are expected, only that they can no longer be ruled out.

The current and potential risk to human health posed by Site conditions at OU2 exceed EPA's acceptable range for non-cancer risks (HI). The updated RME risk estimates for the Northern Slag area are shown in the tables below.

The risks were originally calculated with two different assumptions for chromium: that it was in the hexavalent form, or that it was in the trivalent form. Chromium is sampled as total chromium (thus not distinguishing between trivalent and hexavalent), but the trivalent form is far more common in soil than the more toxic hexavalent form. In the absence of known uses of hexavalent chromium on Site, the much less toxic trivalent form is expected on Site. The risks shown below do not include the risks from hexavalent chromium, which would only further increase the cancer and non-cancer risks. In both the trivalent or hexavalent chromium case, risks posed from metals exceed EPA's acceptable risk goals: the Hazard Index is well above 1, although chromium would only be a chemical of concern if it were in the hexavalent form. Because the interim action for OU2 is a cap, it is expected to address the risk from all metals including chromium, even if the chromium were present in the hexavalent form. As stated above, the BHHRA for the OU2 portion of the Site was updated in 2012 and is part of the administrative record. These documents can be found in the Administrative Record file for the Site at the information repository maintained at the EPA Docket Room in Region III or at the following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp.

The following updated risk estimates were therefore obtained. In the tables below, HI = Hazard Index, CR = Cancer Risk, Ing = Ingestion, Derm = Dermal, and Inhal = Inhalation.

Chronic Risks
Industrial Worker
Surface + Deep Soil

Compound	Ing + Derm HI	Ing + Derm CR	Inhal HI	Inhal CR	Total HI	Total CR
benz[a]anthracene	-	3.00E-07	-	-	-	3.00E-07
benzo[a]pyrene	-	2.00E-06	-	-	-	2.00E-06
benzo[b]fluoranthene	-	9.00E-08	-	-	-	9.00E-08
dibenz[a,h]anthracene	-	6.00E-07	-	-	-	6.00E-07
indeno[1,2,3-c,d]pyrene	-	8.00E-08	-	-	-	8.00E-08
Aroclor 1248	-	1.00E-07	-	-	-	1.00E-07
Aroclor 1254	0.006	8.00E-08	-	-	0.006	8.00E-08
Aroclor 1260	-	1.00E-07	-	-	-	1.00E-07
dieldrin	1.00E-04	4.00E-08	-	-	1.00E-04	4.00E-08
aluminum	0.02	-	0.2	-	0.2	-
arsenic	0.03	4.00E-06	0.03	6.00E-07	0.06	5.00E-06
cadmium	-	-	0.03	4.00E-07	0.03	4.00E-07
cobalt	0.015	-	0.04	8.00E-07	0.06	8.00E-07
iron	0.03	-	-	-	0.03	-
manganese	0.6	-	8	-	9	-
vanadium	0.007	-	-	-	0.007	-
TOTAL	**0.7**	**7E-6**	**8**	**2E-6**	**9**	**1E-05**

Construction Worker
Surface + Deep Soil

Compound	Ing + Derm HI	Ing + Derm CR	Inhal HI	Inhal CR	Total HI	Total CR
benz[a]anthracene	-	3.00E-08	-	-	-	3.00E-08
benzo[a]pyrene	-	2.00E-07	-	-	-	2.00E-07
benzo[b]fluoranthene	-	1.00E-08	-	-	-	1.00E-08
dibenz[a,h]anthracene	-	6.00E-08	-	-	-	6.00E-08
indeno[1,2,3-c,d]pyrene	-	9.00E-09	-	-	-	9.00E-09
Aroclor 1248	-	1.00E-08	-	-	-	1.00E-08
Aroclor 1254	0.01	8.00E-09	-	-	0.01	8.00E-09
Aroclor 1260	-	1.00E-08	-	-	-	1.00E-08
dieldrin	4.00E-04	4.00E-09	-	-	4.00E-04	4.00E-09
aluminum	0.04	-	0.2	-	0.2	-
arsenic	0.07	8.00E-07	0.03	2.50E-08	0.1	1.00E-06
cadmium	-	-	0.03	2.00E-08	0.03	2.00E-08
cobalt	0.04	-	0.04	3.00E-08	0.08	3.00E-08
iron	0.1	-	-	-	0.1	-
manganese	1	-	8	-	9	-
vanadium	0.03	-	-	-	0.03	-
TOTAL	**1**	**1E-6**	**8**	**8E-8**	**10**	**1E-6**

Trespasser/Visitor
Surface + Deep Soil

Compound	Ing + Derm HI	Ing + Derm CR	Inhal HI	Inhal CR	Total HI	Total CR
benz[a]anthracene	-	2.00E-07	-	-	-	2.00E-07
benzo[a]pyrene	-	1.00E-06	-	-	-	1.00E-06
benzo[b]fluoranthene	-	5.00E-08	-	-	-	5.00E-08
dibenz[a,h]anthracene	-	3.00E-07	-	-	-	3.00E-07
indeno[1,2,3-c,d]pyrene	-	5.00E-08	-	-	-	5.00E-08
Aroclor 1248	-	2.00E-08	-	-	-	2.00E-08
Aroclor 1254	0.002	2.00E-08	-	-	0.002	2.00E-08
Aroclor 1260	-	2.00E-08	-	-	-	2.00E-08
dieldrin	6.00E-05	8.00E-09	-	-	6.00E-05	8.00E-09
aluminum	0.004	-	0.01	-	0.01	-
arsenic	0.007	1.00E-06	0.001	2.00E-08	0.008	1.00E-06
cadmium	-	-	0.002	1.00E-08	0.002	1.00E-08
cobalt	0.004	-	0.002	2.00E-08	0.006	2.00E-08
iron	0.01	-	-	-	0.01	-
manganese	0.2	-	0.4	-	0.6	-
vanadium	0.003	-	-	-	0.003	-
TOTAL	**0.2**	**3E-6**	**0.4**	**5E-8**	**0.7**	**3E-6**

Resident HI
Surface + Deep Soil

Compound	Ing + Derm HI	Ing + Derm CR	Inhal HI	Inhal CR	Total HI	Total CR
benz[a]anthracene	-	-	-	-	-	-
benzo[a]pyrene	-	-	-	-	-	-
benzo[b]fluoranthene	-	-	-	-	-	-
dibenz[a,h]anthracene	-	-	-	-	-	-
indeno[1,2,3-c,d]pyrene	-	-	-	-	-	-
Aroclor 1248	-	-	-	-	-	-
Aroclor 1254	0.05	-	0.05	0.007	-	.007
Aroclor 1260	-	-	-	-	-	-
dieldrin	0.001	-	0.001	2e-4	-	.00E-04
aluminum	0.15	0.8	0.95	0.02	0.8	0.8
arsenic	0.2	0.1	0.3	0.03	0.1	0.1
cadmium	-	0.1	0.1	-	0.1	0.1
cobalt	0.1	0.2	0.3	0.02	0.2	0.2
iron	0.4	-	0.4	0.05	-	0.05
manganese	3.5	34.5	38	0.5	34.5	5
vanadium	0.1	-	0.1	0.01	-	.01
TOTAL	**4**	**36**	**39**	**0.6**	**36**	**36**

Resident CR
Surface + Deep Soil

Compound / Age Range/Date	Child Ing + Derm CR		Child Inhal CR		Adult Ing + Derm CR		Adult Inhal CR		Total CR
	0-2	6Feb	0-2	6-Feb	16-Jun	16-30	16-Jun	16-30	
benz[a]anthracene	2e-6	1e-6	-	-	4e-7	2e-7	-	-	e-6
benzo[a]pyrene	e-6	4e-6	-	-	2e-6	7e-7	-	-	1e-5
benzo[b]fluoranthene	e-7	4e-7	-	-	e-7	7e-8	-	-	1e-6
dibenz[a,h]anthracene	e-6	2.5e-6	-	-	9e-7	4e-7	-	-	8e-6
indeno[1,2,3-c,d]pyrene	6e-7	4e-7	-	-	1e-7	6e-8	-	-	1e-6
Aroclor 1248	e-8	2e-7	-	-	6e-8	8e-8	-	-	4e-7
Aroclor 1254	e-8	1e-7	-	-	4e-8	6e-8	--	-	3e-7
Aroclor 1260	e-8	2e-7	-	-	5e-8	7e-8	-	-	4e-7
dieldrin	e-8	6e-8	-	-	2e-8	3e-8	-	-	1e-7
aluminum	-	-	-	-	-	-	-	-	-
arsenic	3e-6	6e-6	2e-7	4e-7	2e-6	.3e-6	1e-6	1.5e-6	1e-5
cadmium	-	-	1e-7	3e-7	-	-	7e-7	9e-7	2e-6
cobalt	-	-	3e-7	5e-7	-	-	1e-6	2e-6	4e-6
iron							-	-	-
manganese	-	-	-	-	-	-	-	-	-
vanadium	-	-	-	-	-	-	-	-	-
TOTAL	**2e-5**	**1.5e-5**	**6e-7**	**1e-6**	**6e-6**	**5e-6**	**3e-6**	**4e-6**	**4e-5**

Acute risks

Acute risks were evaluated using a margin-of-exposure (MOE) comparison to the acute criteria identified during screening. The MOE for zinc was 0.9 and for aluminum was 1, indicating these chemicals do not exceed their acute concentrations of concern. The other MOEs (for arsenic, barium, iron, vanadium and nickel) ranged from 2 to 20. None of these constituents could be attributed to background. Previously, the total RME acute margin of exposure estimate for all receptors was 80, driven by arsenic, barium, nickel, and vanadium. Although the MOE estimates associated with several metals exceed unity, it is important to consider some of the uncertainties associated with the analysis such as the estimates of exposure (e.g., dispersion modeling) and toxicity (e.g., basis of the acute toxicity criteria). The MOE assessment basically indicates that if there were a worst-case, short-term, high-dust event (such as from an extreme weather event), the dust could reach levels of acute concern. While unlikely, this possibility cannot be completely ruled out.

Conclusion on Risk Characterization

These risks are summarized along with the COC's in the Human Health Risk Summary Table 1 in the Northern Slag Area with Slag and Soil below.

Table 1: Human Health Risk Summary
in the Northern Slag Area
Slag and Soil for OU2

Receptor	Cancer Risk	HI	Chemicals of concern
Industrial worker	1E-05	9	Non-cancer hazard due to Aluminum and Manganese. Potential acute effects due to Arsenic, Barium, Iron, Nickel, Vanadium.
Construction worker	1E-06	10	
Adult resident	*	36	
Child resident	*	39	
Total adult and child	4E-05	n/a	
Trespasser/visitor	3E-06	0.7	

*The total cancer risk of 4E-05 reflects a long-term exposure that includes years of exposure in both childhood and adulthood.

I.1.4.1 Cancer Risk

For slag and contaminated soil, the Human Health Risk Assessment found that the carcinogenic risks from potential exposure to slag were within EPA's acceptable range of 1E-6 to 1E-4, as presented in Table 1, assuming the chromium is not in hexavalent form.

I.1.4.2 Non-Cancer Risk from Slag

The non-carcinogenic risks from slag and contaminated soil resulted in a total Hazard Index (HI) above 1 for workers and residents. For long-term exposure, aluminum and manganese in the slag and soil were the chemicals that contributed most significantly. For potential acute exposures to dust, the chemicals of concern were arsenic, barium, iron, nickel, and vanadium.

As a result of these non-cancer hazards, EPA has identified these seven metals as chemicals of concern: aluminum, arsenic, barium, iron, nickel, vanadium and manganese. Although iron is not a hazardous substance, EPA finds that, at this Site the levels detected, iron is a pollutant or contaminant that may present an imminent and substantial danger to the public health or welfare of the United States pursuant to 40 C.F.R. §300.400(a)(2).

I.1.4.3 Uncertainty in Risk Characterization

Risk assessment provides a systematic means of organizing, analyzing, and presenting information on the nature and magnitude of risks posed by contaminant exposures. Uncertainties are present in all risk assessments because of the quality of available data and the need to make assumptions and develop inferences based on incomplete information about existing conditions and future circumstances. To support decision-making processes, significant uncertainties in the risk assessment are discussed in this section and in greater detail in the HHRA documents. The greatest sources of uncertainty were discussed above and include:

Uncertainty about acute exposures: the likelihood of acute high-dust events, and the appropriate MOE; in this case the bias is probably high, to ensure protectiveness;

Uncertainty about chromium: EPA believes chromium is not predominantly hexavalent in OU2 slag and soil. This assumption carries a low bias, but the remedy would incidentally address chromium in either case. Therefore, the remedy is still protective;

Uncertainty associated with data analysis: This is expected to be minimal, since the data were fully validated prior to use in the risk assessment;

Uncertainty in the COPC screening process: While chemicals without toxicity factors were omitted from the risk assessment, producing a low bias in that instance, the other general assumptions used in the COPCs selection process were conservative (biased high) to ensure true COPCs were not eliminated from the quantitative risk assessment and that the most reasonable risk was estimated.

Exposure assessment is a mix of high-end and average values which are designed to produce an overall reasonable maximum exposure ("RME"). RME exposures are intended to protect most receptors in most situations; they may represent higher than average exposures, but not the worst possible case.

Toxicological information such as RfDs and slope factors inherently carry uncertainty. The uncertainty results from extrapolating animal data to humans, extrapolating carcinogenic effects from the laboratory high-dose to the environmental low-dose scenarios, and variations in toxicological endpoints for interspecies and intra-species.

I.2 Ecological Risk Assessment

Like a Human Health Risk Assessment, an Ecological Risk Assessment (ERA) serves to evaluate the potential for risks due to exposure to Site contaminants specific to ecological receptors (such as wildlife, fish, and plants). Since the ERA evaluates many species that have drastically different exposure pathways, the ERA can appear complicated. Numerous environmental processes and ecological receptor groups (part of which are referred to as "assessment endpoints") are evaluated, and there are differences in contaminant exposures and sensitivity to contaminants between groups. For example, wildlife are mainly exposed through their diet while soil organisms are exposed through direct contact with the soil in which they live. The complexity of the ERA arises from the need to evaluate the important exposure pathways to the relevant receptors. The toxicology varies between the different ecological groups. In addition, some contaminants are effectively transferred through the food chain, bioconcentrating and ultimately posing risks, while other contaminants are not transferred because they are metabolized, biologically regulated or simply not absorbed.

The ecological risk assessment for the Sharon Steel Site evaluated all of the habitats across the entire Site. Subsequent to the completion of the risk assessment, the Site was split into Operable Units 1 and 2. The ERA process followed for the Site is described in the following paragraphs.

Superfund Site-specific ERAs are conducted using an eight-step process which minimally consists of two tiers of evaluation: a Screening Level ERA ("SLERA" - steps 1 and 2) and the Baseline ERA ("BERA" - steps 3 through 7). Step 8 is a risk management step. The function of the SLERA is to determine if the potential for unacceptable risk exists and if a BERA is necessary, along with which contaminants should be evaluated further. A SLERA uses published conservative toxicity benchmarks found in literature for water, sediment and soil, and compares Site concentrations to these benchmarks.

The BERA begins with the results of the SLERA and with problem formulation, which establishes the goals, breadth and focus of the investigation. It also establishes the assessment endpoints, which are the "explicit expressions of the ecological values to be protected." The assessment endpoints can also be viewed as the adverse effect(s) that the contaminant(s) from a Site may have on ecological receptors or communities that should be addressed by remedial actions at a Site. The questions and issues to be addressed in the BERA are defined based on potentially complete exposure pathways and ecological effects. Ultimately through the risk assessment process information is generated through literature reviews and field studies, results are compiled and conclusions are reached regarding whether or not the Site poses risk to ecological receptors.

As part of the ecological risk assessment, a conceptual Site model (CSM) is developed that identifies the relationships between exposure and effects. The CSM for the Sharon Steel Farrell Works Site illustrates that the primary sources of chemical contaminants are the slag piles and the BOF sludge pile. Contaminants originate from the northern and southern slag piles and the BOF sludge pile which migrate to the various habitat types (upland, wetland, and open water) through wind erosion, runoff, infiltration and deposition, where soil and benthic invertebrates, fish and other organisms may be exposed. The potential risk exists where organisms are exposed to contamination directly (e.g., benthic invertebrates living in contact with contaminated sediments, fish contacting contaminated sediments/surface water and/or earthworms and other burrowing organisms living in contact with soil), as well as when organisms higher in the food chain consume organisms lower in the food chain that have been in contact with contamination and stored contamination in their bodies (e.g., benthic invertebrates may store contaminants, then a spotted sandpiper eats the invertebrates). In general, the SLERA for the Site identified PAHs, PCBs and inorganic compounds exceeding benchmarks in sediment, soil and water.

A total of 15 assessment endpoints were evaluated for the Sharon Steel Site. Five were related to direct exposure, three related to bioaccumulation of contaminants in tissue and seven related to exposure to contamination through the food chain for both terrestrial and aquatic receptors. Of the 15 assessment endpoints evaluated, only six (endpoints: 1, 2, 10, 9, 4, and 12) were determined to be at potential risk from Site related contaminants (see Table 3 and 4). Four of these assessment endpoints are based on the comparison of Site-specific media data (soil, sediment, and surface water) to ecologically-relevant benchmarks (protective of plants, soil invertebrates, aquatic communities, and benthic invertebrates), representing direct exposure pathways. The remaining two assessment endpoints (terrestrial vermivore and benthivore) are based upon food chain consumption of soil invertebrates and benthic invertebrates respectively.

In general, soil exposure pathways of concern for assessment endpoint 1 (protection of plant communities) and assessment endpoint 2 (protection of soil invertebrate communities) were identified for the following habitats: shrub-scrub, forested riverine floodplain – Shenango River; shrub-sapling floodplain; forested riverine floodplain – Unnamed Tributary (assessment endpoint 1 only). Chemicals of concern for these habitats included several inorganic compounds, total PAHs, and endrin metabolites.

Sediments exposure pathways of concern for assessment endpoint 10 (protection of benthic invertebrate communities) were identified for the following habitats: palustrine emergent wetland; wetland pond habitats; and both open water habitats – Unnamed Tributary and Shenango River. Chemicals of concern for these habitats included inorganic compounds, several individual PAHs, some SVOCs, PCBs, and pesticides.

Surface water exposure pathways of concern for assessment endpoint 9 (protection of aquatic communities) were identified for the following habitats: small wetland and slag pond habitats; and both open water habitats – Unnamed Tributary and Shenango River. Chemicals of concern for these habitats include several inorganic compounds.

Assessment endpoint 4 (protection of vermivores) is based upon Site-specific bioaccumulation earthworm studies to estimate the chemical concentration in earthworm tissue. The estimated tissue concentration is then used in the exposure model for the short-tailed shrew and American robin. Exposure pathways of concern were identified in the following habitats: shrub-scrub; forested riverine floodplain – Shenango River; shrub-sapling floodplain; forested riverine floodplain – Unnamed Tributary; and shrub-scrub palustrine wetland. Chemicals of concern for these habitats included inorganic compounds, several individual PAHs, and dioxins/furans.

Assessment endpoint 12 (protection of benthivores) is based upon estimated benthic invertebrate tissue concentrations. A sediment to invertebrate biotransfer factor (BTF) was used to estimate chemical concentration levels in benthic invertebrates. This value was then used in the exposure model for the spotted sandpiper. Exposure pathways of concern were identified in the following habitats: palustrine emergent wetland; wetland pond habitats; and both open water habitats – Unnamed Tributary and Shenango River. Chemicals of concern for these habitats include inorganic compounds, SVOCs, individual PAHs, and some pesticides.

I.2.1 Summary of Site-Related Ecological Risk

In summary, the evaluation of the assessment endpoints for each habitat of concern at the Site indicated that all habitats contained contaminated media that present a risk to ecological communities. The primary sources of the contaminants are the Northern and Southern Slag Piles and the BOF Sludge Area. The habitat-specific results from the BERA as they specifically pertain to Operable Unit 2 are as follows.

Northern and Southern Slag Piles and BOF Sludge Area

Although not evaluated in the BERA because it is not considered a viable habitat, it has been determined that the slag piles are, or have been, the primary source of contamination in adjacent habitats. The piles and sludge are relatively barren because of the physical and chemical nature of the slag. Because of the nature of these wastes, little to no soil is available for plant communities to become established. Where soil does exist on the piles, the chemical contamination associated with the slag or sludge, often prohibits the establishment of any plant community. Therefore, remediation of the slag piles and sludge area had become the primary focus of the FS, subsequent investigations, and Records of Decision.

Shrub-Scrub Upland Habitat

In the shrub-scrub upland habitat the plant community is likely adversely impacted by direct exposure to metals, PAHs, and dioxins. The BOF Sludge Area is located within this habitat. Beyond the sludge area, no overt visible signs of plant toxicity were observed. However, plants species which had recolonized this area are likely to be resistant to the contaminants in the surface soil. The soil invertebrate population is likely adversely impacted by metals in surface soils. Finally, the **vermivores** are likely impacted by food-chain exposure to metals from surface soils. Metals appear to be the key risk drivers in the shrub-scrub upland habitat.

Forested Riverine Floodplain Habitat – Shenango River

In the forested riverine floodplain habitat, the plant community does not appear to be adversely impacted by physical or chemical stressors. Metals, PAHs, and pesticides are present in surface soils from all areas of this habitat at levels that present a direct exposure risk to soil invertebrates and food chain exposure risk to vermivore communities. Repeated, unsuccessful efforts to collect earthworm samples indicate that the soil invertebrate community is meager. Metals appear to be the key risk drivers in the forested riverine floodplain habitat.

I.2.2 OU2 Ecological Risk Evaluation

OU2 is part of what was identified as the "Slag Piles/Industrialized Area Habitats" in the June 2005 Final Remedial Investigation Report and Final Baseline Ecological Risk Assessment for the Sharon Steel Farrell Works Site. The slag piles/industrialized area is an area where slag had been historically disposed of at the Site. In addition, processed slag materials are stored on OU2.

As noted above, the slag piles are known sources of contamination at the Site. The majority of OU2 is an active industrial/storage area. The area of OU2 adjacent to the Shenango River is comprised of forested riverine floodplain habitat. The area between the floodplain and the active areas of the OU is being invaded by pioneer species such as quaking aspen (*Populus tremuloides*), sumac (*Rhus sp.*), and other successional species, as are other smaller areas within the unit. In the event that operations at OU2, including the operation of an asphalt plant and trucking business were to be discontinued, these pioneer species would likely be the first to dominate as part of the shrub-scrub upland habitat present at the Sharon Steel Site.

Currently, the few disposal areas not significantly impacted by the industrial activities at OU2 are still open piles of gravel, rock, and boulder size pieces of slag with limited vegetation. Since these areas and the operational areas of the unit were essentially void of usable ecological habitat, they were not considered to be exposure areas in the BERA.

In order to evaluate the potential risk associated with just the area now known as OU2, the sample results from locations within the unit were evaluated. These locations were either situated within the Shenango River Floodplain or the Slag Pile/Industrialized Area. The sample results were evaluated by comparing the maximum concentrations detected in each area with the critical concentrations (i.e., ecological toxicity reference values) developed for ecological receptors within the Forested Riverine Floodplain Habitat – Shenango River or the Shrub-Scrub Upland Habitat for the Slag Pile/Industrialized Area. Table 3 shows the ecological risk calculation for the surface soil in the floodplain associated with OU2. Table 4 shows the ecological risk calculation for the surface soil in the scrub shrub habitat associated with OU2.

The ecological risk evaluation indicated potential risk is posed by OU2 floodplain soils to plants, soil invertebrates, and vermivorous birds. The alternatives for the floodplain were evaluated and selected as part of the OU1 ROD. The primary risk drivers were chromium, iron, and manganese for plants; iron for invertebrates; and, chromium and PAHs for vermivorous birds. The upland soils pose a potential risk to the same receptors as the floodplain soils. The primary risk drivers were also chromium, iron, and manganese for plants; iron for invertebrates; and, PAHs for vermivorous birds.

I.2.3 Conclusion of Risk Assessments

EPA has concluded that the human health risk to industrial and construction workers, future residents (if Site use were unrestricted), and nearby current residents exceeds the acceptable non-carcinogenic risk due to inhalation of dust from metals in the slag and contaminated soil. The metals that are chemicals of concern are: arsenic, barium, iron, nickel and vanadium, aluminum and manganese. In addition, EPA has concluded that runoff from contaminated slag areas poses an unacceptable risk to surface water and sediments. Lastly, metal contamination from the slag infiltrates the shallow groundwater at OU2 and may negatively affect the groundwater remedy addressed in the OU1 ROD.

The ecological risk evaluation indicated potential risk is posed by OU2 floodplain soils to plants, soil invertebrates, and vermivorous birds. The alternatives for the floodplain were evaluated and selected as part of the OU1 ROD. The primary risk drivers were chromium, iron, and manganese for plants; iron for invertebrates; and, chromium and PAHs for vermivorous birds. The upland soils pose a potential risk to the same receptors as the floodplain soils. The primary risk drivers were also chromium, iron, and manganese for plants; iron for invertebrates; and, PAHs for vermivorous birds.

EPA has determined that the interim action selected in this Interim Record of Decision is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. This interim action is intended to achieve a significant reduction of risk posed by the slag and contaminated soil.

Table 3: Contaminants of Concern and their Ecological Risk-Based Critical Concentrations in Surface Soil
OU2 Forested Riverine Floodplain Habitat

COPC	Maximum Concentration	Plants		Soil Invertebrates		Vermivorous Mammals		Vermivorous Birds	
		Critical Concentration	Hazard Quotient	Critical Concentration	Hazard Quotient	Critical Concentration	Hazard Quotient	Critical Concentration	Hazard Quotient
INORGANICS (mg/kg)									
Aluminum	30700	pH <5.5	N/A	6180	5	NR	N/A	NR	N/A
Arsenic	13.3	NR	N/A	NR	N/A	10.6	1.25	NR	N/A
Cadmium	2	NR	N/A	NR	N/A	5.8	0.34	7.7	0.26
Chromium	283	1.8 - 31	9.13	NR	N/A	NR	N/A	29.4	9.63
Copper	93.1	10 - 100	0.931	50 - 100	0.93	NR	N/A	NR	N/A
Iron	54700	500 - 1000	54.7	280	195	NR	N/A	NR	N/A
Lead	66	110	0.60	1682	0	NR	N/A	61	1.09
Manganese	2780	500	5.56	1067 - 2836	1	NR	N/A	NR	N/A
Mercury	0.2	NR	N/A	NR	N/A	0.3	0.67	0.07 3	2.7 4
Vanadium	56.3	2.5 - 50		NR	N/ A	NR	N/A	NR	N/A
Zinc	490	58.8 - 1087	0.4 5	120	4	3199. 6	0.1 5	416. 8	1.1 8
ORGANICS (ug/kg)									
ACENAPHTHENE	100	Evaluated as Total PAHs		Evaluated as Total PAHs		NR	N/A	46	2.1 7
ACENAPHTHYLENE	300					NR	N/A	46	6.52
ANTHRACENE	510					NR	N/A	43	11.86
BENZO(a)ANTHRACENE	1200					NR	N/A	37	32.43
BENZO(a)PYRENE	1100					NR	N/A	35	31.43
BENZO(b)FLUORANTHENE	1100					NR	N/A	34	32.35
BENZO(g,h,i)PERYLENE	770					NR	N/A	32	24.06
BENZO(k)FLUORANTHENE	1000					NR	N/A	34	29.41
CHRYSENE	1100					NR	N/A	37	29.73
DIBENZO(a,h)ANTHRACENE	350					NR	N/A	32	10.94
FLUORANTHENE	1900					NR	N/A	40	47.50
FLUORENE	330					NR	N/A	45	7.33
INDENO(1,2,3-c,d)PYRENE	730					NR	N/A	32	22.81
PHENANTHRENE	1200					NR	N/A	43	27.91
PYRENE	1900					NR	N/A	40	47.50
Total PAHs	13590	NR	N/A	5280	3	NR	N/A	N/A	N/A
Endrin aldehyde	19.0	10.5	1.81	10.5	2	NR	N/A	NR	N/A
4,4'-DDT	100	NR	N/A	NR	N/A	NR	N/A	25	4.00

Calculated using maximum concentrations from locations SS50-1, SS51-1, and SS-52-1.
Where a range of critical concentrations is provided, the high end of the range was utilized to calculate the hazard quotient.

The following ecological risk Table 4 shows the risk calculation in surface soil scrub shrub upland habitat.

Table 4: Contaminants of Concern and their Ecological Risk-Based Critical Concentrations in Surface Soil
OU2 Scrub Shrub Upland Habitat

COPC	Maximum Concentration	Plants		Soil Invertebrates		Vermivorous Mammals		Vermivoro
		Critical Concentration	Hazard Quotient	Critical Concentration	Hazard Quotient	Critical Concentration	Hazard Quotient	Critical Concentration
INORGANICS (mg/kg)								
Arsenic	23	NR	N/A	NR	N/A	10.6	2.17	30.6
Chromium	276	1.8 - 31	8.90	32 - 625	0.44	NR	N/A	NR
Copper	32.2	10 - 100	0.32	50 - 100	0.32	171.6	0.19	304
Iron	51200	500 - 1000	51.20	280	182.86	NR	N/A	NR
Lead	30	110	0.27	1682	0.02	1908	0.02	61
Manganese	4920	500	9.84	1067 - 2836	1.73	NR	N/A	NR
Nickel	19.6	NR	N/A	200	0.10	NR	N/A	NR
Selenium	1.2	0.5 - 4	0.30	NR	N/A	2.4	0.50	2.7
Vanadium	72.6	2.5 - 50	1.45	23 - 127.3	0.57	NR	N/A	NR
Zinc	280	58.8 - 1087	0.26	120	2.33	3199	0.09	416.8
ORGANICS (ug/kg)								
ACENAPHTHYLENE	100	Evaluated as total PAHs		Evaluated as total PAHs		NR	N/A	46
ANTHRACENE	390					NR	N/A	43
BENZO(a)ANTHRACENE	1400					NR	N/A	37
BENZO(a)PYRENE	690					NR	N/A	35
BENZO(b)FLUORANTHENE	1000					NR	N/A	34
BENZO(g,h,i)PERYLENE	380					NR	N/A	32
BENZO(k)FLUORANTHENE	910					NR	N/A	34
CHRYSENE	1800					NR	N/A	37
DIBENZ(a,h)ANTHRACENE	200					NR	N/A	32
FLUORANTHENE	2500					NR	N/A	40
FLUORENE	150					NR	N/A	45
INDENO(1,2,3-c,d)PYRENE	410					NR	N/A	32
PHENANTHRENE	520					NR	N/A	43
PYRENE	2600					NR	N/A	40
Total PAHs	13050	NR	N/A	5280	2.47	NR	N/A	N/A

Calculated using maximum concentrations from locations SB04-2, SB05-2, SB06-2, SB07-1, and SB07-2.
Where a range of critical concentrations is provided, the high end of the range was utilized to calculate the hazard quotient.

I.3 Basis for Remedial Action

In summary, the HHRA and SLERA for OU-2 demonstrated the presence of unacceptable risks to human health and the environment. EPA determined that this interim remedial actions is necessary to reduce the risks to. Therefore, it is EPA's determination that implementation of the interim action Selected Remedy identified in this ROD is necessary to protect human health and the environment from actual or threatened releases of hazardous substances. This interim action is intended to achieve a significant reduction of risk posed by the slag and contaminated soil.

J. Remedial Action Objectives ("RAOs")

The following Remedial Action Objectives ("RAOs") were developed to protect human health and the environment from current and potential future risk of contamination in OU2

- Prevent dermal and ingestion exposure to slag, for the industrial workers, trespassers, and nearby or potential future residents.
- Prevent inhalation of dust in air above health-based action levels so that Site conditions do not pose an unacceptable risk for the industrial workers, trespassers, and nearby or potential future residents.
- Reduce future migration of chemicals into shallow groundwater in order to avoid negatively impacting the OU-1 groundwater remedy.
- Reduce surface runoff including storm water and discharge of source materials from the Site into the Shenango River.
- The purpose of the selected interim action is to address contaminated metals in the slag and contaminated soil that pose an unacceptable risk to human health.

K. SUMMARY OF REMEDIAL ACTION ALTERNATIVES

Summary of Alternatives

During the OU2 FS, various alternatives[2] were evaluated to address exposure to slag, contaminated soils and dust; prevent/reduce the migration of contaminants into the groundwater at the Site, and reduce surface runoff and subsequent discharge of contaminants into the Shenango River. This evaluation was based on the information gathered during the RI. EPA's interim action is ***Alternative 3- Install Asphalt Cap or Asphalt Equivalent Cap at the two businesses on Site, and implement Institutional Controls***

EPA has determined that alternative 3 will effectively address slag and contaminated soil that poses an unacceptable risk to human health.

Several alternatives evaluated in the FS did not meet the criteria of protecting human health and the environment. Therefore, they are not discussed in detail in this Interim Record of Decision for OU2. Further information about the rejected alternatives can be obtained from the FS Report in the Administrative Record.

Each remaining alternative, except the "no action" alternative, contains common elements that were considered in the evaluation process. The following section is a summary of the cleanup alternatives[2] evaluated that, if implemented would achieve RAOs compared to taking no action.

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[2] These alternatives were evaluated under the 2007 OU2 Feasibility Study (FS). In the OU2 Feasibility Study, option 10a in the FS is option 2a in this Record of Decision, option 10b in the FS is option 2b in this Interim Record of Decision and option 11 in the FS is option 3 in this Interim Record of Decision. In addition, a Cost Estimate supplement for OU2 was completed in November, 2011. All

Alternative 1 - No Action

Capital Cost:	$0
Annual Operation and Maintenance (O&M) Costs:	$0
Total O&M Costs:	$0
Total ***Present Worth Cost:***	$0
Time to Implement:	0 years

Under this alternative, no remedial measures would be implemented at OU2 to prevent exposure to the waste slag and sludge and contaminated dust and soil. The "no action" alternative was evaluated because the NCP requires that a "no action" alternative be developed as a baseline for evaluating other remedial alternatives.

This alternative would not reduce human health and ecological risks to acceptable levels and is therefore not protective of human health and the environment; this alternative would also not meet ARARs.

Alternative 2a – Purchase of Two Properties, Relocate Impacted Businesses and Move Equipment of Two Businesses to new location, Construction of a Biosolids and Compost Cap, Institutional Controls and Demolition of Buildings

Under this alternative, the two properties would be purchased and the two businesses would be relocated. The expense of moving the businesses and their equipment to their new location would also be included. In this alternative, the buildings on Site would be demolished and a soil cover system would be created by mixing ***Class A biosolids and compost*** with native slag material to create a new soil cover.

Class A biosolid is formed by wastewater treatment processes at local wastewater treatment plants. The treatment provided by the biosolids and compost cap would reduce the mobility of metals by creating physical complexes that bind metals in the slag. The biosolids and compost cover would also allow re-vegetation of the Site and thus would create a protective cover over the contaminated slag and sludge. This vegetative cover would (1) prevent contact with the slag and sludge, (2) prevent the migration of slag dust from the Site, (3) minimize groundwater ***infiltration*** and leaching of contamination from the slag and sludge which would result in a reduction of contaminated surface water runoff and contaminated shallow groundwater to the Shenango River.

Any future land use would have to be coordinated with EPA to ensure protection of the remedy. This alternative also includes erosion protection measures to prevent the erosion of slag and soil into the Shenango River.

Additionally, institutional controls would be implemented on Site to ensure that the biosolid cap is not damaged. The operation and maintenance would include maintaining the vegetative cap.

Capital Cost:	$3,931,010.75
Annual O&M Costs:	$30,295
Total O&M Costs:	$908,843
Total Present Worth Cost:	$4,839,853
Time to Implement:	*Up to 2 years*

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these documents are part of the administrative record and available at following EPA website http://loggerhead.epa.gov/arweb/public/advanced_search.jsp.

Alternative 2b – Purchase of Two Properties and Relocate Impacted Businesses, Appraise and Pay for the Businesses' Equipment, Demolish Buildings, Construct a Biosolids and Compost Cap, and Implement Institutional Controls

Under this alternative, the two properties would be purchased and the two businesses would be paid for their equipment and to relocate their businesses. This alternative varies from Alternative 2a only in that the businesses would be paid for their equipment, enabling the business to buy new equipment after they relocate. In this alternative, the buildings on the Site would be demolished, and a cover system would be created by mixing ***Class A biosolids and compost*** with native slag material to create a new soil cover. This alternative would also implement erosion protection measures to prevent the erosion of slag and sludge into the Shenango River and the wetland/pond area. Additionally, institutional controls would be implemented on Site to ensure that the biosolid cap is not damaged.

Capital Cost:	$6,014,860.75
Annual O&M Costs:	$30;295
Total O&M Costs:	$908,843
Total Present Worth Cost:	$6,923,703.75
Time to Implement:	*Up to 2 years*

Alternative 3- Construction of an Asphalt Cap or Asphalt Equivalent Cap at the Two Businesses Located on this Property, and Institutional Controls

Under this alternative, an asphalt cap or asphalt equivalent cap instead of a biosolid cap shall be constructed over all slag on the two properties on OU2 where the two businesses on the Site are located in order for the businesses to continue to operate.

An EPA visual inspection and the remedial investigation data indicated approximately seven acres are exposed slag on OU2 and would have to be paved with asphalt. An asphalt cap or asphalt equivalent cap shall be used in pavement of the approximately six acres on the Dunbar Property (6 acres of the 27 acres) and approximately one acre on the William Brothers property (1 acre of the 6 acres).

The confirmation sampling of the capped areas for the other approximate 21 acres on the Dunbar property and approximate 5 acres on the William Brothers property shall be conducted through boring sampling outlined in the Performance Standard Section in M.2 of this ROD to determine if there is slag present. All slag and contaminated soils shall be covered by an asphalt or asphalt equivalent cap (See Figures 3 & 4).

An Operation and Maintenance Plan will be included as part of design determining the frequency of inspection of the capped areas and the time period necessary to correct a breach with any component of the cap. This alternative shall prevent contact with the slag and contaminated soil, prevent the migration of slag dust from the Site, reduce groundwater infiltration, and reduce leaching of contamination from the slag which shall reduce surface water contaminated runoff and shallow contaminated groundwater to the Shenango River.

Additionally, institutional controls shall be implemented on Site to restrict land use which shall prevent damage to the asphalt and asphalt-equivalent caps for OU-2.

Capital Cost:	$1,948,449.75
Annual O&M Costs:	$30,000
Total O&M Costs:	$900,000
Total Present Worth Cost:	$2,848,449
Time to Implement:	*1.5 Years*

K.1 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In the FS, EPA evaluated the alternatives to determine which alternative would be the most effective in achieving the goals of CERCLA, and in particular, achieving the RAOs established for the Site. EPA uses nine criteria to evaluate cleanup alternatives in order to select a remedy. Below is a description of each of the nine criteria set forth in the NCP at 40 CFR §300.430(e)(9)(3). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. An alternative must satisfy the threshold criteria to be further considered.

Threshold Criteria

1. *Overall Protection of Human Health and the Environment*

   Overall protection of human health and the environment addresses whether a remedy provides adequate protection to human health and the environment and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with Applicable or Relevant and Appropriate Requirements ("ARARs")*

Section 121(d) of CERCLA and the NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA Sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA Site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA Site address problems or situations sufficiently similar to those encountered at the CERCLA Site that their use is well-suited to the particular Site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of environmental statutes, regulations, and/or whether there are grounds for invoking a waiver.

Primary Balancing Criteria

3. *Long-term Effectiveness and Permanence*

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

4. *Reduction of Toxicity, Mobility, or Volume through Treatment*

Reduction of Toxicity, Mobility, or Volume through Treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

5. *Short-term Effectiveness*

Short-term Effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

6. *Implementability*

Implementability addresses the technical and administrative feasibility of remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

7. *Cost*

The cost includes estimated capital (startup) costs, as well as operation and maintenance costs. They are usually combined and presented as the Total Net Present Worth Cost.

Modifying Criteria

8. *State Acceptance* indicates whether, based on its review of supporting documents and the Interim Record of Decision, the State supports, opposes, or has no comment on the preferred alternative.

9. *Community Acceptance* will be assessed in the ROD following a review of public comments received on the Proposed Plan and supporting documents included in the Administrative Record.

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

The "no action" alternative (Alternative 1) does not meet this threshold criterion. Without any remedial action, human health risks through inhalation and direct contact with contaminants in the waste slag and sludge will remain. Exposure and risk could increase over time due to continued migration of slag/soils and percolation of precipitation through the source material to groundwater.

Alternatives 2a, 2b, and 3 all provide a sufficient level of protection to human health or the environment through the use of source control and institutional controls. Alternative 2a and 2b, would provide protection to the industrial workers on Site by relocating the two businesses and restricting future land use to industrial activity only. Alternative 2a and 2b would also implement institutional controls to not damage the biosolid cap. Alternative 3 protects the workers by covering the contaminants with a cap.

Alternative 3 will be protective of human health by removing the direct contact, ingestion and inhalation pathways because a physical barrier will be placed between the public (including Site workers) and the contaminated slag. Institutional controls and a maintenance program will ensure the continued integrity of the barrier. Alternative 3 will prevent further infiltration of contaminants into the groundwater so as to not negatively affect the OU1 remedy for the groundwater. The asphalt cap or asphalt equivalent cap will prevent additional source materials from contaminating groundwater. It will also control additional storm water runoff related to an impervious surface (asphalt cap). The asphalt cap or asphalt equivalent cap will also help by reducing the infiltration of storm water through the contaminated slag. A maintenance program will ensure the continued integrity of the barrier.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)(Refer to Table 5 ARARs)

Alternative 1, the no action alternative, is not required to meet ARARs because it is not a remedial action. Alternatives 2a, 2b, and 3 must comply with all the ARARs set forth in Table 5.

All of the remedial alternatives have potential impacts of the Shenango River; therefore, the ARARs will apply to each alternative.

Since RCRA hazardous waste is not located on the Site, RCRA Subtitle B and C do not apply to any of the remedial alternatives.

The applicable portions of Pennsylvania's waste management regulations are applicable or relevant and appropriate requirements for alternatives 2a, 2b, and 3. Alternatives 2a, 2b, and 3 are each able to comply with all of these ARARs. No waivers are proposed.

Long-Term Effectiveness and Permanence

The evaluation of alternatives under this criterion considers whether the alternative will maintain protection of human health and the environment over time, usually measured in one or more decades. The evaluation takes into account the residual risk remaining from untreated waste at the conclusion of remedial activities, as well as the adequacy and reliability of containment systems and institutional controls.

The cover systems proposed in these alternatives would all require some routine monitoring and maintenance to maintain its integrity.

Alternatives 2a and 2b because the property owners would be relocated would provide the best degree of long-term effectiveness and permanence because they would provide a permanent solution (relocation, capping and erosion protection).

Alternative 3 would provide a solution (asphalt cap or asphalt-equivalent cap) and not interfere with the current operations of the businesses located on the Site. The OU2 area at the Sharon Steel Site will be implemented as an interim remedy in order to address the current exposure of the on Site workers to slag and contaminated soil material. The selected interim action, Alternative 3 will be effective in the short term by capping areas of slag and contaminated soil and it will be effective in the long term through maintenance and institutional controls.

Reduction in Toxicity, Mobility, or Volume through Treatment

This evaluation criterion addresses the ***statutory*** preference for selecting remedial actions that employ treatment technologies that permanently or significantly reduce the toxicity, mobility, or volume of hazardous substances as their principal element.

Alternatives 2a, 2b, and 3 would all provide for reductions in mobility of contaminants to the groundwater by limiting infiltration and decreasing the discharge of groundwater into the Shenango River and the wetlands.

The biosolids and compost cover used in Alternatives 2a and 2b would reduce infiltration of metals into the groundwater and provide treatment of metals by the biosolids and compost binding with the slag material to reduce mobility and toxicity of metals. The ***Benchscale Treatability Study*** conducted as part of the FS demonstrated reduced leachability and toxicity for slag material that was supplemented with biosolid materials from local sources. In addition, Alternatives 2a and 2b would promote the rapid establishment of a native habitat which would reduce erosion and surface migration of the cover material itself. Evapotranspiration of vegetation reduces the amount of water available to infiltrate the cap; organic material added to the cap via the vegetation increases the adsorptive capacity of the cap material.

Alternative 3 will reduce the mobility of the contaminants by providing a physical barrier between contaminated materials and potential receptors. The remedy will not reduce the toxicity or volume of the contaminants.

Short-Term Effectiveness

This evaluation criterion addresses the effects of the alternatives during the construction and implementation phase until remedial action objectives are met. The criterion considers risks to the community and to on-Site workers. It also considers available mitigation measures, as well as the time frame for the attainment of the response objectives.

The cap/cover alternatives (Alternatives 2a, and 2b and 3) would require regrading the slag located on Site, Alternatives 2a and 2b require transport of biosolids and compost from local facilities, which could increase traffic and noise.

Alternatives 2a and 2b require relocation of the businesses, which could take up to two years to implement.

Alternative 3 would require the least amount of material to be imported to the Site because asphalt is a material produced on Site. As a result, Alternative 3 would be completed faster than any of the other alternatives. The capping activities will require the use of heavy equipment including on and off-road equipment. The risks associated with the use of this equipment (traffic, Site disruption) will be minimal. The limited areas being capped will further minimize these risks.

Implementability

The evaluation of alternatives under this criterion considers the technical and administrative feasibility of implementing an alternative and the availability of services and materials required during implementation. Each of the alternatives is implementable, and the services and materials required for each alternative are available. However, some alternatives would be more difficult to implement than others.

Alternatives 2a and 2b are technically feasible. There is an abundance of Class A biosolid material and compost available from local sources to implement this remedial action. However, relocating the businesses would be dependent upon finding other suitable locations, which may not be available.

Alternative 3 is the most technically feasible given the possibility of using local asphalt materials. It would also take the least amount of time to complete. Implementing this cleanup remedy will be relatively simple from a technical standpoint. Technically, the placement of asphalt capping material and asphalt equivalent capping materials on Site are both very straightforward activities. The capping approach can be phased with Dunbar Asphalt's operation so that exposed slag is capped first and other areas on the property that need to fulfill the performance criteria can be completed in phases. In addition, institutional controls will be implemented to protect the asphalt cap. This cleanup approach will be cost effective and cover any remaining slag present on the surface and serve as a barrier against storm water infiltration. This cleanup approach will meet EPA's stated goals of reducing inhalation and dermal risk and reducing the migration of contaminants into the shallow groundwater. An Operation and Maintenance Plan identifying the frequency of periodic Site inspections, and repairs as needed, will ensure the integrity of the cap and the permanence of the approach.

Cost

The Alternative Cost Summary Table (See Table 2 below) summarizes the capital, annual O&M, and total present worth costs for each alternative. The total present worth is based on an O&M time period of 30 years for an engineered cover system and environmental monitoring. For additional details on the cost estimate breakdown, see the Administrative Record. The cost of cleanup alternative 3 will depend heavily on the market price of asphalt components, specifically oil, and the availability and location of the asphalt or asphalt equivalent materials for the cap on the northern portion of the Dunbar and William Brother's property. In addition, the cost estimate for cleanup alternative 3 is based on capping seven out of the thirty three acres of OU2 with an asphalt or asphalt equivalent cap. There is a potential for an increase of costs for alternative 3 if more slag is identified with the confirmation sampling of the twenty six areas in OU2 outlined in section M.2. The limited area impacted by this cleanup approach and the comparatively lower oil prices and availability of asphalt and asphalt equivalent capping materials on Site will decrease the total cost when compared to the other alternatives proposed in the FS.

Table 2
Alternative Cost Comparison Table

Alternative No.	Description	Capital Cost	Annual O&M Cost	Total O&M Present Worth (30 years)	Total Present Worth (30 years)
1	No Action	$ 0	$ 0	$ 0	$ 0
2a	Purchase of Two Properties and Relocation of Businesses and Equipment, Construction of a Biosolid Cap, Erosion Protection, Demolition of Buildings, Institutional Controls	$3,961,010.75	$30,295	$908,843	$4,869,853
2b	Purchase of Two Properties and Relocation of Businesses, Appraising and Paying the Two Businesses the Cost of their Equipment, Construction of a Biosolid Cap, Erosion Protection, Institutional Controls, Demolition of Buildings	$6,044,860.75	$30,295	$908,843	$6,953,703.75
3	Construction of an Asphalt Cap at the property of the two businesses on Site, Institutional Controls	$1,978,449.75	$30,000	$900,000	$2,878,449

Alternatives 2a and 2b are by far the most expensive alternatives to implement. These costs are primarily attributable to the relocation costs and the purchase of equipment under Alternative 2a and 2b. Alternative 3 is the least expensive of the protective alternatives.

State Acceptance

The Pennsylvania Department of Environmental Protection ("PADEP") concurs with EPA's Selected Remedy for the Site; a concurrence letter was received by EPA on August 12, 2013 with the following conditions: and the Department will have the opportunity to review and concur before any modification to this Interim ROD and the issuance of an Explanation of Significance Difference and concurrence with the remedy should not be interpreted as acceptance of on-Site Operation and Maintenance by the Department. State O & M obligation will be determined during design of the remedy and the completion of a Superfund State Contract. (Appendix B).

Community Acceptance

EPA conducted a public meeting for the Proposed Plan on October 4, 2012 at 6:30 pm at the Farrell City Building. EPA's Preferred Alternative was well received by those in attendance. Questions and concerns that were raised during the public meeting along with EPA's responses are provided in Section III of this Interim ROD, the Responsiveness Summary. Additional comments that were submitted to EPA during the comment period are also addressed in the Responsiveness Summary.

L. Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund Site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination.

Slag is the principal threat waste at the Site. Principal threat wastes are those source materials considered to be highly toxic or highly mobile, which would present a significant risk to human health or the environment should exposure occur. In this case, the metals in the slag are highly mobile through the air with an inhalation risk and through mobility in the shallow groundwater.

The use of treatment technology for OU2 (application of biosolid vegetative cap for OU1), could not be utilized for the principal threat waste (contaminated slag and soil at OU2) because the businesses operations would destroy the biosolid vegetative cap and if this remedy was selected EPA, would have to shut down the current operation of the two businesses on the OU2 parcel. Contact with principal threat wastes is prevented with all alternatives through capping.

M. SELECTED REMEDY

Following consideration of the requirements of CERCLA, a detailed analysis of the alternatives using the nine criteria set forth in the NCP, and careful review of public comments, EPA has selected, Alternative 3:

Construction of an Asphalt Cap or Asphalt Equivalent Cap and Institutional Controls for implementation at the Sharon Steel Farrell Works Superfund Site OU2.

Alternative 3, Total Present Worth = $2,848,449

The interim selected remedy includes the following:

1. Capping OU2 to prevent erosion of slag from the Site negatively impacting the Shenango River and

adjacent habitats.

2. Asphalt will be used in pavement of the estimated six acres on the Dunbar Property (6 acres of the 27 acres) and estimated one acre on the William Brothers property (1 acre of the 6 acres).

3. Confirmation sampling of the capped areas for the other estimated 21 acres on the Dunbar property and estimated 5 acres on the William Brothers property will be conducted through boring sampling outlined in section M.2 of this ROD to determine if there is additional slag present. All slag will be covered by an asphalt or asphalt equivalent cap (See Figure 3 and 4). The elevation and grade of the capped areas and non-capped areas in OU2 shall promote site drainage and minimize erosion.

4. An Operation and Maintenance Plan will be included as part of the design determining storm water control, the frequency of inspection of the capped areas and what time period is necessary to correct a breach with any component of the cap. This alternative shall (1) prevent contact with the slag and contaminated soil, (2) prevent the migration of slag dust from the Site, and (3) reduce groundwater infiltration and leaching of contamination from the slag which would reduce surface water contaminated runoff and shallow contaminated groundwater to the Shenango River so as to not negatively affect the groundwater remedy in OU1 for the Site.

5. Land use restrictions and institutional controls will be documented in a Land Use Control Assurance Plan ("LUCAP") to protect the integrity or the asphalt cap of asphalt equivalent cap. The LUCAP will include controls for OU2.

6. The OU2 institutional controls are for land use restrictions to protect the asphalt cap or asphalt equivalent cap.

M.1 Summary of the Rationale for the Selected Remedy

Overall, based on the currently available information, EPA selects that Alternative 3 for the following reasons:

- It provides the most cost-effective means to achieve the RAOs established for the Site, reduces risk to human health to acceptable levels, and meet the ARARs for the Site.

- It is the most easily implemented alternative available and offers the greatest combination of short-term benefits with minimal short- and long-term adverse impacts. This alternative could be implemented faster than the other alternatives, because it does not require relocation of the businesses and there is sufficient asphalt material readily available for the cover.

- It would allow the two businesses to continue their operation on their property and would require the least maintenance in the long-term. In addition, residential exposure to contamination will be prevented.

M.2 Performance Standards

<u>Performance Standards for the Cover System</u>

1. Conduct sampling to identify the lateral and vertical extent of slag throughout the OU2 area (specified in Figures 3 & 4) where an asphalt cap, or asphalt equivalent cap, will be constructed.
   a. Move aggregate piles temporarily as necessary to accomplish such sampling.

   b. Conduct continuous split spoon sampling until native soils are reached in each borehole location.
   c. Measure the permeability of the subsurface in all boreholes where slag is present.

2. Construct an asphalt cap, or asphalt equivalent cap, above all slag present in the OU2 area, including that identified pursuant to the sampling in 1 above.
   a. The asphalt cap, or asphalt equivalent cap, shall have a permeability less than 1×10^{-7} cm/sec in order to minimize the migration of rainwater through the asphalt cap or asphalt equivalent cap.
   b. The cap shall promote drainage, minimize erosion, and require minimum maintenance.

3. The elevation and grade of the capped areas and non-capped areas in OU-2 shall promote site drainage and minimize erosion.

4. Control storm water flow in OU2 to minimize impacts to the Shenango River.

5. Prohibit activities, unless approved by EPA in consultation with PADEP, that could damage the asphalt cap or asphalt equivalent cap areas placed in the OU2 areas (specified in Figures 3 and 4) described in 2 above through the implementation of institutional controls.

M.3 Expected Outcome of the Selected Remedy

The Selected Remedy for an interim action presented herein will prevent current and potential future exposure to contaminated slag and soil through a combination of containment and institutional controls. This interim remedy will utilize containment to address contaminants in Site media to the maximum extent practicable and so that the two businesses on Site can continue their operations.

N. STATUTORY DETERMINATIONS

This selected interim action is protective of human health and the environment and is intended to provide adequate protection until a final ROD for the Site is signed, complies with Federal and State requirements that are applicable or relevant and appropriate (ARARs for the selected remedy are presented in Table 5) to this limited-scope action, and is cost-effective. The OU2 area at the Sharon Steel Site will be implemented as an interim remedy in order to address the current exposure of the on Site workers to slag and contaminated soil material. EPA will issue a final remedy for OU2 in the future.

This action is an interim solution only, and is not intended to utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this operable unit. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element may be addressed by the final response action.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the selected interim remedy continues to be protective of human health.

N.1 Protection of Human Health and the Environment

The asphalt cap called for in Alternative 3 will (1) prevent direct contact with the slag and contaminated soil through both dermal contact and through ingestion, (2) prevent the airborne migration of slag dust from the Site, (3) minimize groundwater infiltration and leaching of contamination from the slag so that the OU2 area does not negatively impact the OU1 groundwater remedy, and (4) the OU2 cleanup alternative would reduce source materials contaminating surface water runoff into the Shenango River. Based on the information currently available, EPA has determined that the Selected interim Remedy for the contaminated slag and soil is protective of human health and the environment and is cost effective. Exposure levels will be reduced within EPA's acceptable risk range.

N.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and the NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA Sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA Site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA Site address problems or situations sufficiently similar to those encountered at the CERCLA Site that their use is well-suited to the particular Site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of environmental statutes, regulations, and/or whether there are grounds for invoking a waiver.

The interim action in the Selected Remedy for OU2 will comply with ARARs (See Table 5).

N.3 Cost Effectiveness

Cost effectiveness is determined by evaluating the remedy's long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness. If the overall cost of the remedy is proportional to its overall effectiveness, then it is considered to be cost effective. The cost estimate for the interim action for cleanup alternative 3 is based on capping seven out of the thirty three acres of OU2 with an asphalt or asphalt equivalent cap. There is a potential for an increase of alternative 3 if any more slag is identified with the confirmation sampling of the twenty six areas in OU2 outlined in section M.2. The Selected Remedy satisfies the criteria listed above because it offers a containment solution through capping of contaminants in slag and soil onsite with an asphalt cap available on Site or asphalt equivalent cap, reducing toxicity of metals in slag dust, and reducing mobility of metals to the shallow groundwater so as to not negatively impact the OU1 groundwater remedy and is effective in both the short term and long term. Therefore, the interim action in the Selected Remedy is cost effective.

N.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

The interim action will prevent exposure to Site contaminants by human and ecological receptors and will cover any remaining slag present on the surface and serve as a barrier against groundwater infiltration while the businesses continue to operate. The interim action remedy will reduce the mobility of the contaminants by providing a physical barrier between contaminated materials and potential receptors. Institutional controls will be implemented to protect the asphalt cap.

The selected interim action will be effective in the short term by capping areas of slag and contaminated soil and it will be effective in the long term through maintenance and institutional controls. The asphalt cap or asphalt equivalent cap will require maintenance to ensure integrity. The interim action remedy will be protective in the short term because this remedy would require the least amount of material to be imported to the Site because asphalt is a material produced on Site by one of the businesses. As a result, this interim action remedy would be completed faster than any of the other alternatives and will be cost effective.

This cleanup approach will meet EPA's stated goals of reducing inhalation risk and reducing the migration of contaminants into the shallow groundwater. EPA has determined that the interim action in the Selected Remedy represents the maximum extent to which permanent solutions and treatment are practicable at the Site. When compared to the other protective alternatives that were evaluated, EPA has determined that the interim action in the Selected Remedy provides the best balance of tradeoffs in terms of the five balancing criteria, as well as the preference for containment as a principal element so that two businesses onsite can operate. The interim action remedy has State and community acceptance.

N.5 Preference for Treatment as a Principal Element

Slag is the principal threat waste at the Site. Principal threat wastes are those source materials considered to be highly toxic or highly mobile, which would present a significant risk to human health or the environment should exposure occur. In this case, the metals in the slag are highly mobile through the air with an inhalation and dermal risk and through mobility of metals in the slag in the shallow groundwater.

The use of treatment technology for OU2 (application of biosolid vegetative cap for OU1), could not be utilized for the principal threat waste (contaminated slag and soil at OU2) because the businesses operations would destroy the biosolid vegetative cap and if this remedy was selected, EPA would have to shut down the current operation of the two businesses on the OU2 parcel. This asphalt capping remedy will avoid negatively impacting the OU1 groundwater remedy and utilize containment to reduce the toxicity, mobility, and volume of contaminants in Site media to the maximum extent practicable so that the two businesses on Site can continue their operations safely.

N.6 Five-Year Review Requirements

CERCLA (42 U.S.C. § 9621 (c)) and the NCP (40 C.F.R. § 300.430(f)(4)(ii) provide the statutory and legal bases for conducting Five Year Reviews. The interim action in the Selected Remedy will result in hazardous substances remaining onsite above levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review will be conducted within five years after initiation of the Remedial Action to ensure the remedy is, or will be, protective of human health and the environment.

N.7 Documentation of Significant Changes

The Proposed Plan for OU2 was released for public comment on September 17, 2012. The public comment period for the Proposed Plan was held from September 17, 2012 to November 19, 2012. EPA held a public meeting on October 4, 2012 to present the Preferred Alternative for OU2 in the Proposed Plan. EPA has reviewed and responded to verbal and written comments submitted during the public comment period in Part III of this ROD, the Responsiveness Summary. The selected remedy for OU2 in this Interim Record of Decision is contingent upon the businesses operating. The remedy that was selected for OU1 on this Site does not work with the current operations of the two businesses on Site and would have put them out of business.

The remedy in the Proposed Plan (September 13, 2012) is the same cleanup option outlined in this Interim ROD but this Interim ROD specifies the performance criteria in section M.2, including confirmation sampling required for the asphalt cap or asphalt equivalent cap for the OU2 area in more detail than the proposed plan. The cost estimate for cleanup option 3 is based on capping seven out of the thirty three acres of OU2 with an asphalt or asphalt equivalent cap. There is a potential for an increase of option 3 if any more slag is identified with the confirmation sampling of the other twenty six areas in OU2 outlined in section M.2. In addition, the Residual Waste Landfill ARAR was found to be applicable and added as an ARAR for this Interim ROD but did not have an impact on the selected remedy. PADEP also agreed that the Residual Waste Landfill ARAR was applicable to the Sharon Steel Site. Lastly, the groundwater institutional controls were removed from this Interim Record of Decision for OU2 because the institutional controls to prohibit use of shallow contaminated groundwater for drinking water use for the entire groundwater on the Site were already included in the Sharon Steel Farrell Works 2006 OU1 ROD.

Glossary

Administrative Record: EPA's official compilation of documents, data, reports, and other information about a Superfund Site and which forms the basis of EPA's decisions about the Site. The record is placed in the information repository to allow public access to the material.

Air/dust dispersion model: A computer model used to study and predict the transport of air or transport of dust in the air.

Applicable or Relevant and Appropriate Requirements (ARARs): Standards, requirements, or criteria established under federal and state environmental law that are determined to be legally applicable or are relevant for the Site cleanup work.

Aquifer: A layer of rock or soil that can supply usable quantities of ground water to wells and springs. Aquifers can be a source of drinking water and provide water for other uses as well.

Artesian conditions: When a confined aquifer contains groundwater that will flow upwards out of a well without the need for pumping.

Background levels: The concentration of a substance in an environmental media (air, water, or soil) that is not related to the contaminated Site. Background levels may occur naturally or may be the result of non-Site human activities.

Benchscale treatability study: A small study conducted in a laboratory to test the effectiveness of a remedial treatment or innovative technology on contaminated Site materials.

Bioaccumulation: accumulation of substances, such as pesticides, or other organic chemicals in an organism.

Bio-engineered bank stabilization techniques: Techniques that are designed (or engineered) to stabilize or re-build the banks of rivers and streams to prevent erosion. These techniques include erosion blankets, planting vegetation, and bank reconstruction.

Biosolid: Solid, semi-solid, or liquid materials generated from primary, secondary, or advanced treatment wastewater or sewage, often used as fertilizer.

Capital costs: The total purchase price.

Carcinogen: An agent which causes or contributes to the production of cancer.

Class A biosolids: Biosolids that contain very low levels of pathogens, or agents that cause disease. To achieve Class A certification, biosolids must undergo heating, composting, digestion or increased pH that reduces pathogens to low levels.

Code of Federal Regulations (CFR): The codification of federal rules and regulations. For example, the citation 40 C.F.R. 260 means Title 40 of the Code of Federal Regulations, Part 260.

Compost: A mixture of decaying organic matter, such as from leaves and manure, used to improve soil structure and provide nutrients.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA) and in 2002 by the Brownfields Amendments. The Act created a Trust Fund, known as the Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste Sites.

Confining bed: A hydrogeologic unit comprised of impermeable or distinctly less permeable material that bounds or restricts one or more groundwater aquifers.

Contaminant: Any physical, chemical, biological, or radiological substance or matter above background in air, water, or soil.

Ecological communities: Groups of plant and animal life.

Erosion: A process or group of processes (including weathering, dissolution, abrasion, corrosion, and transportation) by which loose or consolidated earth materials are dissolved, loosened or worn away and moved from one place and deposited in another.

Feasibility Study (FS): A report that identifies and evaluates alternatives for addressing the contamination that presents unacceptable risks at a Superfund Site.

Floodplain: An area that borders a body of water (e.g., river) and is subject to flooding.

Glaciated: Formed by the process of glaciation or a geological phenomenon in which massive ice sheets form in the Arctic and Antarctic and advance toward or away from the equator.

Groundwater: The water beneath the earth's surface that flows through the soil and rock openings and often serves as a source of drinking water.

Hazard Index (HI): A numeric representation of non-cancer risk. An HI exceeding one (1) is generally considered an unacceptable non-cancer risk. A Hazard Index for a pathway or Site is often obtained by adding the ***Hazard Quotients*** of individual chemicals.

Hazard Quotient (HQ): The estimated dose or concentration of a chemical from Site-related exposure divided by the acceptable, or Reference, dose or concentration. HQs for chemicals that affect the same receptor and the same target organ are added to calculate a total Hazard Index.

Infiltration: The process by which water on the ground surface enters the soil.

Institutional controls: Non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use.

Low-permeability: Having a low ability to allow the passage of a liquid, such as water, through rocks.

Maximum Contaminant Levels (MCLs): Enforceable standards for public drinking water supplies under the Safe Drinking Water Act. These standards apply to specific contaminants which EPA has determined have an adverse effect on human health above certain levels.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The federal regulations found at 40 C.F.R. Part 300 that provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants and contaminants under the Superfund program.

National Priorities List (NPL): EPA's list of the nation's top priority hazardous waste Sites that is eligible to receive federal money for response under CERCLA.

Organic Compound: A carbon-based material.

Pathways: Routes which contaminants may follow as they move by gravity or ground water flow. In addition, an exposure pathway is the route a contaminant takes in reaching a potential receptor, such as a person, animal or plant.

Porous: Degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

Present worth costs: The sum of the present values of the annual cash flows minus the initial investment.

Promulgated: When a law receives final formal approval.

Interim Record of Decision (ROD): A public document that describes the interim remedial actions selected for a Superfund Site, why certain remedial actions were chosen as opposed to others, and how much they will cost. It summarizes the results of the Remedial Investigation and Feasibility Study reports and the comments received during the comment period for the Proposed Plan. A final remedy for the Site will be addressed by a final response action by a final ROD in the future.

Remedial Action (RA): The actual construction or implementation phase of a Superfund Clean-up following plans for a Remedial Design (RD).

Remedial Action Objectives (RAO): The goals of a remedial action.

Remedial Investigation (RI): A study which identifies the nature and extent of contamination at a Superfund Site and forms the basis for the evaluation of environmental and human health risks posed by the Site.

Remedial Investigation/Feasibility Study (RI/FS): A report composed of two scientific studies, the RI and the FS. The RI is the study to determine the nature and extent of contaminants present at a Site and the problems caused by their release. The FS is conducted to develop and evaluate options for the cleanup of a Site.

Resource Conservation and Recovery Act (RCRA): A federal law that established a regulatory system to track hazardous waste from the time of generation to disposal including requirements for treating, transporting, storing and disposing of hazardous waste.

Risk Assessment: A human health or ecological evaluation process which provides a framework for determining the potential health hazards from contamination at a Site.

Screened: Slotted to keep out soil particles while allowing water to flow freely. Groundwater well casings are screened.

Sediment: Soils, sand and minerals washed from land into water.

Slag: Soil-like material left as a residue from the smelting of metallic ore. A by-product of the steel industry.

Sludge: Semi-solid material. A solid by-product of the steel making process. At the Site, the sludge is a powdery-fine, rust-colored solid.

Statutory: Enacted, regulated, or authorized by a statute.

Superfund: The common name used for CERCLA.

Table 5 Applicable or Relevant and Appropriate Requirements (ARARs)

Requirement	Legal Citation	Classification	Summary of Requirement	Comments
1. Pennsylvania Water Quality Standards	25 Pa. Code, Chapter 93.6, 93.7, 93.8	Applicable	Sets forth criteria for pollutants to protect designated uses of water bodies.	Storm water discharges from the Site to surface waters and wetlands must not cause a violation of these substantive standards.
2. Pennsylvania Water Quality Toxics Management Strategy	25 Pa. Code Chapter 16	Relevant and Appropriate	Sets forth guidelines and procedures for development of criteria for toxic substances and also lists those Site-specific criteria which have been developed.	Substantive provisions more stringent than Clean Water Act/National Recommended Water Quality Criteria are relevant and appropriate to all Site activities that could involve discharge into surface water.
3. Pennsylvania Uniform Environmental Covenants Act	25 Pa. Code Chapter 253.2, 253.3, 253.4	Applicable	Provides a standardized process for creating, documenting and assuring the enforceability of activity and use limitations on contaminated Sites.	Substantive, applicable requirements may apply whenever an engineering or institutional control is used to demonstrate the attainment of an Act 2 remediation standard for any cleanup conducted under an applicable Pennsylvania environmental law.
4. Fugitive Particulate Matter	25 Pa. Code Chapter 123.1 and 123.2	Applicable	Establishes particulate matter requirements.	Substantive standards may apply to remedial alternatives that emit fugitive air contaminants into the outdoor atmosphere.
5. Erosion and Sediment Control	25 Pa. Code Chapters 102.4, 102.11 and	Relevant and Appropriate	Requires preparation of an erosion and sediment control plan for	Substantive standards apply to construction

	102.22		activities involving land clearing, grading and other earth disturbances and establishes erosion and sediment control criteria. No plan will be submitted since this a procedural requirement, but any substantive standards shall be met.	activities at the Site which disturb any ground surface, including clearing, grading and excavation, to extent they are more stringent than federal requirements.
6. Pennsylvania Flood Plain Management Act Regulations	25 Pa. Code Chapter 106.31 - .32	Relevant and Appropriate	Standards relating to construction, earthmoving, filling and excavation within 100-year flood plain, wetlands and regulated water.	The substantive standards of subsections 106.31 and 106.32 apply because the Site is in the Shenango River floodplain and associated wetlands.
7. Discharge of Storm Water	40 CFR 122.26 40 CFR 122.44(h)(iv)(4)	Applicable	Storm water from the Site would fall within the definition of storm water discharge associated with industrial activity.	Storm water runoff from the Site remediation may result in runoff to the Shenango River. Any such runoff must be controlled to comply with the substantive requirements.
8. Federal Clean Air Act Emission Standards	NAAQs: 40 C.F.R. Part 50	Applicable	Establishes National ambient air quality standards for particulate matter.	Fugitive dust emissions generated during remedial activities will be controlled in order to comply with these regulations.
9. Pennsylvania Air Pollution Control Act	25 Pa. Code, Chapter 123 (including 123.1; 123.2; 123.31; 123.41) and 131 (including 131.1 – 131.4)	Applicable	Establishes requirements for fugitive dust emissions and other limitations for visible emissions (Chapter 123) and ambient air quality standards for discharges of air pollutants (Chapter 131).	Substantive standards more stringent than federal standards may apply in design of treatment processes.

10. Residual Waste Landfills	25 Pa. Code Chapter 288.234	Applicable	Establishes requirements for a cap system	The substantive requirements of the specific subchapter listed apply to design, construction or maintenance of the asphalt or asphalt equivalent cap.
11. Residual Waste Landfill	25 Pa. Code Chapter 288.236	Applicable	Establishes requirements for revegetation on land affected by residual waste landfills	The substantive requirements of the specific subchapters listed apply to land affected by residual waste landfills.
12. Residual Waste Landfill	25 Pa. Code Chapter 288.291 and 288.292	Applicable	Establishes requirements for closure and post closure care of a cap system.	The substantive requirements of the specific subchapter listed apply to the closure and post closure plans for residual waste landfill

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PART III - THE RESPONSIVENESS SUMMARY

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III. RESPONSIVENESS SUMMARY

This section summarizes the questions and comments received during the public comment period for the Sharon Steel Farrell Works Superfund Site. The Proposed Plan was released for public comment on October 4, 2012. The notice of the availability of these documents was published in the Sharon Steel Herald and Sharon Steel Vindicator on September 17, 2012 and November 5, 2012 respectively. The public comment period was held from September 17, 2012 to November 19, 2012. EPA hosted a Public Meeting on October 4, 2012 from 6:30 p.m. - 8:30 p.m. in the Council Chambers of the City Building located at 500 Roemer Boulevard, Farrell, PA 16121 to present the Proposed Plan and take public comments.

A. Questions Raised During the October 4, 2012 Public Meeting

Question 1: A participant in the public meeting asked, how did EPA decide where you were going to divide OU-1 from OU-2 on the Sharon Steel Site? Another commenter also asked: How long have the two businesses been on Site? Did they buy the place and was it some time ago?
EPA Response: Operable Unit 1 (OU-1) addresses approximately two-hundred- ninety acres in the Northern and Southern areas of the Site. The remedy for OU-1 is a biosolids vegetative cap. OU-1 addresses the Site excluding the OU-2 parcel where the two businesses are located. Both businesses have been there since the 1960's and own their parcels. The operations of these businesses were not consistent with the application of the biosolids cap that was selected for OU-1. Relocating the businesses, which EPA considered, would be difficult and not cost-effective. Therefore, EPA has selected an asphalt cap or material equivalent to asphalt for the OU-2 area on Site that would accomplish the goal of covering the contaminated material while allowing the established businesses to continue their operations. The decision was based on current use.

Question 2: A citizen asked whether EPA has to submit the proposed plan to PADEP to get their approval on it?
EPA Response: PADEP contact, Gary Mechtly responded by stating that EPA gave the proposed plan to PADEP and that they were in agreement with the EPA cleanup for OU-2. PADEP also provided a list of regulations to EPA for review and EPA included these regulations in the ARAR's section of the Record of Decision. PADEP includes their most stringent requirements to include in the ARAR's, and EPA is required to use them as cleanup standards if they are more stringent than federal laws and regulations. In addition, PADEP stated that they provided a concurrence letter to EPA documenting their agreement with the cleanup for OU-2.

Question 3: A participant in the public meeting asked whether the OU-1 Phase 1 plan and cleanup is completed and the OU-1 Phase 2 plan and cleanup completed? Another participant asked whether there is a schedule for work at the Site.
EPA Response: The Record of Decision for OU1 was written and the design for the OU1 Phase 1 was completed as well. EPA is waiting for funding for OU1. Any NPL Site that requires federal funding to pay for the selected remedy must be evaluated by the National risk Based Priority Panel to determine its risk level versus other Sites which require funding. The OU-1 remedy was previously evaluated by the Panel and a risk ranking has been established. Due to the comparative level of risk and the availability of funding, the OU-1 selected remedy has not yet received funding. The design for OU1 Phase 2 has not been completed because the prospective purchaser party has not completed mining the slag for OU1 in the southern half of the Site. There is only one Record of Decision for OU1 Phase 1 and Phase 2.

Question 4: A citizen asked if the slag produced by Dunbar Asphalt was contaminated? Do they wash the slag and sell it?
EPA Response: The asphalt company makes asphalt from the raw materials, so, EPA's understanding is that they are not selling the contaminated slag from the Site.

Question 5: A participant asked what does Farrell Slag (Prospective Purchaser Party south of Ohio Street) use the slag for?
EPA response: OU1 Phase 2 addresses the parcel south of Ohio Street. Currently there is a Prospective Purchaser Party who is reusing the slag on the southern half of the Site. Farrell Slag is the party who mines the slag and uses it in a mixture for asphalt. Once it is solidified in that form, the metals are bound up in the material. Farrell Slag will leave four feet of slag behind at the Site when it finishes operations, and then EPA will place the OU1 remedy, a vegetative biosolid cap, in this area.

Question 6: A participant in the public meeting asked what is the nature of the two facilities at OU2 that are operating in relation to where the cap is going to be placed? Are the parties participating or cooperating or are they actually participating in providing the asphalt? How do you persuade the two businesses to fund the cleanup?
EPA Response: After the Interim Record of Decision is finalized, EPA will then negotiate the implementation of the cleanup with the two businesses.

Question 7: A citizen asked whether there are any more responsible parties besides the two businesses on Site.
EPA Response: Sharon Steel Corporation is a responsible party but is not financially viable.

B. Stakeholder Comments

The following written comments were received directly from attorney, Robert Thomson, on behalf of the Dunbar Asphalt Plant in a letter dated October 16, 2012 questioning the Air Dispersion Modeling Analysis, and citing issues in Appendix A and B.

EPA responses are provided by the EPA technical staff and the EPA Remedial Project Manager .

Comment 1: The air model assumed all contaminants are absorbed onto/into dust particles

EPA Response: The model assumes that when the wind mobilizes particles of slag, the concentration of the contaminants in the dust is the same as the concentration of the contaminants in the slag. This is not necessarily a conservative assumption, but is believed to be reasonably protective. Furthermore, since most of the contaminants were metals, PCBs and PAHs which are not considered to be volatile, it was reasonable to assume that they were adsorbed onto the dust particles.

Comments 2, 3, & 4: The air model assumed the following: That the facility remains dry and exposed at all times; that erosion potential is restored after each event and that effects of precipitation and vegetation are ignored.

EPA Response: There was little to no vegetation reported at the Site, and no guarantee that the Site would be vegetated in the future. The model assumed that the sampled material would be exposed; this does not constitute all the material on the Site. Dryness was assumed in generating emissions, and this part of the model was conservative. Meteorological data from the area were considered in the dispersion part of the model.

While material that is subject only to wind disturbance may have a somewhat lower erosion potential than that assumed by the model, any active disturbance of the material (e.g., from human or animal activities) would be underestimated by this assumption in the model. Therefore, EPA considered this a protective but reasonable assumption.

Actual contaminant data from the storage areas were used in the emissions estimation model. A grain-size analysis was performed on surface soils which showed that a significant percentage of the surface material was in the 0-75 um size range, which is the most susceptible to wind erosion. Since erodible material was proven to be present at the Site, the standard emission estimation procedures found in document AP-42, Section 13.2.5 – Industrial Wind Erosion, were applied with the assumption that the surface soils were uncovered, dry, devoid of vegetation, and continuously erodible to strong winds.

Comment 5: The air model assumed that a disturbance occurs every hour.

EPA Response: Because the meteorology is evaluated on an hourly basis, the erodibility of the material was also evaluated on an hourly basis. The actual assumption of the model is that the material is "continuously erodible," as described above.

Comment 6: The air model assumed that slag contaminant concentrations are uniform at the highest concentration.

EPA Response: For the Phase I air modeling analysis, it was conservatively assumed that the concentrations of contaminants present in the slag/sludge at the Site were uniformly distributed across all storage areas, and that for each contaminant they were equal to the highest concentration of that contaminant found anywhere on Site in either the Phase I or II soil sampling. However, for the Phase II air modeling analysis, the measured soil concentrations were examined for spatial variations among the three storage areas, as well as among the various sampling locations within each storage area, so that the emissions estimates were more realistic. The slag areas were subdivided into smaller subareas (polygons), and the emissions estimates were based on the area-weighted polygon concentrations.

Comment 7: EPA assumed toxic effects are additive; Hazard Indexes (HIs) were summed and Margin of Exposures (MOEs) were summed.

EPA Response: EPA added together the risks from multiple chemicals present at the site. This is called "assuming additive." However, EPA did not assume that all chemical risks were additive, only those that affected the same target organs. For example, the risks from a chemical that affected the nervous system would be added to the risks from another chemical that also affected the nervous system. But the risks from that chemical would not be added to risks from a chemical that affected the kidney.

The risks from chemicals are often truly additive in this way. On the other hand, sometimes chemicals act antagonistically toward one another, so that the effects of one "cancel out" the effects from another. Assuming additivity overestimates risks for that kind of antagonistic interaction. But chemicals can also interact through potentiation or synergism, where they increase one another's toxicity, to a degree beyond the simple sum of the risks. Additivity underestimates those sorts of effects.

Because the interactions of multiple chemicals in the environment are complex and cannot always be predicted, EPA must choose an assumption when considering the total risks from multiple chemicals. EPA could assume potentiation and synergism (the most protective assumption, but which could exaggerate risks), or antagonism (at the risk of being underprotective), or addivity (the middle-of-the-road assumption). In the absence of more specific evidence, EPA defaults to additivity.

For further discussion of this topic, see Section 8.2.2 of Risk Assessment Guidance for Superfund ("RAGS"), Volume I, Part A.

Comment 8: Background was not considered; Contaminant of Potential Concerns (COPCs) were selected without considering background.

EPA Response: Background was not considered in the selection of initial COPCs, the chemicals that receive detailed evaluation in the risk assessment. However, background, where available, was considered at the end of the risk assessment (see, e.g., Section 6 of the risk assessment). Those chemicals that contributed to unacceptable risk were assessed for possible attribution to background. Chemicals attributed to background were then footnoted on RAGS D Table 10s (Risk Assessment, Appendix I) and were called out in, e.g., Table 7-1 of the risk assessment, and OU-1 ROD Table 1, and were not part of the basis for taking action. Pages 6-4 through 6-7 of the risk assessment describe the detailed statistical analysis, the conclusions of the background assessment, and statements of confidence and uncertainty about those conclusions in relation to the Northern Slag Pile.

Comment 9: Adsorbed dose toxicity values were calculated from an administered dose.

EPA Response: As noted in the uncertainty section of the risk assessment, "The resulting risks may be overestimated or underestimated" from this assumption. The conversion of administered dose to absorbed dose is necessary to avoid underestimating the risk from chemicals absorbed through the skin (see, e.g., Appendix A of RAGS Volume I, Part A). However, such methodology can underestimate point-of-entry effects on the skin, if any occur. On the other hand, this method does not account for first-pass metabolism, and thus can overestimate risk. The bottom line is that this assumption can produce bias in either direction, and does not necessarily overestimate risks.

Comment 10: The air model assumed acute exposures estimated as one-hour maximums.

EPA Response: One hour was the smallest unit of exposure time that this particular model could generate under these conditions. EPA looked at the highest one-hour concentration to gauge the potential for acute exposures of unacceptable risk to occur.

Comment 11: Toxicity for one-hour exposure estimates (from air modeling) was based on one-day, subchronic or intermediate study duration; this probably overestimates risk for one-hour exposures.

EPA Response: EPA believes there is a high bias resulting from the use of acute toxicity values that were based on a longer than one-hour duration. (Such values were used because one-hour acute toxicity values were limited in availability.) However, the magnitude of this bias is uncertain. This is one reason that EPA consulted ATSDR for further opinions with respect to short-term risks. ATSDR concurred that even though the modeling was biased high overall, there was the potential for concern during high-dust events.

Comment 12: "Moderate to high uncertainty" is associated with acute toxicity criteria.

EPA Response: As noted in the risk assessment report, there are fewer acute than chronic and subchronic toxicity criteria available. The available acute numbers did not always exactly match the exposure time assumed in the modeling, and the direction of bias was high, to ensure protectiveness. However, the presence of uncertainty in and of itself does not invalidate the risk-assessment findings; uncertainty is integral to scientific studies.

Comment 13: Exposure time, exposure frequency, and exposure duration are overestimated.

EPA Response: The risk management evaluation (RME) inputs for exposure time, exposure frequency, and exposure duration are high-end, but not maximum or worst-case, values. Other RME inputs, such as body weight, reflect average values. The combination of high-end and average values is intended to produce an overall "conservative exposure case (i.e:, well above the average case) that is still within the range of possible exposures" (RAGS Volume I, Part A, Section 6.1.2). Section 6.4.1 of RAGS describes this process in detail, including the recommendation of high-end values for exposure frequency and duration. See also OSWER Directive 9285.6-03, which states, "Readers are reminded that the goal of RME is to combine upper-bound and mid-range exposure factors ... so that the result represents an exposure scenario that is both protective and reasonable; not the worst possible case" and specifies exposure frequency and exposure duration as factors that use upper-bound values.

Comment 14: The HHRA report contains language acknowledging that the overall risk bias is probably high, i.e., toward overestimation rather than underestimation. Also, uncertainty is inherent in the toxicity values used to characterize cancer and non-cancer risks.

EPA Response: Uncertainty is inherent in any scientific undertaking. The uncertainty in risk assessments is associated with a high bias for some factors and a low bias for others; overall, EPA prefers a high bias because of the need to protect human health and the environment. EPA acknowledges in RAGS Section 8.4 that "As in all environmental risk assessments, it already is known that uncertainty about the numerical results is generally large ... Consequently, it is more important to identify the key Site-related variables and assumptions that contribute most to the uncertainty than to precisely quantify the degree of uncertainty in the risk assessment." However, "Actions at Superfund Sites should be based on an estimate of the <u>reasonable maximum exposure (RME)</u> expected to occur under both <u>current</u> and <u>future</u> land-use conditions. The reasonable maximum exposure is defined here as the highest exposure that is reasonably expected to occur at a Site."

Comment 15: Real-time air sampling could substitute for the modeling estimates used in the risk assessment at this Site.

EPA Response: It should be noted that the usefulness of such data would be limited. While such samples would represent current conditions on the date of sampling, they would not assess future exposures or acute exposures from significant dust-producing events, and the latter two considerations were factors in the decision to take action at the Site.

Comment 16: Percolation of precipitation through the high pH aggregate would not contribute to groundwater contamination; in fact, it would have a positive effect.
EPA Response: There is no evidence that the groundwater is being positively influenced by the aggregate; the aggregate will be subject to the same permeability performance criteria as the asphalt cap.

Comment 17: There are no drinking water wells, and institutional controls would prevent future wells.
EPA Response: EPA had the obligation to address the aquifer for current and future use. However, EPA does agree that institutional controls will be implemented for groundwater.

Comment 18: Emissions for each wind speed category were based on the upper bound of the category.
EPA Response: A range of wind speeds was considered, but emissions were only quantified for the two highest wind-speed ranges because those were the only categories that produced dust.

Comment 19: Reference Doses *(RfDs) of varying levels of confidence and uncertainty factor (UF) and modifying factor (MF) are combined, making interpretation more complex.*
EPA Response: This is an unavoidable source of uncertainty, but it does not mean that the toxicity values or risk estimates are invalid. It merely means that some toxicity factors have more available data (and hence more confidence) than others. Equal amounts of toxicity information are not available for all chemicals; this is a limitation of the scientific literature on which the toxicity values are based.

Comment 20: By eliminating the low risk values in the data sets, the resulting exposure point concentrations may have been biased high.
EPA Response: This statement in the risk assessment was made in the context of eliminating B-flagged data; i.e., eliminating data that were believed to be attributed to blank contamination rather than Site-related. Therefore, one source of potential high bias was eliminated by this practice. In data sets where a substantial amount of data was B-flagged, this could have the effect, as noted, of including more high-concentration samples. However, the low-concentration samples could not be reliably quantified because of the masking effect of blank contamination. In any case, as stated in the risk assessment, "This effect is expected to be greatest on some of the smaller data sets and least on the larger data sets." Furthermore, it only affects data sets with B-flagged data. Also, the greater the contamination (i.e., the higher the concentrations), the less the impact of this issue would be, since blank contamination affects lower-concentration samples.

Comment 21: Models are uncertain; therefore, concentrations in dust, vapor and duck tissue may have been overestimated.
EPA Response: Modeled data are generally less certain than measured data. However, they do have the advantage of zeroing in on specific chemicals, reducing confounding factors, and estimating the contribution from Site-related chemicals in the absence of other effects (such as background or off-Site sources).

Also, the statements of high bias from the risk assessment must be considered in context. Note that the risk assessment stated, "Because considerable information is available with respect to reasonable assumptions for intake parameters, the related uncertainty is considered to be low for potential exposures to soil, groundwater, surface water and sediment. Moderate to high uncertainty is associated with intake parameters associated with fish and duck ingestion." Significant human health risks were estimated for, and the bulk of the proposed actions have focused on, the media of soil/slag, groundwater, and sediment.

Comment 22: There is "moderate uncertainty" that arsenic, barium, nickel, and vanadium risks in N Slag surface soil/slag are Site-related.

EPA Response: With respect to these specific metals, it should be noted that even if all four were ultimately attributable to background (something for which EPA does not have evidence), the need for action and the types of action proposed would not be likely to change significantly. Other metals in the soil/slag material (aluminum, iron, manganese) were also identified as posing significant risks.

FIGURES

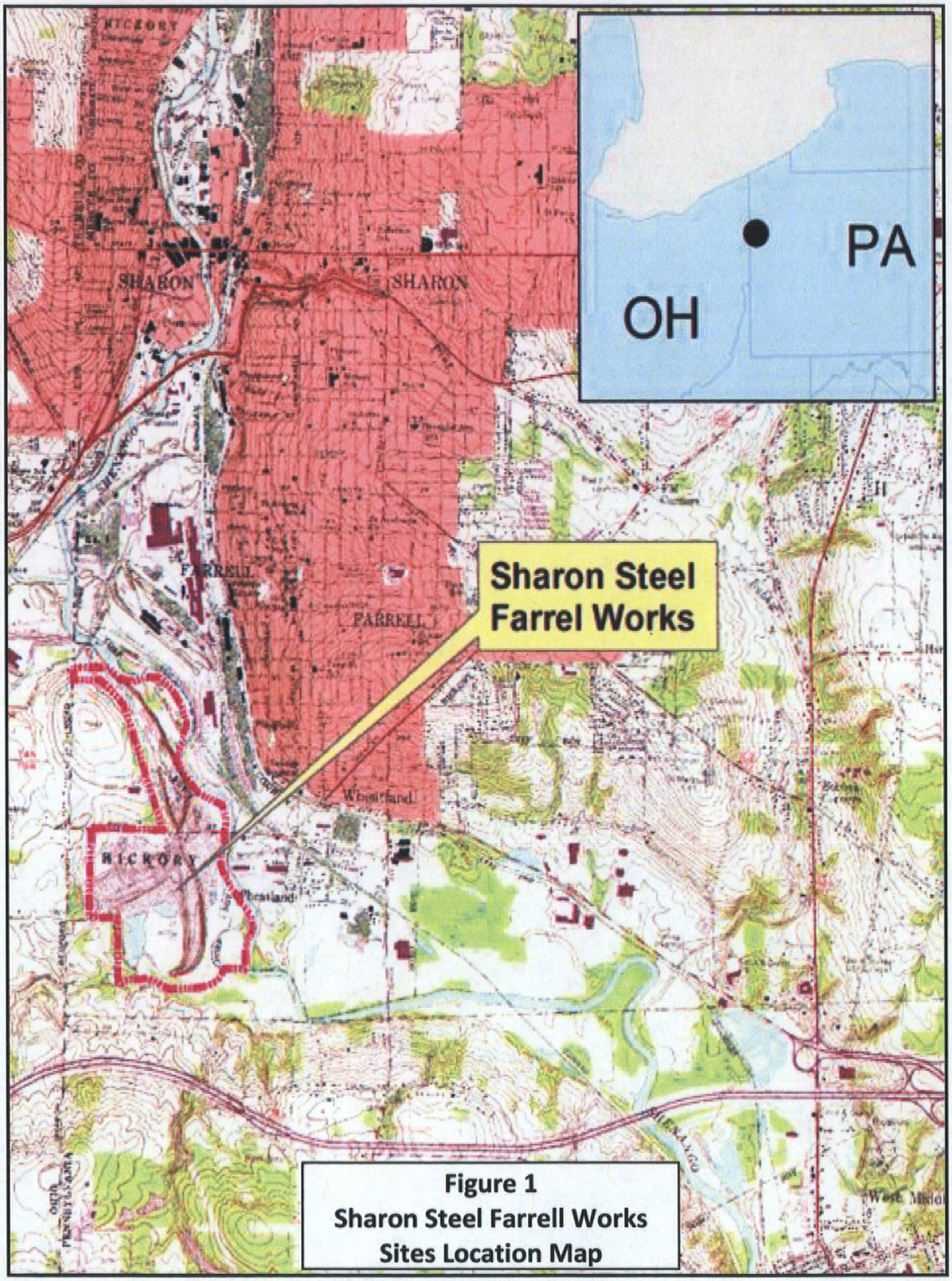
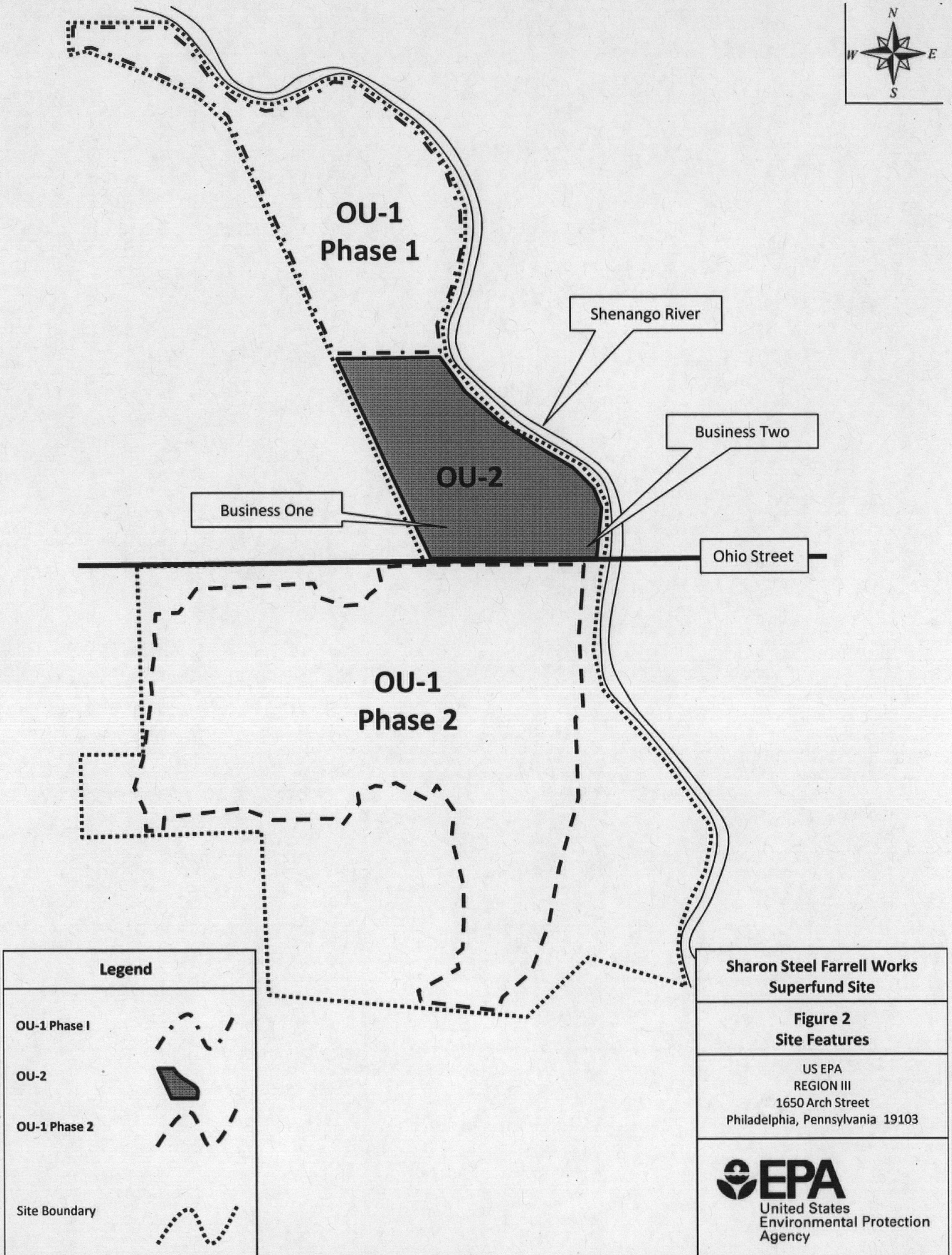


Figure 1
Sharon Steel Farrell Works
Sites Location Map



Sharon Steel Farrell Works Superfund Site

Figure 2
Site Features

US EPA
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103

EPA United States Environmental Protection Agency

U.S. EPA Region III, GIS Team - Map 3710 - J. Cruz, 03/06/2013

United States Environmental Protection Agency

Sharon Steel Superfund Site
Farrell, Pennsylvania

Figure 3
Dunbar Asphalt Property
Areas to Cap

AR300400

United States Environmental Protection Agency

Sharon Steel Superfund Site
Farrell, Pennsylvania

Figure 4
Williams Brothers Property
Areas to Cap

SHARON STEEL FARRELL WORKS
OU2 ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

II. REMEDIAL ENFORCEMENT PLANNING

1. Letter to Mr. Robert Thomson, Babst, Calland, Clements, & Zomni, P.C., from Ms. Ami Antoine, U.S. EPA, re: Administrative Order Settlement on Consent, 12/23/08. P. 200001-200022. Related documents are attached.

2. Appraisal of Real Property, Dunbar Asphalt Products, prepared by Integra Realty Resources - Pittsburgh, 8/8/11. P. 200023-200136.

3. Appraisal of Real Property, Williams Brothers Trucking, prepared by Integra Realty Resources - Pittsburgh, 8/8/11. P. 200137-200276.

4. Letter to Mr. Robert Thomson, Babst Calland Clements, & Zomni, P.C., from Mr. Mark Bolender, U.S. EPA, re: Draft Administrative Settlement Agreement and Order on Consent for Removal Response Action, 4/9/09. P. 200277-200279. Response Action Elements at Sharon Steel Superfund Site, Operable Unit 2, is attached.

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* Administrative Record File available 9/14/12, updated 9/24/13.

III. <u>REMEDIAL RESPONSE PLANNING</u>

1. Report: <u>Remedial Investigation (RI) Report, Volume 1 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

2. Report: <u>Remedial Investigation (RI) Report, Volume 2 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

3. Report: <u>Remedial Investigation (RI) Report, Volume 3 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

4. Report: <u>Remedial Investigation (RI) Report, Volume 4 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

5. Report: <u>Remedial Investigation (RI) Report, Volume 5 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

6. Report: <u>Remedial Investigation (RI) Report, Volume 6 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

7. Report: <u>Remedial Investigation (RI) Report, Volume 7 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

** Marked documents can be found in the Sharon Steel Farrell Works OU1 Administrative Record File and are incorporated herein by reference.

8. Report: <u>Remedial Investigation (RI) Report, Volume 8 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

9. Report: <u>Remedial Investigation (RI) Report, Volume 9 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

10. Report: <u>Remedial Investigation (RI) Report, Volume 10 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

11. Report: <u>Remedial Investigation (RI) Report, Volume 11 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

12. Report: <u>Remedial Investigation (RI) Report, Volume 12 of 12, Sharon Steel Farrell Works Site, Farrell, Mercer County, Pennsylvania</u>, prepared by Black & Veatch, 6/05. **

13. Record of Decision, Operable Unit 1, Sharon Steel Farrell Works, 11/14/06. P. 300001-300077.

14. Report: <u>Final Feasibility Study Report, Sharon Steel Farrell Works (SSFW) Site - OU2,</u> prepared by CDM Federal Programs Corporation (CDM), 9/07. P. 300078-300221.

15. Meeting Minutes: Discussion of Technical Approach Memo, Sharon Steel Farrell Works Superfund Site, Operable Unit 2, 2/19/10. P. 300222-300224. A March 2, 2010, transmittal letter to Ms. Rashmi Mathur, U.S. EPA, from Mr. James Romig, CDM, is attached.

16. Letter Report to Ms. Rashmi Mathur, U.S. EPA, from Mr. James Romig, CDM, re: Revised Draft Technical Approach Memorandum - Sharon Steel Farrell Works OU2, (Dunbar Asphalt Company, Inc. Property), 2/25/10. P. 300225-300234.

17. Table, Asphalt Paving of Former OU2 Area, Rough Order-of-Magnitude Cost Estimate, Sharon Steel Farrell Works, OU2, (undated). P. 300235-300236. A November 29, 2011, electronic transmittal memorandum, to Ms. Rashmi Mathur, U.S. EPA, from Mr. James Romig, CDM, is attached.

18. Superfund Program Proposed Plan, Sharon Steel Corporation (Farrell Works Disposal Area) Superfund Site - Operable Unit 2, Hickory Township and the City of Farrell, Pennsylvania, 9/13/12. P. 300237-300269.

19. Letter to Ms. Ami Antoine, U.S. EPA, from Mr. Robert Thomson, Babst, Calland, Clements, and Zomnir, P.C., re: Dunbar Asphalt, Inc., 2/23/09. P. 300270-300277. Comments on the Phase II, Air Dispersion Modeling Analysis for Identified Chemicals of Potential Concern for Inhalation Exposure, Sharon Steel, Farrell Works Facility, and the Final Baseline Human Health Risk Assessment Report, are attached.

20. Memorandum to Mr. Mitch Cron, U.S. EPA, from Ms. Jennifer Hubbard, U.S. EPA, re: Review of Sharon Steel Farrell Issues in Response to Counsel's Letter, 3/4/09. P. 300278-300285. A March 12, 2009, letter to Ms. Ami Antione, U.S. EPA, from Mr. Robert Thomson, Babst, Calland, Clements, and Zomnir, P.C., regarding Dunbar Asphalt Company, Inc., is attached.

21. Letter to Mr. Mark Bolender, U.S. EPA, from Mr. Robert Thomson, Babst, Calland, Clements, and Zomnir, P.C., re: Response to April 9, 2009, letter, 7/16/09. P. 300286-300289. A response to the April, 9, 2009, letter's attachment regarding Response Action Elements, is attached.

22. Memorandum to Ms. Rashmi Mathur, U.S. EPA, from Ms. Jennifer Hubbard, U.S. EPA, re: OU2 Risk Update for the 2005 Baseline Risk Assessment, 2/7/12. P. 300290-300297.

23. Letter to Ms. Rashmi Mathur, U.S. EPA, from Mr. Robert Thomson, Babst, Calland, Clements, and Zomnir, P.C., re: Proposed Plan for Sharon Steel, Farrell Works Superfund Site, Operable Unit 2, 10/16/12. P. 300298-300301. Comments entitled: Phase II, Air

Dispersion Modeling Analysis for Identified Chemicals of Potential Concern for Inhalation Exposure (Unrealistic Assumptions) and Final Baseline Human Health Risk Assessment Report Unreasonable Assumptions and Uncertainty, are attached.

24. Memorandum to Ms. Rashmi Mathur, U.S. EPA, from Ms. Jennifer Hubbard, U.S. EPA, re: Sharon Steel Farrell Operable Unit 2, Evaluation of PRP Attorney Letter, 1/4/13. P. 300302-300303.

25. Letter to Mr. Robert Thomson, Babst, Calland, Clements, and Zomnir, P.C., from Mr. Lee Zarzecki, U.S. EPA, re: Response to comments submitted to EPA on October 16, 2012, in response to EPA's Air Dispersion Modeling Analysis, 2/21/13. P. 300304-300309.

26. Memorandum to File, from Ms. Rashmi Mathur, U.S. EPA, re: Sharon Steel Farrell Works Superfund Site History for the OU2 Record of Decision, 4/30/13. P. 300310-300312. Δ

27. Letter to Ms. Kathy Hodgkiss, U.S. EPA, from Mr. Kelvin Burch, PADEP, re: State concurrence on the Record of Decision (ROD), 8/12/13. P. 300313-300314.

Δ Confidential Business Information has been redacted from this document. The redaction is evident from the face of the document.

IV. <u>REMOVAL RESPONSE PROJECTS</u>

1. Memorandum to Mr. James Burke, U.S. EPA, from Ms. Rashmi Mathur, U.S. EPA, re: Recommendation for Determination of Imminent and Substantial Endangerment at the Sharon Steel Farrell Works Superfund Site, 3/19/08. **

V. COMMUNITY INVOLVEMENT/CONGRESSIONAL CORRESPONDENCE/ IMAGERY

1. U.S. EPA Public Notice, Sharon Steel-Farrell Works Superfund Site, Farrell, Mercer County, PA, re: US EPA Issues Proposed Remedial Action Plan, 9/17/12. P. 500001-500002.

2. U.S. EPA Public Notice, Sharon Steel-Farrell Works Superfund Site, Farrell, Mercer County, PA, re: US EPA Issues Proposed Remedial Action Plan, 9/17/12. P. 500003-500003.

3. Transcript of Proposed Plan Public Meeting, Sharon Steel Farrell Works Site, Operable Unit 2, 10/4/12. P. 500004-500034.

4. U.S. EPA Public Notice, Sharon Steel-Farrell Works Superfund Site, Farrell, Mercer County, PA, re: US EPA Re-Opens Public Comment Period on the Proposed Remedial Action Plan, 11/5/12. P. 500035-500035.

5. U.S. EPA Public Notice, Sharon Steel-Farrell Works Superfund Site, Farrell, Mercer County, PA, re: US EPA Re-Opens Public Comment Period on the Proposed Remedial Action Plan, 11/5/12. P. 500036-500036.

Confidential Documents ***

1. Quote for moving Dunbar Asphalt, prepared by A&A Machinery Moving, Inc., 9/20/11. P. 000001-000002.
2. Quote for moving Williams Trucking, prepared by A&A Machinery Moving, Inc., 9/20/11. P. 000003-000004.

*** Confidential documents are documents available for review at the U.S. EPA Region III office only with court ordered access in order to protect against the disclosure of privileged and confidential information. For internal reference, confidential documents ONLY are part of SDMS Collection #62687, while releasable documents ONLY are part of SDMS Collection #62662.

pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

NORTHWEST REGIONAL OFFICE

August 12, 2013

Ms. Kathy Hodgkiss
Acting Director
Hazardous Site Cleanup Division
US EPA, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: OU2 Record of Decision
Sharon Steel Farrell Works Superfund Site
City of Farrell, Mercer County, PA

Dear Ms. Hodgkiss:

The Pennsylvania Department of Environmental Protection "Department" has received and reviewed the Record of Decision (ROD) for the Sharon Steel Farrell Works Superfund Site received July 23, 2013. This ROD presents the selected remedial action for Operable Unit 2 (OU2), which addresses the Northern Slag Area. OU2 is located between OU1 North and OU1 South and consists of two parcels totaling 33 acres owned by Dunbar Asphalt Products, Inc. and Williams Brothers, where the companies operate an asphalt plant and trucking operation, respectively.

In evaluating the potential threat to human health and the environment posed by hazardous substances in contaminated soil and slag, the Environmental Protection Agency (EPA) has determined response action is necessary. The selected remedy for the OU2 includes the construction of an asphalt cap, or a cap of equivalent material, to reduce the dermal and inhalation risks. The cap will also reduce the ability of rainwater to pass through the contaminated soils and slag, thus decreasing the migration of contaminants into the groundwater and the Shenango River. The remedy presently addresses 7 acres of the 33 acre OU2, however concurrent sampling of the remaining 26 acres during implementation of the response may require expanding the size of that cap to help meet performance criteria.

The Department hereby concurs with the proposed remedy with the following conditions:

* The Department will have the opportunity to review and concur before any modification to the ROD and the issuance of an Explanation of Significant Difference (ESD).

* Concurrence with the remedy should not be interpreted as acceptance of on-site Operation and Maintenance (O&M) by the Department. State O&M obligations will be determined during design of the remedy and the completion of a Superfund State Contract.

Thank you for the opportunity to comment and concur on this Record of Decision. If you have any questions regarding this matter, please contact Mr. Gary Mechtly at 814.332.6646.

Sincerely,

Kelvin A. Burch
Regional Director

cc: Ms. Rashmi Mathur, EPA Region III
Mr. Weaver (file)

KAB:JW:lsl