Superfund Program Proposed Plan

Sharon Steel-Farrell Works Superfund Site- Operable Unit One

Hermitage Township, City of Farrell, PA **July, 2006**

EPA Announces Cleanup Plan

The U.S. Environmental Protection Agency (EPA) has completed a Feasibility Study (FS) for Operable Unit One of the Sharon Steel – Farrell Works Superfund Site (SSFW or Site) located near Farrell, Pennsylvania (see Figure 1). After the FS, EPA evaluated and compared several engineering technologies that could be used to address contamination at the SSFW Site. The technologies that were determined to be the most appropriate for cleaning up the slag, dried sludge, and contaminated ground water at the SSFW Site comprise EPA's Preferred Alternative and are described in this Proposed Plan. Other technologies that were evaluated during the FS are also discussed. The terms in ***bold italic*** print are explained in the glossary included in the back of this Proposed Plan.

July 16, 2006 to August 14, 2006
Public comment period on alternatives in Proposed Plan.

July 26, 2006 at 6:30 pm
Public meeting at the Stey Nevant Library

1000 Roemer Boulevard
Farrell, PA 16121

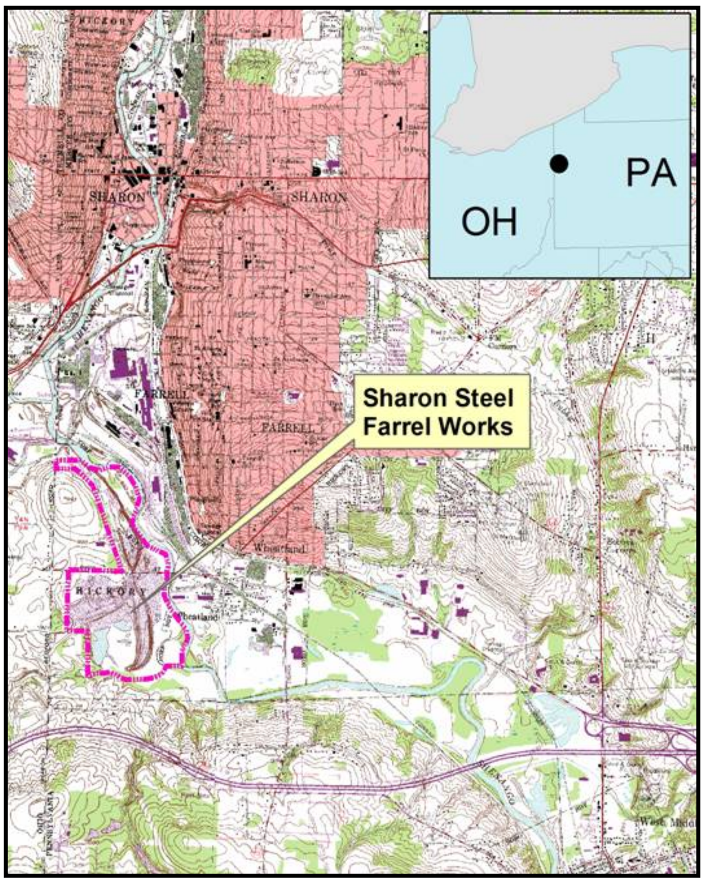


Figure 1: Site Location Map

This Proposed Remedial Action Plan (Proposed Plan) describes remedial alternatives for mitigating threats posed to human health and the environment at and from the Sharon Steel Farrell Works Superfund Site (Site) located in Farrell, Pennsylvania. In addition, this Proposed Plan includes a summary of background information relating to the Site, describes the United States Environmental Protection Agency Region III's (EPA's) preferred remedial alternatives, solicits public review and comment on all of the alternatives described in this Proposed Plan, and provides information on how the public can be involved in the remedy selection process.

This Proposed Plan is issued by EPA, the lead agency for Site activities under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F. R. Part 300, pursuant to the

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601 to 9675. This Proposed Plan highlights key information from the Remedial Investigation/Feasibility Study Report (RI/FS) prepared by EPA for the Site. The RI/FS Report, as well as other documents upon which this Proposed Plan is based, is available for public inspection in an Administrative Record for the Site. The detailed Administrative Record can be examined at the following locations:

Stey Nevant Library
1000 Roemer Blvd.
Farrell, PA 16121
(724) 983-2714

US EPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3157

The Administrative Record File can also be accessed remotely via the internet by going to the following web site address: http://www.epa.gov/arweb/.

EPA's general information web address for the Sharon Steel – Farrell Works Superfund Site is: http://www.epa.gov/reg3hwmd/super/sites/PAD001933175/index.htm.

EPA and the Pennsylvania Department of Environmental Protection (PADEP) encourage the public to review and comment on all of the cleanup options evaluated in this Proposed Plan. EPA is providing a 30-day public comment period on this Proposed Plan. The public comment period begins on July 16, 2006 and closes on August 14, 2006. EPA will hold a public meeting to discuss this Proposed Plan at the Stey Nevant Library located at 1000 Roemer Boulevard in Farrell on July 26, 2006. EPA will summarize and respond to relevant comments received at the public meeting and to written comments post-marked by midnight on date, in the Responsiveness Summary section of the ROD, which will document EPA's final selection of a clean-up remedy. Written comments, postmarked no later than midnight August 14, 2006 should be sent to:

Rashmi Mathur, RPM (3HS22)
U.S. EPA, Region III
1650 Arch Street
Philadelphia, PA 19103

Toll-free: 1-800-553-2509 (x45234)

Although EPA has identified its preferred remedial alternatives, no final decision has been made. EPA may modify the preferred alternatives, select other response actions, or develop other alternatives based on comments received during this period. EPA, in consultation with PADEP, will announce the selection of a remedy for this Site in a Record of Decision.

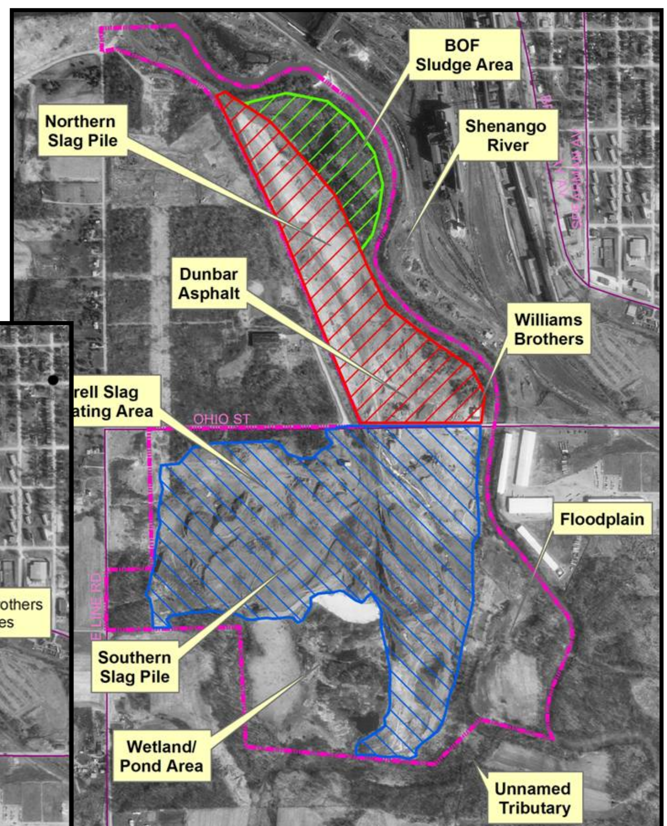
EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the NCP. This Proposed Plan fulfills the public notification requirements of CERCLA Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G), 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), and 9621(f)(1)(G).

Site Background

The SSFW Site is comprised of four main areas. 1) The Northern Area: which is approximately sixty one acres includes those portions of the site which are north of Ohio Street- the Northern Slag Pile, the Basic Oxygen Furnace (BOF) Sludge Area, 2) Dunbar Asphalt Property: a twenty seven acre area which includes an eight acre work area under the asphalt plant operated by the Dunbar Asphalt Co, 3) a six acre property owned by the William Brothers, and 4) the Southern Slag Pile: approximately two hundred and thirty one acres which includes those areas south of Ohio Street- the Southern Slag Pile which is currently being mined by Farrell Slag LLC, 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). Farrell Slag LLC 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). Farrell Slag 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, then the slag is beneficially reused to make road aggregate. However, due to technical limitations (groundwater dewatering) and cost/benefit considerations, Farrell Slag will not remove the last four feet of slag. This will leave four feet of slag over the original native soil in the Southern Area.

INSIDE:

The SSFW Site has been separated into the



re 2: Site Features

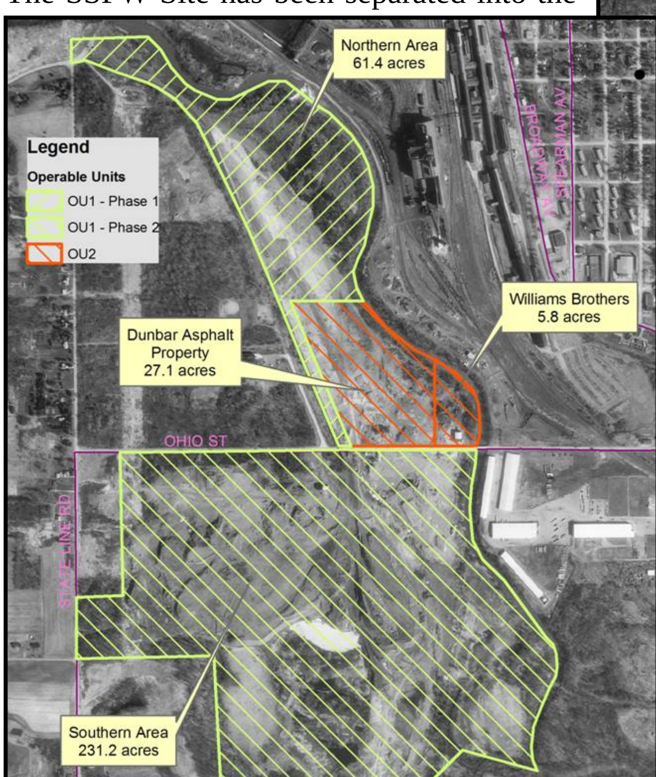


Figure 3: Operable Units and Land Ownership

over the contaminated soil. The cover will prevent contact with ***slag***, dried ***sludge***, contaminated slag dust, and contaminated ***groundwater***. The high piles of BOF slag and sludge will be removed from the banks of the Shenango River and will be used to re-grade the interior portions of the Site. When regraded, these materials will form open space. The area adjacent to the Shenango River will be graded to re-create a broad level floodplain. ***Bio-engineered bank stabilization techniques*** and erosion control measures will be designed to stabilize the river bank and prevent further erosion of contaminated material into the Shenango River and the wetlands area. A ***passive vegetated groundwater barrier*** consisting of poplar trees will be planted between the Northern slag area and the Shenango River. This vegetated barrier will absorb groundwater from the source areas before it flows into the Shenango River.

Once the Site has been re-graded, a biosolid material will be worked into the surface material to create an ideal environment for a ***high-fertility*** protective cover over the slag and dried sludge. The protective biosolid cover will also minimize the ability of water to pass through the slag and sludge. By reducing the quantity of water passing through the slag and sludge, the migration of ***contaminants*** into the groundwater will also be reduced, and ultimately the discharge of contaminated groundwater into the Shenango River will be minimized. Remaining groundwater flow through the site will be intercepted by the passive vegetated groundwater barrier, which will use poplar trees to absorb groundwater before it is discharged into the Shenango River. The biosolid cover will also provide a protective barrier between the contaminated slag and sludge and the people and wildlife that access the Site. This cover will be seeded with native plant species to create a grass and shrub or tree habitat. Perimeter fencing will be installed around the biosolid cap so that the cap can be well established. ***Long-term monitoring*** of the groundwater, sediment, and surface water in the Shenango Rive***r*** will be used to demonstrate a decrease in Site-related contaminants discharges and an increase in water quality in the Shenango River after consolidating contaminated slag and sludge under the biosolids cover. Certain land use and activity restrictions, known as ***institutional controls***, will be implemented to prevent unacceptable human health risks and ***ecological*** exposure risks to slag, dried sludge, contaminated dust and contaminated groundwater located at the Site. The land use restrictions will prohibit damaging the cap and the groundwater use restrictions will prohibit the use of contaminated groundwater from being used as a drinking water source. The institutional controls will be implemented through orders or agreements with EPA or through municipal ordinances (see Figure 4).

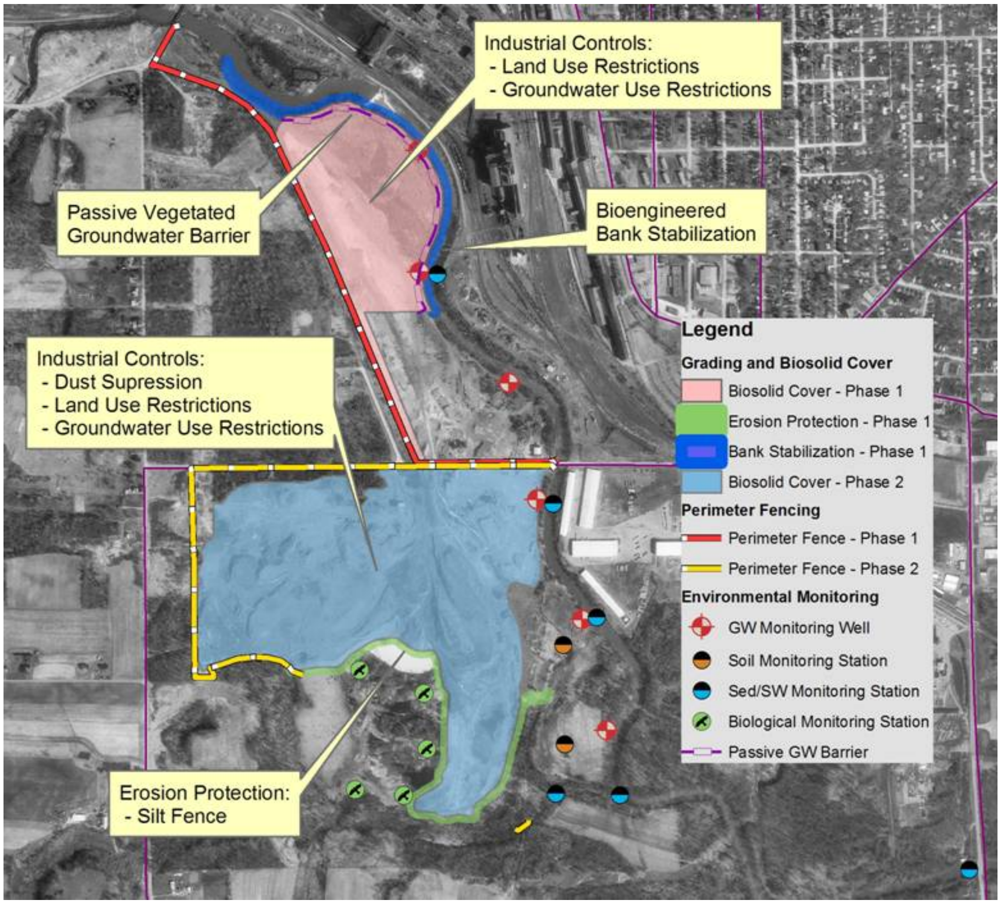


Figure 4: Features of Recommended Alternative

In 2000, EPA entered into a Superfund PPA with Farrell Slag LLC because the PPA allows Farrell Slag to mine and market the slag for beneficial reuse as construction material. Current mining operation at Farrell Slag LLC is of beneficial reuse because the operation is removing contaminated slag from the Site. The remedial action will be conducted in two phases that will allow Farrell Slag to continue mining operations until EPA completes its response actions in the Northern Area of the Site.

Phase 1 will include the regrading and application of the biosolid cover on the Northern Area; the bank stabilization along the Shenango River; the erosion protection along the wetland/pond habitat; the implementation of the environmental long-term monitoring program; and the institutional controls restricting trespassers (fencing) until the biosolid cap is established on the Site, and groundwater and land use. Phase 1 can be implemented when EPA issues the Final Record of Decision (ROD) and completes the design and contracting required for construction.

Phase 2 will include the regrading and application of the biosolid cover on the Southern Area. EPA will coordinate with Farrell Slag regarding the implementation schedule for this area of the Site.

This Proposed Plan summarizes information found in the ***Remedial Investigation*** and the ***Feasibility Study*** reports. Both reports are contained in the ***Administrative Record,*** along with other information used to develop the preferred alternative. If more in-depth information is needed, these documents can be referenced directly. The locations of the Administrative Record for the Site and the address to which you may send comments on this Plan are given at the end of this Proposed Plan. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

After the public comment period has ended and the comments received during the comment period have been reviewed and carefully considered, EPA, in consultation with PADEP, will select a final remedy for Operable Unit One for soil, slag, sludge and groundwater contamination at the SSFW Site. The final remedy will be described in a ***Record of Decision (ROD)***. The public's comments will be incorporated into a Responsiveness Summary contained in the ROD. Based on new information and/or public comments received, the remedy selected in the ROD may be different from the preferred alternative identified in this Proposed Plan. If there is a change from the remedy proposed in this Proposed Plan to the final remedy, the public will be informed.

This Proposed Plan is being issued as part of EPA's public participation requirements under Section 117(a) of the ***Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA)*** and Section 300.430(f)(2) of the ***National Oil and Hazardous Substances Pollution Contingency Plan (NCP)***.

Site Location and History

The SSFW Site is approximately 400 acres in size and is located approximately one (1) mile southwest of the City of Farrell, Mercer County, Pennsylvania (Figure 1). The Site is also located approximately 400 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 SSFW Plant, located across the Shenango River to the northeast of the subject site, was founded in 1900 and began to manufacture a variety of steel products. Throughout the operating history of the plant, waste and byproducts of the manufacturing process were transported on rail cars across the Shenango River (via bridge) and side-cast down embankments or piled into large mounds in several areas adjacent to the Shenango River on the subject Site. From 1949 to 1981, waste liquids (acids and oils) were poured onto the hot slag wastes which were subsequently disposed at the site. This practice continued until 1981when 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 stopped in 1992. PADEP conducted several inspections of the waste disposal areas in the 1970's and concluded that Sharon Steel was responsible for the lack of biological community along at least 11.5 miles of the Shenango River. In 1992, after Sharon Steel Corporation filed for bankruptcy, the plant shut down and waste disposal at the Site stopped. Since the Site was no longer in operation, it was evaluated under CERCLA. In August 1993, samples of groundwater, soil, ***sediment***, and surface water were collected during an Expanded Site Investigation (ESI) to support the preparation of a ***Hazard Ranking System (HRS)*** score. The HRS score is used to justify placing a site on the ***National Priorities List (NPL),*** a list of the most serious uncontrolled or abandoned hazardous waste sites requiring long-term clean up actions. The investigation identified metals and organic compounds at the site. Based on the findings of the ESI, the SSFW Site was recommended for HRS scoring in 1995. The HRS package was completed in February 1998, and the Site scored high enough to warrant listing on the NPL. On March 6, 1998, the Site was proposed to the NPL. It was formally added to the NPL on July 28, 1998, making it eligible for Federal cleanup funds.

In October 1999, EPA initiated a ***Remedial Investigation and Feasibility Study (RI/FS)*** for the Site to evaluate existing data; collect additional data, as necessary; and assess and consider appropriate remedial 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, which was completed in early 2004, 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 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 RI report indicated that there were unacceptable risks to human health and the environment; therefore, remedial actions would be required to control, reduce, or eliminate these risks. An FS report 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*** (***ARAR***).

Site Characteristics and Risks

Geology and Site Drainage

The SSFW 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, while 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 Mississipian bedrock of the Pocono Group. The Site is located on the western floodplain of the Shenango River between the river and the Ohio/Pennsylvania state boundary.

The slag and sludge wastes are extremely porous and most rainfall infiltrates the wastes and becomes groundwater. The limited surface runoff from the Northern Area, including the Dunbar Asphalt Plant, flows overland and eastward into the Shenango River or collects in the sunken landform within the Northern Area. Drainage from the Northern portion of the Southern area flows overland in a northward direction into a wetland area bisected by Ohio Street or collects in the sunken landform within the source area. There is no direct surface connection between this wetland area and nearby surface water features. Any hydraulic connection to nearby surface waters is through groundwater. Drainage from the southern portion of the Southern area 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.

Source Areas

Data from onsite soil and groundwater samples, as well as observations made during drilling operations, were compiled in the RI report to develop an understanding of the nature of the soils, geology, and ground water at the site. This information provides an insight to the nature and extent of contamination at the site and the direction that contamination may travel. Drilling information at the site indicates that the waste piles of slag and sludge range in thickness from 5 to over 40 feet. The BOF Sludge Pile (in the Northern Area) contains the most contamination. 2-Methylnaphthalene, an ***organic compound,*** and several metals (cadmium, chromium, copper, lead, mercury, silver, sodium, and zinc) were detected at higher concentrations than those found in the other source areas***.*** ***Polynuclear aromatic hydrocarbons*** (PAHs) were detected at significant concentrations in the northern and southern ends of the BOF Sludge Disposal Area. The Northern Slag Pile (in the Northern Area) was the least contaminated source/slag area and contained metals, PAHs, pesticides, and Polychlorinated biphenyls (PCBs). These were the most frequently detected constituents and were detected in all depth intervals. The Southern Area contained metals, PAHs, pesticides, and PCBs. The Southern Area also contained notably higher concentrations of most PAHs, Aroclor-1248, DDT metabolites, and heptachlor epoxide than the other two source/slag areas. This was particularly true in the central portion of the source area.

Groundwater

Site-related contamination from the Northern and Southern Areas has been detected in groundwater which flows under the Site. Groundwater occurs under the site in four main ***aquifers***. These four aquifers include: 1) an uppermost silty sand aquifer, which ranges in thickness from 0 to 30 feet; 2) an underlying silt and clay low permeability unit, approximately 30 to 70 feet thick; 3) a sand and gravel aquifer, approximately 70 to 120 feet thick; and 4) an underlying bedrock aquifer. The lithologies in the first three units are not continuous across the Site.

The two uppermost units contained elevated levels of metals and organic chemicals. 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. At the Southern Slag disposal area, groundwater flow discharges to the wetland/pond complex, the unnamed tributary and the Shenango River. The lower two units indicate groundwater flow towards the north with some discharge to the Shenango river. The glacial till materials are extensive enough to produce a less permeable layer above the gravel zone and underlying bedrock. With the exception of barium and thallium, concentrations of site-related constituents in the gravel and bedrock aquifers are generally consistent with regional ***background levels***. These observations suggest that there is no downward flow of contamination into the deeper confined aquifers. Flow in the confined aquifers is generally to the north and east and does not discharge into the Shenango River. Wells in the confined aquifers indicated ***artesian conditions***.

Residential Wells

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

Approximately 40 homes within 1 mile of the Site have domestic wells for water use. Well surveys have revealed that the wells for some of these residents, located west and southwest of the Site, are screened in the gravel and/or bedrock aquifers. Since ground water flow in the Site gravel and bedrock aquifers is to the northeast, towards the Shenango River and away from the residential wells; residential well data indicate these residents have not been impacted by the Site.

Additionally, groundwater on Site is contaminated with metals and volatile organic compounds in the upper two aquifers while the current residents have their drinking water wells in the non-Site contaminated lower bedrock aquifer.

Wetland Habitats
There is a large (over 80 acre) and ecologically important wetland habitat located in the Southern Area. This habitat includes emergent wetland areas, a large pond, a small unnamed tributary of the Shenango River, and associated forested floodplain/wetlands. The habitat supports a variety of waterfowl, fish, amphibians, and mammals.

The Site is surrounded on three sides by steep slag piles which are directly adjacent to the wetlands. In addition, there is a small pond with extremely alkaline water (pH 11-12) between the southern slag pile and the wetland. Some contamination from the waste piles enters the wetland directly, through erosion of the piles. However, most contamination is carried directly into the wetland by the discharge of contaminated groundwater from the base of the piles through the small pond. Given the low contaminant concentrations and the characteristics of the habitat, the wetland/pond area should be left intact and allowed to recover naturally once the sources of contamination are eliminated.

The entire wetland/pond area flows through a small channel which connects to the unnamed tributary of the Shenango River. There are also some places where groundwater from the Southern Slag pile discharges through ***seeps*** directly into the unnamed tributary. The soils, sediments, and surface waters of the unnamed tributary and its floodplain contain some Site-related metals and organic compounds.

Shenango River
Site-related contamination from the waste areas has resulted in some contamination of adjacent floodplain soils located between the site 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 is known to discharge into the Shenango River and is the most significant source of contamination from the Site. Contamination related to the site, primarily metals, was detected at elevated levels in sediment and surface water samples 1 kilometer (km) downstream of the Site.

Scope and Role

This Proposed Plan presents the information necessary to inform the public of the existing contamination at the Site and risk associated with the exposure to contamination and explain EPA's proposed clean up alternative. The Proposed Plan also addresses all the remedial activities that are necessary to remediate the Northern and Southern Areas of the Site (OU-1).

The proposed remedial action primarily addresses exposure to the slag and sludge. The primary goals of the remedial action are to prevent dust migration and direct contact with contaminated waste materials, immobilize metals in the soil/waste, decrease migration of contaminates or infiltrate passing through wastes, and restore wildlife habitat to barren lands by re-grading the site and covering it with a biosolid material. Although shallow groundwater under the slag areas has elevated levels of contaminants, there are no current residents using the shallow groundwater for drinking purposes. Potential future use of the Site groundwater will be restricted by institutional controls. The biosolid cover will immobilize contaminants by reducing the precipitation that can pass through it into the waste materials, and this in turn, will reduce the concentration of contaminants entering the ground water and discharging into the Shenango River and the wetland/unnamed tributary. Ultimately, this remedial action should reduce the overall amount of contamination going into the Shenango River from the SSFW Site.

Other elements of this cleanup will include the following:

1. Creation of a surface drainage collection system to minimize the amount of surface runoff passing through surface soils and prevent erosion of surface material into adjacent wetlands and streams.
2. Re-establishment of a more natural floodplain along the Shenango River and implementation of bio-engineering techniques to prevent further erosion of the contaminated stream bank.
3. Installation of a passive vegetated groundwater barrier to intercept shallow groundwater in the source areas before it discharges into the Shenango River.
4. Installation of perimeter fencing to prevent trespassing and unauthorized recreational activities until the biosolid cover is established.
5. Long-term monitoring to measure decreases in ***contaminant loads*** to the wetland/unnamed tributary habitat, the Shenango River, and its floodplains.
6. Establishment of institutional controls to minimize health exposure risks to regulate future land use so that the biosolid cap is not damaged and to prohibit shallow contaminated groundwater from being used for drinking water purposes on Site.

Summary of Site Risks

Risks to human health were determined in a Baseline Human Health Risk Assessment (HHRA). Risks to the environment were determined in a Baseline Ecological Risk Assessment (ERA). A Superfund risk assessment estimates the "baseline risk." This is an estimate of the likelihood of health and environmental problems occurring if no cleanup action were taken at a Site. The HHRA and ERA are part of the RI report. The HHRA and the ERA indicated that soils, groundwater, sediment, surface water and fish tissue at, or impacted by, the Site pose an unacceptable level of risk. It is EPA's current judgment that the preferred alternative identified in the Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Human Health

The Human Health Risk Assessment studies the ***carcinogenic*** and non-carcinogenic risks to people exposed to contaminants at the Site. The human health risks for exposure to source material are shown in Figure 5. A four-step process is used to estimate the baseline human health risk at a Superfund Site:

Exposure Point/Media	Receptor	Cancer Risk		Hazard Index		Constituents Of Concern
		RME	CT	RME	CT	
Northern Area (Northern Slag Pile + BOF Sludge Area) - Surface Soil, Dust, Shallow Subsurface Soil, Deep Subsurface Soil	Industrial Worker	2.3E-04	1.6E-05	3E+01	8E+00	Cancer risk due to Cr. Noncancer hazard due to Al, Cd, Cr, Fe, Pb, Mn, Tl, V, Zn. Potential acute effects due to As, Ba, Ni, V. (Only Al in surface soil at BOF Sludge Area can be attributed to background.)
	Construction Worker	1.7E-05	2.1E-06	5E+01	8E+00	
	Trespasser/Visitor	7.1E-06	1.5E-06	3E+00	9E-01	
	Adult Resident	5.0E-04	6.0E-05	5E+01	2E+01	
	Child Resident	3.6E-04	1.1E-04	2E+02	6E+01	
	Total Adult and Child	8.6E-04	1.7E-04			
Southern Area (Southern Slag Area) - Surface Soil, Dust, Shallow Subsurface Soil, Deep Subsurface Soil	Industrial Worker	3.6E-05	3.4E-06	4E+01	1E+01	Noncancer hazard due to Al, Cr, Fe, Mn, Tl, V. Potential acute effects due to As, Ba, Ni, V. (Only Al and As in surface soil/slag can be attributed to background.)
	Construction Worker	3.6E-06	6.2E-07	7E+01	9E+00	
	Trespasser/Visitor	4.8E-06	9.1E-07	4E+00	1E+00	
	Adult Resident	4.5E-05	3.8E-06	8E+01	3E+01	
	Child Resident	7.5E-05	1.6E-05	2E+02	8E+01	
	Total Adult and Child	1.2E-04	2.0E-05			

Notes:

CT = central tendency	Fe = iron
RME = reasonable maximum exposure	Mn = manganese
Al = aluminum	Ni = nickel
As = arsenic	Pb = lead
Ba = barium	Tl = thallium
Cd = cadmium	V = vanadium
Cr = chromium	Zn = zinc

Figure 5: Risks associated with exposure to source areas.

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 as a substitute when no human studies are available). Comparisons between site-specific concentrations and concentrations reported in past studies enable EPA to determine which contaminants are most likely to pose the greatest threat to human health. Constituents at the various source areas at the SSFW Site were identified from samples of soil/slag, groundwater, surface water, sediment and fish tissue. Over 100 constituents (primarily metals but also including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PAHs, pesticides, PCBs, and dioxins) were detected in these media however some of these maybe from other upstream sources.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. The current and potential future land uses play a key role when EPA determines the exposure scenarios to be evaluated in the Human Health Risk Assessment. The SSFW Site has historically been used for industrial purposes and is currently zoned for industrial use. However, since land use and zone can change, a future residential scenario has been considered and will serve to justify restrictions on land use in the future. The Human Health Risk Assessment evaluated the pathways which could lead to exposure for people, such as dust inhalation, use or drinking of well water, wading or swimming in the Shenango River and the wetland ponds, eating fish or waterfowl, and direct contact with or ingestion of the soil. The possible human receptors include current and future residents (children and adults), trespassers, recreational users (fishing and hunting), industrial workers, and construction workers. Using this information, EPA calculates the "reasonable maximum exposure" (RME) 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 health risks. EPA considers two types of risk: cancer risk and non-cancer risk. The NCP, 40 ***Code of Federal Regulations*** (***CFR)*** Part 300, establishes a range of acceptable levels of carcinogenic risk for Superfund sites that range between one in 10,000[1] and one in 1 million additional cancer cases if cleanup action is not taken at a site. In addition to carcinogenic risk, chemical contaminants that are ingested, inhaled or absorbed through the skin may present non-carcinogenic risks to different organs of the human body. The non-carcinogenic risks or toxic effects are expressed as a Hazard Index (HI). EPA considers a HI exceeding one (1) to be an unacceptable non-carcinogenic risk.

In Step 4, EPA determines whether site risks are great enough to potentially cause health problems for people at or near a 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.

Summary of Site-Related Human Health Risk

<u>Northern Area</u>

Cancer Risk

Current and future cancer risks associated with exposures to soil and dust at the Northern Area at the Sharon Steel Farrell Works Site (Northern Slag Pile and BOF Sludge Area) exceed the acceptable risk range due to potential inhalation of chromium (as Cr^{+6}) in dust (resident and industrial worker).

Chronic Noncancer Hazard

Current and future chronic (long duration) noncancer hazards are a concern due to potential ingestion and dermal absorption of aluminum in soil and potential inhalation of aluminum in dust (resident and construction worker), potential ingestion and dermal absorption of cadmium in soil and potential inhalation of cadmium in dust (child resident only), potential ingestion and dermal absorption of chromium (as Cr^{+6}) in soil and potential inhalation of chromium (as Cr^{+6}) in dust (child resident and construction worker), potential ingestion and dermal absorption of iron in soil (child resident and construction worker), potential ingestion of lead in soil (child resident, adult nonresident), potential ingestion and dermal absorption of manganese in soil and potential inhalation of manganese in dust (resident, industrial worker, construction worker, trespasser/visitor), potential ingestion and dermal absorption of thallium in soil (child resident), potential ingestion and dermal absorption of vanadium in soil (child resident and construction worker) and potential ingestion and dermal absorption of zinc in soil (child resident only).

Acute Noncancer Hazard

Current and future acute effects (short term) are a concern due to potential inhalation of arsenic,

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[1] In other words, for every 10,000 people 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 to from all other causes.

barium, nickel, and vanadium in dust (resident, industrial worker, construction worker, and trespasser/visitor).

Background
Aluminum in surface soil at part of the Northern Area (the BOF Sludge Area) is found regionally in the soils of the area.

<u>Southern Area</u>

Cancer Risk
Current and future potential cancer risks associated with exposures to soil and dust at the Southern Area at the Sharon Steel Farrell Works Site (Southern Slag Pile) are within the acceptable risk range. Current and future cancer risks associated with exposures to soil and dust in floodplain soils exceed the acceptable risk range due to potential ingestion and dermal absorption of benzo(a)pyrene in soil, and potential inhalation of chromium (as Cr+6) in dust (resident). In addition, current and future cancer risks associated with exposure to soil and dust in the Ohio Street Wetland exceed the acceptable risk range due to potential inhalation of chromium (as Cr+6) in dust (resident and industrial worker).

Chronic Noncancer Hazard
Current and future chronic noncancer hazards at the southern slag pile and floodplain are a concern due to potential ingestion and dermal absorption of aluminum in soil and potential inhalation of aluminum in dust (resident, industrial worker, construction worker), potential ingestion and dermal absorption of chromium (as Cr^{+6}) in soil (resident, industrial worker, construction worker), potential ingestion and dermal absorption of iron in soil (resident, industrial worker, construction worker), potential ingestion and dermal absorption of manganese in soil and potential inhalation of manganese in dust (resident, industrial worker, construction worker, trespasser/visitor), potential ingestion and dermal absorption of thallium in soil (child resident only at the southern slag pile) and potential ingestion and dermal absorption of vanadium in soil (resident, industrial worker, construction worker). Current and future chronic noncancer hazards are also a concern due to aluminum, chromium and manganese at the Ohio Street Wetland (resident, industrial worker and construction worker).

Acute Noncancer Hazard
Current and future acute effects are a concern due to potential inhalation of arsenic, barium, nickel and vanadium in dust (resident, industrial worker, construction worker, and trespasser/visitor).

Background
The presence of aluminum and arsenic in surface soil/slag in the Southern Area can be attributed to levels found in soils regionally. There are no unacceptable risks to people who may come in contact with the sediment, or surface water in the wetland/pond habitat.

Lead
Lead is evaluated not by a cancer risk or a non-cancer ***HI,*** but by a model that predicts potential blood-lead levels. Lead in the waste sludge would be associated with potentially unacceptable blood-lead levels in children, if they accessed the site or the soil was used by residents.

Groundwater

Many residents in the area obtain drinking water from private wells ***screened*** in the gravel or bedrock aquifer. Groundwater from the site flows away from these residential wells and towards the Shenango River; therefore, the Site cannot impact these wells. Sampling of the residential wells has indicated elevated levels of arsenic, thallium and manganese related to high natural concentrations of these metals in groundwater in the region. There are no current users of contaminated groundwater at the Site, and the Shenango River prevents the flow of groundwater to areas east of the river. Contaminated groundwater from the Site flows directly into the Shenango River or the emergent wetland/unnamed tributary. Additionally, only the shallow two uppermost aquifers on Site contained elevated levels of metals and organic chemicals from Site contamination while residential wells are in the two lowermost non-Site contaminated gravel or bedrock aquifers. The risk assessment indicated a potential health risk if contaminated groundwater at the Site were to be used for drinking water or industrial purposes in the future.

Surface Water

The Shenango River supports a variety of wildlife and fish and is used by people for recreational fishing. There are no unacceptable current risks to people who may come in contact with the sediment, soil, or surface water of the Shenango River. For people who might eat fish from this river, unacceptable concentrations of PCBs, dioxins, thallium, and mercury were found in fish tissue. However, of these only mercury was found to be Site related. Thallium was also found in fish from the Unnamed Tributary and Slag Pond at unacceptable concentrations that could not be attributed to background. The risk assessment also indicated a potential health risk if these areas along the Shenango River were to be used for residential or industrial purposes.

Summary of Site-Related Ecological Risk

The purpose of the ERA was not to assess the risks to individual species; it is designed to assess the risks to ***ecological communities***. The ERA follows a process similar to that for the HHRA; however, cancer risks are not considered as these are risks that do not often relate to ecological community-level effects.

EPA reviews the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have on plants and animals. Comparisons between site-specific concentrations and concentrations reported in past scientific studies enable EPA to determine which contaminants are, most likely, the greatest threats to ecological communities.

Ecological receptors at the site can be exposed to contaminated media by direct exposure (ingestion of media soil, water or dermal absorption of contaminants) or by ingesting plants and animals that have absorbed and accumulated contamination. Several of the metals and organic compounds detected at the site are known to be stored in living organisms. Based on the habitats present on and near the site, the ERA was designed to consider risks to key elements of the local ecology: plant communities, soil invertebrate communities, and wildlife species.

Chemical contaminants that are ingested or absorbed through the skin may disrupt growth, behavior, reproduction, or some other factor that can adversely impact the ecological community. The toxic effects are expressed as a ***HI*** for each element of the ecological community. EPA considers an ***HI*** exceeding one (1) to be an unacceptable ecological risk.

The source areas are mostly barren slag piles that provide minimal ecological habitat; therefore, there are no current risks to wildlife.

Remedial Action Objectives

The ***remedial action objectives*** (**RAOs**) describe the goals, or objectives for Site cleanup as set forth in the Proposed Plan. The RAOs for the site are as follows:

- Prevention of exposure to slag, contaminated soils, and dust
- Prevention of exposure to contaminated groundwater
- Reduction of future migration of chemicals into groundwater
- Reduction of surface runoff of materials into the Shenango River and wetlands

Summary of Alternatives

During the Feasibility Study, various alternatives were evaluated to determine the best cleanup method to prevent inhalation, dermal contact with waste slag and contaminated soils; prevent/reduce the migration of contaminated ground water at the Site into the Shenango River; and cleanup contaminated sediments in the Shenango River, wetland/pond habitat, and the unnamed tributary. This evaluation was based on the information gathered during the RI. EPA's preferred alternative is ***Alternative 4 – Biosolid-Enhanced Cap and Passive Vegetated Groundwater Barrier with Industrial Controls and Long-Term Monitoring.***

Several alternatives evaluated in the FS did not meet the criterion of protecting human health and the environment; therefore, they are not discussed in detail in this Proposed Plan. These alternatives were considered, but are not described here because they were not sufficient to achieve all the RAOs or were not implementable as discussed in the Feasibility Study. Further information can be obtained from the Administrative Record. These included:

- Alternative 2 – Institutional Controls.
- Alternative 5 – Source Removal, Media Excavation/Extraction, Treatment and Disposal.

Each remaining alternative, except the "no action" alternative, contains some common elements that were considered in the evaluation process. The common elements include:

- Institutional Controls
  - Groundwater restrictions
  - Land use restrictions
- Environmental monitoring with objectives determined in a Long Term Monitoring Plan
  - Groundwater
  - Surface water
  - Sediment

- Wetland plant community abundance and diversity

- Erosion protection to prevent the erosion of waste slag and sludge into the Shenango River and the wetland/pond area:
  - Streambank stabilization of the west bank of the Shenango River along its frontage with the SSFW Site.
  - Silt fencing will be anchored along the north perimeter of the wetland/pond habitat to prevent the inflow of eroded material from the adjacent slag piles into the wetland.

The following section is a summary of the most significant cleanup alternatives that were considered during the Feasibility Study and their associated costs. The number of the alternatives is that which was used in the Feasibility Study itself.

Alternative 1 - No Action Alternative

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

Under this alternative, no remedial measures would be implemented at the site to prevent exposure to the waste slag and sludge, contaminated soil and sediment, or groundwater contamination. The "no action" alternative is included 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 would not meet ARARs.

Alternative 3a – Industrial Controls, Long-Term Monitoring, and a Geosynthetic Liner/Topsoil Cap

Capital Cost:	$51,267,215
Annual O&M Costs:	$68,946
Total O&M Costs:	$2,068,380[2]
Total Present Worth Cost:	$53,335,595

This option uses a ¼-inch thick polypropylene/clay geosynthetic liner and 12-inch thick topsoil cover to cover the graded slag/sludge. In addition to covering the contaminated slag/sludge at the site, this cover would prevent infiltration of precipitation into underlying groundwater and would significantly reduce the discharge of contaminated groundwater into the Shenango River and the wetland/pond complex. As a result, this option would require significant area for stormwater management facilities and point discharges for stormwater from the site into the river, ponds, and wetlands. Using this cover would eliminate the need for groundwater barriers between the source areas and the Shenango River and would be among the most effective at attaining groundwater RAOs.

[2] Includes annual costs for environmental monitoring based on quarterly sampling for 30 years.

The liner/topsoil cover option will require significant ongoing maintenance and therefore, are typically only re-vegetated with grass species to allow visual inspection of the cap integrity. Disadvantages of this cover include the availability of sufficient quantities of topsoil needed for the large site area.

Alternative 3b – Industrial Controls, Long-Term Monitoring, and a Clay/Topsoil Cap

Capital Cost:	$24,084,468
Annual O&M Costs:	$68,946
Total O&M Costs:	$2,068,380
Total Present Worth Cost:	$26,152,848

This option uses a 6-inch thick clay layer and a 12-inch thick topsoil cover to cover the graded slag/sludge. In addition to covering the contaminated slag/sludge at the site, this cover would prevent infiltration of precipitation into underlying groundwater and would significantly reduce the discharge of contaminated groundwater into the Shenango River and the wetland/pond complex. As a result, this option would require the most area for stormwater management facilities and point discharges for stormwater from the site into the river, ponds, and wetlands. Using this cover would eliminate the need for groundwater barriers between the source areas and the Shenango River and would be among the most effective at attaining groundwater RAOs.

The clay/topsoil cover option will require significant ongoing maintenance and therefore, are typically only re-vegetated with grass species to allow visual inspection of the cap integrity. Disadvantages of this cover include the availability of sufficient quantities of clay and topsoil needed for the large site area.

Alternative 3c – Industrial Controls, Long-Term Monitoring, and a Portland Cement Cap

Capital Cost:	$64,844,799
Annual O&M Costs:	$67,260
Total O&M Costs:	$2,017,800
Total Present Worth Cost:	$66,862,599

This option applies Portland cement to the graded mass of slag and sludge to create a cemented crust of site material that covers the underlying source material. In addition to covering the contaminated slag/sludge at the site, this cover would prevent infiltration of precipitation into underlying groundwater and would significantly reduce the discharge of contaminated groundwater into the Shenango River and the wetland/pond complex. As a result, this option would require the most area for stormwater management facilities and point discharges for stormwater from the site into the river, ponds, and wetlands. Using this cover would eliminate the need for groundwater barriers between the source areas and the Shenango River and would be among the most effective at attaining groundwater RAOs.

The Portland cement cover option will require minimal ongoing maintenance; however, it would not be possible to re-vegetate the site in the short or long-term. Under this capping option, the site would remain a cemented area in the long-term; however, this could provide long-term opportunities for industrial uses.

Alternative 4 – Biosolid-Enhanced Cap and Passive Vegetated Groundwater Barrier with Industrial Controls and Long-Term Monitoring

Capital Cost:	$8,727,200
Annual O&M Costs:	$67,260
Total O&M Costs:	$2,017,800
Total Present Worth Cost:	$10,745,000

This option mixes biosolid material from nearby municipalities into the top 3 to 4 feet the graded mass of slag and sludge to create an enhanced soil that will cover the underlying source material. The slag on Site is exempt from being RCRA Hazardous waste through the Bevill Exemption. Biosolids have been demonstrated to reduce the bioavailability and toxicity of contaminated soils and have been used successfully at other mine-related sites throughout the United States. In addition to covering the contaminated slag/sludge at the site, this cover would reduce infiltration of precipitation into the underlying groundwater, would reduce the loading of contaminants from contaminated materials into groundwater, and would reduce the discharge of contaminated groundwater into the Shenango River and the wetland/pond complex. As a result, this option would require less area for stormwater management facilities and point discharges for stormwater from the site into the river, ponds, and wetlands.

The biosolid enhanced cover option will require minimal ongoing maintenance, will allow the Site to be planted with native species, and will facilitate natural re-colonization of native plant species to create a natural habitat at the site. A ***benchscale treatability study*** is currently being conducted to determine the effectiveness of the biosolid cover on reducing bioavailability and toxicity. Initial results are promising and appear to demonstrate reduced bioavailability and toxicity; however the final results are not yet available. The final study is expected to be available in August 2006 and would be used to determine the optimum blend of biosolid material needed to support the re-vegetation of the site.

A key benefit of the biosolid enhanced cover is that it allows for the beneficial reuse of a waste stream generated by municipal waste water treatment plants (biosolid sludge). Municipalities currently pay a significant amount of money to dispose of their waste sludge; however, some have begun processing their sludge into a biosolid material that can be sold or given away for agricultural land amendments to lower their operating costs. Use of a biosolid to create an enhanced cover can provide cost savings for these municipalities.

Because the groundwater protection afforded by the biosolid enhanced cover is lower than for the other capping variants, a passive groundwater barrier would be used. This passive vegetated groundwater barrier would include the planting of two staggered lines of poplar trees between the source areas and the Shenango River. Poplar trees can draw as much as 30 gallons of groundwater per day and placing these trees just above the Shenango River will allow the root systems of these trees to draw some groundwater from the surface aquifers before it is discharges into the Shenango River. No groundwater protection measures are proposed adjacent to the wetland/pond complex since this area has no significant groundwater contamination.

Alternative 6a – Industrial Controls, Long-Term Monitoring, Geosynthetic Liner/Topsoil Cap, Hot-Spot Removal and Disposal of Impacted Media, Pump/Treat Impacted Groundwater

Capital Cost:	$63,737,282
Annual O&M Costs:	$152,445
Total O&M Costs:	$4,573,338
Total Present Worth Cost:	$68,310,619

This alternative is the same as SWRA 3a except that it adds the pumping and treatment of contaminated groundwater to address groundwater migration and contamination and the excavation of hot spots of floodplain soils and suction dredging of sediment in downgradient areas.

Excavation of contaminated floodplain soil hot spots and contaminated sediment hot spots in the wetland would be accomplished using typical excavation machinery. Areas of significantly high concentration which drive the ecological risks in this area will be excavated to a depth of two feet, treated on site to stabilize and demobilize the contaminants, loaded in trucks, and transported to a nearby municipal landfill for use as cover material. This will require the construction of access roads to the southeast floodplain.

Dredging of contaminated sediment hot spots in the Shenango River and the wetland ponds would be accomplished using suction dredging equipment. Areas of significantly high concentration which drive the ecological risks in this area will be excavated to a depth of two feet, treated on site to stabilize and demobilize the contaminants, loaded in trucks, and transported to a nearby landfill for use as cover material.

The groundwater pump and treat system would consist of the installation of extraction wells around the perimeter of the source areas where groundwater discharges. Due to the site of the site and direction of groundwater flow, two areas of extraction wells (along the Shenango River and along the wetland/pond complex) would be required. Contaminated groundwater from these extraction wells would be pumped from the well into a collection system which would convey contaminated water to two treatment facilities (one in the north portion of the site and one in the south). Each treatment facility would consist of a granular activated carbon unit (GAC), to remove organic contaminants, and an ion exchange unit (IE) to remove metals. The solid waste stream (sludge and brine) and spent treatment units would be transported off site for disposal and the treated water would be piped to the Shenango River or the wetland/pond complex and discharged at the surface. Groundwater treatment demands would be expected to gradually decrease as the groundwater aquifer is lowered through pumping and the covers prevent further infiltration. A smaller amount of flow would be expected as groundwater flows through the site from upgradient areas.

Alternative 6b – Industrial Controls, Long-Term Monitoring, Clay/Topsoil Cap, Hot-Spot Removal and Disposal of Impacted Media, Pump/Treat Impacted Groundwater

Capital Cost:	$36,554,535
Annual O&M Costs:	$152,445
Total O&M Costs:	$4,573,338
Total Present Worth Cost:	$41,127,872

This alternative is the same as SWRA 6a except that it uses a clay/topsoil cap. The details of the clay/liner cap are discussed under Alternative 3b.

Alternative 6c – Industrial Controls, Long-Term Monitoring, Portland Cement Cap, Hot-Spot Removal and Disposal of Impacted Media, Pump/Treat Impacted Groundwater

Capital Cost:	$77,134,866
Annual O&M Costs:	$150,759
Total O&M Costs:	$4,522,758
Total Present Worth Cost:	$81,837,624

This alternative is the same as SWRA 6a except that it uses a Portland cement cap. The details of the Portland cement cap are discussed under Alternative 3c.

Alternative 7 – Industrial Controls, Long-Term Monitoring, Biosolid Enhanced Cap, Groundwater Slurry Wall/Pump & Treatment System, and Sediment Armoring

Capital Cost:	$12,127,129
Annual O&M Costs:	$145,716
Total O&M Costs:	$4,371,487
Total Present Worth Cost:	$16,498,607

This alternative is similar to Alternative 4 except that an active groundwater barrier system and sediment armoring is proposed in place of the passive vegetated groundwater barrier. Because the groundwater protection afforded by the biosolid enhanced cover is lower than for the other capping variants, a groundwater barrier is included in this alternative.

The groundwater barrier would consist of 4,500 linear feet of a bentonite slurry wall between the source areas and the Shenango River to a depth of 15 feet to prevent shallow groundwater from flowing from the site into the Shenango River. In addition, a pump and treatment system is needed to remove and treat the contained groundwater before it is discharged to the Shenango River. No groundwater protection measures are proposed adjacent to the wetland/pond complex since this area has no significant groundwater contamination. The groundwater pump and treat system would consist of the installation of extraction wells around the perimeter of the source areas where groundwater discharges. Due to the site of the site and direction of groundwater flow, one area of extraction wells would be required along the Shenango River. Contaminated groundwater from these extraction wells would be pumped from the well into a collection system which would convey contaminated water to a treatment facility. The treatment facility would consist of a granular activated carbon unit (GAC), to remove organic contaminants, and an ion exchange unit (IE) to remove metals. The solid waste stream (sludge and brine) and spent treatment units would be transported off site for disposal and the treated water would be piped to the Shenango River and discharged at the surface. Groundwater treatment demands would be expected to gradually decrease as the groundwater aquifer is lowered through pumping and the biosolid cover reduces future infiltration.

The sediment armoring would consist of encapsulating sediment hot spots in the Shenango River and the unnamed tributary with an impermeable geosynthetic liner anchored to the stream bottom and cover with rip rap to prevent future erosion.

Evaluation of Alternatives

In this section, EPA evaluated the alternatives in detail to determine which alternative would be the most effective in achieving the goals of CERCLA, and in particular, achieving the remedial action objectives 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, 40 CFR § 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

Threshold Criteria:

1. *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 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* refers to the ability of a remedy to maintain reliable protection of human health and the environment, over time, once cleanup goals are achieved.

4. *Reduction of Toxicity, Mobility, or Volume through Treatment* addresses the degree to which alternative treatments will reduce the toxicity, mobility, or volume of the contaminants causing Site-related risks.

5. *Short-term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and environment that may be posed during the construction and implementation period.

6. *Implementability* addresses the level of technical and administrative difficulty associated with completing a remedy, including whether materials and services needed to implement a particular option are readily available.

7. *Cost* includes estimated capital (startup) costs, as well as operation and maintenance costs, and 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 Proposed Plan, 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
CERCLA requires that the selected remedial action be protective of human health and the environment. An alternative is protective if current and potential future risks associated with each exposure pathway at a Site are reduced to acceptable levels. An exposure pathway refers to the way in which a person or other living organism can come into contact with contaminants.

Alternative 1 does not protect human health or the environment to any greater extent than already protected; adverse risk from exposure to source material and contaminated media downgradient is not reduced or eliminated by this option. In fact, exposure and risk could increase over time due to continued migration of slag/sludge solids with storm water runoff and the percolation of infiltrated storm water through the source material to groundwater. Also, as stated earlier, Alternatives 2 and 5 considered early in the FS either do not meet this threshold criteria or are not implementable and are not further evaluated in this Proposed Plan.

Alternatives 3, 4, 6, and 7, all are likely to provide protection of human health and the environment. The ICs proposed under all of these alternatives will address groundwater usage in the short- and long-term. Covering the source material prevents onsite exposure to source material, retains the source material in place to minimize migration (via erosion or dust), and minimizes the percolation of surface precipitation through the source material to shallow groundwater. The cover/caps for all these alternatives prevent exposure to source contaminants and address groundwater migration and erosion of source material into the Shenango River. Ecological risks may remain in downgradient habitats; however, since these habitats are not visibly impacted, it is believed that source area controls will allow contaminant levels in these habitats to decrease over time. Alternatives 6 and 7 provide somewhat greater protection to human health and the environment since they will remove contaminated groundwater from the site and provide for immediate remediation of the most significantly impacted downgradient media.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
Any cleanup alternative selected by EPA must comply with all applicable or relevant and appropriate federal and state environmental requirements. *Applicable* requirements are those substantive environmental standards, requirements, criteria, or limitations ***promulgated*** under federal or state law that can be legally applied to the remedial action to be implemented at the Site. *Relevant and appropriate* requirements, while not being directly applicable, address problems or situations sufficiently similar to those encountered at the Site that their use is well-suited to the particular Site. EPA may waive an ARAR under certain conditions; however, EPA is not waiving any ARARs for this Site. Alternative 1 does not meet the requirements of CERCLA because it results in unacceptable risks to human health and the environment; therefore, it is not included in the discussion below. The following are the main ARARs applicable to the Site: Major ARARs that may apply to the groundwater remedies listed in this Proposed Plan include: Federal Maximum Contaminant Levels (MCLs) and/or Maximum Contaminant Level Goals (MCLGs) for drinking water established under the Safe Drinking Water Act 42 U.S.C. §§300g-l. To meet the substantive requirements on surface water discharge on Site the following ARARS may apply: Pennsylvania

National Pollutant Discharge Elimination System (NPDES) program requirements; 25 PA Code Chapters 95.1 - 95.3; Section 402 of the Clean Water Act; and 40 CFR 131 (compliance with established water quality standards);Storm Water Management Act 32 P.S. §680.13; Erosion and Sediment Control 25 PA Code 102.4(b)(1), 102.11, 102.22; Pennsylvania Water Quality Standards 25 PA Code Chapters 93.4A, 93.5-93.7 and 93.8a; Pennsylvania Wetland Regulations 25 PA Code Chapter 105.18a

Long-Term Effectiveness and Permanence
The evaluation of alternatives under this criterion considers the ability of an alternative to 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.

Alternative 1 does not provide any long-term or reliable protection of human health or the environment. One possible exception is the conditional long-term protection of human visitors/trespassers by implementing institutional controls at the site; as long as the controls were enforced in the long-term, they would deter or restrict access to the site.

Alternatives 3, 4, 6, and 7 would all provide partial long-term protection to human health and the environment through implementation of the capping/covering element, and would provide conditional long-term protection to human visitors/trespassers through implementation of institutional controls at the site. The cover systems proposed in these alternatives would all require some routine monitoring and maintenance to maintain; however, Alternatives 4 and 7 would require the least maintenance because it would support the rapid establishment of a diverse habitat of native grasses and shrubs. This habitat, by design, would require very little upkeep and would provide additional ecological habitat. Alternative 7 would also provide long term effectiveness and permanence. As long as the institutional controls were enforced in the long-term, and as long as the cap structure was not breeched, this remedial alternative would prevent or at least restrict exposure to contaminated source media. This alternative would not address currently impacted media downgradient of the source material; therefore it would not provide any long-term protection to human health and the environment downgradient of the site.

The remedial technologies included in Alternatives 6 and 7 to remove contaminated groundwater from the site; migration of contamination into the Shenango River and risks associated with groundwater use would be significantly minimized. The long-term effectiveness of the removal and treatment elements of these remedial alternatives are completely effective over the long-term since contamination in shallow groundwater under the source material would be eliminated and removed from the site. The long-term effectiveness at protecting human health and the environment is the best for these alternatives.

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.

Alternative 1 does not reduce the toxicity, mobility, or volume of contamination at the SSFW site.

Alternative 3 would reduce the mobility of contaminants because the cover physically blocks the migration of contaminants in the source material. The volume of contamination discharge in groundwater would decrease since the covers would prevent infiltration and reduce groundwater levels under the source material. The toxicity of contaminants materials would be unchanged. Alternatives 4, 6, and 7 would reduce the toxicity, mobility, and volume of contaminants from the site. The introduction of groundwater treatment would reduce the volume of contamination in groundwater due to the covers, the groundwater barriers and the extraction wells. The groundwater treatment system element of Alternatives 6 and 7 will reduce the toxicity of groundwater at the site. The use of a biosolid enhanced cap associated with Alternatives 4 and 7 could reduce toxicity of the source material and groundwater by reducing the bioavailability of contaminants in the covered source material.

Short-Term Effectiveness
This evaluation criterion addresses the effects of the alternatives during the construction and implementation phase until remedial action objectives are ***implemented***. 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.

Alternative 1 is not effective in the short-term because no action is implemented with this option; however there are also no associated additional adverse impacts. The industrial controls associated with Alternatives 3, 4, 6, and 7 provide some short-term effectiveness in minimizing human exposure to source material and groundwater.

Alternatives 3, 4, 6, and 7 are not likely to provide short-term protection to human health or the environment. The grading associated with all of these alternatives could result in adverse short-term impacts if not carefully executed and could actually increase potential exposure in the short-term to contamination during the implementation phase of this remedial alternative. Best management practices for dust suppression and erosion control should be used to minimize creation of excessive dust, dispersion, and runoff of contaminants. All of these alternatives would involve the delivery of a significant amount of material to create the cover, which would create increased human risks due to increased local traffic. Impacts would be minimized by creating established trucking routes that minimize the use of small local streets and schedule delivery times to avoid high traffic times (morning and evening rush hours). Alternatives 4 and 7 would require the least amount of material to be imported to the Site because the biosolid material is used to supplement the existing waste slag/sludge to create the cover. The biosolids from local facilities would require transporting materials the least distance, thus minimizing the affect on traffic.

The work in aquatic habitats (sediment dredging and wetland soil excavation) may also have adverse short-term impacts to these habitats. In the floodplain and wetlands, excavating contaminated materials under Alternative 6 would eliminate these habitats in the short-term. These areas would need to be restored to be compliant with action and location specific-ARARs. Under Alternative 7, the sediment armoring would result in a temporary loss of benthic invertebrate habitat, which would be expected to naturally recover over time as the rip rap became a substrate for benthic species and fish.

Alternative 6 would take the longest to implement due to the amount of work required for its implementation. Alternative 4 would be the fastest to implement due to the availability of biosolid material and would result in the fastest reductions in off-site contamination.

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 would be more difficult to implement than others.

Alternative 1 is most easily implemented since no activities to address remediation of contaminated media at the site would be initiated. Alternative 4 would be the most easily implemented action alternative. The availability of biosolid material and the simplicity of the groundwater barrier would enable this alternative to be implemented with little difficulty. Alternative 7 would be the next most easily implemented alternative due to the biosolid availability. Alternatives 4 and 7 are technically feasible and there is an abundance of Class A biosolid material available from local sources to implement this remedial action. The installation of the groundwater barrier and treatment system and the sediment armoring are implementable but would take additional time to be installed and become operational. Alternatives 3 and 6 would be difficult to implement due to the large volume of topsoil or clay and the difficulty with finding local sources of this volume and transporting it to the site. The Portland cement variant (c) of these alternatives may be more easily implemented as there are likely to be adequate sources of this material. Alternative 6 is the most difficult to implement due to the additional work required for the hot spot excavation, treatment, transportation, and off-site disposal.

Cost

The Alternative Cost Summary Table (See Figure 6) 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.

Alternative 1 has the lowest cost as there are no actions associated with its implementation. Alternatives 4 and 7 are the least expensive action alternatives, largely as a result of the availability and low cost associated with the biosolid enhanced cap. Alternative 4 is less expensive than Alternative 7 due to the use of passive groundwater controls and the strategy of solely using source control and LTM to reduce off-site concentrations and risks. Alternatives 3 and 6 are the most expensive alternatives to implement, largely because of the capping costs. The costs associated with

Alternative No.	Description	Total Project (Phases 1 and 2)			
		Capital Costs	Annual O&M Costs	Total O&M Present Worth (30 years)	Total Present Worth (30 years)
SWRA 1	No action	$ 0	$ 0	$ 0	$ 0
SWRA 3(a)	IC, LTM, and Capping (Liner/Tosoil)	$ 51,267,215	$ 68,946	$ 2,068,380	$ 53,335,595
SWRA 3(b)	IC, LTM, and Capping (Clay/Tosoil)	$ 24,084,468	$ 68,946	$ 2,068,380	$ 26,152,848

SWRA 3(c)	IC, LTM, and Capping (Portland Cement)	$ 64,844,799	$ 67,260	$ 2,017,800	$ 66,862,599
SWRA 4	IC, LTM, Biosolid Enhanced Cap, and Passive Vegetated Groundwater Barriers	$ 8,727,200	$ 67,260	$ 2,017,800	$ 10,745,000
SWRA 6(a)	IC, LTM, Capping (Liner/Topsoil), Hot Spot Excavation/Extraction, and GW Pump and Treat	$ 63,737,282	$ 152,445	$ 4,573,338	$ 68,310,619
SWRA 6(b)	IC, LTM, Capping (Clay/Topsoil), Hot Spot Excavation/Extraction, and GW Pump and Treat	$ 36,554,535	$ 152,445	$ 4,573,338	$ 41,127,872
SWRA 6(c)	IC, LTM, Capping (Portland Cement), Hot Spot Excavation/Extraction, and GW Pump and Treat	$ 77,314,866	$ 150,759	$ 4,522,758	$ 81,837,624
SWRA 7	IC, LTM, Biosolid Enhanced Cap, Groundwater Barrier with Pump and Treat System and Sediment Containment	$ 12,127,129	$ 145,716	$ 4,371,478	$ 16,498,607

Figure 6: Comparison of Costs for Alternatives

Alternative 3 costs are more than twice the costs of Alternative 4 and may not be significantly more effective. The groundwater treatment systems make SWRA 6 considerably more expensive than Alternative 3.

Based on the benefit afforded to the other non-modifying selection criteria, Alternative 4 appears to provide the best cost benefit.

State Acceptance
State acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD.

Community Acceptance
Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD.

<u>Summary of the Preferred Alternative</u> - Alternative 4, Total Present Worth= $10,745,000

EPA's preferred alternative for the SSFW Site is Alternative 4 – Biosolid-Enhanced Cap and Passive Vegetated Groundwater Barrier with Industrial Controls and Long-Term Monitoring. EPA’s preferred alternative includes the following:

- Re-grading and contouring the Site to prevent erosion of slag materials from the Site into the Shenango River and adjacent habitats and using Class A biosolids to create a protective cover over the contaminated slag and sludge to prevent contact with the slag and sludge material, prevent the migration of slag dust from the Site, minimize groundwater infiltration of metals through the vegetative biosolid cap and reduce the mobility of the metals contamination from the slag and sludge into groundwater by treating the contaminated slag and sludge with biosolids which binds with the metals, and creating an open space suitable for wildlife habitat. The slag on Site is exempt from being RCRA Hazardous Waste through the Bevill Exemption. Additionally, there would be installation of perimeter fencing and signs to limit trespasser exposure until a biosolid cap is established on Site.

- Installation of a passive vegetated groundwater barrier to minimize the discharge of contaminated groundwater from the site into the Shenango River. This would include:

    - Planting two staggered lines of poplar trees between the source areas and the Shenango River. Poplar trees can draw as much as 30 gallons of groundwater per day. Planting these trees just above the Shenango River will allow the root systems of these trees to draw some groundwater from the surface aquifers before it discharges into the Shenango River.

- Implementing erosion protection measures to prevent the erosion of waste slag and sludge into the Shenango River and the wetland/pond area. This would include:

    - Streambank stabilization of the west bank of the Shenango River along its frontage with the SSFW Site. The bank of the Shenango River would be excavated away to create a broad and level floodplain at the normal high water elevation. This bank would be stabilized using a combination of bioengineering techniques including block placement with willow plantings supplemented by gabion baskets (in high erosion areas). Streambank stabilization would not be conducted in the Southern Area since there are no waste piles adjacent to the river and the river bank is well forested.

- Implementing institutional controls for the Site through orders or agreements with EPA or by municipal ordinances which would include:

    - Prohibition of use of shallow groundwater at the Site for drinking water purposes to prevent unacceptable exposure to contaminated ground water via ingestion, vapor inhalation or dermal contact.

    - Restriction of certain property uses to prevent activities, such as construction, that would adversely affect the protective cover or other components of the remedy or would result in unacceptable exposure risks related to contaminated soil.

- Implementing an environmental monitoring strategy for groundwater, surface water, sediment and monitoring of planted areas to ensure that there are no adverse impacts on human health and ecological habitats associated with the Site. Environmental monitoring measures would be specified in a Long-Term Monitoring Plan.

Overall, based on the currently available information, EPA believes that Alternative 4 would provide the best balance of tradeoffs among the other alternatives for the following reasons:

- It would offer the most cost-effective means to achieve the RAOs established for the site, it would reduce risks to human health to acceptable levels, and it would meet the ARARs for the site. While this alternative would leave residual ecological risks, EPA believes that the source control remedial actions would allow contaminant concentrations in the impacted habitats to decrease over time.
- 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, there is sufficient biosolids material readily available for the cover, and this alternative would allow for the creation of significant ecological habitat value over an area that currently offers very little. In addition, this alternative could provide additional recreational opportunities (hunting, nature watching, and hiking) that are not currently available in this area.
- It would provide the most economical means of treating waste slag and sludge to decrease its leachability and toxicity.
- It would provide a permanent solution to the problems at the site and would require the least maintenance to maintain.

EPA's preferred alternative would satisfy the statutory requirements of CERCLA §121(b) by being protective of human health and the environment; complying with ARARs; being cost-effective; utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and satisfying the preference for treatment as a principal element. EPA's preferred alternative could be modified or changed in response to state comments, public comments, or new information. The total present worth cost of EPA's preferred alternative is $10,745,000.

Community Participation

This Proposed Plan is being distributed to solicit public comment on the appropriate cleanup action for the Site. EPA relies on public input so that the remedy selected for each Superfund Site addresses the concerns of the local community. EPA is providing a 30-day public comment period beginning on July 16, 2006, and ending on August 14, 2006, to encourage public participation in the selection process. EPA will conduct a public meeting during the comment period in order to present the Proposed Plan and supporting information, answer questions, and accept both oral and written comments from the public. The public meeting will be held on July 26, 2006, at the Stey Nevant Library, 1000 Roemer Boulevard, Farrell, PA 16121 at 6:30 p.m.
EPA will summarize and respond to relevant comments received at the public meeting and to written comments post-marked by midnight on August 14, 2006, in the Responsiveness Summary section of the ROD, which will document EPA's final selection of a clean-up remedy. To obtain additional information relating to this Proposed Plan, please contact either of the following EPA representatives:

Carrie Deitzel (3HS52)
Community Involvement Coordinator
U.S. EPA - Region III
1650 Arch Street

Rashmi Mathur (3HS23)
Remedial Project Manager
U.S. EPA - Region III
1650 Arch Street

Philadelphia, PA 19103	Philadelphia, PA 19103
Phone: 215-814-5525	Phone: 215-814-5234

Toll-free: 1-800-553-2509 (x45525 or x45234)

The detailed Administrative Record can be examined at the following locations:

Stey Nevant Library	US EPA Region III
1000 Roemer Blvd.	1650 Arch Street
Farrell, PA 16121	Philadelphia, PA 19103
(724) 983-2714	(215) 814-3157

The Administrative Record File can also be accessed remotely via the internet by going to the following web site address: http://www.epa.gov/arweb/.

EPA's general information web address for the Sharon Steel – Farrell Works Superfund Site is: http://www.epa.gov/reg3hwmd/super/sites/PAD001933175/index.htm.

Glossary

Administrative Record: EPA's official compilation of documents, data, reports, and other information that is considered important to the status, and decisions made, relating to a Superfund 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): The federal and state requirements or criteria that are determined to be legally applicable or 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 concentrations of substances in environmental media (air, water, soil, etc) that are not related to the Site in question. They may occur naturally or as a result of human activities other than the Site.

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.

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.

Carcinogenic: An agent which causes or contributes to the occurrence of cancer.

Class A biosolids: Class A biosolids 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): For example, the citation 40 C.F.R. 260 means Title 40 of the Code of Federal Regulations, Part 260.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and amended several times subsequently. The Act created a Trust Fund, known as Superfund, with funds available to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Confining bed: A hydrogeologic unit of impermeable or distinctly less permeable material bounding or restricting one or more groundwater aquifers.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Crushed rock stabilization: The use of gravel and crushed rock to stabilize a bank of a river or stream.

Depressed biological community: A biological community that shows evidence of being adversely impacted, altered, or degraded.

Ecological communities: Groups of plant and animal life.

Erosion: A process of 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.

Gabion baskets: Metal cages filled with rip rap (or rock) which are used for erosion control, to build dams, or foundations.

Geomembrane/Geosynthetic: These sheet materials are either manmade (e.g., plastic) or manmade composites (e.g., clays sandwiched in fabric) and are used in the earth ("geo") or soils for filtration, drainage, protection, separation, reinforcement, sealing and erosion control.

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. A HI exceeding one (1) is generally considered an unacceptable non-cancer risk.

Hot spots: An isolated area that exhibits high levels of contamination.

High-fertility: Having a high ability to reproduce.

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

Impervious: Eliminating the infiltration of rainwater or natural groundwater recharge.

In-situ: At Superfund sites this generally refers to treatment of contaminated soil in place rather than removing the soil first.

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.

Long-term monitoring: Monitoring (or sampling) to assess the effectiveness of the remedial alternative in meeting the cleanup limits and reducing the risk to human health and the environment.

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. Theses 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 are eligible to receive federal money for response under CERCLA.

Natural attenuation: The reliance on natural processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. The 'natural attenuation processes' that are at work in such a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater.

Organic Compound: A carbon-based material.

Passive Vegetated Groundwater Barrier: A barrier placed between a contaminant source area and a feature to be protected that uses trees or plants to draw groundwater up out of the ground and minimize the amount of groundwater that passes through.

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.

Porosity: 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.

Record of Decision (ROD): A public document that describes the 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.

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

Seeps: Areas where ground water discharges along the banks into the Creek.

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 SSFW site, the sludge is a powdery-fine, rust-colored solid.

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

Superfund: The common name used for CERCLA.

Topographic depression: A landform that is sunken or depressed below the surrounding area.