

February 2010



**Environmental
Protection Agency**

Division of Emergency
and Remedial Response

Preferred Plan for the Remediation of Franklin Steel Company (a.k.a. Columbus Steel Drum) Franklin County, Ohio



Ted Strickland, Governor
Lee Fisher, Lt. Governor
Chris Korleski, Director

**PREFERRED PLAN FOR THE REMEDIATION OF
Franklin Steel Company, Inc. (a.k.a. Columbus Steel Drum)**

Franklin County, Ohio

Prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

February 25, 2010

Solicitation of Comments

Submit public comments by April 23, 2010 to:

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Public Meeting

A public meeting is scheduled for:

Date: April 14, 2010

Time: 6:30 PM

Location: Lincoln High School Cafeteria
140 South Hamilton Road
Gahanna, Ohio 43230

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1.0 INTRODUCTION

1.1 Executive Summary

The Ohio Environmental Protection Agency (Ohio EPA) has prepared this Preferred Plan for the remediation of the former Franklin Steel Company, Inc. (Franklin Steel) site in Blacklick, Ohio. This Preferred Plan summarizes information on the range of remedial alternatives evaluated, identifies Ohio EPA's preferred remedial alternative, explains the reasons for the selection of the preferred remedial alternative, solicits public review and comments and provides information on how the public can be involved in the remedy selection process.

The Preferred Plan, which will form the basis for the Decision Document, is based on a Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) and corrective measures study (CMS) prepared by Franklin Steel. The RFI report was approved by Ohio EPA in March 2009 and the CMS report was approved in July 2009, pursuant to the director's final findings and orders journalized in June 1992.

The former Franklin Steel site occupies approximately 38 acres located at 1385 Blatt Boulevard in Jefferson Township, Franklin County as shown in **Figure 1**. The 38 acres consists of two 10-acre drum storage areas and one 18-acre processing/drum storage area. Since 1988, only the 18-acre portion of the site has been used for drum reconditioning operations and storage under the business name of the Columbus Steel Drum Company. The site has numerous localized areas with elevated concentrations of contaminants found in the soils of the active operations area and in the sediments of the storm water collection and drainage system. The health and environmental risks associated with this site result from direct surface contact and/or ingestion of contaminated soil, sediment and ground water. The contaminants detected in the upper ground water aquifer system beneath the site have not been detected in the lower regional aquifer used by the nearby Jefferson Township Water Treatment Plant's Taylor Road public water supply wellfield.

The contaminants of concern (COCs) with elevated concentrations in the soil and ground water that pose a threat to human health include metals (arsenic, chromium, iron, and lead); the polychlorinated biphenyl (PCB) Aroclor 1254; semi-volatile organic compounds (SVOCs) (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene and bis(2-ethylhexyl)phthalate); and volatile organic compounds (VOCs) (chloroethane, 1,1-dichloroethane, trichloroethene, vinyl chloride and total xylenes).

The COCs with elevated concentrations in the stream sediments that pose a threat to the environment include metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and SVOCs (anthracene, benzo(a)anthracene, benzo(a)pyrene,

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chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, phenanthrene, pyrene, and bis(2-ethylhexyl)phthalate).

1.2 How the Preferred Plan Process Works

The Preferred Plan is a preliminary recommendation to address risks to public health and the environment posed by the site. All public comments, recommendations, or concerns regarding any of the evaluated remedial alternatives could influence the final decision on the remedy selection. The decision regarding the remedy will be documented in a Decision Document after Ohio EPA has taken into consideration all public comments received during the public comment period on the Preferred Plan.

1.3 Statutory Requirements

Ohio EPA is charged with the responsibility to protect public health and safety and the environment and to abate or prevent threats caused by air pollution, water pollution and physician soil contamination.

1.4 Scope of the Proposed Remedial Action

Ohio EPA's preferred remedial alternative will yield a permanent solution for risks associated with the contaminated media at the site. The expectations for the preferred alternative include:

- Reduction of human health risks to within acceptable limits and protecting human health and the environment from exposure to COCs in the ground water, sediment, soil and surface water that are above acceptable limits.
- Short and long-term protection of public health and the environment.
- Compliance with applicable regulations.
- Cost-effectiveness and limitation of expenses to what is necessary to achieve the preferred alternative expectations.
- Continued operation and maintenance of existing remedial action and monitoring systems.

2.0 COMMUNITY ACCEPTANCE

Community acceptance is an important criterion that Ohio EPA evaluates during the remedy selection process. Ohio EPA gauges the degree of community acceptance using open dialogue with citizens concerning the results of the investigation, and by

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encouraging citizens to comment on the remedial alternatives. This interaction with the public is important to making sound environmental decisions.

The actual selection of the final remedy will be made only after the comments received during the public comment period have been reviewed and analyzed. Ohio EPA will consider all public comments on this Preferred Plan to select a final remedial alternative and prepare the Decision Document. Depending on comments received, the final remedy selected in the Decision Document could be different from the remedial alternative presented in this Preferred Plan. All written and verbal comments received during the public comment period will be summarized and addressed in the responsiveness summary section of the Decision Document. The Decision Document for the site will be issued after its entry into the Ohio EPA Director's Journal.

2.1 Invitation for Public Comment

Ohio EPA invites comments from the public on whether the preferred remedial alternative identified for the site meets the needs of the local community and is an effective way to achieve the remedial action objectives (RAOs) for the site. The comment period includes a public meeting where Ohio EPA will discuss the RFI report, the CMS report, and the Preferred Plan, and will answer questions and take oral and written comments. Ohio EPA invites public comments on the Preferred Plan for the former Franklin Steel site and on all of the remedial alternatives in the CMS report.

2.2 Opportunities for Public Involvement

The public is encouraged to review and comment on all of the remedial alternatives presented in this Preferred Plan. The remedial alternatives are explained in detail in the section titled, "Summary of Remedial Alternatives." Additional details on the remedial alternatives can be found in the RFI report, the CMS report and the risk assessment assumptions document (RAAD).

The RFI report, the CMS report and other documents regarding the site are available in the public repository for this site located at:

Columbus Metropolitan Library – Gahanna Branch
310 Granville Street
Gahanna, Ohio 43230

And on the internet at the Ohio EPA Central District Office website:
<http://www.epa.ohio.gov/cdo/colsteeldrm.aspx>.

The complete project file for site can be reviewed at the:

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Ohio EPA Central District Office
50 West Town Street, Suite 700
Columbus, Ohio 43215

Ohio EPA will hold a public meeting to present the findings of the CMS report and the Preferred Plan. Ohio EPA staff will attend the meeting to respond to questions on the RFI report, the CMS report and the Preferred Plan and to formally receive public comment.

The public meeting is scheduled for:

Date: April 14, 2010
Time: 6:30 PM
Location: Lincoln High School Cafeteria
140 South Hamilton Road
Gahanna, Ohio 43230

Public comments may either be presented at the public meeting or submitted by regular mail or e-mail to:

David M. O'Toole, Site Coordinator
Division of Emergency and Remedial Response, Central District Office
Ohio EPA, Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43216-1049
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The public comment period for this Preferred Plan will run from March 8, 2010 until April 23, 2010 and will be extended by Ohio EPA if a specific request for a comment period extension is received within the original comment period.

3.0 SUMMARY OF SITE CONDITIONS

3.1 Site History

The Columbus Steel Drum Company, Inc. began operations in 1955, changing its name to the Franklin Steel Company in 1979. Columbus Steel Drum constructed the current drum reconditioning facility in 1971 at 1385 Blatt Boulevard in the Gahanna Industrial Park in Blacklick, Franklin County, Ohio (see **Figure 1**). The area surrounding the site has seen extensive commercial development since 1971 in the areas to the west, north and southeast. Immediately south of the site is the Conrail Railroad track. An extensive residential area was developed in 2005 to the southwest of the site.

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Approximately 2,600 feet northeast of the site is the Jefferson Township WTP's Taylor Road public water supply wellfield.

Franklin Steel owned and operated the 55-gallon drum reconditioning and recycling business from 1971 through 1997 under the business name of Columbus Steel Drum Company. Franklin Steel sold the drum reconditioning business to Evans Industries, Inc. in June 1997. Evans Industries operated the drum reconditioning business from 1997 through December 2002. The business was then leased and operated by Container Recyclers, Inc., a subsidiary of Queen City Barrel, Inc., from December 2002 through December 2007 using the Columbus Steel Drum Company business name. Property ownership throughout the various business ownership changes was retained by Franklin Steel. However, as of December 13, 2007, Franklin Steel sold part of the property (the 18-acre active operations area) to Queen City Barrel, Inc. which was immediately acquired by Industrial Container Services, Inc. The site continues to operate under the business name of Columbus Steel Drum Company.

Franklin Steel's operations involved reconditioning and recycling of open head and closed head 55-gallon steel drums under the Standard Industrial Classification Code 7699. Prior to 1986, when drum inventory was at its peak, approximately 450,000 "RCRA empty" (*i.e.*, less than one inch of liquid) drums were stored at the site for processing. At that time, approximately 38 acres of property were utilized for drum storage and processing, two 10-acre drum storage (now inactive) areas and the 18-acre active processing/drum storage area. Since 1988, only the 18-acre portion of the site has been used for drum reconditioning/storage operations. Currently, there are approximately 56,000 drums being stored on the ground with an additional 11,000 drums stored inside numerous semi-trailers in the 18-acre active operations area.

The 18-acre active operations area reconditions approximately 5,000 used 55-gallon steel drums per day for resale. Closed-head drums are placed on a conveyor belt and transported to the process building where the drums are cleaned with a hot caustic solution, rinsed, shot blasted to remove the old paint, and then repainted. Open-head drums are turned upside down on a conveyor belt to drain any liquids before they enter the thermal oxidizer (furnace). The oxidizer burns off any residual material remaining in the drum(s). The open head-drums are then sent into the process building for caustic rinse, shot blasting and repainting.

Drainage ditches at the site empty into three on-site storm water holding ponds that discharge through a 15-inch outfall into Unzinger Ditch (also known as Rosehill Run), a small tributary of Blacklick Creek. The discharge from the three on-site storm water holding ponds into Unzinger Ditch is regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued by Ohio EPA's Division of Surface Water (DSW). The historical NPDES permit violation issues are being addressed under the terms of the Franklin County Environmental Court's July 2005 consent order between DSW and Container Recyclers, Inc. doing business as (d.b.a.) Columbus Steel Drum.

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The facility also operates an on-site wastewater pretreatment plant (WWTP) to remove solids, metals and oil and grease from the wastewaters generated during the drum reconditioning process prior to its discharge to the city of Columbus sanitary sewer system. The treated wastewater is regulated under the terms and conditions of the discharge permit issued by the Columbus Division of Sewerage and Drainage.

An Ohio EPA Emergency Response's February 25, 1980 Initial Pollution Incident Report (Spill Incident No. 8002-25-0281) documented a spill of 15,000 to 20,000 gallons of hazardous waste sludge from the WWTP's caustic clarifier, caused by an overflow of the system. The released sludge was observed to have entered the Blacklick Creek drainage system. The sediment and surface water sample results collected during Ohio EPA's five sampling events in 1980 found elevated levels of cadmium, chromium, lead, zinc, and phenol. Water samples from the storm water holding pond collected by Ohio EPA on December 5, 1985 found elevated levels of various VOCs, SVOCs, arsenic, cadmium, chromium, cyanide and lead.

An Ohio EPA March 20, 1987 inspection determined that contaminants had been released to the soil in seven different areas at Franklin Steel. Subsequent sampling of these areas found elevated levels of arsenic, cadmium, chromium, lead, ethanol, propanol, toluene, xylenes, and mineral spirits. On December 5, 1987, Ohio EPA requested Franklin Steel to remove the contamination at five of the seven areas, by excavating the first 18-inches of soil in a 15-foot radius, by February 1988.

In April and May 1989, U.S. EPA, conducted a preliminary review/site visit inspection (PR/SVI) at the site. The purpose of the PR/SVI was to evaluate risk to the environment from the site through potential migration pathways. The PR/SVI report concluded that two areas of concern had potential releases to the environment: the oxidizer and associated waste management units and the dust collector storage units.

On June 23, 1992, Ohio EPA entered into an administrative consent order with Franklin Steel for an environmental assessment of the site by performing a RFI. The RFI required an investigation to determine the nature and extent of contamination from the releases of pollutants and wastes at the site, and to assess the potential risk to human health and the environment resulting from the site's contamination. The CMS used the data collected from the RFI to develop and evaluate potential remedial alternatives for the site.

In November 2000, the Ohio EPA DSW completed its biological, sediment and physical habitat investigation of Unzinger Ditch, which was summarized in the document *Biological and Sediment Quality Study of Unzinger Ditch 2000*. For a copy of this report, refer to the internet location: <http://www.epa.ohio.gov/portals/35/documents/Unzinger.pdf>.

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On July 6, 2005, the Franklin County Environmental Court issued a consent order and final judgment entry between the State of Ohio and Container Recyclers, Inc. d.b.a. Columbus Steel Drum. The terms of the consent order establish the tasks to be performed by Container Recyclers to address Ohio EPA's issues and concerns with the site. The tasks include addressing the drum reconditioning operation's outdoor and indoor air contamination issues with the Division of Air Pollution Control (DAPC); the closure action of the container storage pad with the Division of Hazardous Waste Management (DHWM); and the storm water holding pond's National Pollutant Discharge Elimination System (NPDES) permit violations with the DSW.

The RFI report was approved by Ohio EPA in March 2009. Through the course of the RFI activities, the extent of the soil and sediment contamination was defined, soil, ground water, surface water and sediment were sampled, and these results were evaluated to determine the human health and ecological exposure risks posed by the site.

The CMS report was approved by Ohio EPA in July 2009 and outlines various options for addressing the threats to public health, safety and the environment that were identified during the RFI.

3.2 Summary of the RCRA Facility Investigation (RFI)

The RFI was conducted in two parts by Franklin Steel, and included sampling of soil, ground water, surface water and sediment to determine the nature and extent of site-related chemical contaminants. The investigation was conducted as Part 1 (September 1993 through December 2002) and Part 2 (January 2003 through October 2006) with oversight by Ohio EPA. The RFI report was approved by Ohio EPA on March 13, 2009. The data obtained from the investigation were used to conduct a baseline risk assessment (*i.e.*, an evaluation of the risks to humans and the environment posed by the site) and to determine the need to evaluate remedial alternatives.

This Preferred Plan contains only a summary of the findings of the RFI report. Refer to the RFI report for additional information on contaminant concentrations. The RFI report is available for review in Ohio EPA's Central District Office located in Columbus, Ohio, in the public repository (Gahanna Branch of the Columbus Metropolitan Library) located in Gahanna, Ohio, and on the internet at the Ohio EPA Central District Office website: <http://www.epa.ohio.gov/cdo/colssteeldrum.aspx>.

Part 1 of the RFI included the evaluation of the following ten solid waste management units (SWMUs) at the site as shown in **Figure 2**.

- 1) SWMU S101, Stormwater Drainage System
- 2) SWMU S102, Sanitary Sewer Lines and Valve Pit
- 3) SWMU S103, Shot Blast Dust Collectors

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- 4) SWMU S104, Former Shot Blast Storage Area
- 5) SWMU S105, Former Caustic Rinse System/Caustic Sludge Holding Tank
- 6) SWMU S106, Oxidizer System
- 7) SWMU S107, Drum Storage Area #1
- 8) SWMU S108, Drum Storage Area #2
- 9) SWMU S109, Drum Storage Area #3 [10-acre Former Drum Storage Area]
- 10) SWMU S201, Drum Storage Area #4 [10-acre Former Drum Storage Area]

Part 2 of the RFI was performed to evaluate the ten new areas of concern (AOCs) at the site described in Ohio EPA's January 31, 2003 letter and two additional AOCs described in Ohio EPA's May 16, 2006 letter. These 12 new AOCs include:

- 1) AOC A, Hazardous Waste Storage Area
- 2) AOC B, Shot Blast Dust Collector Area
- 3) AOC C, Shot Blast Dust Bags Storage Area
- 4) AOC D, Filter Press Sludge Storage Pad
- 5) AOC E, Former Hazardous Waste Storage Pad
- 6) AOC F, Drum Conveyor Chain Ash Fall-off Area
- 7) AOC G, Thermal Oxidizer Building Doorway Area
- 8) AOC H, Thermal Oxidizer Sludge Storage Area
- 9) AOC I, Heavy Drums Storage Pad
- 10) AOC J, Old Oxidizer Quench Pit Area
- 11) AOC K, Former Drum Storage Area – Trailer Parking Lot
- 12) AOC L, Newly Discovered Storm Water Outfall (#2)

During the RFI's Part 1 and Part 2, the following activities were conducted:

- Three hundred and forty-six soil samples were collected from both surface soil and soil boring locations, and also from ground water monitoring well boring locations in both the ten SWMUs and the 12 new AOCs. The soil samples were analyzed for Target Analyte List (TAL) metals and the Target Compound List (TCL) SVOCs and VOCs.
- Two hundred and eighty-four ground water samples were collected from 13 monitoring wells and six piezometers during the RFI's 24 separate sampling events. Three other piezometers were not sampled, but used to measure ground water elevations. The ground water samples were analyzed for both total and dissolved TAL metals and TCL SVOCs and VOCs.
- Fifty sediment samples were collected from the on-site storm water holding ponds, adjacent unnamed drainage ditches, Unzinger Ditch and Blacklick Creek. The sediment samples were analyzed for TAL metals and TCL SVOCs and VOCs.

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- Twenty-one surface water samples were collected from the storm water holding ponds, adjacent drainage ditches and Unzinger Ditch. The surface water samples were analyzed for TAL metals and TCL VOCs and SVOCs.
- Ohio EPA's DSW completed in November 2000 the biological, sediment and physical habitat investigation of Unzinger Ditch performed to determine the appropriate aquatic use classification that would establish the protection standards in the ecological risk assessment (ERA).

The ten SWMUs and 12 new AOCs were grouped into the following three contiguous areas for separate evaluation in the Franklin Steel baseline risk assessment:

- **Contiguous Area #1 (Exposure Unit 1)** – The active operations area includes surface soils (0-2 feet below ground surface (bgs)) and subsurface soils (2 feet bgs to 10 feet bgs) from SWMUs S101 through S108 and new AOCs A through L surface soils (0-2 feet bgs). The total area encompasses approximately 18 acres.
- **Contiguous Area #2 (Exposure Unit 2)** – The inactive operations area includes surface soils and subsurface soils from SWMUs S109 and S201. These two areas encompass approximately ten acres each for a total of 20 acres.
- **Contiguous Area #3 (Exposure Unit 3)** - Sediment and surface water from Unzinger Ditch downstream of the 15-inch outfall at River Mile (RM) 0.6 and sediment upstream of the 15-inch outfall in Unzinger Ditch.

The nature and extent of COCs at Franklin Steel in each environmental medium are described in Sections 3.2.1 through 3.2.4.

3.2.1 Soil Contamination

During the RFI, 114 soil borings and nine piezometers/monitoring wells were installed in the active operations area (Exposure Unit 1), and 41 soil borings and 11 piezometers/monitoring were installed in the inactive operations area (Exposure Unit 2), for a total of 346 soil samples. The soil borings typically were installed to at least a depth of 12 feet bgs, and the deepest of the soil samples was collected at a depth of 19 feet bgs. A number of soil samples were collected from each boring to evaluate the vertical and horizontal extent of the site's contamination.

In Exposure Unit 1, the soil sampling results above the background concentrations and/or U.S. EPA's Region 9 Preliminary Remediation Goals (PRGs) for industrial screening levels, were evaluated in the human health risk assessment (HHRA) to identify the COCs that pose an exposure risk to the site worker's health. The HHRA identified a total of 14 COCs which are listed here with their maximum detected value: the metals arsenic at 94 ppm, chromium at 1,120 ppm, iron at 166,000 ppm, and lead at

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5,060 ppm; the PCB Aroclor 1254 at 1.0 ppm; the SVOCs benzo(a)anthracene at 24.4 ppm, benzo(a)pyrene at 24.2 ppm, benzo(b)fluoranthene at 28.1 ppm, benzo(k)fluoranthene at 24.2 ppm, dibenzo(a,h)anthracene at 0.96 ppm, bis(2-ethylhexyl)phthalate at 1,300 ppm and Indeno(1,2,3-cd)pyrene at 5.11 ppm; and the VOCs trichloroethene at 0.69 ppm and total xylenes at 720 ppm.

These 14 COCs are listed in Table 3.1 and Table 3.2 of the CMS report, which also lists the remedial action goal (or protection standard) for each COC. The lateral extent of contamination appears to be in various localized areas of elevated chemical concentrations (“hot spots”) throughout the active operations area. The vertical extent of contamination appears to be limited to 0 – 2 feet bgs, except at Sample Location S108-SB13, which has contamination extending down to a depth of 7 – 8 feet bgs.

In Exposure Unit 2, the soil sampling results above the background concentrations and/or U.S. EPA’s Region 9 PRGs for residential screening levels, were then evaluated in the HHRA to identify the COCs that pose an exposure risk. The HHRA identified arsenic as the only COC in the inactive operations area. However, only one sample location each in SWMUs S109 and S201 had elevated arsenic concentrations above its remedial action goal to be considered as a COC. Subsequent soil samples at and around these two sample locations detected arsenic levels below the site-specific background level, and the elevated arsenic concentrations were attributed to naturally occurring deposits. Therefore, Exposure Unit 2 (SWMUs S109 and S201) was not evaluated in the HHRA, and was not considered for further corrective measures in the CMS.

3.2.2 Sediment Contamination

In Exposure Unit 3, the sediment sampling results above the more stringent (the lesser) value of either background concentrations, U.S. EPA Region 9 PRGs for residential exposure, or Ohio EPA DERR ecological screening values for sediment, were evaluated in the ERA. However, calcium, iron, magnesium, potassium and sodium were not considered further in the ERA because they are naturally-occurring compounds and/or essential human nutrients. The ERA identified 19 ecological COCs (ecoCOCs) that pose a potential exposure risk to the animals or plant life from the contaminated sediment.

The 19 ecoCOCs are listed here with their maximum detected value: the metals arsenic at 37.1 ppm, cadmium at 10.1 ppm, chromium at 164 ppm, copper at 164 ppm, lead at 775 ppm, mercury at 0.57 ppm, nickel at 152 ppm and zinc at 954 ppm; the SVOCs anthracene at 3.40 ppm, benzo(a)anthracene at 9.90 ppm, benzo(a)pyrene at 16.0 ppm, chrysene at 19.0 ppm, dibenzo(a,h)anthracene at 1.90 ppm, fluoranthene at 13.0 ppm, fluorene at 0.540 ppm, phenanthrene at 9.70 ppm, pyrene at 7.10 ppm, and bis(2-ethylhexyl)phthalate at 620 ppm, and total polycyclic aromatic hydrocarbons (PAHs).

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These 19 ecoCOCs are listed in Table 3-5 of the CMS report which also lists the remedial action goal (or protection standard) for each ecoCOC.

3.2.3 Ground Water Contamination

The site's surface soils consist primarily of low-permeability silty clay with an average thickness of 12 feet. However, some boreholes completed in the active operations area indicate the presence of fill materials in the upper 2 to 3 feet of soil that consist of fly ash from the former Columbus Municipal Power Plant and/or foundry sand from the former Claycraft brick-making facility.

The site is located on the west edge of a buried pre-glacial carved bedrock valley that trends northwest to southeast following the course of Blacklick Creek. Over 200 feet of sediments consisting of layers of glacially derived clay, silt, sand and gravel fill this bedrock valley, which is an extension of the Big Walnut and the Baltimore Buried Valley Aquifer systems.

Beneath the surface soils lies a 5 to 20 foot thick water-bearing sand and gravel layer that represents the upper ground water zone. Underlying this upper zone are less permeable deposits of clay and silty clay mixed with silt and sand and ranging in thickness from a few feet beneath most of the site to over 20 feet at Jefferson Township's Taylor Road wellfield. This low permeability layer separates the upper ground water zone from highly permeable sand and gravel deposits in the center of the buried valley which comprise the lower ground water zone. The public water supply wells at the Taylor Road wellfield draw water from this lower zone, approximately 50 to 70 feet bgs. The ground water pumping tests performed during development of the Taylor Road wellfield indicate semi-confined conditions in the lower ground water zone.

In general, ground water flows from the east and west flanks of the buried valley toward the center, eventually converging and flowing south-southeast along the valley's center. Water level data from Franklin Steel's monitoring wells and the Taylor Road wellfield indicate that the upper ground water zone flows predominantly in an east-northeasterly direction across the site towards the center of the buried valley. Along the extreme southern portion of the site, however, the ground water flows east-southeast.

Fifteen monitoring wells and nine piezometers were installed during the RFI to determine the nature and extent of ground water contamination at the site as shown by **Figure 3**. From May 1997 through October 2008, a total of 284 ground water samples were collected from 24 separate sampling events. These samples were collected from 13 monitoring wells (S101-MW01, S105-MW01, S108-MW03, S108-MW04, S108-MW05, S108-MW06D, S109-MW05D, S109-MW06, S201-MW02, JTMW-1S, JTMW-1D, JTMW-3S and JTMW-3D) and six piezometers (S107-PZ01, S018-PZ01, S108-PZ02, S109-PZ01, S109-PZ02 and S109-PZ01). Two of the 15 monitoring wells (S100-MW01 and S107-MW02) were used only for background concentration ground water

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samples. Three piezometers (S100-PZ03, S109-PZ03 and S109-PZ04) were not sampled, but only used to measure ground water elevations to assist in the determination of the upper ground water zone's direction of flow.

In the 1997 to 2004 ground water sampling events, both unfiltered and filtered samples were collected using hand bailers that created high levels of turbidity in the samples. Following Ohio EPA technical guidance manual's recommendations, the 1997 – 2004 filtered sampling results (instead of the unfiltered results), and the 2006 – 2008 unfiltered sampling results collected using low-flow pumping methods, were selected for use in the HHRA's ground water evaluation.

The ground water sampling results above the more stringent (the lesser) value of either background concentrations; U.S. EPA Region 9 PRGs for tap water; or federal drinking water maximum contaminant levels (MCLs); were evaluated in the HHRA. However, calcium, magnesium, potassium and sodium were not considered further in the HHRA because they were naturally-occurring compounds and/or essential human nutrients. The HHRA identified 22 COCs in the ground water that pose a potential exposure risk to human health, and are listed in Table 3.3 and Table 3.4 of the CMS report.

The 22 COCs are listed here with their maximum detected value: the metals aluminum at 8.87 ppm, antimony at 0.0072 ppm, arsenic at 0.405 ppm, barium at 0.78 ppm, beryllium at 0.40 ppm, cadmium at 0.0103 ppm, lead at 0.0116 ppm, manganese at 5.6 ppm, nickel at 0.34 ppm, thallium at 0.0102 ppm, vanadium at 0.0081 ppm and zinc at 0.20 ppm; the SVOCs benzo(a)anthracene at 0.00014 ppm, benzo(b)fluoranthene at 0.00021 ppm, bis(2-ethylhexyl)phthalate at 0.250 ppm, dibenzo(a,h)anthracene at 0.00014 ppm, and Indeno(1,2,3-cd)pyrene at 0.0025 ppm; and the VOCs chloroethane at 0.54 ppm, chloroform at 0.00097 ppm, 1,1-dichloroethane at 0.0180 ppm, methylene chloride at 0.0067 ppm and vinyl chloride at 0.0117 ppm.

These maximum concentrations of metals, SVOCs and VOCs were detected only once at seven different wells/piezometers in various sampling events, with no detections above the MCLs in the prior or subsequent sampling events except for arsenic, beryllium, bis(2-ethylhexyl)phthalate and the results from Monitoring Well S109-MW06. Arsenic has been detected above the MCL in the same three monitoring wells/piezometers in each of the RFI sampling events. However, beryllium was detected above the MCL in all of the monitoring wells/piezometers results from the March 2000 sampling event, but it was not detected again in any of the subsequent sampling events through October 2008.

Concentrations of bis(2-ethylhexyl)phthalate above the MCL were sporadically detected in six different monitoring wells/piezometers from July 1997 thru December 2003, then not detected again in the subsequent sampling events. However, the May 2009 sampling event results detected bis(2-ethylhexyl)phthalate above the MCL for the first time in eight years at Monitoring Wells S108-MW03, S108-MW04 and S201-MW02R.

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Beginning in January 2003, vinyl chloride was detected above the MCL in Monitoring Well S109-MW06, and has shown an increasing trend for eight consecutive sampling events, with the maximum result of 0.0117 ppm detected in October 2008. However, this well has exhibited decreasing levels of chloroethane ranging from the maximum result of 0.46 ppm in June 1999 to 0.10 ppm in November 2006, and 1,1-dichloroethane ranging from the maximum result of 0.018 ppm detected in June 1999 to 0.0012 ppm in October 2008. As shown in **Figure 3**, Monitoring Well S109-MW06 is located within the drinking water source protection area (five-year time-of-travel zone) calculated for the Jefferson Township's Taylor Road wellfield.

Most of the 22 COCs were only detected once above the MCLs in different monitoring wells, and were not detected again in the same well or other monitoring wells, so these compounds were not considered for further corrective measures in the CMS. Only chloroethane, 1,1-dichloroethane and vinyl chloride in the ground water were evaluated in the CMS. Because bis(2-ethylhexyl)phthalate was detected in the May 2009 sampling event above the MCL, Ohio EPA has added bis(2-ethylhexyl)phthalate as a COC in the upper ground water zone.

3.2.4 Surface Water Contamination

In Exposure Unit 3, the surface water sampling results above the lesser value of either background concentrations or U.S. EPA Region 9 PRGs for tap water were evaluated in the HHRA to identify the COCs that pose a human health exposure risk. However, calcium, iron, magnesium, potassium and sodium were not considered further in the HHRA because they are naturally-occurring compounds and/or essential human nutrients.

The HHRA evaluation identified 19 COCs, which are listed here with their maximum detected value: the metals aluminum at 4.54 ppm, antimony at 0.024 ppm, arsenic at 0.017 ppm, barium at 0.339 ppm, copper at 0.19 ppm, iron at 27.0 ppm, lead at 0.040 ppm, manganese at 1.72 ppm, thallium at 0.0016 ppm and vanadium at 0.090 ppm; the SVOCs 2-methylnaphthalene at 0.003 ppm, 4-methylphenol at 0.039 ppm, benzo(a)pyrene at 0.0011 ppm, benzo(b)fluoranthene at 0.0022 ppm, benzo(k)fluoranthene at 0.0012 ppm, bis(2-ethylhexyl)phthalate at 0.008 ppm and isophorone at 0.120 ppm; and the VOCs acetone at 0.810 ppm and chloroform at 0.002 ppm. These 19 COCs are listed in Table 3-7 and Table 3-8 of the RAAD but the detected compounds were below the human health exposure risk levels, so they were not considered for further corrective measures in the CMS.

However, the surface water sample analytical results were evaluated in the ERA to identify the COCs that pose an exposure risk to ecological receptors when compared to Ohio EPA's Surface Water Quality Criteria. The ERA evaluation of the surface water results identified various ecoCOCs that are above the RAOs. Each of the ten ecoCOCs are listed here with their maximum detected value and their surface water

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quality criteria (in parenthesis): the metals aluminum at 4.54 ppm (0.250 ppm), barium at 0.339 ppm (0.220 ppm), copper at 0.19 ppm (0.010 ppm), cyanide at 0.050 ppm (0.012 ppm), lead at 0.040 ppm (0.0064 ppm), manganese at 1.72 ppm (0.100 ppm), and zinc at 0.49 ppm (0.120 ppm) and the SVOCs benzo(a)pyrene at 0.0011 ppm (0.000014 ppm), fluoranthene at 0.0075 ppm (0.00080 ppm), and pyrene at 0.0056 ppm (0.0046 ppm). These ecoCOCs are listed in Table 3.6 of the CMS report.

Because ecoCOCs in surface water were likely the result of sediment contamination, the ERA focused on sediment ecoCOCs and biological criteria. EcoCOCs in surface water typically diminish as a result of sediment removals and they were not addressed separately in the CMS

3.2.5 Air Releases

The active operations area's outdoor and indoor air contamination issues are being addressed under the terms of the Franklin County Environmental Court's July 2005 consent order between the Ohio EPA DAPC and Container Recyclers, Inc. d.b.a. Columbus Steel Drum.

3.3 Interim or Removal Actions Taken to Date

The following actions/closures have been conducted in the active operations area:

- December 1987, hot spot removal actions from five different locations.
- September 1988 closure plan submitted for the closure of SWMU S110(Hazardous Waste Underground Storage Tank) and SWMU S111(Hazardous Waste Storage Pad).
- December 1992, three underground storage tanks (USTs) were removed from an area located north of the waste water treatment plant.
- September 1993, additional over-excavation and confirmatory sampling conducted at area of the three former USTs.
- May 2001, Bureau of Underground Storage Tank Regulations (BUSTR) – Tier I evaluation completed for the three USTs removal and closure.
- June 4, 2007, BUSTR no further action (NFA) determination requested based on a benzene cleanup level of 5.3 ppm in the ground water and 37.6 ppm in the soil.
- June 19, 2007, NFA issued for all three USTs previously located at Franklin Steel.

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- June 2007, RCRA closure plan of the drum storage pad determined to have stored hazardous waste in excess of the regulatory 90 days (not the SWMU S111 pad) approved.
- March 2009, RCRA closure action of the drum storage pad determined to store hazardous waste (not the SWMU S111 pad) completed.

4.0 SUMMARY OF SITE RISKS

A baseline risk assessment (*i.e.*, the HHRA and ERA) was conducted to evaluate current and potential future risks to human health and ecological receptors as the result of exposure to the contaminants present at the site. The results demonstrated that the existing contaminants in environmental media pose or potentially pose unacceptable risks and/or hazards to human and ecological receptors sufficient to trigger the need for remedial actions.

The conceptual site model shown by **Figure 4** describes the physical and chemical setting of Franklin Steel by combining historical site information with the data collected during the RFI field activities. Based on the history of the site and the results of site investigations, the primary sources of contamination are releases from past and ongoing drum reconditioning operations and waste management and storage practices. Primary release mechanisms may include direct release, leaching, erosion, and precipitation and associated runoff. Secondary sources of contamination at the site are the impacted surface and subsurface soils, sediment, and the upper ground water zone.

The environmental media directly impacted by the site's drum reconditioning activities are soil, sediments and ground water. Surface runoff is considered a transport medium because precipitation from previous storm events has carried COCs away from the on-site storm water holding ponds off-site to Unzinger Ditch. Ground water is considered a transport medium because leaching of COCs from impacted soils may occur into the upper ground water zone. Dust is considered a potential transport medium because COCs present in the soil may become entrained in fugitive dust emissions.

4.1 Risks to Human Health

4.1.1 Exclusion of Hot Spots

During the HHRA evaluation, various localized areas (hot spots) within Exposure Units 1 and 3 exhibited elevated concentrations of SVOCs and VOCs identified as COCs. These hot spots' values were excluded from the holistic risk assessment evaluation as these chemical concentrations interfered with the database population distribution. In the evaluation of these chemicals (and sample locations), it was apparent the ten hot spots exceed human health risk standards and would be included as locations for

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further corrective actions under the CMS. The ten hot spots are shown in **Figure 2** and the chemicals identified exhibiting elevated concentrations are as follows.

Exposure Unit 1 – Active Operations Area – Surface Soil (0 to 2 feet bgs)

- Sample Location F-GP-18 had dibenzo(a,h)anthracene at 0.96 ppm.
- Sample Location S107-SB12 had bis(2-ethylhexyl)phthalate at 110 ppm, ethylbenzene at 210 ppm, toluene at 310 ppm and total xylenes at 720 ppm.
- Sample Location S107-SB11 had bis(2-ethylhexyl)phthalate at 1,300 ppm.
- Sample Location S107-SS05 had bis(2-ethylhexyl)phthalate at 1,000 ppm.
- Sample Location S107-SB07 had bis(2-ethylhexyl)phthalate at 230 ppm, ethylbenzene at 210 ppm and trichloroethene at 0.690 ppm.
- Sample Location S108-SB16/SS18 had bis(2-ethylhexyl)phthalate at 230 ppm.

Exposure Unit 1 – Active Operations Area – Subsurface Soil (2 to 10 feet bgs)

- Sample Location S108-SB13/SS15 had benzo(a)anthracene at 6.20 ppm, benzo(a)pyrene at 5.10 ppm and benzo(b)fluoranthene at 5.90 ppm.

Exposure Unit 3 – Unzinger's Ditch - Sediment

- Sample Location S101-SD24 had bis(2-ethylhexyl)phthalate at 620 ppm.
- Sample Location S101-SD25 had bis(2-ethylhexyl)phthalate at 400 ppm.
- Sample Location S101-SD07 had bis(2-ethylhexyl)phthalate at 100 ppm.

4.1.2 Risk Evaluation Summary

A HHRA was prepared to evaluate potential adverse impacts to human health posed by COCs in the on-site soil, sediment, ground water, and surface water; and Unzinger Ditch sediment and surface water based on data collected during the RFI. However, when site-specific data was not available, standard default values were used in the risk assessment's evaluation.

In Exposure Unit 1, nine metals and 13 SVOCs/PAHs were identified within the surface and subsurface soils above the RFI's screening levels for human health established by the use of U.S. EPA Region 9 PRGs for industrial risk exposure. The HHRA's evaluation identified within the surface and subsurface soils the following 14 COCs: the

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metals arsenic, chromium, iron, lead; the PCB Aroclor 1254; the SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene; and the VOCs trichloroethene and total xylenes. Seven metals and bis(2-ethylhexyl)phthalate were identified as COCs in ground water; however, the presence of elevated metals in the background samples produce uncertainty concerning the identification of metals as COCs. Protection standards were developed for these COCs in both soil and ground water to assist in evaluating the need for any further corrective measures.

In the evaluation of the 42 identified soil sample locations identified with elevated COCs, six locations were determined to have a low risk potential and/or a calculated risk ratio below the risk $1E-5$ and/or hazard index (HI) of 1. For example, Soil Sample Location S100-SS09 is located in an area of limited human interaction, thus, potential exposure is low. This resulted in a total of 36 soil locations that warranted further evaluation in the CMS. Of the 36 soil locations identified for evaluation, several were located adjacent to one another facilitating the combination of various locations into one area for remediation. The combination of the 36 soil locations, which include the seven hot spots excluded from the HHRA, resulted in 22 soil areas within the active operations area that warrant corrective measures as shown in **Figure 2**.

The HHRA determined that in Exposure Unit 1, the non-cancer HI for all pathways for site workers is 1.6 and the total excess lifetime cancer risk is $4E-3$ (i.e., 4 in 1,000). For construction/utility workers, the HI for all pathways is 2.4 and the total excess lifetime cancer risk is $3E-3$. These values are in excess of the acceptable risk limits, HI of 1.0 and excess lifetime cancer risk of $1E-5$, that are explained in further detail in Section 6.0 REMEDIAL ACTION OBJECTIVES. In addition, lead was evaluated in the HHRA using a lead-specific U.S. EPA risk model to calculate that concentrations above 710 ppm would pose an unacceptable exposure risk to the site worker. Therefore, lead was determined to also be a COC for site workers. The COCs for soil are arsenic, chromium, iron, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, bis(2-ethylhexyl)phthalate, the PCB Aroclor 1254, trichloroethene and total xylenes. The main exposure pathway of concern is from ingestion of soils.

The RFI's sampling data show that bis(2-ethylhexyl)phthalate, chloroethane, vinyl chloride and 1,1 dichloroethane have migrated through the soil to contaminate the upper ground water zone underlying the active operations area in Exposure Unit 1. However, ground water modeling of the sampling results support the RFI's conclusion that these chemicals exceeding their respective PRGs are not migrating off-site in excess of the site specific RAOs. These chemicals display limited potential for migration to ground water under observed site conditions and were not considered for active corrective measures.

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In Exposure Unit 2, six metals were identified within the surface and subsurface soils above the RFI's screening levels for human health established by the lower value of background concentrations or U.S. EPA's Region 9 PRGs for residential risk exposure. The HHRA evaluation identified only arsenic as a COC within the surface and subsurface soils. However, only one sample location each in SWMUs S109 and S201 had elevated arsenic concentrations above its remedial action goal to be considered as a COC. Subsequent soil samples at and around these two sample locations detected arsenic levels below the site-specific background level, so the earlier elevated arsenic concentrations were attributed to naturally-occurring deposits. Therefore, Exposure Unit 2 (SWMUs S109 and S201) was not evaluated in the HHRA, and was not considered in the CMS for further corrective measures.

In Exposure Unit 3, three sediment "hot spots" were excluded from the HHRA because the chemical concentration interfered with the database population distribution. No other COCs were identified within the sediment and surface water above the RFI's screening levels for human health established by the lower value of background concentrations of U.S. EPA's Region 9 PRGs for residential risk exposure. Therefore, Exposure Unit 3 was not evaluated in the HHRA. However, the risk to ecological receptors in Exposure Unit 3 was evaluated in the ERA.

4.2 Risks to Ecological Receptors

An ERA was prepared to evaluate potential adverse impacts to ecological receptors posed by ecoCOCs in the Unzinger Ditch sediment and surface water based on data collected during the RFI. Unzinger Ditch (*i.e.*, Exposure Unit 3) was divided into two segments, downstream of the 15-inch outfall from the storm water holding ponds at River Mile (RM) 0.6 and upstream of the 15-inch outfall. This division of Unzinger Ditch was based on the Ohio EPA DSW designation of the stretch downstream of RM 0.6 as Warmwater Habitat and the stretch upstream of RM 0.6 as Limited Resource Water. The 15-inch outfall from Franklin Steel's storm water holding ponds discharges into Unzinger Ditch upstream from RM 0.6 as shown in Figure 1 of the DSW document, *Biological and Sediment Quality Study of Unzinger Ditch 2000*. The 2000 study identified that both sections of Unzinger Ditch were in non-attainment of the Ohio Water Quality Criteria.

The ERA expressed the effects of exposure to individual chemicals (the ecoCOCs) in Unzinger Ditch in units of hazard quotients (HQs). HQ refers to the effects of an individual chemical whereas HI refers to the combined effects of all chemicals. High HQs (above 1) in the lower segment of Unzinger Ditch are primarily from metals and SVOCs in the sediment contamination and were indicated primarily for aquatic biota. Few metals had concentrations high enough to cause ecological concern in the surface water of Unzinger Ditch, and releases of inorganic compounds from the 15-inch outfall's effluent into the downstream segment of Unzinger Ditch does not cause markedly

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higher concentrations in the downstream segment versus the upstream segment's surface water.

Eight metals (arsenic, cadmium, chromium, copper, lead, mercury and nickel and zinc) had HQs above 1 for sediment in the downstream segment of Unzinger Ditch. Of those eight metals, lead and cadmium posed the highest HQ values of 21.6 and 10.2, respectively. The upstream segment sampling indicated only six metals (arsenic, cadmium, copper, lead, mercury and zinc) with HQ values higher than 1. As with the lower segment, lead and cadmium posed the highest HQ values of 4.3 and 4.1, respectively.

The HQs for SVOCs were highest in the downstream segment of Unzinger Ditch. Nine SVOCs had HQs above 1 in the sediment in the downstream segment of Unzinger Ditch, whereas only benzo(a)anthracene had an HQ above 1 in the upstream segment; the HQs for the total SVOCs were 225 downstream and 53 upstream. Bis(2-ethylhexyl)phthalate had the most impact in the downstream segment of Unzinger Ditch with an value of 67.

The ERA concluded sediment within both segments of Unzinger Ditch has been impacted by ecoCOCs. The greatest accumulation of impact is downstream of the 15-inch outfall, at RM 0.54 (Broughton Road overpass). This area is subject to high sedimentation as the easterly flowing Unzinger Ditch takes a sharp bend south causing a sediment deposition bank on the easterly stream edge. Metals show the greatest sediment impact at RM 0.54, as these compounds tend to settle out in areas of low flow. Various SVOCs detected in the downstream sediment are the likely source of SVOC-impacted surface water in the downstream segment.

The ecoCOCs that pose a threat to the environment in Unzinger Ditch's sediment include the metals arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc; and the SVOCs anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, phenanthrene, pyrene and bis(2-ethylhexyl)phthalate.

The ERA also identified risks to ecological receptors from several surface water contaminants (as listed in Table 3.6 of the CMS); however, surface water is not addressed directly for further corrective measures in the CMS. Instead, the remedial alternatives address sediment contamination, which is the most likely source material for ecoCOC impacts in surface water.

5.0 CORRECTIVE MEASURES STUDY

A CMS was conducted by Franklin Steel to define and analyze appropriate remedial alternatives. The CMS was conducted with oversight by Ohio EPA, and was approved

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on July 10, 2009. The RFI, RAAD and CMS are the basis for the selection of the Ohio EPA's preferred remedial alternative.

This Preferred Plan contains only a summary of the CMS report. Refer to the CMS report for additional information on the remedial alternatives. The CMS report is available for review at Ohio EPA's Central District Office located in Columbus, Ohio, in the public repository (Gahanna Branch of the Columbus Metropolitan Library) located in Gahanna, Ohio, and on the internet at the Ohio EPA Central District Office website: <http://www.epa.ohio.gov/cdo/colssteeldrm.aspx>.

6.0 REMEDIAL ACTION OBJECTIVES

As part of the RFI/CMS process, RAOs were developed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), codified at 40 CFR Part 300 (1990), as amended, which was promulgated under the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601 et. seq., as amended, and U.S. EPA guidance. The RAOs are goals that a remedy should achieve in order to ensure the protection of human health and the environment. The goals are designed specifically to mitigate the potential adverse effects of site COCs present in the environmental media.

PRGs for the protection of human health were established using the acceptable excess lifetime cancer risk and non-cancer hazard goals identified in the DERR technical decision compendium (TDC) document *Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response and Federal Facility Oversight* dated April 26, 2004. These goals are given as 1E-5 (*i.e.*, 1 in 100,000) excess lifetime cancer risk and an HI of 1, and were established using the default exposure parameters provided by U.S. EPA and/or site-specific information. This TDC document can be found at the Ohio EPA webpage:

<http://www.epa.ohio.gov/portals/30/rules/riskgoal.pdf>.

The carcinogenic risk level refers to the increased likelihood that someone exposed to COCs at the site would develop cancer during his or her lifetime as compared with a person not exposed to the COCs at the site. For example, a 1 in 100,000 (equal to 1/100,000 or 1E-5) risk level means that if 100,000 people were chronically exposed to a carcinogen at the specified concentration, then there is a probability of one additional case of cancer in this population. Note that the risk levels refer only to the incremental risks created by exposure to the COCs at the site. They do not include the risks of cancer from other non-site related factors to which people could be exposed in their lifetime (*e.g.*, smoking, poor diet).

Non-carcinogenic hazards are generally expressed in terms of an HI or HQ, which combines the concentration of chemical exposures with the toxicity of the chemicals

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(whereas HI refers to the combined effects of all chemicals whereas HQ refers to the effects of an individual chemical). An HI of 1 represents the highest level of exposure at which no harmful effects are expected.

The RAOs developed for the site are detailed in **Table 1**. The RAOs for the site have been developed to address the pathways of exposure to COPCs that were identified in the conceptual site model and evaluated by the human health and ecological risk assessments. Based on the results of the RFI and CMS, the site's contaminated soils create an unacceptable risk to local workers, and the contaminated sediments cause an unacceptable risk to the stream's ecological receptors. The site will continue to be an industrial facility located in an industrial park into the foreseeable future, and the RAOs have been designed to be protective of human health and ecological receptors for this use designation.

Table 1 – Remedial Action Objectives Summary			
Pathway	Applicable Compounds	Target Level (ppm)	Basis
<i>Soils – Human Receptors (H1)</i>			
Protect human health by eliminating exposure (<i>i.e.</i> , direct contact, ingestion) to soils with concentrations of COCs in excess of regulatory or risk based standards.	Arsenic	39	Background ¹
	Chromium	210	Region 9 PRG ²
	Iron	100,000	Region 9 PRG ²
	Lead	710	Region 9 PRG ²
	Aroclor 1254	0.74	Region 9 PRG ²
	Benzo(a)anthracene	2.1	Region 9 PRG ²
	Benzo(b)fluoranthene	2.1	Region 9 PRG ²
	Benzo(k)fluoranthene	21.1	Region 9 PRG ²
	Benzo(a)pyrene	0.21	Region 9 PRG ²
	Dibenzo(a,h)anthracene	0.21	Region 9 PRG ²
	Indeno(1,2,3-cd)pyrene	2.1	Region 9 PRG ²
	Bis(2-ethylhexyl)phthalate	120	Region 9 PRG ²
	Trichloroethene	0.11	Region 9 PRG ²
	Xylenes	420	Region 9 PRG ²
<i>Upper Ground Water Zone – Human Receptors (H2)</i>			
Protect human health by eliminating exposure (<i>i.e.</i> , ingestion) to shallow ground water with concentrations of COCs in excess of regulatory or risk based standards.	Aluminum	3.60	Region 9 PRG ⁴
	Antimony	0.006	MCL ⁵
	Arsenic	0.010	Region 9 PRG ⁴
	Barium	2.00	MCL ⁵
	Beryllium	0.004	Region 9 PRG ⁴
	Cadmium	0.005	Region 9 PRG ⁴
	Lead	0.015	Region 9 PRG ⁴
	Manganese	0.880	Region 9 PRG ⁴
	Nickel	0.730	Region 9 PRG ⁴
	Thallium	0.002	MCL ⁵

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	Vanadium	0.036	MCL ⁵
	Zinc	5.00	Region 9 PRG ⁴
	Benzo(a)anthracene	0.000029	Region 9 PRG ⁴
	Benzo(b)fluoranthene	0.000029	Region 9 PRG ⁴
	Bis(2-thylhexyl)phthalate	0.006	MCL ⁵
	Dibenzo(a,h)anthracene	0.000029	Region 9 PRG ⁴
	1,1-Dichloroethane	0.0024	Region 9 PRG ⁴
	1,2-Dichloroethene	0.0050	MCL ⁵
	Indeno(1,2,3-cd)pyrene	0.000029	Region 9 PRG ⁴
	Chloroethane	0.217	RCRA MCL ⁶
	Chloroform	0.00019	Region 9 PRG ⁴
	Methylene Chloride	0.0048	Region 9 PRG ⁴
	Vinyl Chloride	0.002	MCL ⁵
Sediments – Ecological Receptors (E1)			
Prevent direct contact with contaminated off-site sediments and consumption of contaminated food (i.e., fish)	Arsenic	18	Sediment ⁷
	Cadmium	0.90	Sediment ⁷
	Chromium	40	Sediment ⁷
	Copper	34	Sediment ⁷
	Lead	34	Sediment ⁷
	Mercury	0.12	Sediment ⁷
	Nickel	42	Sediment ⁷
	Zinc	160	Sediment ⁷
	Anthracene	0.0572	Sediment ⁷
	Benzo(a)anthracene	0.108	Sediment ⁷
	Benzo(a)pyrene	0.150	Sediment ⁷
	Chrysene	0.166	Sediment ⁷
	Dibenzo(a,h)anthracene	0.033	Sediment ⁷
	Fluoranthene	0.423	Sediment ⁷
	Fluorene	0.0774	Sediment ⁷
	Phenanthrene	0.204	Sediment ⁷
	Pyrene	0.195	Sediment ⁷
Bis(2-ethylhexyl)phthalate	9.30	SQB ⁸	
Total PAHs	1.60	Sediment ⁷	
<ol style="list-style-type: none"> 1. Value calculated from site-specific background sampling results 2. U.S. EPA Region 9 Preliminary Remediation Goal – industrial exposure 3. U.S. EPA Region 9 Preliminary Remediation Goal – tap water concentration 4. U.S. EPA Drinking Water Standards Maximum Contaminant Level 5. RCRA MCL = RCRA closure action maximum contaminant level 6. Ohio EPA Sediment Reference Value (2003) 7. SQB = sediment quality benchmark derived by toxicity calculation 			

7.0 SUMMARY OF REMEDIAL ALTERNATIVES

Eleven remedial alternatives were considered for soil (four alternatives), sediment (four alternatives), and ground water (three alternatives) in the CMS report. A brief description of the major features of each of the 11 remedial alternatives follows. More detailed information about these alternatives can be found in the CMS report. Note, remedial alternatives for surface water were not considered because contaminated sediment is the primary source for chemical impacts in surface water, and the corrective measures implemented for sediment are expected to reduce the impacts of any ecoCOCs in surface water and result in the future attainment of chemical-specific and biological criteria.

7.1 Soil Alternatives

7.1.1 Soil Alternative #1 – No Action Alternative

The NCP requires evaluation of a “No Action” alternative to establish a baseline for the comparison of the other soil remedial alternatives proposed in the CMS report. Under this alternative, no active corrective measures would be implemented for the COC-impacted soil at the site. The soil would remain undisturbed in its present condition.

7.1.2 Soil Alternative #2 – Capping of Soil

Alternative #2 consists of a cap system for the 22 COC-impacted soil locations, which include the seven hot spots excluded from the HHRA, identified as requiring corrective measures to meet the RAOs. This alternative would include a new concrete cap for areas that are currently uncovered (approximately 29,500 square feet), and the maintenance of the existing concrete in areas that are currently covered (approximately 5,000 square feet) in the active operations area. Once completed, all capped/covered areas would serve as an engineering control to prevent site worker contact with COC-impacted soils beneath the concrete.

For the currently uncovered areas requiring corrective measures, up to 12 inches of soil would be removed so that the finished cap grade would be level with the surrounding land surface and promote positive drainage. Soil would be removed and transported off-site for disposal in a permitted, Subtitle D landfill. A 4- to 6-inch thick concrete cap with a gravel or sand base layer would then be constructed over the currently uncovered areas.

For currently covered areas over COC-impacted soils, observed defects would be repaired as needed.

Annual inspection and necessary repairs to the capped/covered areas that are part of this alternative would be conducted as part of long-term care under an operation and

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maintenance (O&M) plan developed by Franklin Steel. In addition, the O&M plan would provide notice for construction worker protection should the cover/cap be disturbed in the impacted areas. An institutional control proposed for this alternative would include establishing and recording an environmental covenant to restrict the property to industrial/commercial usage in accordance with the Ohio Uniform Environmental Covenants Act, Ohio Revised Code (ORC) § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant.

7.1.3 Alternative #3 (listed as #3A in CMS) – Removal of Soil from Uncovered Areas

Alternative #3 consists of excavating soil only from the currently uncovered (no concrete but gravel and/or soil) areas identified as requiring corrective measures to meet the RAOs. The areas currently covered by concrete would not be removed. The existing concrete covered areas would serve as an engineering control to prevent site worker contact with COC-impacted soils beneath the concrete.

Twenty-two COC-impacted soil areas, which include the seven hot spots excluded from the HHRA, were identified in Exposure Unit 1 as shown in **Figure 3**. An average of 2 feet of soil depth would be excavated from 21 of the areas, and one area (Boring S107-SB12) would have soil removed to a depth of 7–8 feet. Five of these areas are partially covered with concrete, and 17 do not have any cover; their surface is gravel and/or soil. The total amount of COC-impacted soil from these 22 areas that needs to be removed is an estimated 4,300 tons from the approximately 29,500 square feet of uncovered surface area. Excavated areas would be backfilled with compacted, clean fill material, and the removed soil would be transported off-site for disposal in a permitted, Subtitle D landfill.

Annual inspection and repairs to existing concrete covered areas would be conducted as part of long-term care provided under an O&M plan developed by Franklin Steel. In addition, the O&M plan would provide notice for construction worker protection should the existing concrete covered area be disturbed in the COC-impacted areas. An institutional control proposed for this alternative would include establishing and recording an environmental covenant to restrict the property to industrial/commercial usage in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to §5301.92, with Ohio EPA as a signatory to the covenant.

7.1.4 Soil Alternative #4 (listed as #3B in CMS) – Removal of Soil from Uncovered and Covered Areas

Alternative #4 consists of excavating soil from both the uncovered (no concrete but gravel and/or soil) and the currently concrete covered areas identified as requiring corrective measures to meet the RAOs. For currently covered areas, existing concrete would be removed prior to initiating soil excavation. Where removal is conducted in

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contiguous covered areas, a new layer of concrete would be installed as the final surface cover.

Twenty-two COC-impacted soil areas, which include the seven hot spots excluded from the HHRA, were identified in Exposure Unit 1 as shown in **Figure 3**. An average of 2 feet of soil depth would be excavated from 21 identified areas (that includes seven hot spots), and one location (Boring S107-SB12) would have soil removed to a depth of 7–8 feet. Five of these areas are partially covered with concrete, and 17 do not have any cover; their surface is gravel and/or soil. The total amount of impacted soil from these 22 areas that need to be removed is an estimated 5,000 tons from the approximately 34,500 square feet of covered and uncovered areas. Excavated areas would be backfilled with compacted fill material. Soil would be removed and transported off-site for disposal in a permitted, Subtitle D landfill.

An institutional control proposed for this alternative would include establishing and recording an environmental covenant to restrict the property to industrial/commercial usage in accordance with the Ohio Uniform Environmental Covenants Act, ORC §5301.80 to §5301.92, with Ohio EPA as a signatory to the covenant.

7.2 Sediment Alternatives

7.2.1 Sediment Alternative #1 – No Action Alternative

The “No Action” alternative is evaluated to establish a baseline for comparison of the other sediment remedial alternatives proposed in the CMS. Under this alternative, no active corrective measures would be implemented for the ecoCOC-impacted sediment in Unzinger Ditch. The sediment would remain undisturbed in its present condition. In addition, ecological impacts to surface water would not be addressed.

7.2.2 Sediment Alternative #2 – Capping of Sediment

Alternative #2 consists of a cap system for stream sediment identified as requiring corrective measures to meet the RAOs in Unzinger Ditch as shown in **Figure 5**. A four to six-inch thick geomembrane/geotextile clay liner would be installed over the current ecoCOC-impacted sediment areas; dependent on confirmation sampling results, visual observation, and/or the absence of appreciable sediment. Therefore, the extent of impacted sediment capping in Unzinger Ditch could vary: from the entire stream’s lower reach of approximately 3,500 linear feet that encompasses its confluence at Blacklick Creek (Sample Location S101-SD26) to the storm water holding pond’s 15-inch outfall into the stream (Sample Location S101-SD07) to only selected portions of the stream’s lower reach that is estimated at 1,440 linear feet. The three hot spots excluded from the HHRA (Sediment Sample Locations S101-SD07, S101-SD17, and S101-SD18) would be capped. Before performing the sediment capping activities, Franklin Steel would

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need to obtain permits from both the U.S. Army Corps of Engineers and the Ohio EPA DSW.

Annual inspection and necessary repairs to the capped areas that are part of this alternative would be conducted as part of long-term care for the stream under an O&M plan developed by Franklin Steel. In addition, surface water would need to be periodically sampled for the duration of the cap system as an indicator of the effectiveness of the sediment remediation.

An institutional control proposed for this alternative would include establishing and recording an environmental covenant on the property to restrict disturbance of the sediment's cap in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant.

7.2.3 Sediment Alternative #3 (listed as #3A in CMS) – Sediment Removal, Five Target Reaches

Alternative #3 - *Five Target Reaches* consists of excavating ecoCOC-impacted sediment, dewatering as necessary, transporting and disposal at an approved landfill from five targeted stream reaches (estimated to be approximately 1,440 linear feet) to meet the RAOs in Unzinger Ditch. The sediment removal areas are located in the lower reach of Unzinger Ditch from its confluence at Blacklick Creek (Sediment Sample Location S101-SD26) to the storm water holding pond's 15-inch outfall into the stream (Sediment Sample Location S101-SD07) as shown in **Figure 5**. The sediment removal areas are estimated to consist of:

- Reach 1: Blacklick Creek Confluence (0 feet) to 150 feet, average width of 14 feet
- Reach 2: 1,000 to 1,320 feet (320 feet), average width of 14 feet
- Reach 3: 2,200 to 2,600 feet (400 feet), average width of 8 feet
- Reach 4: 2,750 to 3,100 feet (350 feet), average width of 6 feet
- Reach 5: 3,300 to 3,520 feet (220 feet), average width of 6 feet

The three hot spots excluded from the HHRA (Sample Locations S101-SD07, S101-SD17, and S101-SD18) would also be removed.

Before performing the sediment removal activities, Franklin Steel will need to obtain permits from both the U.S. Army Corps of Engineers and the Ohio EPA DSW. After clearing vegetation and installing erosion controls, an average of 12 inches of sediment would be excavated from the five target reaches to an average channel width of seven feet. Excavated areas may need to be backfilled with compacted fill material, clay and top soil to match the existing grade. The total amount of sediment that will be removed from these five stream areas is estimated to be 950 tons from approximately 13,200 square feet; dependent on confirmation sampling results, visual observation, and/or the

absence of appreciable sediment. Once the sediment removal operation is completed, the stream will be restored by landscaping and vegetation as needed according to the terms and schedule of the required permits.

One of the goals in removing contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria.

7.2.4 Sediment Alternative #4 (listed as #3B in CMS) – Sediment Removal, Lower Segment Reach

Alternative #4 - *Lower Segment Reach* consists of excavating ecoCOC-impacted sediment, dewatering as necessary, transporting and disposal at an approved landfill from Sediment Sample Locations S101-SD26 to S101-SD07 (approximately 3,500 linear feet) to meet the RAOs in Unzinger Ditch. This length of stream is from Unzinger Ditch's confluence at Blacklick Creek to just upstream of the storm water holding pond's 15-inch outfall into the stream as shown in **Figure 5**. The three hot spots excluded from the HHRA (Sediment Sample Locations S101-SD07, S101-SD17, and S101-SD18) would also be included in the sediment removal.

Before performing the sediment capping activities, Franklin Steel will need to obtain permits from both the U.S. Army Corps of Engineers and the Ohio EPA DSW. An average of 9 inches of sediment would be excavated from the stream's lower segment reach, with an estimated average channel width of 7.6 feet. Excavated areas may need to be backfilled with compacted fill material, clay and top soil. The total amount of sediment that needs to be removed from the lower segment reach is estimated to be 1,450 tons from approximately 26,800 square feet, dependent on the results of the confirmation sampling results. Once the sediment removal operation is completed, the stream will be restored by landscaping and vegetation as needed according to the terms and schedule of the required permits.

One of the goals in removing contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria.

7.3 Ground Water Alternatives

7.3.1 Ground Water Alternative #1 – No Action Alternative

The "No Action" alternative is evaluated as a baseline for comparison to the other ground water remedial alternatives proposed in the CMS. Under this alternative, no active corrective measures or ground water monitoring would be implemented at the site.

7.3.2 Ground Water Alternative #2 – Monitored Natural Attenuation with Institutional Controls

Alternative #2 consists of monitored natural attenuation as the primary mechanism to address COCs in the upper ground water zone. Natural attenuation relies on naturally occurring physical, chemical, and biological processes in the subsurface materials at the site to limit migration and potentially reduce concentrations of SVOCs/VOCs in the upper ground water zone over time.

As part of this alternative, an enhanced monitoring program for the upper ground water zone would be implemented under an O&M plan developed by Franklin Steel. The ground water monitoring program would begin three to six months after the completion of the soil removal activities and continue for a period of at least five years. Ground water sampling data would be used to evaluate concentrations of COCs, to analyze trends in concentration levels and to determine if the concentration levels meet the RAOs for ground water. In addition, the monitoring program would include sampling and analysis for appropriate indicator parameters to confirm that natural attenuation is occurring in the subsurface materials. The enhanced ground water monitoring program would consist of a minimum two-year compliance period followed by a three-year detection monitoring period.

During the two-year compliance period, ground water samples would be collected semiannually from six monitoring wells (S107-MW02, S101-MW01R, S109-MW06, S109-PZ02, S109-MW07 and S201-MW02) and analyzed for VOCs, SVOCs, metals and natural attenuation indication parameters. The natural attenuation indication parameters would signify biological activity in the ground water is occurring, and these parameters include alkalinity, chlorides, dissolved oxygen and sulfates. Statistical trend analysis of the sampling data results would be performed to evaluate any trends in the concentrations of COCs over time. Ground water flow and contaminant fate and transport modeling would also be performed to estimate the rate and extent of migration of the COCs from the site.

If RAOs are met for all COCs at the end of the two-year compliance period, then three years of detection monitoring would be conducted to verify that natural attenuation is occurring and RAOs continue to be met. Statistical trend analysis would be conducted to verify that COC concentrations are decreasing over time and remain below the RAOs. For the detection monitoring period, ground water samples would be collected semiannually from the same six monitoring wells used for the compliance period's monitoring. The samples would be analyzed for VOCs and all the appropriate natural attenuation indicator parameters.

If RAOs are not met for all COCs at the end of the two-year compliance period, but the COC levels are stable or decreasing as shown by the statistical trend analysis, then the compliance monitoring period would continue until the RAOs are met in the upper

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ground water zone followed by the detection monitoring period. However, if the COC levels are increasing as shown by the trend analysis, a contingent remedy would be developed and implemented by Franklin Steel. The contingent remedy would require the evaluation and selection of an active remediation system by Franklin Steel to reduce the levels of COCs. The active remediation option employed could be the extraction of COC-impacted groundwater followed by *ex situ* treatment and discharge of the treated water as outlined in Ground Water Alternative #3. A ground water monitoring program would be developed including, but not limited to, the activities performed for compliance and detection monitoring periods as described above.

An institutional control proposed for this alternative would include establishing and recording an environmental covenant on the property to prohibit the use of ground water for potable water purposes in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant.

7.3.3 Ground Water Alternative #3 – Ground Water Extraction and Treatment

Alternative #3 consists of the extraction of COC-impacted upper ground water zone system followed by *ex situ* treatment and discharge of the treated ground water. Ground water from Monitoring Well S109-MW06, which has had detections of chloroethane, 1,1-dichloroethane, and vinyl chloride concentrations greater than its RAO, would be recovered through one or more extraction wells. The construction of the extraction and treatment system components would require state construction and operating permits from the Ohio EPA DAPC and DSW.

The area targeted for ground water recovery is defined by chloroethane, vinyl chloride, and 1,1-dichloroethane concentrations detected in the ground water samples collected from Monitoring Well S109-MW06 as shown in **Figure 3**. Recovered ground water would be treated and then discharged to a nearby stream or drainage ditch under an NPDES permit issued by Ohio EPA DSW. However, an *ex situ* treatment component for this alternative may be required to meet NPDES permit requirements. If required, treatment could be accomplished using a packaged treatment system designed to remove the COCs from the recovered ground water. The system would likely use a low profile air stripping unit to remove the chloroethane, 1,1-dichloroethane, and vinyl chloride from the ground water. The stripped chloroethane, 1,1-dichloroethane, and vinyl chloride would be part of the vapor stream, and captured in a carbon polishing unit before discharge to the atmosphere under a permit to operate from DAPC. After passing through the packaged system, the treated ground water would be discharged under the NPDES permit from DSW.

As part of this alternative, a monitoring program for the upper ground water zone would be developed and implemented under an O&M plan developed by Franklin Steel. Ground water sampling data would be used to evaluate the progress of the removal of

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COCs from the impacted ground water, and to determine when the concentrations meet the RAOs for ground water. Periodic ground water samples would be collected from six monitoring wells (S107-MW02, S101-MW01R, S109-MW06, S109-PZ02, S109-MW07 and S201-MW02) and analyzed for VOCs.

An institutional control proposed for this alternative would include establishing and recording an environmental covenant on the property to prohibit the use of ground water for potable water purposes in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant.

8.0 COMPARISON AND EVALUATION OF ALTERNATIVES

8.1 Evaluation Criteria

In selecting a remedy for a contaminated site, Ohio EPA considers the following eight evaluation criteria as outlined in U.S. EPA's NCP promulgated under CERCLA (40 CFR 300.430):

1. Overall protection of human health and the environment - Remedial alternatives shall be evaluated to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site.
2. Compliance with all applicable or relevant and appropriate requirements (ARARs) - Remedial alternatives shall be evaluated to determine whether a remedy will meet all of the applicable or relevant and appropriate requirements of state and federal environmental laws.
3. Long-term effectiveness and permanence - Remedial alternatives shall be evaluated to determine the ability of a remedy to maintain reliable protection of human health and the environment over time once pollution has been abated and RAOs have been met. This includes assessment of the residual risks remaining from untreated wastes, and the adequacy and reliability of controls such as containment systems and institutional controls (*i.e.*, environmental covenant).
4. Reduction of toxicity, mobility, or volume through treatment - Remedial alternatives shall be evaluated to determine the degree to which recycling or treatment are employed to reduce toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

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5. Short-term effectiveness - Remedial alternatives shall be evaluated to determine the following: (1) short-term risks that might be posed to the community during implementation of an alternative; (2) potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) time until protection is achieved.
6. Implementability - Remedial alternatives shall be evaluated to determine the ease or difficulty of implementation and shall include the following as appropriate: (1) technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy; (2) administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions); and (3) availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and the availability of prospective technologies.
7. Cost - Remedial alternatives shall evaluate costs and shall include the following: (1) capital costs, including both direct and indirect costs; (2) annual O&M costs; and (3) net present value of capital and O&M costs. The cost estimates include only the direct costs of implementing an alternative at the site and do not include other costs, such as damage to human health or the environment associated with an alternative. The cost estimates are based on figures provided by the CMS.
8. Community acceptance - Remedial alternatives shall be evaluated to determine which of their components interested persons in the community support, have reservations about, or oppose. This assessment is not to be completed until public comments on the Preferred Plan are considered.

Evaluation Criteria 1 and 2 are threshold criteria required for acceptance of an alternative that has accomplished the goal of protecting human health and the environment and has complied with the law. Any acceptable remedy must comply with both of these criteria. Evaluation Criteria 3 through 7 are the balancing criteria used to select the best remedial alternative(s) identified in the Preferred Plan. Evaluation Criterion 8, community acceptance, is a modifying criterion that will be evaluated through public comments on the selected remedial alternatives received during the comment period (see Section 2.0).

8.2 Analysis of Evaluation Criteria

This section examines how each of the evaluation criteria is applied to each of the remedial alternatives presented in Section 7.0 and compares how the alternatives achieve the desired criteria. These analyses have been provided for each medium of concern, with the names of specific remedial alternatives shown in italics.

8.2.1 Overall Protection of Human Health and the Environment

8.2.1.1 Soil

Alternative #1 (No Action) would not modify or reduce the potential for exposure to COC-impacted soil. The soil would remain in its present condition. The RAOs established for the impacted soil and the corrective measures objectives would not be met under this alternative.

Alternative #2 (Soil Capping) would protect human health by preventing direct contact with COCs that exceed RAOs, thereby rendering the exposure pathway incomplete. The institutional controls for *Alternative #2* would limit future site usage to commercial and/or industrial development. The engineering controls would maintain existing concrete covered and newly concreted covered areas to prevent site worker's direct contact with COC-impacted soil beneath these areas, maintain long-term concrete cover integrity and provide notice for construction worker protection should the concrete cover need to be disturbed or breached.

Alternative #3 (Soil Removal From Uncovered Areas) would protect human health by removing COC-impacted soil from currently uncovered areas and preventing direct contact with COCs that exceed the RAOs, thereby rendering the exposure pathway incomplete. The institutional controls for *Alternative #3* would limit future site usage to commercial and/or industrial development. The engineering controls would maintain existing concrete covered areas to prevent site worker direct contact with COC-impacted soil beneath the covered areas, maintain long-term concrete cover integrity and provide notice for construction worker protection should the concrete be disturbed or breached.

Alternative #4 (Soil Removal From Uncovered and Covered Areas) would protect human health by removing both the concrete cover and impacted soil in all the areas where COCs exceed the criteria for requiring corrective measures, thereby rendering the exposure pathway incomplete. The institutional controls for *Alternative #4* would protect human health by limiting future site usage to commercial and/or industrial development. Engineering controls would not be necessary for this alternative.

Alternative #1 would not change the existing site soil conditions to improve the protection of human health and the environment. *Alternatives #2 and #3* would provide

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increased protection of human health and the environment by preventing direct contact with the COC-impacted soil. Alternative #4 would provide a higher degree of protection for human health by the entire removal of the COC-impacted soil from both the uncovered and covered areas.

8.2.1.2 Sediment

Alternative #1 (No Action) would not modify or reduce the potential for exposure to ecoCOC-impacted sediment. The sediment would remain in its present condition. The RAOs established for the impacted sediment would not be met under this alternative, nor would ecological issues in surface water be addressed.

Alternative #2 (Sediment Capping of Lower Segment Reach) would protect the stream's biological communities by preventing direct contact with ecoCOC-impacted sediment that exceeds RAOs, thereby rendering the exposure pathway incomplete.

Alternative #3 (Sediment Removal of Five Target Reaches) would protect the stream's biological communities by removing ecoCOC-impacted sediment that exceeds RAOs from selected areas of the stream, thereby rendering the exposure pathway incomplete.

Alternative #4 (Sediment Removal of Lower Segment Reach) would protect the stream's biological communities by removing ecoCOC-impacted sediment that exceeds RAOs from the stream's entire lower portion, thereby rendering the exposure pathway incomplete.

Alternative #1 would not change the existing stream sediment conditions to improve the protection of the environment. Alternative #2 would provide increased protection of the environment by preventing direct contact with the ecoCOC-impacted sediment. Alternatives #3 and #4 would provide increased protection of the environment by the removal of the ecoCOC-impacted sediment from the stream. One of the goals in capping and removing the contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria.

8.2.1.3 Ground Water

Alternative #1 (No Action) does not protect human health because it does not remediate the ground water nor establish institutional controls to prohibit the use of ground water for potable water purposes. And in the case of monitored natural attenuation, does not monitor ground water or evaluate the effectiveness of the natural attenuation process to reduce the levels of COCs.

Alternative #2 (Monitored Natural Attenuation with Institutional Controls) would protect human health through the expected natural reduction process of COCs-impacted ground water over time. This alternative would rely on the ability of the organic

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compounds in the upper ground water zone to decrease over time through naturally occurring processes. The effectiveness of the reduction process would be evaluated through periodic ground water monitoring events. However, if the expected reduction in COC levels does not occur in the upper ground water zone, Alternative #2 would require the development and implementation of a contingent remedy (such as Ground Water Alternative #3) to protect human health. The institutional control for Alternative #2 would protect human health by prohibiting the use of ground water for potable water purposes.

Alternative #3 (Ground Water Extraction and Treatment) would protect human health by reducing concentrations of chloroethane, 1,1-dichloroethane, and vinyl chloride below the RAOs, and should also reduce concentrations of any other SVOCs and VOCs. The effectiveness of the treatment system to reduce the levels COCs would be evaluated through periodic ground water monitoring events. The institutional control for Alternative #3 would protect human health by prohibiting the use of ground water for potable water purposes.

Alternative #3 would provide protection of human health and the environment by reducing the concentrations, and further migration of COCs, in the upper ground water zone. Institutional controls associated with Alternatives #2 and #3 would also provide overall protection of human health.

8.2.2 Compliance with ARARs

8.2.2.1 Soil

Alternative #1 (No Action) would not meet any ARARs for minimizing the site worker's exposure to COC-impacted soils.

Alternative #2 (Soil Capping) would only remove enough surface soil from the site for off-site disposal such that the final elevation of the newly installed concrete cover would be consistent with adjacent concrete cover. The soil removal and capping activities would be subject to state and federal regulations for transport of waste materials. Disposal of COC-impacted soil would be subject to the permit requirements of the accepting landfill facility. The institutional control portion of this alternative would require that an environmental covenant be placed on the property pursuant to the Ohio Uniform Environmental Covenants Act, Ohio Revised Code § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant. The environmental covenant would restrict the property to industrial or commercial usage.

Alternative #3 (Soil Removal from Uncovered Areas) would only remove the COC-impacted soil from the site's uncovered areas for off-site disposal. However, *Alternative #4* (Soil Removal from Uncovered and Covered Areas) would remove both the concrete cover and the COC-impacted soil beneath it for off-site disposal in addition to the COC-

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impacted soil from the uncovered areas. Alternatives #3 and #4 would be subject to state and federal regulations for the transport of waste materials. Disposal of COC-impacted soil and concrete debris would be subject to the permit requirements of the accepting landfill facility. The institutional control portion of these alternatives would require that an environmental covenant be placed on the property pursuant to the Ohio Uniform Environmental Covenants Act, Ohio Revised Code § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant. The environmental covenant in Alternatives #3 and #4 would restrict the property to industrial/commercial usage.

Alternatives #2, #3 and #4 would require the establishment of institutional controls to restrict the future land usage of the property. Additionally, these alternatives would involve the removal and off-site disposal of impacted soil, which would be subject to applicable regulations and permits for transport and landfill disposal.

8.2.2.2 Sediment

Alternative #1 (No Action) would not meet any ARARS for minimizing the exposure of biological receptors to ecoCOC-impacted sediment, nor would ecological issues in surface water be addressed.

Alternative #2 (Capping of Sediment of Lower Segment Reach) may remove ecoCOC-impacted sediment from Unzinger Ditch for off-site disposal during the sediment cap construction activities which would be subject to state and federal regulations for transport of waste materials. Disposal of ecoCOC-impacted sediment would be subject to the permit requirements of the accepting landfill facility. Permits from both the U.S. Army Corps of Engineers and Ohio EPA DSW would need to be obtained by Franklin Steel before performing the sediment cap construction activities. The institutional control portion of this alternative would require that an environmental covenant be placed on the property pursuant to the Ohio Uniform Environmental Covenants Act, Ohio Revised Code § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant. This covenant would prohibit excavation activities in the stream to prevent disturbance of the sediment's cap.

Alternatives #3 (Sediment Removal of Five Target Reaches) and *#4* (Sediment Removal of Lower Segment Reach) both remove ecoCOC-impacted sediment from Unzinger Ditch for off-site disposal subject to state and federal regulations for transport of waste materials. Disposal of ecoCOC-impacted sediment would be subject to the permit requirements of the accepting landfill facility. Permits from both the U.S. Army Corps of Engineers and Ohio EPA DSW, would need to be obtained by Franklin Steel before performing the sediment removal activities.

Alternative #2 would require the establishment of an institutional control to prevent disturbance of the sediment's cap. Alternatives #3 and #4 would involve the removal, and off-site disposal of impacted soil, which would be subject to applicable regulations

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and permits for transport and landfill disposal. Before performing the sediment removal activities, Alternatives #3 and #4 would require U.S. Army Corps of Engineers and Ohio EPA DSW permits and all sediment removal activities would be subject to the permit terms and requirements. One of the goals in removing the contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria.

8.2.2.3 Ground Water

Alternative #1 (No Action) would not meet any ARARS for minimizing direct contact with, and the ingestion of, COC-impacted ground water.

Alternative #2 (Monitored Natural Attenuation with Institutional Controls) would require that an environmental covenant be placed on the property pursuant to the Ohio Uniform Environmental Covenants Act, Ohio Revised Code § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant. The environmental covenant would prohibit the use of ground water for potable water purposes.

Alternative #3 (Ground Water Extraction and Treatment) would include *ex situ* treatment involving the extraction and treatment of ground water. Installation and construction of the extraction and treatment system components would require Ohio EPA construction and operating permits. Discharge permits, such as a NPDES permit issued by Ohio EPA DSW and a permit to operate issued by Ohio EPA DAPC, would also be required for the system's operation. The institutional control portion of *Alternative #3* would require that an environmental covenant be placed on the property pursuant to the Ohio Uniform Environmental Covenants Act, Ohio Revised Code § 5301.80 to § 5301.92, with Ohio EPA as a signatory to the covenant. The environmental covenant would prohibit the use of ground water for potable water purposes.

Alternatives #2 and #3 would involve compliance with the requirements of Ohio EPA DAPC and DSW permits. In addition, Alternatives #2 and #3 would require the establishment of institutional controls to prevent the use of ground water for potable water purposes.

8.2.3 Long-Term Effectiveness and Permanence

8.2.3.1 Soil

Alternative #1 (No Action) does not provide any long-term effectiveness and permanence to reduce the extent and amount of the COC-impacted soils.

The long-term reliability and effectiveness of *Alternative #2* (Soil Capping) would depend on the quality of the concrete cover's construction and the ability to maintain the cover's integrity over time. It is not a permanent remedy. Concrete cover maintenance

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would require long-term management. A well-maintained cap would effectively and reliably minimize exposure to COC-impacted soil. The institutional control portion of this alternative would restrict future land by an environmental covenant would restrict the property to industrial/commercial usage. The environmental covenant is an effective long-term and permanent method to restrict the property's future land usage.

The proposed soil removal in *Alternatives #3* (Soil Removal from Uncovered Areas) and *#4* (Soil Removal from Uncovered and Covered Areas) is an effective and permanent method to reduce the exposure risks from the COC-impacted soil. By removing the impacted soil sources from the site, COCs migration and exposure would be prevented and/or eliminated. For *Alternative #3*, long-term effectiveness would also depend on the ability to maintain the concrete cover's integrity over time. A well-maintained concrete cover would effectively and reliably minimize exposure to COC-impacted soils. Concrete cover maintenance would require long-term management. *Alternative #4* would not require long-term maintenance or management since it removes the COC-impacted soils. The institutional control portion of *Alternatives #3* and *#4* would restrict future land usage by establishing an environmental covenant to restrict the property to future use to industrial/commercial. The environmental covenant is an effective long-term and permanent method to restrict the property's future land usage.

Alternatives #2 and *#3*, which rely upon maintaining existing concrete pavement and/or capping currently uncovered areas with concrete, in whole or in part, would provide an effective long-term barrier to direct contact with COC-impacted soil but would be dependent on the quality of the long-term maintenance to maintain its integrity over time. These alternatives are not permanent remedies. *Alternative #4* would provide an effective and long-term permanent remedy, due to the removal of soils with concentrations of COCs exceeding the RAOs. *Alternatives #2* and *#3* would rely on long-term maintenance of concrete covered areas, and the establishment of institutional controls to permanently restrict the property to industrial/commercial usage.

8.2.3.2 Sediment

Alternative #1 (No Action) does not provide any long-term effectiveness and permanence to reduce the ecoCOC-impacted sediment exposure risk, nor would ecological issues in surface water be addressed.

The long-term reliability and effectiveness of *Alternative #2* (Sediment Capping of Lower Segment Reach) would depend on the quality of cap construction and the ability to maintain cap integrity over time. It is not a permanent remedy. However, a well-maintained cap would effectively minimize exposure to the stream's ecoCOC-impacted sediment. The institutional control portion of this alternative would require the establishment of an environmental covenant on the property to prohibit excavation activities in the stream to prevent disturbance of the sediment's cap. The environmental

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covenant is an effective long-term and permanent method to restrict the excavation activities in the stream.

The proposed sediment removal in *Alternatives #3* (Sediment Removal of Five Target Reaches) and *#4* (Sediment Removal of Lower Segment Reach) is an effective long-term and permanent method of remediation. By removing the impacted sediment from the stream, ecoCOC-impacted sediment migration and exposure would be prevented.

Alternative *#2* relies on capping to provide an impervious barrier to direct contact with impacted sediment, but would be dependent on long-term maintenance to preserve its reliability over time. Alternatives *#3* and *#4* would both provide an effective and permanent remedy, because it would remove impacted sediment from Unzinger Ditch that has concentrations of ecoCOCs exceeding the RAOs. One of the goals in removing the contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria.

8.2.3.3 Ground Water

Alternative #1 (No Action) does not provide for routine ground water monitoring to determine the long-term effectiveness of the natural attenuation processes to reduce the levels of COCs, nor does this alternative establish a permanent prohibition of using ground water for potable water purposes.

Alternative #2 (Monitored Natural Attenuation with Institutional Controls) involves evaluating and monitoring the long-term effectiveness of natural attenuation processes in reducing the levels of COCs by the periodic sampling of selected monitoring wells. The monitoring wells would need to be maintained for a limited period of time (until it is established that natural attenuation processes are occurring or not occurring). The institutional controls for this alternative would rely on the establishment of an environmental covenant on the property to prohibit the use of ground water for potable water purposes. The environmental covenant is an effective long-term and permanent method to restrict contact with, or ingestion of, COCs in the ground water. However, if the expected reduction in COC levels does not occur in the upper ground water zone, Alternative *#2* requires the development and implementation of a contingent remedy (such as Alternative *#3* below).

Alternative #3 (Ground Water Extraction and Treatment) involves a ground water extraction and treatment system to reduce the levels of COCs. The long-term effectiveness and permanence of the treatment system would be dependent upon the continuous withdrawal of ground water from the aquifer to maximize the recovery of COC-impacted ground water. Periodic ground water compliance monitoring would be necessary to evaluate the effectiveness of the treatment system to decrease the levels of COCs in the upper ground water zone. The institutional controls for this alternative would rely on the establishment of an environmental covenant on the property to

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prohibit the use of ground water for potable water purposes. The environmental covenant is an effective long-term and permanent method to restrict contact with, or ingestion of, COCs in the ground water.

Alternatives #2 includes monitoring wells that will need to be maintained for a limited period of time. Alternative #3 includes an active treatment system that needs to be continuously operated over an extended period of time to be effective.

8.2.4 Reduction of Toxicity, Mobility or Volume by Treatment

8.2.4.1 Soil

Alternative #1 (No Action) would not reduce the toxicity, mobility, or volume of COCs in the impacted soils.

Alternative #2 (Soil Capping) would reduce the potential mobility of the COCs in the impacted soil. However, this alternative would not reduce the volume and toxicity of the COCs in the impacted soil.

Alternatives #3 (Soil Removal from Uncovered Areas) and *#4* (Soil Removal from Uncovered and Covered Areas) would reduce toxicity and mobility by reducing the volume of COC-impacted soil. *Alternative #3* would remove a portion of the COC-impacted soil, while *Alternative #4* would remove all COC-impacted soil identified as exceeding the RAOs.

8.2.4.2 Sediment

Alternative #1 (No Action) would not reduce the toxicity, mobility, or volume of COCs present in the ecoCOCs in the impacted sediment or surface water.

Alternative #2 (Sediment Capping of Lower Segment Reach) would reduce the potential mobility of ecoCOCs in the impacted sediment and surface water. However, this alternative would not reduce the volume and toxicity of the ecoCOCs in the impacted sediment but would reduce the volume and toxicity of the ecoCOCs in surface water.

Alternatives #3 (Sediment Removal of Five Target Reaches) and *#4* (Sediment Removal of Lower Segment Reach) would reduce the toxicity and mobility by reducing the volume of ecoCOC-impacted sediment within Unzinger Ditch. *Alternative #3* would only remove sediment from selected areas of Unzinger Ditch; it would likely remove most of the ecoCOC-impacted sediment by targeting depositional areas in the stream. *Alternative #4* would remove all the ecoCOC-impacted sediments from Unzinger Ditch. Removal of contaminated sediments would be expected to result in the reduction of the toxicity, mobility or volume of ecoCOCs in surface water.

8.2.4.3 Ground Water

Alternative #1 (No Action) may naturally reduce the toxicity, mobility, and volume of COCs in the ground water through combined physical, chemical, and biological attenuation processes. However, the actual existence of the natural attenuation process has not been established, and if it is occurring, the effectiveness of these natural attenuation processes in achieving this goal would not be evaluated and monitored through routine ground water sampling.

If occurring, *Alternative #2* (Monitored Natural Attenuation with Institutional Controls) would naturally reduce the toxicity, mobility, and volume of the COCs in the upper ground water zone through combined physical, chemical, and biological attenuation processes.

Alternative #3 (Ground Water Extraction and Treatment) would reduce the toxicity, mobility, and volume of the COCs in the upper ground water zone.

8.2.5 Short-Term Effectiveness

8.2.5.1 Soil

Alternative #1 (No Action) would not implement any active corrective measures, and there would not be any short-term exposure risks due to remedy implementation or construction.

Alternative #2 (Soil Capping) would involve installation of a concrete cover over the COC-impacted soil areas, and could cause significant disruption to the active facility operations, particularly if it is required to temporarily shut the operations down or to relocate them. Construction activities and heavy equipment could pose a potential risk to employees during the impacted soil removal operation. Employees could also come into contact with COC-impacted soil as it is being removed and staged prior to off-site disposal. Construction workers involved with the cover's construction and removing limited amounts of soil could potentially increase the short-term exposure risk to COC-impacted soil if not carefully monitored. Construction workers involved with the concrete cover construction would wear appropriate personal protective equipment (PPE) to minimize their short-term exposure risk during the concrete cover installation and construction. Once construction activities were completed, there would be no further short-term effects to employees or construction workers and active facility operations could return to normal.

Alternatives #3 (Soil Removal from Uncovered Areas) and *#4* (Soil Removal from Uncovered and Covered Areas) would involve removal of the COC-impacted soil, and could cause significant disruption to the active facility operations, particularly if it is required to temporarily shut the operations down or to relocate them. Construction

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activities and heavy equipment could pose a potential risk to employees during the impacted soil removal operation. Employees could also come into contact with COC-impacted soil as it is being removed and staged prior to off-site disposal. Construction workers removing the soil and handling materials during the excavation and removal process could have a potentially increased short-term exposure risk to COC-impacted soil if not carefully monitored. Construction workers involved with the soil removal operation would wear appropriate PPE to minimize their short-term exposure risk during the soil removal. Once construction activities were completed, there would be no further short-term effects to employees or construction workers and active facility operations could return to normal.

Alternatives #3 and #4 would have the highest potential for short-term effects to employees and construction workers due to disruption of active facility operations, construction activities and the active handling of COC-impacted surface soil during remedy implementation. Alternative #2 would have a lower potential for short-term effects to employees and construction workers than Alternatives #3 and #4 due to the limited amount of impacted soil removal and the non-disturbance of the existing concrete covered areas. For Alternatives #2, #3 and #4, short-term exposure risks can be addressed through proper use of PPE by construction workers and employees, and safe construction practices.

8.2.5.2 Sediment

Alternative #1 (No Action) would not implement any active corrective measures and there would not be any short-term exposure risks due to remedy implementation or construction activities.

Alternative #2 (Sediment Capping of Lower Segment Reach) would involve construction of a cap over the areas of ecoCOC-impacted sediment, and could cause significant disruption to the ecosystem of the stream, particularly if the stream bank has to be cleared of vegetation, the stream has to be dewatered or water flow has to be re-routed. Construction workers could have potentially increased short-term exposure risks from the ecoCOC-impacted sediments during cap construction. Trespassers entering the stream's work zone would also have potential risks from the cap construction activities and heavy equipment operation. Construction workers involved with cap construction would wear appropriate PPE to minimize their short-term exposure risk to ecoCOCs in sediment. It would likely take the stream's ecosystem an extended period of time to fully recover after the completion of the cap construction activities.

Alternatives #3 (Sediment Removal of Five Target Reaches) and *#4* (Sediment Removal of Lower Segment Reach) both involve the removal of the ecoCOC-impacted sediment, and could cause significant disruption to the ecosystem of the stream, particularly if the stream bank has to be cleared of vegetation, the stream has to be dewatered or water flow has to be re-routed, and sediment has to be removed or

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managed. Construction workers removing sediment and handling materials during the excavation and dewatering process could have a potentially increased short-term exposure risk from the ecoCOC-impacted sediment. Trespassers entering the stream's work zone would also have potential risks from the sediment removal activities and heavy equipment operation. Construction workers involved with sediment removal would wear appropriate PPE, as necessary, to minimize their short-term exposure risk to ecoCOCs in sediment. It would likely take the stream's ecosystem an extended period of time to fully recover after the completion of the sediment removal activities.

Alternatives #3 and #4 would have the highest potential for short-term effects due to disruption of the stream's ecosystem and active handling of ecoCOC-impacted sediment. Alternative #2 would have a lower potential for short-term effects to construction workers than Alternatives #3 and #4 due to the relatively low-disturbance of the existing ecoCOC-impacted sediment. For Alternatives #2, #3 and #4, short-term exposure risks can be addressed through proper use of PPE and safe construction practices.

8.2.5.3 Ground Water

Alternative #1 (No Action) would not implement any active corrective measures and there would not be any short-term exposure risks due to remedy implementation or construction.

Alternatives #2 (Monitored Natural Attenuation with Institutional Controls) and *#3 (Ground Water Extraction and Treatment)* both involve periodic sampling of selected ground water monitoring wells. Sampling of the monitoring wells would not be disruptive to operations at the facility or to employees. Workers involved with the sampling of ground water could have a potentially increased short-term exposure from the COC-impacted ground water. Workers involved with ground water sampling would wear appropriate PPE during sampling events to minimize exposure to the COCs in the ground water.

Alternative #3 (Ground Water Extraction and Treatment) involves the installation and operation of the ground water extraction and treatment system and construction activities could potentially have a short-term effect to operations at the facility and employees. However, it is possible to locate the extraction and treatment system in an area at the site where it would have minimal effect on facility operations and employees. Workers involved with construction, system operations, and ground water sampling would wear appropriate PPE to minimize their exposure to COCs in the ground water.

Alternative #3 would have the highest potential for short-term effects on employees, construction workers and other workers due to construction of the extraction and treatment system and operation of the system. For both Alternatives #2 and #3, short-

term exposure risk can be addressed through proper use of PPE and safe construction practices.

8.2.6 Implementability

8.2.6.1 Soil

Alternative #1 (No Action) does not contain any active corrective measures requiring implementation for COC-impacted soil.

For *Alternative #2* (Soil Capping) installation of a concrete cover over COC-impacted soil areas would be implementable, but the construction activities would have to contend with being located in the active operations area (drum storage, conveyor chains, truck trailers, etc). For the institutional controls portion of this alternative to be effective, the environmental covenant would need to be executed and then maintained over time by the current property owner (who is not Franklin Steel).

For *Alternative #3* (Soil Removal from Uncovered Areas) removal of COC-impacted soil from uncovered areas would be relatively implementable, but the construction activities would have to contend with being located in the active operations area (drum storage, conveyor chains, truck trailers, etc). For the institutional controls portion of this alternative to be effective, the environmental covenant would need to be executed and then maintained over time by the current property owner (who is not Franklin Steel).

For *Alternative #4* (Soil Removal from Uncovered and Covered Areas) removal of COC-impacted soil from covered and uncovered areas would not be easily implementable, as most of the covered portions of the impacted soil are beneath the active operations area, which is supported by the 2 to 3-foot wide slabs of concrete. Removing and excavating soil, and then installing a concrete cover in this area, would result in a major disruption to the active facility operations. For the institutional controls portion of this alternative to be effective, the environmental covenant would need to be executed and then maintained over time by the current property owner (who is not Franklin Steel).

The equipment, material, technology, and contractors would be readily available to implement the removal and/or concrete cover of COC-impacted soil proposed by Alternatives #2, #3 and #4. Landfills are also readily available in the area for the disposal of impacted soil. The institutional control portion of Alternatives #2, #3 and #4 would need to be executed and then maintained over time by the current property owner (who is not Franklin Steel) to be effective.

8.2.6.2 Sediment

Alternative #1 (No Action) does not contain any active corrective measures requiring implementation for ecoCOC-impacted sediment.

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For *Alternative #2* (Sediment Capping of Lower Segment Reach) the installation of a cap over the areas of ecoCOC-impacted sediment is more involved than the proposed sediment removal operations in Alternatives #3 and #4, but the cap installation would be implementable. Capping of sediment would be a more complicated corrective action to implement due the installation of the liner system over the stream banks and the need to periodically monitor surface water to ensure the cap's effectiveness. In addition, the institutional control portion of this alternative would need the environmental covenant would need to be established by the multiple property owners affected by the sediment capping operation.

For *Alternatives #3* (Sediment Removal of Five Target Reaches) and *#4* (Sediment Removal of Lower Segment Reach) the removal and dewatering of ecoCOC-impacted sediment areas in Unzinger Ditch would be readily implemented. As required in *Alternative #2*, the stream bank would have to be cleared of vegetation, and the stream's water flow would have to be rerouted. However, Alternatives #3 and #4 sediment removal involves a dewatering process operation and storage area, but does not include an environmental covenant to prohibit the disturbance of the stream's sediment.

The equipment, material, technology, and contractors would be readily available to implement the proposed removal and dewatering of impacted sediment and/or the proposed capping of impacted sediment by Alternatives #2, #3 and #4. Landfills are also readily available in the area for the disposal of the impacted sediment. In addition, the appropriate permits will have to be obtained before the start of any disturbance activity in the stream's sediment.

8.2.6.3 Ground Water

Alternative #1 (No Action) does not contain any active corrective measures requiring implementation for ground water.

Alternative #2 (Monitored Natural Attenuation with Institutional Controls) includes a period of both compliance and detection ground water monitoring events. Monitoring ground water quality through sampling, laboratory analysis and evaluation of the extent of natural attenuation in the upper ground water zone would be technically feasible. A potable water use restriction would need to be implemented and maintained over time by the current property owner (who is not Franklin Steel) and Franklin Steel's portion of the property by the establishment of an environmental covenant on the site.

Alternative #3 (Ground Water Extraction and Treatment) involves the construction and operation of a ground water extraction and treatment system, which would use readily available technology, equipment, material and contractors. Additional hydraulic testing may be required to properly design the recovery system. Effective pre-treatment to meet permit requirements for the system's discharged water can be achieved using

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standard industrial wastewater treatment equipment. State and local permits for treating and discharging ground water would need to be obtained prior to implementing this alternative. Depending on the rate of COC reduction achieved over time, the extraction system would likely need to remain operational for an extended period (estimated at 2 years), and system repairs and component replacement would need to be addressed throughout the life of the system.

Alternatives #2 and #3 would require the establishment of institutional controls. None of the three alternatives would have any significant technical implementation issues that preclude their implementation.

8.2.7 Cost

Cost estimates to implement the remedial alternatives for soil, sediment and ground water are provided below in separate summary tables. Each table lists the capital costs, the annual O&M costs, and the net present value (based on the total costs evaluated for a 30-year period) as presented in the approved CMS. These costs may be subject to change or refinement during the future remedial design.

8.2.7.1 Soil

Alternative	Capital Cost	Annual O&M Cost	Net Present Value
Alternative #1 No Action	\$ 0	\$ 0	\$ 0
Alternative #2 Capping of Impacted Soil	\$ 408,650	\$ 18,800	\$ 698,000
Alternative #3 Removal of Soil from Uncovered Areas Only	\$ 511,900	\$ 10,000	\$ 666,000
Alternative #4 Removal of Soil from Uncovered and Covered Areas	\$ 707,150	\$ 0	\$ 707,150

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8.2.7.2 Sediment

Alternative	Capital Cost	Annual O&M Cost	Net Present Value
Alternative #1 No Action	\$ 0	\$ 0	\$ 0
Alternative #2 Capping of Impacted Sediment Lower Segment Reach	\$ 540,900	\$ 35,000	\$ 1,079,000
Alternative #3 Removal of Sediment from Five Target Reaches	\$ 432,500	\$ 6,300	\$ 444,000
Alternative #4 Removal of Sediment from Lower Segment Reach	\$ 482,500	\$ 11,300	\$ 541,000

8.2.7.3 Ground Water

Alternative	Capital Cost	Annual O&M Cost	Net Present Value
Alternative #1 No Action	\$ 0	\$ 0	\$ 0
Alternative #2 Monitored Natural Attenuation with Institutional Controls	\$ 18,800	\$ 67,500	\$ 203,000
Alternative #3 Ground Water Extraction, Treatment and Recovery System	\$ 142,500	\$ 78,100	\$ 356,000

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8.3 Summary of Evaluation Criteria

8.3.1 Soil

Table 2: Evaluation of Remedial Alternatives for the Franklin Steel Site

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
(1) Overall protection of human health and the environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(2) Compliance with ARARs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(3) Long term effectiveness and permanence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(4) Reduction of toxicity, mobility or volume through treatment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(5) Short term effectiveness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(6) Implementability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(7a) Capital Cost	---	\$408,650	\$511,900	\$707,150
(7b) Net Present Value	---	\$698,000	\$666,000	\$707,150
(8) Community acceptance	<i>Community acceptance of the preferred alternatives will be evaluated after the public comment period.</i>			
<input checked="" type="checkbox"/> Fully meets criteria <input checked="" type="checkbox"/> Partially meets criteria <input type="checkbox"/> Does not meet criteria				

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8.3.2 Sediment

Table 3: Evaluation of Remedial Alternatives for the Franklin Steel Site

<i>Evaluation Criteria</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>
<i>(1) Overall protection of human health and the environment</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(2) Compliance with ARARs</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(3) Long term effectiveness and permanence</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(4) Reduction of toxicity, mobility or volume through treatment</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(5) Short term effectiveness</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(6) Implementability</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(7a) Capital Cost</i>	---	\$540,900	\$432,500	\$482,500
<i>(7b) Net Present Value</i>	---	\$1,079,000	\$444,000	\$541,000
<i>(8) Community acceptance</i>	<i>Community acceptance of the preferred alternatives will be evaluated after the public comment period.</i>			
<input checked="" type="checkbox"/> <i>Fully meets criteria</i> <input checked="" type="checkbox"/> <i>Partially meets criteria</i> <input type="checkbox"/> <i>Does not meet criteria</i>				

NOTE: Alternative 3 = removal of impacted sediment from Five Target Reaches
 Alternative 4 = removal of impacted sediment from Lower Segment Reach

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8.3.3 Ground Water

Table 4: Evaluation of Remedial Alternatives for the Franklin Steel Site

<i>Evaluation Criteria</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
<i>(1) Overall protection of human health and the environment</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(2) Compliance with ARARs</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(3) Long term effectiveness and permanence</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(4) Reduction of toxicity, mobility or volume through treatment</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(5) Short term effectiveness</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(6) Implementability</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>(7a) Capital Cost</i>	---	\$18,800	\$142,500
<i>(7b) Net Present Value</i>	---	\$203,000	\$356,000
<i>(8) Community acceptance</i>	<i>Community acceptance of the preferred alternatives will be evaluated after the public comment period.</i>		
<input checked="" type="checkbox"/> <i>Fully meets criteria</i> <input checked="" type="checkbox"/> <i>Partially meets criteria</i> <input type="checkbox"/> <i>Does not meet criteria</i>			

9.0 OHIO EPA’S PREFERRED ALTERNATIVE

The preferred remedial alternative is a combination of three of the 11 alternatives detailed in Section 7.0 (and in the CMS report), each alternative provides corrective measures to address the different impacted environmental media at the site; soil, sediment and ground water. The elements of the preferred remedial alternatives are as follows: *Soil Alternative #3* Removal of Soil from Uncovered Areas; *Sediment Alternative #3* Sediment Removal of Five Target Reaches; and *Ground Water Alternative #2* Monitored Natural Attenuation with Institutional Controls. Ohio EPA believes that the combination of the three selected preferred remedial alternatives will be protective of human health and the environment, be relatively easy to implement, and provide cost effective remediation. The total net present value for the preferred remedial alternatives is estimated at \$1,313,000 (based on the cost estimates in the CMS). Note, that the number of ground water monitoring events increased from eight in the CMS to ten in the Preferred Plan, which would slightly increase O&M costs. When implemented, the selected combination of preferred remedial activities will reduce or

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eliminate the potential for exposure to the metals, SVOCs and VOCs found at, and emanating from, the site's drum reconditioning operations.

Based on information currently available, Ohio EPA believes the preferred remedial alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to balancing and modifying criteria. The Ohio EPA expects the preferred alternative to satisfy the following requirements: 1) overall protection of human health and the environment; 2) compliance with ARARs; 3) long-term effectiveness and permanence; 4) reduction of toxicity, mobility or volume through treatment; and 5) cost effectiveness. The selected preferred alternative can change in response to Ohio EPA's consideration of public comments or new information.

The combined elements of Ohio EPA's selected preferred alternative are as follows:

9.1 Soil Excavation - Soil Alternative #3 Removal of Soil from Uncovered Areas

The recommended alternative for COC-impacted soil is the removal of soil from the 22 uncovered (no concrete) areas where COC concentrations exceeding the RAOs listed in **Table 1** Soil – Human Receptors (H1) have been identified (see **Figure 2**). Under Soil Alternative #3, currently concrete covered areas would not be disturbed but would be maintained intact as an engineering control to prevent contact with COC-impacted soil that may exist under them. An average of 2 feet of soil would be excavated from 21 areas and transported for off-site disposal at a permitted Subtitle D landfill, and one area (S107-SB12) would have soil removed to a depth of 7–8 feet. Where removal is conducted in contiguous concrete covered areas (five total), the concrete would be replaced as needed. Excavated areas would be backfilled with compacted clean fill material to match the surrounding grade.

This alternative also includes the development of an O&M plan detailing the annual inspection and maintenance of existing five concrete covered areas of COC-impacted soil where the concentrations exceed the RAOs; and an institutional control to restrict the future use of the site to industrial/commercial.

Performance Standards: Ohio EPA will consider the contaminated soil removal operation successful when the following items are completed.

- A) COC-impacted soils have been removed, transported and disposed off-site at a permitted, Subtitle D landfill facility.
- B) Analysis of confirmation samples collected from the excavation areas show that the remaining soils meet the RAOs listed in H1 of **Table 1**.
- C) Excavated areas are backfilled as needed with compacted clean fill materials to match the surrounding area's grade.

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- D) A long-term O&M plan is developed by Franklin Steel that includes the annual inspection and maintenance of the existing concrete covered areas in COC-impacted soil areas, and the plan is approved by Ohio EPA.
- E) The institutional controls to restrict the future land use to industrial/commercial purposes are established by an environmental covenant both approved and signed by Ohio EPA, and recorded in the same manner as the deed by the property owner with the Franklin County Recorder's Office in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to § 5301.92.
- F) Ohio EPA is notified that the environmental covenant has been recorded on the property in accordance with ORC § 5301.80 to § 5301.92.

This remedial alternative fulfills the two threshold criteria: protecting human health and the environment by preventing direct contact and/or ingestion of soil; and complying with all applicable federal and state regulations by disposing of soil that meets landfill acceptance criteria in a permitted, Subtitle D landfill and establishing an institutional control in accordance with the requirements specified in the ORC.

9.2 Sediment Excavation – Sediment Alternative #3 Sediment Removal of Five Target Reaches

The recommended alternative for ecoCOC-impacted sediment is the removal of the sediment in the five target reaches where concentrations exceeding the RAOs listed in **Table 1** Sediments – Ecological Receptors (E1) have been identified in Unzinger Ditch as shown in **Figure 5**. Under Sediment Alternative #3, an average of 12 inches of sediment would be excavated from the five target reaches in the stream that are located below the storm water holding ponds 15-inch storm water outfall line in Unzinger Ditch down to its confluence at Blacklick Creek.

The sediment removal operation involves clearing vegetation; excavating sediment and dewatering as necessary; transporting sediment for disposal at an approved landfill; and stream restoration (vegetation and landscaping) to minimize erosion. Excavated areas may need to be backfilled with compacted fill materials, such as clay, gravel and top soil to match the surrounding grade. The extent of the stream's sediment removal would be based on the following stream characteristics: confirmation sampling, visual observation, and/or the absence of appreciable sediment in the stream's channel. Franklin Steel would be required to obtain permit from both the U.S. Army Corps of Engineers and the Ohio EPA DSW before performing the sediment removal activities in Unzinger Ditch.

One of the goals in removing the contaminated sediments is to return the lower section of Unzinger Ditch to full attainment of Ohio EPA's chemical-specific and biological criteria. In addition, compliance by the operating facility with their existing NPDES permit and improvements to the management and treatment of storm water required under the 2005 consent order with Container Recyclers, Inc. d.b.a. Columbus Steel

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Drum would further improve water quality in Unzinger Ditch. Completion of the storm water management and treatment improvements prior to the sediment removal would be preferred (although not absolutely necessary).

Performance Standards: Ohio EPA will consider the contaminated sediment removal operation successful when the following items are completed.

- A) Excavated ecoCOC-impacted sediments are dewatered, transported and disposed off-site at a permitted, Subtitle D landfill facility.
- B) Analysis of confirmation samples collected from the excavation areas demonstrate that the remaining sediments meet the RAOs listed in E1 of **Table 1**.
- C) The excavated areas are backfilled as needed with compacted clean fill materials to match the surrounding area's existing grade.
- D) Restoration activities (vegetating and landscaping), which are to begin immediately after the completion of the sediment backfilling to minimize stream erosion, are completed.

This remedial alternative fulfills the two threshold criteria: protecting human health and the environment by preventing direct contact and/or ingestion of sediment by wildlife and trespassers; and complying with all applicable federal and state regulations by disposing of sediment that meets landfill acceptance criteria in a permitted, Subtitle D landfill and restoring the stream under the terms/requirements of the permits from the U.S. Army Corps of Engineers and the Ohio EPA DSW.

9.3 Monitored Natural Attenuation - Ground Water Alternative #2 Monitored Natural Attenuation with Institutional Controls

The recommended alternative for COC-impacted ground water is monitored natural attenuation with institutional controls. This alternative consists of a minimum two-year compliance monitoring program of the upper ground water zone followed by a three year-detection monitoring program; an institutional control prohibiting the installation of potable water wells; and a contingent remedy that would be implemented if the natural attenuation process is determined to be ineffective by a trend analysis of the compliance monitoring period's ground water sampling results.

As part of the O&M plan for the site, an enhanced ground water monitoring plan would be developed that consists of a two year period of compliance monitoring followed by a three year period of detection monitoring that would begin after the completion of the COC-impacted soil removal activities in the active operations area.

In the two year compliance monitoring period, ground water samples would be collected semiannually from six monitoring wells (see **Figure 3**), and analyzed for VOCs, SVOCs, and natural attenuation indication parameters. The compliance monitoring sampling

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data would be evaluated by a statistical trend analysis of the sample results to verify the effectiveness of natural attenuation process in achieving the RAOs in the upper ground water zone as listed in **Table 1** Upper Ground Water Zone – Human Receptors (H2). Ground water flow and contaminant fate and transport modeling would also be performed to evaluate the rate and extent of migration of the COCs from the site.

If RAOs are met for all COCs at the end of the two-year compliance period, then three years of detection monitoring would be conducted to verify that natural attenuation is occurring and RAOs continue to be met. Statistical trend analysis of the sampling data results would be conducted to verify that COC concentrations are decreasing over time. For the detection monitoring period, ground water samples would be collected semiannually from the same six monitoring wells used for the compliance monitoring period. The detection monitoring samples would be analyzed for VOCs and all the appropriate natural attenuation indicator parameters.

If RAOs are not met for all COCs at the end of the two-year compliance period, but the COC levels are stable or decreasing as shown by the statistical trend analysis, then the compliance monitoring period would continue until the RAOs are met in the upper ground water zone followed by the detection monitoring period. However, if the COC levels are increasing as shown by the statistical trend analysis, then a contingent remedy would be selected and developed. The contingent remedy would require the evaluation and selection of an active remediation system to reduce the levels of COCs. The active remediation option employed could be the extraction of COC-impacted groundwater followed by *ex situ* treatment and discharge of the treated water as outlined in Ground Water Alternative #3, or equivalent system to address the specific COCs.

A ground water monitoring program would be developed including, but not limited to, the activities performed for compliance and detection monitoring as described above.

An institutional control would prohibit the use of ground water for potable water purposes by the establishment of an environmental covenant on the property.

Performance Standard: Ohio EPA will consider the monitored natural attenuation successful when the following items are completed.

- A) Demonstrate via periodic ground water monitoring that the natural attenuation process in the ground water is decreasing the levels of COCs, and that the RAOs listed in H2 of **Table 1** will be achieved by the end of the 5-year monitoring period.
- B) The institutional controls to prohibit the use of the area's ground water for potable water purposes are established by an environmental covenant both approved and signed by Ohio EPA, and recorded in the same manner as the deed by the

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property owner with the Franklin County Recorder's Office in accordance with the Ohio Uniform Environmental Covenants Act, ORC § 5301.80 to § 5301.92.

- C) Ohio EPA is notified that the environmental covenant has been recorded on the property in accordance with ORC § 5301.80 to § 5301.92.

This remedial alternative fulfills the two threshold criteria: protecting human health and the environment by preventing direct contact and/or ingestion of ground water; and complying with all applicable federal and state regulations by establishing that the ground water meets the drinking water MCLs.

10.0 GLOSSARY

Aquifer -	An underground geological formation capable of holding and yielding water.
ARARs -	Applicable or relevant and appropriate requirements. Those rules which strictly apply to remedial activities at the site, or those rules whose requirements would help achieve the remedial goals for the site.
Baseline Risk Assessment -	An evaluation of the risks to humans and the environment posed by a site.
Carcinogen -	A chemical that causes cancer.
CERCLA -	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq. A federal law that regulates cleanup of hazardous substances sites under the U.S. EPA Superfund Program.
Contaminants of Concern (COCs) -	Chemicals identified at the site which are present in concentrations that may be harmful to human health or the environment.
Contaminants of Potential Concern (COPCs) -	Chemicals potentially at the site present in concentrations that may be harmful to human health or the environment.
Corrective Measures Study (CMS) -	A study conducted to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected for the site.
Decision Document -	A statement issued by the Ohio EPA giving the Director's selected remedy for a site and the reasons for its selection.
Ecological Receptor -	Animals or plant life exposed or potentially exposed to chemicals released from a site.

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Ecological Risk Assessment (ERA) -	Animals or plant life exposed or potentially exposed to chemicals released from a site.
Environmental Covenant -	A servitude arising under an environmental response project that imposes property activity and use limitations and that meets the requirements established in Section 5301.80 through 5301.92 of the Ohio Revised Code.
Exposure Pathway -	Route by which a chemical is transported from the site to a human or ecological receptor
Final Cleanup Levels -	Final cleanup levels are identified in the Decision Document along with the RAOs and performance standards.
Hazardous Substance -	A chemical that may cause harm to humans or the environment.
Hazardous Waste -	A waste product, listed or defined by the RCRA, which may cause harm to humans or the environment.
Human Receptor -	A person or population exposed to chemicals released from a site.
Human Health Risk Assessment (HHRA) -	Animals or plant life exposed or potentially exposed to chemicals released from a site.
Maximum Contaminant Level (MCL) -	The highest level of a contaminant that is allowed in a public drinking water supply. The level is established by U.S. EPA and incorporated into OAC 3745-81-11 and 3745-81-12.
NCP -	National Oil and Hazardous Substances Pollution Contingency Plan, codified at 40 C.F.R. Part 300 (1990), as amended. A framework for remediation of hazardous substance sites specified in CERCLA.
O&M -	Operation and Maintenance. Long-term measures taken at a site, after the initial remedial actions, to assure that a remedy remains protective of human health and the environment.

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- PAHs - Polycyclic aromatic hydrocarbons. Class of semi-volatile chemicals including multiple six-carbon rings. Often found as residue from incomplete combustion processes.
- PCBs - Polychlorinated biphenyls. An oily chemical typically used in electrical equipment.
- PCE - Tetracholoethene or Perchloroethylene. A common industrial solvent and cleaner, often used for dry cleaning.
- Performance Standard - Measures by which Ohio EPA can determine if RAOs have been met.
- Preferred Plan - The plan that evaluates the preferred remedial alternative chosen by Ohio EPA to remediate the site in a manner that best satisfies the eight evaluation criteria.
- Preliminary Remediation Goal (PRG) - Initial clean-up goals that (1) are protective of human health and the environment and (2) comply with ARARs. They are developed early in the process (scoping) based on readily available information and are modified to reflect the results of the baseline risk assessment (termed site-specific PRGs at this point in time).
- RCRA - Resource Conservation and Recovery Act of 1976 codified at 42 C.F.R. Part 6901 et seq. (1988), as amended. A federal law that regulates the handling and disposal of hazardous waste materials.
- Remedial Action Objectives (RAOs) - Specific goals of the preferred remedy for reducing the exposure risks posed by the site.
- RCRA Facility Investigation (RFI) - A study conducted to collect information necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives.
- Responsiveness Summary - A summary of all public comments received concerning the Preferred Plan and Ohio EPA's response to all issues raised in those comments.

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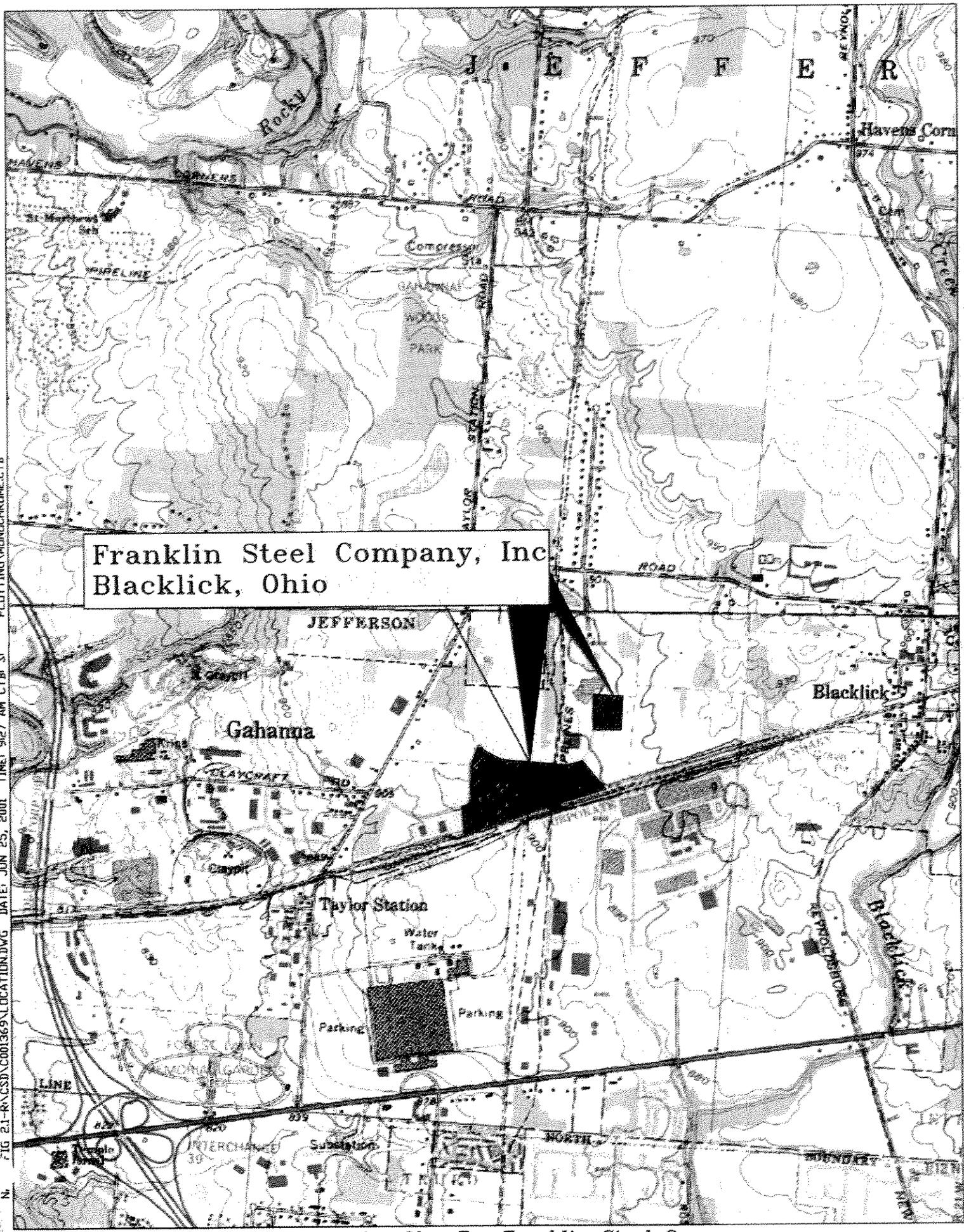
- SVOCs - Semi-volatile organic compounds; includes the PAHs group.
- TAL - Target Analyte List for laboratory analysis of metals.
- TCA - 1,1,1-Trichloroethane. A common industrial solvent and cleaner.
- TCE - Trichloroethene. A common industrial solvent and cleaner.
- TCL - Target Compound List for laboratory analysis of SVOCs and VOCs.
- Vinyl Chloride - A common industrial solvent and cleaner.
- VOCs - Volatile organic compounds; such as TCE.
- Water Quality Criteria - Chemical, physical and biological state standards that define whether a body of surface water is unacceptably contaminated. These standards are intended to ensure that a body of water is safe for fishing, swimming and as a drinking water source. These standards can be found in Chapter 3745-1 of the Ohio Administrative Code.

FIGURE 1

Site Location (United States Geological Survey)

(from RMT's June 2009 Corrective Measures Study)

FIG 21-RACSDA0001369\LOCATION.DWG DATE: JUN 25, 2001 TIME: 9:27 AM CTB: S1 PLOTTING MONOCHROME.CTB



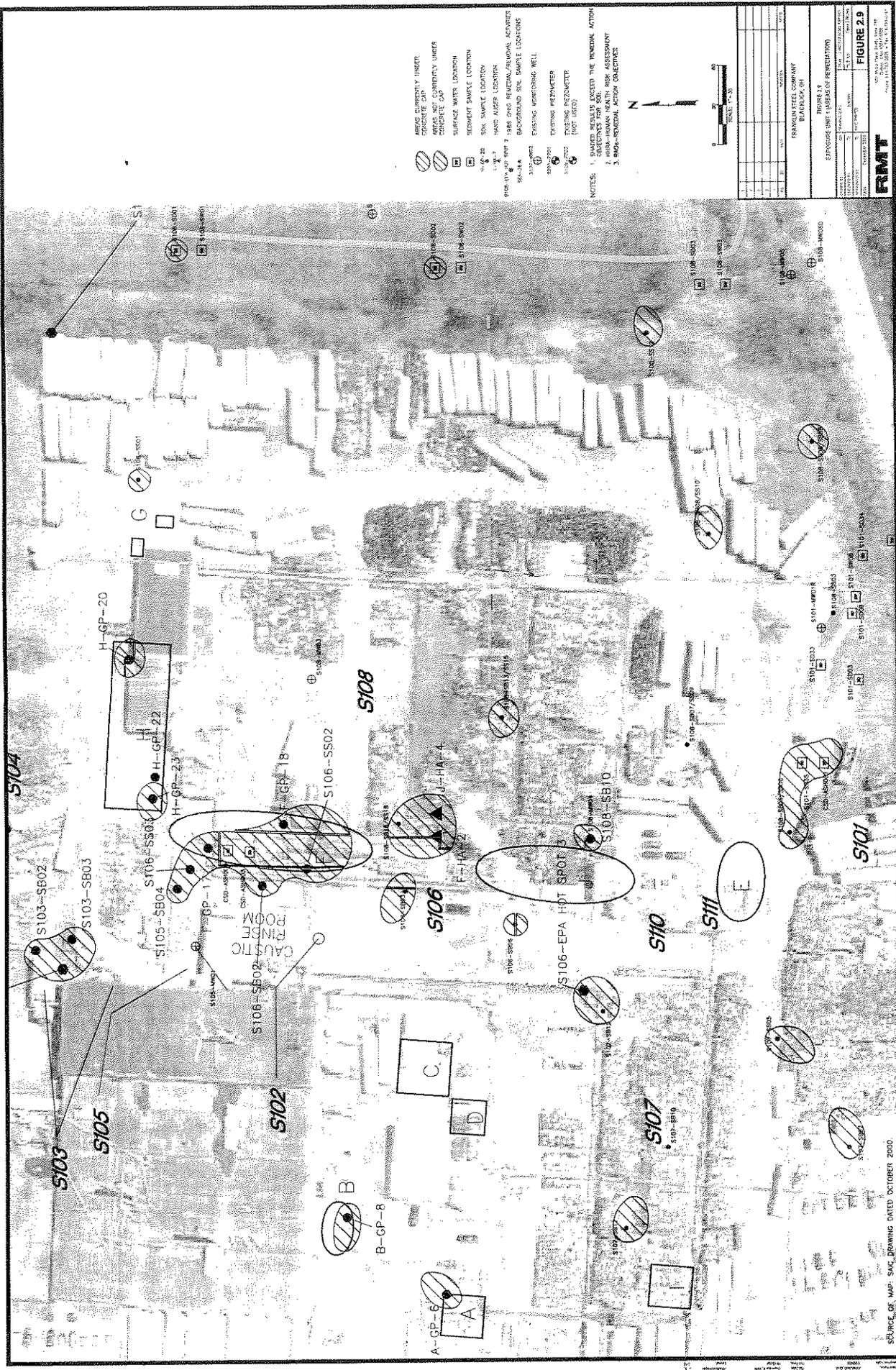
Franklin Steel Company, Inc
Blacklick, Ohio

Figure 1.1 Location Map For Franklin Steel Company

FIGURE 2

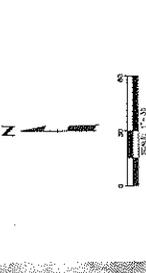
Solid Waste Management Units and Identified Areas of Concern

(from RMT's June 2009 Corrective Measures Study)



- MONITORING POINT UNDER PROTECTIVE CAP
- AREAS NOT CONTIGUOUS UNDER CONCRETE CAP
- SURFACE WATER LOCATION
- SEDIMENT SAMPLE LOCATION
- SOIL SAMPLE LOCATION
- WATER METER LOCATION
- WATER METER # 1989 (P&ID REFERENCE/REVISION NUMBER)
- BACKGROUND SOIL SAMPLE LOCATIONS (R-104)
- EXISTING MONITORING WELL
- EXISTING MONITORING POINT
- EXISTING MONITORING POINT (NOT USED)

NOTES:
 1. SHADER RESULTS EXCEED THE REMEDIATION ACTION LEVELS.
 2. HIGHLIGHTED AREAS REQUIRING RISK ASSESSMENT.
 3. RMO-REMEDIATION ACTION OBJECTIVES.



FRM T	
DATE	10/01/2000
PROJECT	FRANKLIN COUNTY BLADUEN, OH
FIGURE	FIGURE 2.9
SCALE	AS SHOWN
DATE	10/01/2000
PROJECT	FRANKLIN COUNTY BLADUEN, OH
FIGURE	FIGURE 2.9
SCALE	AS SHOWN

SOURCE OF MAP: SAC DRAWING DATED OCTOBER 2000.

FIGURE 3

Location of Ground Water Monitoring Wells and Piezometers

(from RMT's August 2009 Ground Water Summary Report)

FIGURE 4

Conceptual Site Model

(from RMT's June 2008 RCRA Facility Investigation Report)

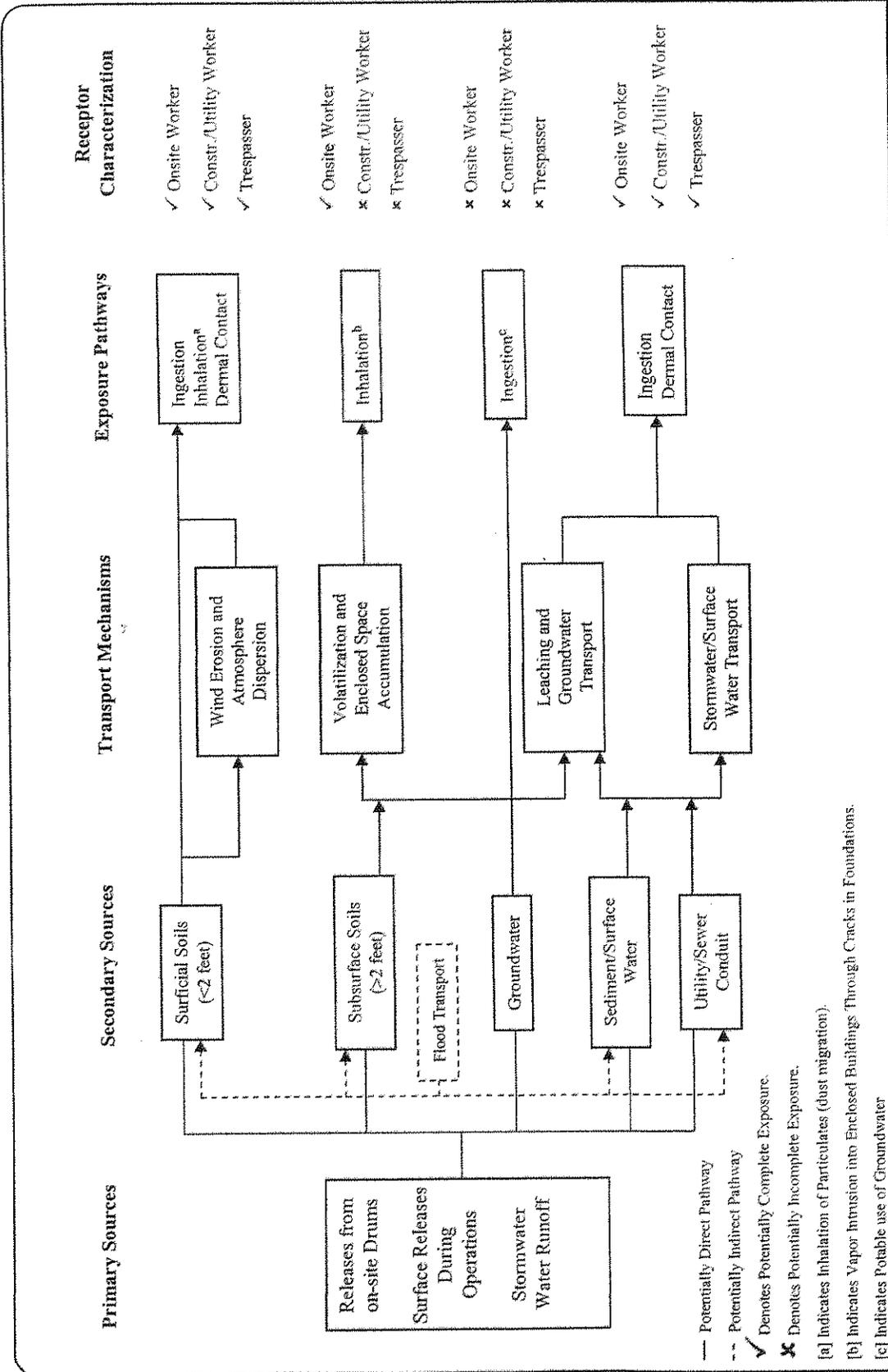


Figure 1 Conceptual Site Model For Franklin Steel Exposures



FIGURE 5

Unzinger Ditch Sediments with Elevated Concentrations

(from RMT's June 2009 Corrective Measures Study)

