PREFERRED PLAN

FOR THE REMEDIATION OF THE
RCA/THOMSON CONSUMER ELECTRONICS SITE
CIRCLEVILLE, PICKAWAY COUNTY, OHIO

Ohio Environmental Protection Agency
Division of Environmental Response and Revitalization
Central District Office
February 25, 2014

Ohio EPA's Division of Environmental Response and Revitalization (DERR) - Assessment, Cleanup & Reuse Section Remedial Response Program			Preferred Plan For Remediation of the RCA/Thomson Site Circleville, Pickaway County, Ohio		
THE REMEDIAL RESPONSE PROCESS					
(1) Preliminary Assessment & Site Inspection **[Completed]**	**(2)** Remedial Investigation & Feasibility Study **[Completed]**	**(3)** Remedy Selection (Preferred Plan & Decision Document)	**(4)** Remedial Design	**(5)** Remedial Action	**(6)** Remedy Operation, Maintenance & Monitoring

Ohio EPA Announces Preferred Plan

This Preferred Plan identifies the preferred remedial alternative for the cleanup of the contaminated soils/sediments at the former RCA/Thomson Consumer Electronics site and provides the rationale for this preference. The Preferred Plan also includes summaries of other remedial alternatives evaluated for use at this site. The primary goal is to inform the public about the background and problems posed by the site, and what the Agency proposes to do to clean up the site.

Ohio EPA will select a final remedy for the site after reviewing and considering all information submitted during the public comment period for this Preferred Plan. Ohio EPA may modify the preferred remedial alternative or select another alternative presented in this Preferred Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the remedial alternatives presented in this Preferred Plan. Once the final remedial alternative is selected, it will be presented in a Decision Document for the project, which will be available in the locations noted below.

Ohio EPA is issuing this Preferred Plan in a manner consistent with 40 CFR Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It summarizes information found in detail in the remedial investigation and feasibility study reports and other documents contained in the administrative record file for this site. Ohio EPA encourages the public to review these documents to gain a better understanding of the site and the activities that have been conducted at the site.

Public Comment Period: March 4, 2014 – April 18, 2014. Ohio EPA will accept written comments on the Preferred Plan during the public comment period. Comments may be sent to the address shown below.

Public Meeting: Ohio EPA will hold a public meeting to explain the Preferred Plan. Oral and written comments will be accepted at this meeting, which will be held on April 9, 2014 at 7:00 p.m. at the 586 North Court Street in the Circleville, Ohio Fire Department Meeting Room.

Additional Information: Available from Ohio EPA's Central District Office, located at 50 West Town Street, Suite 700, Columbus, OH, 43215, Attn: David O'Toole, Site Coordinator; at (614) 728-5040 and David.O'Toole@epa.ohio.gov; and on the Ohio EPA DERR CDO webpage at http://www.epa.ohio.gov/cdo/rca.aspx.

TABLE OF CONTENTS

	Page Number
i. TABLE OF ACRONYMS	3
1.0 EXECUTIVE SUMMARY	4
2.0 SUMMARY OF SITE CONDITIONS	6
2.1 Site History	6
2.2 Site Characteristics and Investigation	7
2.3 Interim or Removal Actions Taken to Date	11
2.4 Summary of Site Risks	14
2.4.1 Risks to Human Health	14
2.4.2 Risks to Ecological Receptors	16
3.0 REMEDIAL ACTION OBJECTIVES	16
4.0 SUMMARY OF REMEDIAL ALTERNATIVES	19
4.1 No Action Alternative	20
4.2 Soil/Sediment Alternatives	20
5.0 COMPARISON AND EVALUATION OF REMEDIAL ALTERNATIVES	23
5.1 Evaluation Criteria	23
5.2 Analysis of Evaluation Criteria	24
5.3 Summary of Evaluation Criteria	29
6.0 OHIO EPA'S PREFERRED REMEDIAL ALTERNATIVE	29
6.1 Preferred Remedial Alternative Components and Performance Standards	30
6.1.1 Soil and Sediment Removal	30
6.1.2 Rehabilitation and Maintenance of EFA	31
6.1.3 Institutional Controls	32

APPENDICES

Appendix A Glossary of Terms
Appendix B Primary Contaminants of Concern
Appendix C ARARs Table
Appendix D Environmental Covenants

TABLES

Table 1 Owners, Operators and Disposers
Table 2 Maximum COC Concentrations in Each Area of Concern
Table 3 Remedial Action Objectives
Table 4 Contaminants of Concern / Remediation Levels in Soil and Sediment
Table 5 Areas of Concern and Selected Exposure Scenarios
Table 6 Summary of Site Remedial Alternatives
Table 7 Remedial Alternative Evaluation Criteria
Table 8 Evaluation of Site Remedial Alternatives

FIGURES

Figure 1 Site Location Map
Figure 2 Site Areas of Concern Map
Figure 3 Former Facility Plan
Figure 4 Off-Site Creek Area Plan

TABLE OF ACRONYMS

AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
COC	Contaminant of Concern
DERR	Division of Environmental Response and Revitalization
ERA	Ecological Risk Assessment
FS	Feasibility Study
HASP	Health and Safety Plan
HI	Hazard Index
HQ	Hazard Quotient
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OAC	Ohio Administrative Code
ORC	Ohio Revised Code
O&M	Operation and Maintenance
PAHs	Polycyclic Aromatic Hydrocarbons; class of semi-volatile organic chemicals
PPM	Parts Per Million
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act of 1976
RD	Remedial Design
RFI	RCRA Facility Investigation
RG	Remediation Goal
RI	Remedial Investigation
RLs	Remediation Levels
SVOCs	Semi-Volatile Organic Compounds
TDC	Technical Decision Compendium
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
U.S. EPA	United States Environmental Protection Agency
VAP	Voluntary Action Program
VOCs	Volatile Organic Compounds

1.0 EXECUTIVE SUMMARY

On February 14, 1994, Thomson Consumer Electronics (now known as Technicolor) and General Electronic Company (GE) signed Director's Final Findings and Orders (1994 Orders) with the Ohio Environmental Protection Agency (EPA). The 1994 Orders included remedial investigation and feasibility study (RI/FS) activities to determine the nature and extent of contamination, and to develop and evaluate remedial alternatives for the RCA/Thomson Consumer Electronics facility located at 24200 U.S. Route 23 South, Circleville, Pickaway County, and anywhere contamination may have migrated from the facility (site) (see **Figure 1 Site Location Map**, **Figure 2 Site Areas of Concern Map,** and **Figure 3 Former Facility Plan**). As agreed to by the parties, the work performed under the 1994 Orders was intended to be equivalent to and fulfill the purposes of a Resource Conservation and Recovery Act (RCRA) facility investigation and a corrective measures study.

GE developed the RI/FS work plan to determine where contamination exists at the site and at what concentrations. Ohio EPA approved the RI/FS work plan on August 23, 1995 to investigate the nature and extent of target chemicals at the site, to assess the potential risks to human health and the environment, and to develop and evaluate cost-effective remedial alternatives to minimize or eliminate those risks.

Ohio EPA approved the final RI report on March 23, 2010. The RI report documented contamination at the East Fenced Area (EFA), the East Swale, the former Raw Materials Handling Area (RMHA), the South Ditch, and the Off-site Creek Area (OCA) which consists of the Upper Creek, Deltaic and Non-Deltaic Areas. Each of these areas requires remediation (see **Figure 2 Site Areas of Concern Map, Figure 3 Former Facility Plan**, and **Figure 4 Off-Site Creek Area Plan**). The primary contaminants of concern (COCs) at the site are listed in **Table 4 Contaminants of Concern / Remediation Levels in Soil and Sediment** of this Preferred Plan, and include antimony, arsenic and lead. Additional details concerning the health risks associated with each primary COC are located in **Appendix B Primary Contaminants of Concern**.

A human health risk assessment, approved on March 23, 2010, defined the contaminant concentrations at the site that could adversely affect human health. An ecological risk assessment evaluating potential harm to the environment was also approved on March 23, 2010. The current and future risks of this site result from direct contact with contaminated soil, sediment and sludge.

Based on an evaluation of historic usage and the results of previous investigations indicating that contamination was not present above unrestricted use levels, Ohio EPA issued Director's Final Findings and Orders on January 24, 2012 (2012 Orders) that amended the definition of "Site" in the 1994 Orders to exclude two tracts (totaling approximately 45 acres) of the former facility property.

The RI report indicated that remedial alternatives needed to be developed to address human health risks posed by the site. Ohio EPA approved the FS report, which identified potential remedial alternatives, on August 21, 2013. As part of the FS, remedial action objectives (RAOs) were developed to ensure protectiveness of human health and the environment.

Additional information is available in the RI and FS reports and other site-related materials, located at the Ohio EPA Central District Office (Division of Environmental Response and Revitalization) and online at http://www.epa.ohio.gov/cdo/rca.aspx.

Prior to completion of the FS and preparation of the Preferred Plan, a number of activity and use limitations were established on the former facility manufacturing areas through an environmental covenant, recorded on December 28, 2011 at the Pickaway County Recorder's Office. Another environmental covenant was recorded on August 22, 2012, placing activity and use limitations on the Deltaic and Non-Deltaic Areas of the OCA.

This Preferred Plan summarizes information on the range of remedial alternatives evaluated, identifies Ohio EPA's preferred remedial alternative, and explains the reasons for selecting the preferred remedial alternative. The Preferred Plan, which forms the basis for the Decision Document (*i.e.,* the final remedy decision), is based on the Ohio EPA-approved RI and FS reports completed by GE and Technicolor.

Ohio EPA's preferred remedial alternative should 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 protection of human health and the environment from exposure to contaminants of concern that are above acceptable concentrations in soil and sediment (see **Table 4 Contaminants of Concern / Remediation Levels in Soil**).

- Short-term and long-term protection of public health and the environment.

- Compliance with applicable or relevant and appropriate requirements (ARARs).

- Cost-effectiveness and limitation of expenses to what is necessary to achieve the expectations stated above.

- Ongoing operation and maintenance (O&M) and monitoring of the completed remedial action and established institutional controls.

The major components of the preferred remedial alternative include:

- Removal of contaminated soil and sediment from the East Swale, South Ditch, RMHA, and OCA to acceptable concentrations. Transporting excavated material to off-site disposal facilities, restoring removal areas to pre-construction grades, and vegetating disturbed areas as necessary.

- Rehabilitation of the EFA, including clearing/grubbing of existing vegetation, placement of a one-foot thick soil cover, repair/replacement/expansion of the existing security fencing, and ongoing maintenance of the EFA soil cover and vegetation and fence.

- Adherence to institutional controls (*i.e.,* activity and use limitations) included in Environmental Covenants established for the former facility and OCA property (parcels).

Ohio EPA finds these measures will protect public health and the environment by reducing risk to acceptable levels after the RAOs have been achieved.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site History

The former RCA/Thomson manufacturing facility is located on approximately 227 acres at 24200 U.S. Route 23 South, Circleville, Pickaway County, Ohio adjacent to residential, commercial and agricultural areas as shown on **Figure 1 Site Location Map**. The RCA/Thomson facility (see **Figure 3 Former Facility Plan**) contains the EFA, East Swale, South Ditch and RMHA that were part of the site under the 1994 Orders. To facilitate remedial decision-making for areas potentially affected by off-site transport of lead-bearing particulates from the South Ditch, an additional area of concern, the OCA, was included in the evaluation. The OCA was evaluated in three sub-sections; the Upper Creek Area, the Deltaic Area and the Non-Deltaic Area.

A list of owners, operators and/or disposers that may have contributed to the contamination at the site property is shown in **Table 1 Owners, Operators and/or Disposers**.

TABLE 1 – OWNERS, OPERATORS AND/OR DISPOSERS		
Owners, Operators and/or Disposers	**Property Usage**	**Period**
Radio Corporation of America (RCA)	Glass TV Picture Tubes	1970 – 1986
General Electric Company (GE)	Glass TV Picture Tubes	1986 – 1987
Thomson Consumer Electronics (now known as Technicolor)	Glass TV Picture Tubes	1987 – 2008
IRG Circleville, LLC and Circleville Pickaway, LLC	Commercial operation and future development	2008 – Present

The former facility was built in 1969 and operated from 1970 to 2004. The facility manufactured the face plate or panel (3% lead) and funnel (24% lead) components of television picture tubes from 1970 until 2004. During this time, the facility consisted primarily of interconnected administration, production, laboratory, batch house, and warehouse buildings. Batch house silos were used to contain raw and intermediate materials such as sand, litharge (lead oxide), and cullet (recycled glass). Excess cullet was also stored on covered and uncovered concrete storage pads in the RMHA, which were adjacent to the East Swale.

Operations at the facility, related to the manufacturing of leaded glass components for television picture tubes, presumably resulted in the release of contaminants including glass polishing and grinding materials (fines) at the site. Prior to 1980, the fines were carried by

cold-end process rinse wastewaters for settling in Lagoons #1 and #2. The solids were pumped out of the lagoons about four times per year, to three sludge pits (the EFA). Sludge accumulated between 1980 and 1982 in Lagoons #1 and #2, and in Lagoons #3 and #4 (temporary impoundments used during the construction of the wastewater treatment plant (WWTP)), was disposed of in off-site landfills. After 1982, cold rinse wastewaters with the fines were routed through the WWTP, which discharged to the City of Circleville's publicly owned treatment works (POTW).

From 1970 to 1990, the hot-end process wastewaters were sent to the Oil Skimmer Pond, prior to discharge through the National Pollutant Discharge Elimination System (NPDES) permit regulated Outfall 001 into the South Ditch. After 1990, the hot process wastewaters were conveyed to the WWTP for further treatment before discharge to the sanitary sewer.

Prior to 1990, potentially contaminated storm water (from contact with various process materials – cullet, cold and hot process wastewaters and raw materials), entered the South Ditch through four outlets. These outlets were from the East Swale, Storm Sewer Outlet B, NPDES Outfall 001, and an unnamed storm sewer outlet.

After manufacturing operations ceased in March 2004, a large portion of the glass manufacturing equipment was sold and removed from the facility. Former manufacturing buildings and structures, specifically those located within the former glass melting and forming operation areas, were demolished between 2005 and 2006. Currently, only the warehouse, administrative offices, and associated paved parking areas remain at the former facility.

The former RCA facility property is currently owned by IRG Circleville, LLC and Circleville Pickaway, LLC. The property is used for small commercial and warehouse operations. A large portion is still under development for future commercial use.

2.2 Site Characteristics and Investigation

Pursuant to the 1994 Orders, RI and FS reports were submitted to and subsequently approved by Ohio EPA in March 2010 and August 2013, respectively. The RI/FS activities identified the nature and extent of contamination at the site and developed remedial alternatives to address the contamination. The areas investigated during the RI include the EFA (the former sludge pits), the adjacent fields, the on-site soils, the East Swale, the former Oil Skimmer Pond, the South Ditch, the OCA, and later the RMHA. The investigation provided a description of site geology, topography, hydrogeology and other characteristics. See **Figure 2 Site Areas of Concern Map** and **Figure 3 Former Facility Plan.**

The surface water drainage system of the former facility's manufacturing area consists of the East Swale and an unnamed spur ditch, which flow to the main drainage ditch (known as the South Ditch). The South Ditch flows from east to west on the south side of the former facility manufacturing area. The unnamed spur ditch entered the South Ditch near the former potable water treatment plant and carried primarily agricultural runoff from fields immediately to the south. The East Swale is normally dry, but it may have previously received runoff from the east end of the former manufacturing area and from the open fields to the east-northeast during significant precipitation events. To capture this intermittent and potentially

contaminated surface water, the East Swale was blocked in 1990. After that, surface water in the East Swale was collected and routed to the WWTP as part of the facility's surface water management program. The South Ditch flows from east to west along the southern portion of the former facility before entering the OCA, and eventually the Scioto River.

RI activities included sampling soil, sediment, sludge, ground water and surface water for laboratory analyses for the following potential COCs: antimony, arsenic, barium, chromium, fluoride, lead, nickel, polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). Agricultural fields are located immediately east and south of the site, and various commercial properties are west of the site adjacent to U.S. Route 23. A commercial property is located north of, and a residential area (Logan Elm Village) is located approximately 1,000 feet south of, the site. The Earnhart Hill Water District's Treatment Plant and water supply well field are located approximately 4,000 feet southwest of the site.

The final RI report, completed in March 2010 by Exponent on behalf of GE and Technicolor, provided the following information:

- The EFA is an approximately 5-acre area located east of the former facility manufacturing area (see **Figure 3 Former Facility Plan**), and is enclosed by security fencing. Glass polishing and grinding fines were pumped from former facility lagoons to three 8- to 10-foot deep "sludge pits" during facility operations in the 1970s. In October 1980, the three sludge pits were covered with approximately 2 feet of soil and enclosed by a security fence. However, based on test pit excavations, the limits of sludge deposits extend to the south and the east (but not to the South Ditch), slightly beyond the existing EFA fence. With the exception of lead and arsenic, metals were generally detected at concentrations consistent with regional background levels. A maximum arsenic concentration of 358 parts per million (ppm) and a lead concentration of 13,800 ppm were detected in EFA sludge samples.

  With regard to ground water, the August 1995 RI/FS Work Plan discussed the nine years of sampling data previously collected from 13 monitoring wells at the site. While the work plan indicated that ground water in the vicinity of the plant was not significantly impacted by contaminants, it also noted that further information was needed in and around the EFA. Ground water was repeatedly sampled at the EFA during the RI. Antimony was not detected during any of the monitoring events and lead and arsenic were only occasionally detected at low concentrations in total (*i.e*., not filtered) water samples. All reported concentrations of metals were below federal maximum contaminant levels (MCLs) at all wells during all sampling events. Based on these data and other factors (*e.g.,* the ground water beneath the EFA was the most likely to be contaminated by activities at the facility), ground water was not considered a medium that required further evaluation or remedial action. Specific information on ground water and sample results are provided in the RI report.

- The East Swale is a drainage ditch located east of the former facility manufacturing area (see **Figure 3 Former Facility Plan**) that was typically dry, but received some storm water runoff from fields northeast of the former manufacturing area and from the east end of the former manufacturing area where cullet was formerly stored, during significant rain events. During the 1970s, batch plant and furnace waste materials

were stored in piles on the east side of the former manufacturing area in the vicinity of the East Swale, prior to disposal. During heavy rain events, some portion of the runoff from the East Swale discharged to the South Ditch prior to 1990. From 1990 to 2006, water that drained to the East Swale was captured at the southern end of the ditch and was conveyed to the former onsite WWTP. However, most of the structures associated with the former facility, including the WWTP were dismantled or demolished in 2006.

Sampling conducted from 1988 to 1995 in the East Swale detected lead and arsenic at elevated concentrations in the surface soils and sediments. Analytical results for samples collected at the southern end of the East Swale from the 0- to 6 inch depth interval revealed the greatest concentrations of COCs. Surface sample analytical results detected maximum concentrations of lead at 23,500 ppm, arsenic at 530 ppm and antimony at 604 ppm. Refer to Appendix C and Figure C-15 in the FS report for the soil/sediment sampling locations and data summary.

- The South Ditch is the on-site portion of an unnamed tributary to the Scioto River (see **Figure 3 Former Facility Plan**). The South Ditch is located south of the former facility manufacturing area and is a perennial, grass-lined ditch, which is fed by a marsh located east of the site. Multiple current and historical outfalls are located within the South Ditch, including the East Swale (during heavy precipitation events) and the former Oil Skimmer Pond discharging to the South Ditch prior to 1990, at which point those flows were diverted to the former WWTP. From 1990 until 2006, the flow within the ditch was continuous as a result of the discharge from the former WWTP. Upon demolition of the former WWTP in 2006, the flow within the South Ditch was greatly reduced.

  Soil/sediment samples collected from the South Ditch contained elevated concentrations of lead and other inorganics. The highest concentrations of lead were generally observed in samples collected from the top 12 inches of soil/sediment in the vicinity of current/former outfalls and samples collected from localized sediment accumulation areas downstream of the former outfall from the East Swale.

  Lead was detected in the South Ditch at the following levels and locations:

  - 8,770 ppm (0 to 2 inch interval) and at 12,100 ppm (6 to 12 inch interval) at Storm Sewer Outfall B, located approximately 470 feet downstream of the former East Swale Outfall.

  - 10,500 ppm (0 to 2 inch interval) at the bend in the South Ditch located approximately 830 feet downstream of the former East Swale Outfall.

  - 4,680 ppm (0 to 2 inch interval) at Outfall 001 (former Oil Skimmer Pond outfall) located approximately 1,170 feet downstream of the former East Swale Outfall.

  - 16,200 ppm (0 to 2 inch interval) and 4,350 ppm (6 to 12 inch interval) at the west end of the South Ditch.

The maximum arsenic concentration (239 ppm) was detected in a soil/sediment sample collected at Storm Sewer Outfall B. Elevated TPH concentrations (*i.e*., to 250,000 ppm) and PAHs were detected in soil/sediment samples. TPH concentrations observed during the supplemental sampling conducted in December 2005 ranged from non-detect to 250 ppm. PAHs were not detected in the oily material collected from the former Oil Skimmer Pond. Therefore, the RI report concluded that the TPH and PAH concentrations detected in the South Ditch were likely the result of the surface water discharge from Storm Sewer Outfall B. Refer to Appendix C and Figures C-12, C-13 and C-14 in the FS report for the sample locations and analytical results.

- The OCA is broken into three sub-sections: the Upper Creek Area, the Deltaic Area and the Non-Deltaic Area (see **Figure 4 Off-Site Creek Area Plan**). The OCA is approximately 12 acres and receives drainage from two main sources, the off-site creek (a continuation of the South Ditch) and the farm drainage ditch. The OCA also receives runoff from nearby residential/commercial areas, agricultural areas, and effluent from the Earnhart Hill Water District water treatment plant.

  The Upper Creek Area is the narrow riparian corridor between U.S. Route 23 and the CSX Transportation railroad tracks. This drains into a triangular-shaped depositional area called the Deltaic Area located between the railroad tracks and the farm drainage ditch. The Non-Deltaic Area consists of two portions, one small area located north of the Deltaic Area and a larger area located to the south of the Deltaic Area. The Non-Deltaic Area ends at the stream confluence to the Scioto River.

  In the Upper Creek Area, analyses of soil and sediment samples detected maximum concentrations of lead and arsenic at 7,820 ppm and 44 ppm, respectively. In the Deltaic Area, analyses of soil and sediment samples detected maximum concentrations of lead and arsenic at 15,800 ppm and 222 ppm, respectively. In the Non-Deltaic Area, analyses of soil and sediment samples detected maximum concentrations of lead and arsenic at 2,760 ppm and 195 ppm, respectively. Finally, soil/sediment samples collected west of the railroad tracks contained TPH ranging from 25 to 52 ppm. Refer to Appendix C and Figures C2 through C-15 in the FS report for the sample locations and analytical results.

- The RMHA is a portion of the former facility manufacturing area that is located immediately west of the East Swale. During facility operations, this area consisted of open and covered concrete pads and a batch house used for the storage and handling of raw materials and a building for the temporary accumulation/storage of hazardous waste prior to transportation to an off-site disposal facility (see **Figure 3 Former Facility Plan**). The hazardous waste storage building was clean closed under RCRA in 1985 and U.S. EPA approved clean closure of the building in June 1992. The structures present at the RMHA were subsequently removed as part of demolition activities in 2005 and 2006.

  Ohio EPA's October 17, 2011 letter noted that the June 1992 *Clean Closure Equivalency Demonstration Hazardous Waste Storage Building Unit* report by PTI Environmental Services and the August 2005 Limited *Phase II Environmental Site Assessment* by CTL Engineering reported elevated soil concentrations of lead and

arsenic in front of the former hazardous waste storage building. As a result, supplemental investigations of the RMHA were completed in March 2012, including 33 soil borings in the vicinity of the RMHA, and the analyses of 66 samples for arsenic and lead.

The May 2012 *Supplemental Site Investigation - Former RMHA Hazardous Waste Storage Building and Surrounding Area* report indicated that lead and arsenic were detected in soil samples at maximum concentrations of 180,000 ppm and 1,700 ppm, respectively. Refer to Appendix C and Figure C-16 in the FS report for soil sample locations and analytical results.

The reasonably anticipated future land use for the former facility property is commercial and industrial. The reasonably anticipated future land use for the OCA is expected to continue as primarily commercial (Upper Creek Area) and agricultural (Deltaic and Non-Deltaic Areas). **Figure 2 Site Areas of Concern Map** shows the various areas investigated during the RI to determine the extent and concentration of contamination at the site.

Prior to completion of the FS and preparation of the Preferred Plan, a number of activity and use limitations (*e.g.,* general prohibitions against residential or agricultural land use, ground water extraction and usage, and more specific restrictions for each of the areas of concern) were established on the former facility manufacturing areas through an environmental covenant, recorded on December 28, 2011 with the Pickaway County Recorder's Office. Another environmental covenant was recorded on August 16, 2012, placing activity and use limitations (*e.g.,* prohibitions against residential, commercial and industrial land use, and against ground water extraction and usage) on the Deltaic and Non-Deltaic Areas of the OCA. See **Appendix D** for copies of environmental covenants.

Ohio EPA issued Amended Director's Final Findings and Orders on January 24, 2012 (2012 Orders) that amended the definition of "Site" in the 1994 Orders to exclude two tracts (totaling approximately 45 acres) of the former facility property. This was based on an evaluation of historic uses and the results of previous investigation indicating that contamination was not present on the two tracts above unrestricted use levels.

2.3 Interim or Removal Actions Taken to Date

Prior interim remedial activities associated with the site include the clean closure of the former settling lagoons; clean closure of the former hazardous waste storage building; placement of soil cover and security fencing at the EFA; upgrade of the WWTP; upgrade of the storm water collection and treatment system; removal of the Oil Skimmer Pond; response to a diesel spill; and limited soil removal and storm water culvert installation at the OCA.

2.3.1 Clean Closure of Former Settling Lagoons

The glass polishing fines generated in the television picture tube manufacturing process were carried in rinse water to two unlined lagoons for settling. The water and particulates contained arsenic, chromium, fluoride and lead. The settled solids (sludge) were pumped out of the lagoons four times per year to three unlined earthen sludge pits, covering two acres east of the former facility manufacturing area.

Four former settling lagoons were clean-closed under RCRA Interim Status (40 Code of Federal Regulations (CFR) Part 265) in 1982 and 1984, respectively. Subsequent to an Ohio EPA site screening inspection, soils in the vicinity of the former settling lagoons were removed in 1988 and disposed of offsite at an approved disposal facility. These lagoons subsequently received clean-closure approval by U.S. EPA under the more stringent 40 CFR Part 264 requirements in July 1990.

Confirmation soil sampling demonstrated that remaining soil did not contain applicable Appendix VIII constituents at significant levels. The clean closure mitigated any potential release of potential COCs from the vicinity of the lagoons, and likely contributed to the decreasing trend in fluoride concentrations observed in shallow ground water at the site.

2.3.2 Clean Closure of Hazardous Waste Storage Building Unit

The former hazardous waste storage building was used as a 90-day accumulation area for hazardous wastes generated from the glass manufacturing operation. The unit was clean closed under RCRA Interim Status (40 CFR Part 265) in 1985. Subsequent to an Ohio EPA site screening inspection, soils in the vicinity of the hazardous waste storage building unit were removed in 1988 and disposed of offsite at an approved disposal facility. The unit subsequently received clean-closure approval by U.S. EPA under the more stringent 40 CFR Part 264 requirements in 1992. The building was routinely inspected and managed in accordance with applicable regulations for the accumulation of hazardous waste.

2.3.3 Soil Cover and Fencing at the EFA

Placement of glass polishing fines (sludge) at the EFA was discontinued in 1980. In 1980, the sludge was covered with approximately 2 feet of clean fill. The EFA was also enclosed with a perimeter security fence in 1989. These measures help control any access and possible exposure to the sludge deposits. The soil cover also provides protection from potential dispersal by wind action.

2.3.4 Upgrade of the Wastewater Treatment System

The capabilities for on-site wastewater treatment were expanded over the period of facility operation through multiple upgrades and modifications. Construction of the WWTP in 1982 eliminated discharge of the cold-end effluent to the unlined lagoons. Significant WWTP upgrades in 1990 allowed for on-site treatment of hot-end effluent generated at the facility and treatment of storm water from process areas of the plant. These efforts eliminated discharge of process water to the POTW, the need for the Oil Skimmer Pond, and the discharge of untreated storm water from the east end of the facility and the East Swale to the South Ditch.

2.3.5 Storm Water Collection and Treatment System

Prior to 1990, storm water collected through the facility storm sewers discharged into the South Ditch at three outfalls. These three outfalls and corresponding drainage areas were:

- The East Swale Outlet: agricultural and indeterminate surface areas to the east of the plant buildings.

- A storm drain outlet approximately 400 feet downstream of the East Swale (the 19+30 Outfall, Storm Sewer Outlet B): cullet storage, north-side employee parking lots, cafeteria and maintenance shop roofs, railroad spur loading/unloading areas, and a portion of "A/B" manufacturing roof.

- A former storm water drain outlet approximately 30 feet downstream of former NPDES Outfall 001 from the Oil Skimmer Pond: main office roof, warehouse roof, southwest employee and visitor parking lots, and the area around the WWTP.

From 1990 until 2006, storm water runoff that came into contact with process materials at the east end of the "A/B" manufacturing plant, the north side of the "A/B" maintenance shop, "C" batch house material handling area, and other runoff that collected in the East Swale was diverted into a "lift station" and pumped to a 200,000 gallon storm water collection tank. The storm water collection tank was tied into the WWTP (for treatment), prior to discharge through an NPDES-permitted outfall.

2.3.6 Removal of Oil Skimmer Pond

The Oil Skimmer Pond was removed from service in 1990. In 1992, soils and sludge were excavated from the bottom and sides of the pond to approximately 10 feet below ground surface and disposed of off-site. Excavation of the soil around the pond removed a potential source of contaminants to media in the immediate area.

2.3.7 Diesel Spill Response

Approximately 300 to 800 gallons of diesel fuel were spilled on the ground at the "C" manufacturing building on November 30, 1991. Corrective actions resulted in the recovery of approximately 70 gallons of fuel and 310 gallons of fuel/water mixture from shallow soil adjacent to the building. Phase I and II investigations were subsequently implemented and coordinated with Ohio EPA; four shallow groundwater wells were installed, and soil and groundwater samples were collected and analyzed for fuel constituents. Analytical results indicated negligible environmental impact. Ohio EPA required no further investigation or remediation.

2.3.8 Offsite Creek Area Interim Action

In September 2002, an interim action by the current off-site property owner, Richards Land Company (Richards), was implemented to remove lead-bearing soil/sediment at the OCA to accommodate construction of a local access roadway. Soil and sediment within the roadway footprint with lead concentrations exceeding 400 ppm were removed and disposed off-site in accordance with applicable regulations. The 400 ppm lead concentration value was specified in the Ohio EPA-approved *Interim Action Work Plan for Select Soil/Sediment Removal from the Offsite Creek Area*. The basis (in the work plan) for the value was the U.S. EPA Regional Screening Level – Residential Land Use Standard of 400 ppm. The interim action included construction of a culvert extension (approximately 75 feet in length), and removal of 1,559

tons (approximately 1,039 cubic yards) of soil/sediment immediately west of the railroad tracks. A work plan detailing the interim action approach was submitted to Ohio EPA on September 5, 2002, and revised on September 27, 2002, in response to Ohio EPA comments. The final work plan was approved by Ohio EPA in October 2002. A final report documenting the completion of the interim action was submitted to Ohio EPA on February 11, 2003.

2.4 Summary of Site Risks

As part of the RI/FS, a baseline risk assessment was conducted to evaluate current and potential future risks to human and ecological receptors as the result of exposure to site contaminants. The RI report was approved by Ohio EPA in March 2010, but additional RI work (at the RMHA) was required in October 2011. This work was completed and the RMHA was designated an area of concern (AOC) in August 2012. The FS was approved in August 2013. The results of the RI/FS demonstrated that the existing contaminants in environmental media pose or potentially pose unacceptable risks and/or hazards to human health sufficient to trigger the need for remedial actions. Additional primary COC information can be found in **Appendix B**.

2.4.1 Risks to Human Health

The risk assessment for human health is an estimate of the likelihood of potential health problems occurring if no remedial actions were taken at the site. To estimate baseline risk, a four-step process is undertaken.

Step 1. Data Collection and Evaluation of Contamination: The concentrations of contaminants at the site as well as scientific studies on the effects these contaminants have had on people are reviewed. Comparisons of site-specific concentrations of potential COCs and concentrations reported in past studies help determine which contaminants are most likely to pose the greatest threat to human health.

Step 2. Exposure Assessment: The different ways that people might be exposed to the potential COCs, the concentrations they might be exposed to, and the likely frequency and duration of exposure are evaluated as part of the exposure assessment. A reasonable maximum exposure scenario is calculated, which portrays the highest level of human exposure that could reasonably be expected to occur. Exposure scenarios that were evaluated include residential, commercial/industrial, construction workers and trespassers. In the FS, and in Tables 4 and 5 in this Preferred Plan, the selected exposure scenarios are labeled as follows: hypothetical residential land user, current/future recreational user, trespasser, future site worker, and future construction/excavation worker.

Step 3. Toxicity Assessment: The ability of the potential site COCs to cause adverse effects and the estimate of the relationship between the extent of exposure and the increased likelihood and/or severity of the adverse effects are evaluated. Two types of adverse effects are considered: cancer risk and non-cancer risk.

Step 4. Risk Characterization: A determination is made whether site risks are substantial enough to cause potential health problems for people at or near the site. The information from Steps 2 and 3 are combined for each COC to assess potential health risks. The likelihood of cancer resulting from exposure at a site is expressed as a probability of 1 in 100,000 or $1x10^{-5}$. In other words, for every 100,000 people that could be exposed, one extra case of cancer may occur as a result of exposure to site COCs. For non-cancer health effects, a hazard quotient (HQ) or hazard index (HI) is calculated (quotient refers to the effects of an individual COC, whereas index refers to the combined effects of COCs). The key concept is that a "threshold level" (measured as an HQ or HI of 1) exists below which non-cancer health effects are not expected to occur to exposed populations or individuals. The potential risks from the individual pathways (*e.g.,* inhalation, direct contact, ingestion) and individual chemicals, as appropriate, are added together to determine the total cumulative risk to human health.

The human health risk assessment evaluated potential adverse effects to human health posed by COCs in soil and sediment for the following exposure pathways: direct contact which includes ingestion, inhalation of particles and dermal absorption.

Soil and Sediment

Soil and sediment sampling data indicates that probable exposure concentrations (based upon a 95% upper confidence limit (UCL) of the mean average) of lead, arsenic and antimony in soil exceed the site-specific remediation goals and therefore pose an unacceptable risk/hazard to receptor populations. Maximum concentrations of lead, arsenic and antimony detected in each AOC are identified in **Table 2 Maximum COC Concentrations in each Area of Concern**.

TABLE 2 – MAXIMUM COC CONCENTRATIONS IN EACH AREA OF CONCERN			
Area of Concern	**Antimony (max. conc. in ppm)**	**Arsenic (max. conc. in ppm)**	**Lead (max. conc. in ppm)**
East Fenced Area	68	**358**	**13,800**
RMHA	Not Sampled	**1,700**	**180,000**
East Swale	**604**	**530**	**23,500**
South Ditch	52	**239**	**16,200**
Upper Creek Area	Not sampled	**43**	**7,820**
Deltaic Area	113	**222**	**15,800**
Non-Deltaic Area	19	**37**	**2,760**

The concentrations shown by the bold font are associated with likely adverse health effects and/or unacceptable excess lifetime cancer risk, which trigger the need for remedial actions.

2.4.2 Risks to Ecological Receptors

An ecological risk assessment (ERA) was conducted as part of the RI. The ERA was conducted to assess potential adverse effects of COCs on site ecological receptors. The aquatic environments including the unnamed tributary of the OCA and the Scioto River and terrestrial habitats associated with the OCA were evaluated in the ERA, which was completed pursuant to Ohio EPA and U.S. EPA guidance. A Level I scoping ERA determined that based on the history of activities and surrounding land use, the site has the potential to pose a risk to the environment. Therefore, a Level II screening ERA was conducted.

The Level II ERA included a comparison of site-specific data to screening benchmark values and the identification of relevant and complete exposure pathways between each source medium of concern and ecologically significant receptors for the potential ecological COCs. Evaluations of sediment, surface water and soil were included as part of the ecological assessment process. Lead was identified as the only potential COC.

A Level III baseline ERA was conducted following the Level II ERA as some areas exceeded screening levels for lead in soil and sediment. The Level III baseline ERA approach consisted of sediment bioassays and calculation of HQs using site-specific exposure factors, chemical-specific and species-specific toxicity values and representative endpoint species.

Upon completion of the baseline ERA, which included a weight of evidence evaluation of all ERA levels, it was determined that unacceptable risks to ecological receptors were unlikely. Therefore, site remediation goals were based only on potential human health concerns.

3.0 REMEDIAL ACTION OBJECTIVES

An FS, to define and analyze appropriate remedial alternatives, was completed with Ohio EPA oversight and was approved on August 21, 2013. As part of the RI/FS process, RAOs were developed in accordance with 40 CFR Section 300.430 of the NCP, pursuant to 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 (*e.g.,* RI/FS Guidance (EPA/540/G-89/004). The RAOs are goals that a remedy should achieve in order to ensure protection of human health and the environment. The RAOs for the site include those listed in **Table 3 and work in conjunction with Table 4 and Table 5.** Site specific and holistic RAOs were developed for the site and are included in section 3.2.2 (pages 23-24) of the FS report.

TABLE 3 – REMEDIAL ACTION OBJECTIVES	
Soil	
Human Health Risk	Prevent ingestion/direct contact with soil having the carcinogen arsenic that would result in an excess lifetime cancer risk greater than $1x10^{-5}$.
Human Health Risk	Prevent ingestion/direct contact with soil having the non-carcinogen antimony in that would result in a HQ greater than 1.
Human Health Risk	Prevent ingestion/direct contact with soil containing lead at a concentration that would result in a blood lead level greater than 10 µg/dL.
Sediment	
Human Health Risk	Prevent ingestion/direct contact with sediment having the carcinogen arsenic that would result in an excess lifetime cancer risk greater than $1x10^{-5}$.
Human Health Risk	Prevent ingestion/direct contact with sediment having the non-carcinogen antimony in that would result in a HQ greater than 1.
Human Health Risk	Prevent ingestion/direct contact with sediment containing lead at a concentration that would result in a blood lead level greater than 10 µg/dL.

In the process of scoping and conducting the RI, generic preliminary remediation goals (PRGs) were established. These PRGs were converted to site-specific remediation goals (RGs) following completion of the RI and FS phase of the project. The FS includes a list of RGs for protection of human health, established using the acceptable excess lifetime cancer risk and non-cancer hazard goals identified in the DERR Technical Decision Compendium document *Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response and Federal Facility Oversight* dated August 21, 2009 (http://www.epa.ohio.gov/portals/30/rules/riskgoal.pdf).

These goals are $1x10^{-5}$ (*i.e.*, 1 in 100,000) excess lifetime cancer risk and an HQ or HI of 1, and were established using the default exposure parameters provided by U.S. EPA or site-specific information. In addition, because of lead's unique toxicity, it was assessed, and PRGs were derived, using U.S. EPA guidance on lead exposures and developing remediation goals, found at: http://www.epa.gov/superfund/lead/guidance.htm#interimsoillead. The COCs and the PRGs, now considered final remediation levels (RLs) for the site are shown in **Table 4 Contaminants of Concern / Remediation Levels in Soil and Sediment**:

Table 4 - Contaminants of Concern / Remediation Levels in Soil and Sediment					
Exposure Scenario	**Constituent**	**Risk-Based PRG[1] (in ppm)**	**USEPA RSL PRG[2] (in ppm)**	**VAP PRG[3] (in ppm)**	**Selected Remediation Level (RL) (in ppm)**
Future Site Worker (Commercial / Industrial)	Antimony	454	410	1,200	410
	Arsenic	1.77	24	82	33[5]
	Lead	2,240	800	1,800	800[6]
Current/Future Recreational User/Trespasser	Antimony	146	---[4]	---	146
	Arsenic	1.82	---	---	33[5]
	Lead (GE) Lead (Ohio EPA)	4,905 1,505	---	---	1,505
Hypothetical Residential Land Use	Antimony	---	31	30	30
	Arsenic	---	6.1	6.7	33[5]
	Lead	---	400	400	400
Future Construction/ Excavation Worker	Antimony	1,550	---	390	390
	Arsenic	166	---	420	420
	Lead	---	---	750	750

Notes:

1. Risk-based PRGs developed by GE in Interim RAO Report or Ohio EPA (see Sections 3.3 and 3.4 of that document).
2. EPA RSLs for constituents other than lead are based on either a 10^{-5} risk level or a hazard quotient of 1.
3. Generic chemical-specific GDCS contained in Ohio EPA's VAP.
4. --- Indicates that PRG is not available or has not been developed for the given scenario.
5. Per Ohio EPA's June 14, 2011 letter on the Revised Interim RAO Report, the site-specific background concentration of 33 ppm for arsenic is to be used as the PRG when the scenario-specific risk-based values are below this concentration.
6. Ohio EPA specified the use of EPA's lead RSL of 800 ppm for the future site worker exposure scenario.

Table 5 Areas of Concern and Selected Exposure Scenarios provides a list of the site AOCs (also see **Figure 2 Site Areas of Concern Map**) and the associated exposure scenario (area / pathway).

Table 5 - Areas of Concern and Selected Exposure Scenarios	
Area of Concern	Selected Exposure Scenario
East Fenced Area (EFA)	Current/Future Recreational User / Trespasser
East Swale	Future Site Worker, and Future Construction/Excavation Worker
Former Raw Materials Handling Area (RMHA)	Future Site Worker, and Future Construction/Excavation Worker
South Ditch	Future Site Worker, and Future Construction/Excavation Worker
Upper Creek Area *	Hypothetical Residential Land User
Deltaic Area *	Current/Future Recreational User / Trespasser
Non-Deltaic Area *	Current/Future Recreational User / Trespasser

* These 3 areas are part of the Offsite Creek Area (OCA) (see **Figure 4 Off-Site Creek Area Plan**).

4.0 SUMMARY OF REMEDIAL ALTERNATIVES

A total of three remedial alternatives were considered in the FS, as shown in **Table 6 Summary of Site Remedial Alternatives**. A brief description of the major features of each remedial alternative follows. More detailed information can be found in the FS report.

TABLE 6 - SUMMARY OF SITE REMEDIAL ALTERNATIVES	
Remedial Alternatives	**Description of Remedial Alternative**
Remedial Alternative 1	**No Action**
Remedial Alternative 2	**95% UCL Removal Scenario:** Soil removal to 95% UCL in all areas except EFA; soil cover and fencing rehabilitation and maintenance in EFA; site institutional controls (activity and use limitations)
Remedial Alternative 3	**Discrete Removal Scenario:** Soil removal in discrete locations in all areas except EFA; soil cover and fencing rehabilitation and maintenance in EFA; site institutional controls (activity and use limitations)

4.1 No Action Alternative (Alternative 1)

The NCP requires evaluation of a no action alternative to establish a baseline for the comparison of other remedial alternatives. Under this alternative, no remedial activities or monitoring are conducted at the site to prevent exposure to contaminated media.

4.2 Soil/Sediment Alternatives (Alternatives 2 and 3)

Based on the results of the RI, only soils and sediments were identified as media requiring remediation. Remedial Alternatives 2 and 3 are similar in that they both involve rehabilitation of the soil cover and fencing for the EFA, adherence to institutional controls (activity and use limitations) established on site property, and removal of contaminated soil in all AOCs (*i.e.,* East Swale, Former RMHA, South Ditch and OCA) except the EFA.

However, Alternative 2 involves the removal of contaminated soil/sediment until the 95% UCL of the mean residual lead concentrations for each AOC or subsections are equal to or less than applicable remediation levels. In comparison, Alternative 3 involves the removal of contaminated soil/sediment until the maximum lead concentration of each AOC or subsection is equal to or less than the applicable remediation levels.

For purposes of developing remedial alternatives and performing the comparative analyses of those alternatives, the 95% upper confidence limit (UCL) removal scenario focused solely on achievement of the final remediation levels for lead, because:

- Elevated concentrations of arsenic and antimony are generally collocated with the elevated concentrations of lead.

- The release and transport mechanisms are similar for the contaminants which would typically result in these materials being found in the same locations.

- The sample data set for lead is significantly larger than the data sets for either arsenic or antimony.

<u>Alternative 2: 95% UCL Removal Scenario</u>

Under Alternative 2, soils/sediments containing lead at concentrations greater than the final remediation levels would be removed from each exposure unit from all AOCs until the concentrations remaining in soil/sediment result in 95% UCL concentrations less than the applicable lead remediation level.

<u>General Explanation of 95% Upper Confidence Limit (UCL)</u>

The technical definition of a 95% UCL is “a number that one can be 95% confident that the true mean (average) concentration of the population is below that value.” A slightly simpler definition is that it is a level that the Agency is confident is health protective when used to calculate risks and hazards.

All excavated materials would be subject to disposal at appropriately permitted off-site facilities. A total of approximately 4,260 cubic yards of material would be removed to achieve the lead remediation level applicable to each AOC. Alternative 2 includes excavation of contaminated soil from beneath the paved portion of the RMHA, and restoration of removal areas as appropriate. In addition, pre-removal remedial design sampling and analyses, pursuant to an Ohio EPA approved Remedial Design Work Plan, will be conducted as necessary to further refine the cut lines for soil removal and to ensure that soil/sediment removal activities result in the achievement of the appropriate 95% UCL lead remediation levels.

The FS screening evaluation included an EFA sludge removal scenario, and estimated that between approximately 25,800 and 32,300 cubic yards of sludge materials would need to be removed. Excavation and off-site disposal costs for the EFA sludge were estimated at approximately $10 million dollars not including the cost of the clean backfill and placement of the backfill. In addition, the environmental covenant recorded December 2011 explicitly prohibits the disturbance of existing or future soil cover over the EFA. Given this information, the remedial component for the EFA in both Alternatives 2 and 3 is limited to rehabilitation of the existing soil cover and security fence; complete removal of sludge materials is not considered further in this preferred plan.

Rehabilitation of the EFA includes clearing and grubbing and repair of the existing soil cover, followed by installation of a one-foot thick soil cover, and repair and/or replacement of the existing fence (and installation of new fencing as necessary) around the EFA. Annual site inspection and maintenance (*e.g.*, minor fence repairs, mowing/clearing of vegetation, and minor soil cover repairs) of the EFA cover are also included.

Alternative 2 includes adherence to institutional controls established for site property. Site environmental covenants require development of and compliance with an Ohio EPA approved soil management plan (SMP) establishing procedures for waste characterization and proper soil management and disposal methods for potential future intrusive construction/excavation activities that may be conducted at the site. With regard to future redevelopment, the environmental covenant established in 2011 for the former facility property may be amended to more specifically define the appropriate activity and use limitations.

In support of this alternative, an operation and maintenance plan (O&M plan) would be prepared to document protocols for inspections, maintenance, and annual verification of institutional controls. The O&M plan shall also document known locations of soil/sediment containing lead greater than the applicable lead remediation levels after the completion of the soil/sediment removal activities. Estimated Costs of Alternative 2 include:

Estimated Capital Cost	$ 3,890,000
Estimated O&M Cost	$ 500,000
Estimated Present Worth Cost	$ 4,390,000
Estimated Construction Time	4 months

Alternative 3: Discrete Removal Scenario

Under Alternative 3, soils/sediments containing lead at each discrete sample location with concentrations greater than the applicable lead remediation levels would be removed from each AOC. The limits of soil removal for Alternative 3 were developed using the same procedures utilized in Alternative 2. A total of approximately 11,460 cubic yards of material would be removed to achieve the lead remediation levels applicable to each AOC. Alternative 3 includes the excavation of contaminated soil from beneath the paved portion of the RMHA, and restoration of removal areas as appropriate. An appropriate level of post-removal confirmatory sampling and analyses would be conducted as necessary to determine whether soil/sediment removal activities result in the achievement of the appropriate lead remediation levels.

The FS screening evaluation included an EFA sludge removal scenario, and estimated that between approximately 25,800 and 32,300 cubic yards of sludge materials would need to be removed. Excavation and off-site disposal costs for the EFA sludge were estimated at approximately $10 million dollars not including the cost of the clean backfill and placement. In addition, the environmental covenant recorded December 2011 explicitly prohibits the disturbance of existing or future soil cover over the EFA. Given this information, the remedial component for the EFA in both Alternatives 2 and 3 is limited to rehabilitation of the existing soil cover and security fence; complete removal of sludge materials is not considered further in this preferred plan.

Rehabilitation of the EFA includes clearing and grubbing and repair of the existing soil cover, followed by installation of a one-foot thick soil cover, and repair and/or replacement of the existing fence (and installation of new fencing as necessary) around the EFA. Annual site inspection and maintenance (*e.g.*, minor fence repairs, mowing/clearing of vegetation, and minor soil cover repairs) of the EFA cover are also included.

Alternative 3 includes adherence to institutional controls established for site property. Site environmental covenants require the development of and compliance with an Ohio EPA approved SMP establishing procedures for waste characterization and proper soil management and disposal methods for potential future intrusive construction/excavation activities that may be conducted at the site. With regard to future redevelopment, the environmental covenant established in 2011 for the former facility property may be amended to more specifically define the appropriate activity and use limitations.

In support of this alternative, an operation and maintenance plan (O&M plan) would be prepared to document protocols for inspections, maintenance, and annual verification of institutional controls. Estimated Costs of Alternative 3 include:

Estimated Capital Cost	$ 7,800,000
Estimated O&M Cost	$ 500,000
Estimated Present Worth Cost	$ 8,300,000
Estimated Construction Time	10 months

5.0 COMPARISON AND EVALUATION OF REMEDIAL ALTERNATIVES

5.1 Evaluation Criteria

Ohio EPA considers eight criteria, as outlined in the NCP, to evaluate the various remedial alternatives individually and compare them with each other in order to select a remedy. A more detailed analysis of the remedial alternatives can be found in the FS report. The eight evaluation criteria, including the threshold, balancing and modifying criteria are shown in **Table 7 Remedial Alternative Evaluation Criteria**.

TABLE 7 - REMEDIAL ALTERNATIVE EVALUATION CRITERIA
Threshold Criteria (2)
Overall Protection of Public Health and the Environment - determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, treatment, etc.
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) - evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
Balancing Criteria (5)
Long-Term Effectiveness and Permanence – evaluates the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment – evaluates the amount of contamination present, the ability of the contamination to move in the environment, and the use of treatment to reduce harmful effects of the principal contaminants.
Short-Term Effectiveness – evaluates the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
Implementability – evaluates the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost – includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying Criterion (1)
Community Acceptance – considers whether the local community agrees with Ohio EPA's analyses and preferred alternative. Comments received on the Preferred Plan are an important indicator of community acceptance.

Evaluation Criteria 1 and 2 are threshold criteria required for acceptance of an alternative. 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 evaluated through public comment on the alternatives received during the comment period.

5.2 Analysis of Evaluation Criteria

This section examines how each of the evaluation criteria is applied to each of the remedial alternatives listed in Section 4.0 and compares how the alternatives achieve the evaluation criteria.

Overall Protection of Human Health and the Environment

Evaluation of the overall protectiveness of the alternatives focused on whether each alternative achieves the threshold of adequate protection of human health and the environment, and identifies how site risks posed through each pathway being addressed are eliminated, reduced or controlled by the alternative. This evaluation includes consideration of whether the alternative poses any unacceptable short-term or cross-media impacts.

Alternative 1:

The "No Further Action" in Alternative 1 does not include active remedial measures to address contaminated media on- and off-site.

Alternatives 2 and 3:

Alternatives 2 and 3 both involve institutional controls which include O&M plan components, but also include soil and sediment removal and EFA rehabilitation. Alternative 2 includes the removal of soil/sediment from select locations until the calculated 95% UCL of lead concentrations for the remaining data set do not exceed the applicable remediation levels. Under Alternative 2, the requirement for soil management plans in environmental covenants (which will be satisfied through the preparation of O&M plans) will manage safety practices and future construction/excavation worker exposure, and disposal methods for contaminated materials in the East Swale, South Ditch, and the Deltaic and Non-Deltaic Areas of the OCA. Portions of the RMHA not discussed in the former facility environmental covenant will also require characterization of wastes to determine the disposal method.

Alternative 3 includes the removal of all soil/sediment containing lead concentrations that exceed the lead remediation levels for the East Swale, RMHA, South Ditch, Upper Creek Area, and the Deltaic and Non-Deltaic Areas of the OCA. A soil management plan to manage safety practices during future construction/excavation would only be required in the Deltaic and Non-Deltaic Areas of the OCA because the remaining lead concentrations will be less than the applicable lead remediation level.

Alternatives 2 and 3 both result in post-remediation conditions that achieve the same level of risk reduction and make each area of concern safe for its intended future use.

Compliance with ARARs

This threshold criterion is evaluated based on whether the alternative meets federal and state environmental statutes and rules that strictly apply to remedial activities at the site, or those statutes and rules whose requirements would help achieve the remedial goals for the site, or whether a waiver is justified. See **Appendix C ARARs Table** for additional detail.

Alternatives 2 and 3:

- *Chemical-Specific ARARs* – The list of chemical-specific ARARs for this site is included in the FS Report. Potentially applicable chemical-specific ARARs include the Ohio EPA Voluntary Action Program (VAP), and generic numerical standards presented in Ohio Administrative Code (OAC) 3745-300-08. Additionally, OAC 3745-300-09 allows for the calculation of site-specific standards. The PRGs presented in the FS report were developed based on the Ohio VAP standard and site-specific risk calculations. Alternatives 2 and 3 include the removal of soils/sediments containing elevated lead concentrations. Both Alternative 2 and Alternative 3 would achieve the chemical-specific ARARs.

- *Action-Specific ARARs* – The list of action-specific ARARs for this site is included in the FS Report. Potentially applicable action-specific ARARs include health and safety requirements and regulations associated with handling impacted media. Work activities would be conducted in accordance with Occupational Safety and Health Administration (OSHA) requirements that specify general industry standards, safety equipment and procedures, and record keeping and reporting regulations (*i.e*., 40 CFR 264, 29 CFR 1910, 1926, and 1904). Compliance with these action-specific ARARs would be accomplished by following a site-specific health and safety plan (HASP).

  Excavated material would be subject to U.S. Department of Transportation and any additional state of Ohio requirements for packaging, labeling, manifesting, and transporting hazardous or regulated materials (*i.e.,* 49 CFR Parts 107 and 171.1 through 172.558, and OAC 3745-52-11, 12, 14, 20, 22, 23, 30-34, 40, and 41). Compliance with these requirements, as well as ARARs related to air and water quality management, would be achieved by following an Ohio EPA-approved remedial design and using licensed waste transporters and permitted disposal facilities. All excavated material would be disposed of in accordance with applicable state and federal land disposal regulations (*e.g.,* OAC 3745-270 and -57).

- Location-Specific ARARs – The list of potentially applicable location-specific ARARs are included in the FS Report and generally include regulations on conducting construction/remedial activities on flood plains/wetlands. Compliance with these ARARs would be achieved by obtaining any necessary permits prior to conducting remediation activities. Both Alternatives 2 and 3 would be equally effective at achieving the location-specific ARARs. Additionally, remedial activities would be conducted in accordance with the city of Circleville building/construction codes and ordinances, as applicable.

Alternative 1 (No Action) does not meet the threshold criteria (overall protection of human health and the environment; compliance with ARARs) so is eliminated from further consideration and is not carried forward in the evaluation of the remedial alternatives.

Long-Term Effectiveness and Permanence

Alternatives 2 and 3:

Both Alternatives 2 and 3 include the same institutional control components listed in Alternative 1. Alternatives 2 and 3 are protective of human health and the environment and achieve the established RAOs through the removal of soils/sediments with the elevated lead concentrations.

Alternatives 2 and 3 also include annual verification of institutional controls and preparation of an O&M plan and require the rehabilitation of the EFA, including repair/ replacement/installation of new fencing.

Under Alternative 2, potential exposures to remaining/residual site contamination in the EFA, East Swale, South Ditch, RMHA and the Deltaic and Non-Deltaic Areas of the OCA would be mitigated by following the procedures established in the O&M plan.

Under Alternative 3, potential exposures to remaining/residual site contamination in the EFA, and the Deltaic and Non-Deltaic Areas of the OCA would be mitigated by following the procedures established in the O&M plan. However, the East Swale, RMHA, Upper Creek Area and the South Ditch would not be included in the O&M plan.

Alternatives 2 and 3 are not anticipated to have negative long-term impacts to the environment as a result of remedial construction activities. Following removal of the contaminated soil/sediment, disturbed areas would be restored to pre-construction levels and grades and vegetated, as appropriate.

Reduction of Toxicity, Mobility or Volume by Treatment

Alternatives 2 and 3:

Both remedial alternatives do not reduce the toxicity, mobility or volume through a treatment process. However, both Alternatives 2 and 3 would reduce the volume of contaminated soils/sediments through excavation and removal from the site.

Alternative 2 would include excavation of approximately 4,260 cubic yards of contaminated soils/sediments, as required until the calculated 95% UCL lead concentrations for the remaining data set are not greater than the applicable lead remediation levels. Alternative 3 would include the excavation of approximately 11,460 cubic yards of soil/sediment containing discrete lead concentrations greater than the applicable lead remediation levels. Under both alternatives, excavated material would be transported offsite for disposal at either a non-hazardous solid waste landfill or hazardous waste landfill (*i.e.*, depending on the results of waste characterization sampling).

Short-Term Effectiveness

Alternatives 2 and 3:

Alternatives 2 and 3 both involve soil excavation to address soil/sediment contamination.

Both Alternatives 2 and 3 pose potential short-term risks to remedial workers, the environment and the public from potential exposure to contaminated soil/sediment during excavation, transportation of excavated material, and backfilling. Additionally, the activities conducted under these alternatives would pose short-term risks from the operation of construction equipment and generation of noise and dust.

Alternative 3 would cause greater disruption to the natural environment and surrounding community than Alternative 2.

Specifically, Alternative 3 would require excavation and/or restoration activities within an area measuring approximately 6.5 acres, while Alternative 2 would require excavation and/or restoration activities within an area measuring approximately 2.5 acres. Therefore, Alternative 2 would require less than 40% of the excavation and/or restoration footprint required to implement Alternative 3, while achieving the same level of risk reduction.

In addition, nuisances to the surrounding community would include noise from the operation of construction equipment and an increase in local truck traffic due to transportation of excavated materials and importation of fill materials. Estimated duration of remedial construction activities for each of the alternatives and number of truck trips required for each alternative are:

- Alternative 2 – 4 months and 420 truck trips
- Alternative 3 – 10 months and 1,110 truck trips

Potential exposures during implementation of these alternatives would be mitigated, to the extent practicable, by using appropriate personal protective equipment (PPE), conducting community air and work space monitoring, implementing dust control (*e.g.*, water sprays) and noise mitigation measures (as appropriate, and if necessary based on monitoring results), and proper planning and training of remedial workers. Additionally, erosion and sediment controls would be used to minimize impacts to the environment. Health and safety practices and protective measures would be developed/included as part of the remedial design and HASP.

The potential for short-term harm to the public, the environment and remedial workers inherently increases as the volume of excavated material and number of truck trips increases. Alternative 2 would be the least disruptive to the natural environment and the surrounding community, would provide a smaller potential for exposures to remedial workers and the public, and would require the shortest time to implement.

Therefore, Alternative 2 has the greater short-term effectiveness, while achieving the same level of risk reduction as Alternative 3.

Implementability

Alternatives 2 and 3:

Alternatives 2 and 3 would include excavation of contaminated soil/sediments, rehabilitation of the EFA, and preparation of an O&M plan. From a technical implementation standpoint, these activities do not require highly specialized equipment (beyond the potential use of low ground pressure equipment, tundra mats, and/or other equipment designed for use in wetland environments) or personnel, and could be easily implemented. Remedial contractors capable of conducting these activities are readily available.

Alternatives 2 and 3 have similar implementation challenges associated with access to the soil/sediment removal areas. Temporary construction roads would be constructed to facilitate access to the South Ditch, Upper Creek Area, and OCA. In addition, support areas would likely be constructed in the vicinity of the Upper Creek Area and OCA during the excavation of material due to the relative lack of working space in those areas.

Alternatives 2 and 3 will require compliance with the substantive requirements of a Section 404 Permit from the U.S. Army Corps of Engineers and a Section 401 Permit from Ohio EPA's Division of Surface Water, before performing the soil/sediment removal operation activities. Water management in the streams/drainage ditches will present a challenge for both Alternatives 2 and 3. As a result, bypass pumping will likely be required to divert surface water flow around soil/sediment removal areas and material dewatering/solidification may be required to condition the excavated materials prior to transportation to the applicable offsite disposal facilities.

Institutional controls in the form of environmental covenants have been established for the former facility and the portion of the OCA owned by the Richard entities. With regard to future redevelopment, the Environmental Covenant established in 2011 for the former facility property may be amended to more specifically define the appropriate activity and use limitations.

Cost

Alternatives 2 and 3:

Alternative 3 corresponds to the greatest removal volume (approximately 2.7 times the amount removed under Alternative 2), and is approximately 1.9 times as expensive as Alternative 2.
Alternatives 2 and 3 would include the same EFA rehabilitation and O&M plan components. Alternative 2 would include verification of institutional controls and site inspection/maintenance components to limit potential future exposures to remaining/residual impacts in the EFA, East Swale, South Ditch, RMHA and appropriate OCA portions.

The estimated present worth cost of Alternative 2 is $4,390,000. The estimated present worth cost of Alternative 3 is $8,300,000. The FS report provided a separate breakdown of the estimated costs for the East Swale, RMHA, South Ditch, Upper Creek Area and OCA.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends. All comments will be summarized and responded to by the Agency in a responsiveness summary, attached to the Decision Document issued by the Director of Ohio EPA (after the Preferred Plan), and which provides the final remedy selection.

5.3 Summary of Evaluation Criteria

A summary of the evaluation of the site remedial alternatives is included in **Table 8 Evaluation of Site Remedial Alternatives**.

TABLE 8 EVALUATION OF SITE REMEDIAL ALTERNATIVES

Remedial Alternatives	Threshold Criteria		Balancing Criteria					Modifying Criteria
	1. Protects Human Health & Environment	2. Compliance with ARARs	3. Long Term Effectiveness	4. Reduces T, M and/or V by Treatment	5. Short Term Effectiveness	6. Implementable	7. Costs	8. Community Acceptance
1	☐	☐						
2	■	■	◘	◘	■	■	■	
3	■	■	◘	◘	◘	■	◘	

■ = Fully Meets Criteria ◘ = Partially Meets Criteria ☐ = Does Not Meet Criteria

6.0 OHIO EPA'S PREFERRED REMEDIAL ALTERNATIVE

Ohio EPA's preferred remedial alternative for the former RCA/Thomson Site is Alternative 2 (95% UCL Removal Scenario), which includes removal of contaminated soil from the East Swale, South Ditch, former RMHA and OCA, rehabilitation and maintenance of the EFA soil cover and fence, and adherence to institutional controls established in environmental covenants on the former facility property and on portions of the OCA. With regard to future redevelopment, the Environmental Covenant established in 2011 for the former facility property may be amended to more specifically define the appropriate activity and use limitations.

This preferred remedial alternative may change in response to Ohio EPA's consideration of public comment or new information.

Alternative 2 is protective of human health and the environment, complies with ARARs established for the site, and will achieve the site-specific RAOs. The estimated total cost of the Ohio EPA preferred remedial alternative is $4,390,000. Alternative 2 is nearly 50% less expensive than Alternative 3 yet has similar results with regard to the remaining evaluation criteria. Based on information presently available, it is Ohio EPA's current judgment that the preferred remedial alternative best satisfies the evaluation criteria in **Table 8 Evaluation of Site Remedial Alternatives.**

6.1 Preferred Remedial Alternative Components and Performance Standards

The major remedial components of Alternative 2 and their associated performance standards are soil and sediment removal based on a 95% UCL approach, rehabilitation and maintenance of the EFA and institutional controls. Details on the remedial components and associated performance standards are provided in Sections 6.1.1 through 6.1.3 below:

6.1.1 Soil and Sediment Removal

Alternative 2 includes the removal through excavation of soil/sediment, as necessary until the calculated 95% UCL lead concentrations are not greater than the applicable remediation levels in each AOC (*i.e.,* East Swale, South Ditch, RMHA, and OCA (Upper Creek Area, Deltaic Area, and Non-Deltaic Area), as follows:

- The East Swale, RMHA and South Ditch will have soil/sediment removed to meet the construction worker lead value of 750 ppm in the calculated 95% UCL concentration.

- The Upper Creek Area in the OCA will have soil/sediment removed to meet the unrestricted (*e.g*., residential) land use lead value of 400 ppm in the calculated 95% UCL concentration.

- The Deltaic and Non-Deltaic Areas of the OCA will have soil/sediment removed to meet the trespasser lead value of 1,505 ppm in the calculated 95% UCL concentration.

As noted previously, lead was selected as the "driver" contaminant to guide future soil and sediment removal. With regard to soil/sediment excavation limit planning, the limits were preliminarily established by extending the horizontal and vertical limits of removal from locations where lead concentrations exceeded remediation levels to the nearest adjacent sampling location with a lead concentration that did not require removal to meet the appropriate remediation level. If such a sample analytical data point/location was not available, the planned limits of soil removal were extended to a topographic boundary feature (*e.g*., steep ditch embankment, culvert). An estimated total of 4,260 cubic yards of material would be removed under Alternative 2 to achieve the lead PRG applicable to each area of concern. This total includes the excavation of the contaminated soil (via 95% UCL) beneath a paved portion (*i.e.,* concrete pad) of the RMHA, which Ohio EPA will require as a part of Alternative 2.

Pre-removal remedial design sampling and analyses, pursuant to an Ohio EPA approved Remedial Design Work Plan, will be conducted as necessary to further refine the cut lines for soil removal and to ensure that soil/sediment removal activities result in the achievement of the appropriate 95% UCL lead remediation levels.

Excavated soil/sediment material will be transported to appropriate off-site disposal facilities and removal areas will be restored to match pre-construction levels, grades and vegetation. The concrete removed during excavation from the RMHA will be disposed of in an appropriate manner. Post-removal restoration activities (vegetating and landscaping) are to begin immediately after the completion of backfilling and grading such that stream erosion is minimized in compliance with the substantive requirements of any necessary pre-removal permits (*e.g.,* Section 404 and 401 permits).

The long-term O&M plan to be prepared (and approved by Ohio EPA), primarily in association with the EFA cover and fencing (detailed in 6.1.2 below), shall include details on the components of and the process for submittal and approval of any soil management plans. It shall also include a site map of any known location of soil containing lead greater than the applicable lead concentrations, after completion of the soil and sediment removal activities using the 95% UCL approach. This information will be provided (and available to future land owners and developers) to establish protocols (including health and safety requirements) for conducting construction/excavation activities, and managing and disposing (as necessary) of potentially contaminated material encountered during such activities, post removal.

Performance Standard:

> The performance standard is met when contaminated soils/sediments have been removed in accordance with the cut lines for soil removal established based on the 95% UCL cleanup levels for lead, as further refined in pre-removal sampling and analyses conducted pursuant to an Ohio EPA approved Remedial Design Work Plan.

6.1.2 Rehabilitation and Maintenance of the EFA

The existing soil and vegetative cover on the EFA will be cleared and grubbed, and rehabilitated through the installation of a one-foot thick soil cover. The soil cover will be graded and vegetated to minimize erosion and ensure a protective barrier is established to prevent contact with the material. In addition, the existing fenced area will be expanded as necessary to fully secure the material within the EFA, and new fencing will be added as appropriate. An Ohio EPA-approved O&M plan, to include long-term maintenance of the soil cover and fence, will also be necessary.

Performance Standards:

1) The performance standard is met when the one foot thick soil cover is placed, graded, and vegetated, and the EFA area of contamination is surrounded by a security fence, per the Ohio EPA-approved work plan.

2) The performance standard is met when Ohio EPA approves the site O&M plan.

6.1.3 Institutional Controls

Institutional controls (*e.g.,* activity and use limitations) were established on the former facility manufacturing areas through an environmental covenant recorded on December 28, 2011 with the Pickaway County Recorder's Office. With regard to future redevelopment, this environmental covenant may be amended to more specifically define the appropriate activity and use limitations. Another environmental covenant was recorded on August 16, 2012, placing activity and use limitations on the Deltaic and Non-Deltaic Areas of the OCA. See **Appendix D** for copies of the environmental covenants.

Current and future owners of these site parcels will need to adhere to and comply with all activity and use limitations included in the environmental covenants. Ohio EPA will conduct periodic inspections to monitor compliance with the environmental covenants.

Performance Standard:

1) The performance standard is met through adherence to and compliance with the institutional controls included in environmental covenants established for the site property, as reviewed by Ohio EPA during periodic inspections, including property and record reviews, until such institutional controls are no longer necessary.

Appendix A - Glossary of Terms

Administrative Record: All documents that Ohio EPA considered or relied on in selecting a remedial action for a site.
Aquifer: An underground geological formation capable of holding and yielding water.
Applicable or Relevant and Appropriate Requirements (ARARs): Those statutes and rules that strictly apply to remedial activities at the site or those statutes and 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 in the absence of any remedial action, which also determines the extent of cleanup needed to reduce potential risk levels to within acceptable ranges.
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 that are present in concentrations that may be harmful to human health or the environment.
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.
Environmental Covenant: A servitude arising under an environmental response project that imposes activity and use limitations and that meets the requirements established in section 5301.82 of the Ohio Revised Code.
Exposure Pathway: Route by which a chemical is transported from the site to a human or ecological receptor.
Feasibility Study: 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 can be selected.
Final Cleanup Levels: Final cleanup levels 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 RCRA that may cause harm to humans or the environment.
Human Receptor: A person/population exposed to chemicals released at a site.
Leachate: Water that collects contaminants as it migrates through wastes, pesticides or fertilizers. Leaching may occur in farming areas and landfills, and may result in hazardous substances entering surface water, ground water, soil or sediment.

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 sections 3745-81-11 and 3745-81-12 of the Ohio Administrative Code.
Monitoring Well: A well installed to collect ground water samples for the purpose of physical, chemical, or biological analyses to determine the amounts, types, and distribution of contaminants in ground water beneath a site.
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.
Operation and maintenance (O&M): 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.
Performance Standard: Measures by which Ohio EPA determines if RAOs are being 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 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 RGs at this point in time). They are also used during the analysis of remedial alternatives in the RI/FS.
RCRA: Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. 6901 et seq. A federal law that regulates the handling of hazardous wastes.
Remedial Action Objectives: Specific remedial goals for reducing risks posed by the site.
Remedial Investigation: 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 comments received concerning the Preferred Plan and Ohio EPA's response to the comments.
Sediment: Topsoil, sand and minerals washed from the land into water, usually after rain or snow melt.
Water Quality Criteria: Chemical, physical and biological 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.

Appendix B Primary Contaminants of Concern

A total of three (3) primary contaminants of concern (COCs) have been identified that pose the greatest potential risk to human health and the environment at this site. Additional details on each primary COC (from the Agency for Toxic Substances and Disease Registry (ATSDR Toxicological Profiles) are provided below.

Antimony is a silvery-white metal that is found in the earth's crust. Antimony isn't used alone because it breaks easily, but when mixed into alloys, it is used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and plastics to prevent them from catching fire. It is also used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass. Breathing high levels for a long time can irritate your eyes and lungs and can cause heart and lung problems, stomach pain, diarrhea, vomiting, and stomach ulcers. Ingesting large doses of antimony can cause vomiting. Long-term animal studies have reported liver damage and blood changes when animals ingested antimony. Antimony can irritate the skin following long term exposure.
Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic can combine with oxygen, chlorine and sulfur to form inorganic arsenic compounds. The main use of inorganic arsenic compounds is to preserve wood. Organic arsenic compounds are used primarily as pesticides. Breathing high levels of inorganic arsenic can cause throat and lung irritation. Ingesting high levels of arsenic can result in death, while at lower levels it can result in nausea, decreased red and white blood cell production, and damage to blood vessels. Skin contact can cause redness and swelling. Arsenic is a known human carcinogen.
Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of the environment, but much of it comes from human activities including the burning of fossil fuels, mining and manufacturing. Lead is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays, and was a common additive to gasoline in the U.S. until it was banned in 1996. The effects of lead are the same whether exposure is through ingestion or inhalation. It affects almost every organ in the body, though the main target is the nervous system. Long term exposure can result in decreased nervous system functionality, and it may cause weakness in fingers, wrists and ankles. Exposure to high levels can severely damage the brain and kidneys, and ultimately cause death. U.S. EPA has determined that lead is a probable human carcinogen.