Little Scioto River Superfund Site

ID: OHN 000 509 590

Operable Unit 1

Marion, Marion County, Ohio

Record of Decision

U.S. Environmental Protection Agency Region 5

77 W Jackson Blvd
Chicago, IL 60604

June 2016

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LIST OF ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
AVS/SEM	Acid Volatile Sulfide and Simultaneously Extracted Metals
BaPE	Benzo(a)pyrene Equivalent
BERA	Baseline Ecological Risk Assessment
BLRA	Baseline Risk Assessment
BWC	Baker Wood Creosoting
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
COI	Chemicals of Interest
CSM	Conceptual Site Model
DNR	Department of Natural Resources
EPA	U.S. Environmental Protection Agency
ELCR	Excess lifetime cancer risk
ERA	Ecological Risk Assessment
ESI	Expanded Site Inspection
ESL	Ecological Screening Level
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HHSL	Human Health Screening Level
HI	Hazard index
HQ	Hazard quotient
IC	Institutional control
LSR	Little Scioto River
MCL	Maximum Contaminant Level
MNR	Monitored Natural Recovery
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NRD	North Rockswale Ditch
ODH	Ohio Department of Health

LIST OF ACRONYMS AND ABBREVIATIONS, CONT'D

Ohio EPA	Ohio Environmental Protection Agency
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polyaromatic Hydrocarbon
PEC	Probable Effects Concentration
ppm	Parts per million
QHEI	Qualitative Habitat Evaluation Limit
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
R/T	Release/Transport
SI	Site Investigation
SLERA	Screening Level Ecological Risk Assessment
SVOC	Semi-volatile Organic Compound
TBC	To be considered
TEC	Threshold Effects Concentration
U.S.C.	United States Code
USDA	United States Department of Agriculture

Part 1 – Declaration

1.1 Site Name and Location

Little Scioto River Superfund Site
Marion, Marion County, Ohio
CERCLIS ID: OHN 000 509 590

1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for Operable Unit 1 (OU 1) of the Little Scioto River (LSR) Superfund site in Marion, Marion County, Ohio. The U.S. Environmental Protection Agency (EPA) chose the Selected Remedy in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 U.S.C. § 9601 *et seq.* and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based on the Administrative Record file (see Appendix 1) for the LSR site.

The State of Ohio (Ohio EPA) has indicated concurrence with the selected remedy. EPA will place the State's concurrence letter (see Appendix 2) into the site Administrative Record upon receipt.

1.3 Assessment of Site

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 Description of Selected Remedy

The Selected Remedy for OU 1 of the LSR site is Alternative 4a - Dry Excavation and Off-Site Disposal - and is estimated to cost a total of $35.5 million to implement over four to six construction seasons. The total cost includes a capital cost estimate of $34.8 million and an estimated present worth operation and maintenance (O&M) cost of $0.7 million.

Alternative 4a will address polyaromatic hydrocarbon (PAH) contamination in the river sediment through:

- Isolating and dewatering designated segments of the river;
- Excavating PAH-contaminated sediment to meet cleanup levels;
- Replacing the excavated volumes with clay and then restoring the river flow;
- Disposing of excavated sediment off-site in an approved landfill; and

- Relying on existing institutional controls (ICs) (state fish advisory) to help prevent consumption of impacted fish and mussels until the remedial action objectives are achieved.

This action will provide for a clean sediment layer, which will then allow for a healthy benthic community to thrive in the river. The fish/mussels consumption advisory could then be lifted by the Ohio Department of Public Health when the fish and mussels are safe to eat.

This is the first decision document for the LSR site and it addresses the contaminated sediment in the Little Scioto River (OU 1). At a later date EPA will address OU 2, the nearby Baker Wood Creosoting (BWC) property, which was the source of the Little Scioto River sediment contamination. BWC no longer discharges into the river system.

EPA did not identify any principal threat waste in OU 1 and will be managing excavated sediment in an off-site landfill, for it is not cost-effective to treat the sediment to remove or destroy the PAH contamination.

1.5 Statutory Determinations

The Selected Remedy for OU 1 is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate (ARAR) to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

The remedy in this OU does not satisfy the statutory preference for treatment as a principal element of the remedy because treatment is not cost-effective. Although removal of the contaminated river sediment will disrupt or eliminate the existing benthic community and temporarily increase the levels of suspended solids in the water column in the short-term, benthos will recolonize the clean fill placed in the excavated areas resulting in an overall healthier benthic community.

This remedy addresses OU 1, and upon completion, it will result in no hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure when the remedial action objectives are achieved. However, because the OU 1 remedy may take longer than 5 years to implement and an OU 2 remedy has not been selected, EPA will conduct a policy review every 5 years after initiation of the remedial action until remedial action objectives are achieved to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 Data Certification Checklist

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

Information Item	Section in Record of Decision
Chemicals of concern and their respective concentrations	2.2 and 2.5
Baseline risk represented by the chemicals of concern	2.2 and 2.7
Cleanup levels established for chemicals of concern and the basis for these levels	2.8
How source materials constituting principal threats are addressed	2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater use in the baseline risk assessment and the ROD	2.6
Potential land use* that will be available at the site as a result of the Selected Remedy	2.6
Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	2.9
Key factor(s) that led to selecting the remedy (that is, describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)	2.10, 2.12, and 2.13

*Groundwater is not addressed by the Selected Remedy

1.7 Authorizing Signature

Douglas Ballotti, Acting Director
Superfund Division
U.S. EPA - Region 5

6/17/2016
Date

Ohio EPA, as the support agency for the LSR Superfund site, indicated concurrence with this ROD on April 28, 2016. The state's concurrence letter will be added to the Administrative Record upon receipt.

Part 2 – Decision Summary

2.1 Site Name, Location, and Brief Description

The LSR Superfund site (CERCLIS ID# OHN000509590) is located west of the city of Marion in Marion County, Ohio (see Figure 1, next page). EPA placed the LSR site on the National Priorities List (NPL) in September 2009 and is the lead agency for the site. The Ohio EPA is the support agency. All EPA site work to date has been fund-financed.

The LSR site is comprised of two separate OUs. OU 1 is the Little Scioto River and OU 2 is the former BWC facility (see Figure 2, following page), which was the source of PAH contamination in the river sediment. This ROD pertains only to OU 1, which consists of an 8.5-mile stretch of the Little Scioto River and includes site features such as the North Rockswale Ditch (NRD), the Rockswale Ditch, the Columbia Ditch, and the Unnamed Ditch.

The LSR site investigation area for OU 1 begins at the State Route 309 bridge and extends to the Scioto River confluence just south of Green Camp, Ohio. This part of the site is located in a low-density residential area with unrestricted access via farm fields, bridges, state-designated recreation areas, and wildlife areas. Here, the Little Scioto River flows north to south and feeds the Scioto River, which in turn is a major tributary to the Ohio River. The Little Scioto River is a low-velocity, high-turbidity waterway that ranges between 20 and 49 feet wide and 2 and 5 feet deep. The streambed consists primarily of sand with increasing clay/silt fractions downstream. The topography of the surrounding land area is generally flat with a gentle slope toward the river.

2.2 Site History and Enforcement Activities

Site History

The former BWC facility operated as a lumber preserver from the 1890s until the 1960s. In the 1940s, the Ohio Department of Health (ODH) documented that chemicals from BWC were being discharged into the combined sewers that drained into the NRD and then to the Little Scioto River. Information shows that a combined sanitary and storm sewer is located along the southern border of BWC along Holland Road. The sewer travels west beneath Holland Road and discharged into the NRD and the NRD flows west approximately 0.5 mile before it discharges into the LSR. The BWC drain is now sealed so no further contamination can be released into the NRD or the river.

History of Remedial Activities

In 1987, Ohio EPA conducted a biological and water quality study of the Little Scioto River and its tributaries. Its 1988 study report concluded that heavy metals and organic chemical contamination had caused severe biological and water quality degradation in the river downstream of the BWC facility and in Rockswale Ditch and Columbia Ditch.

Figure 1: Site Map

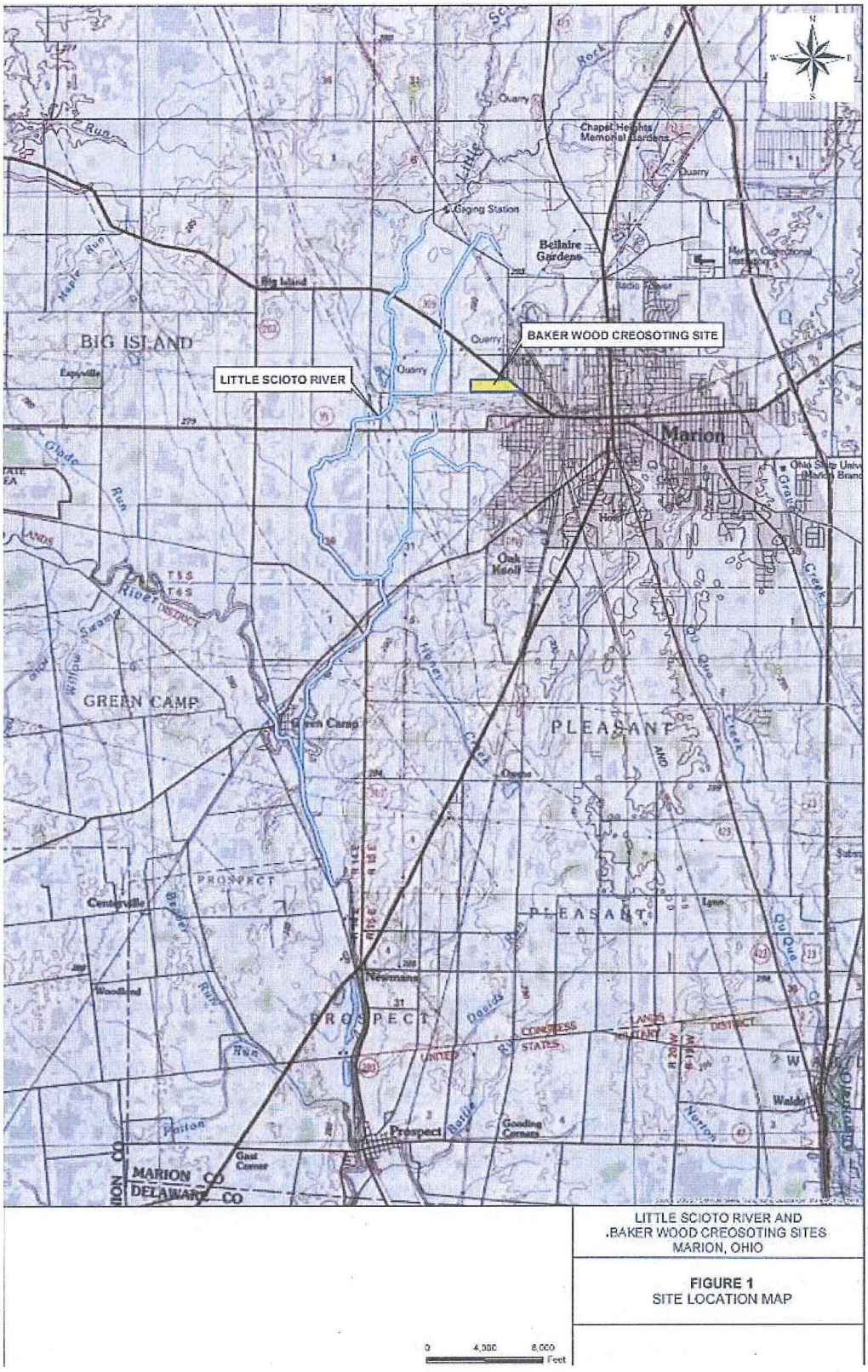
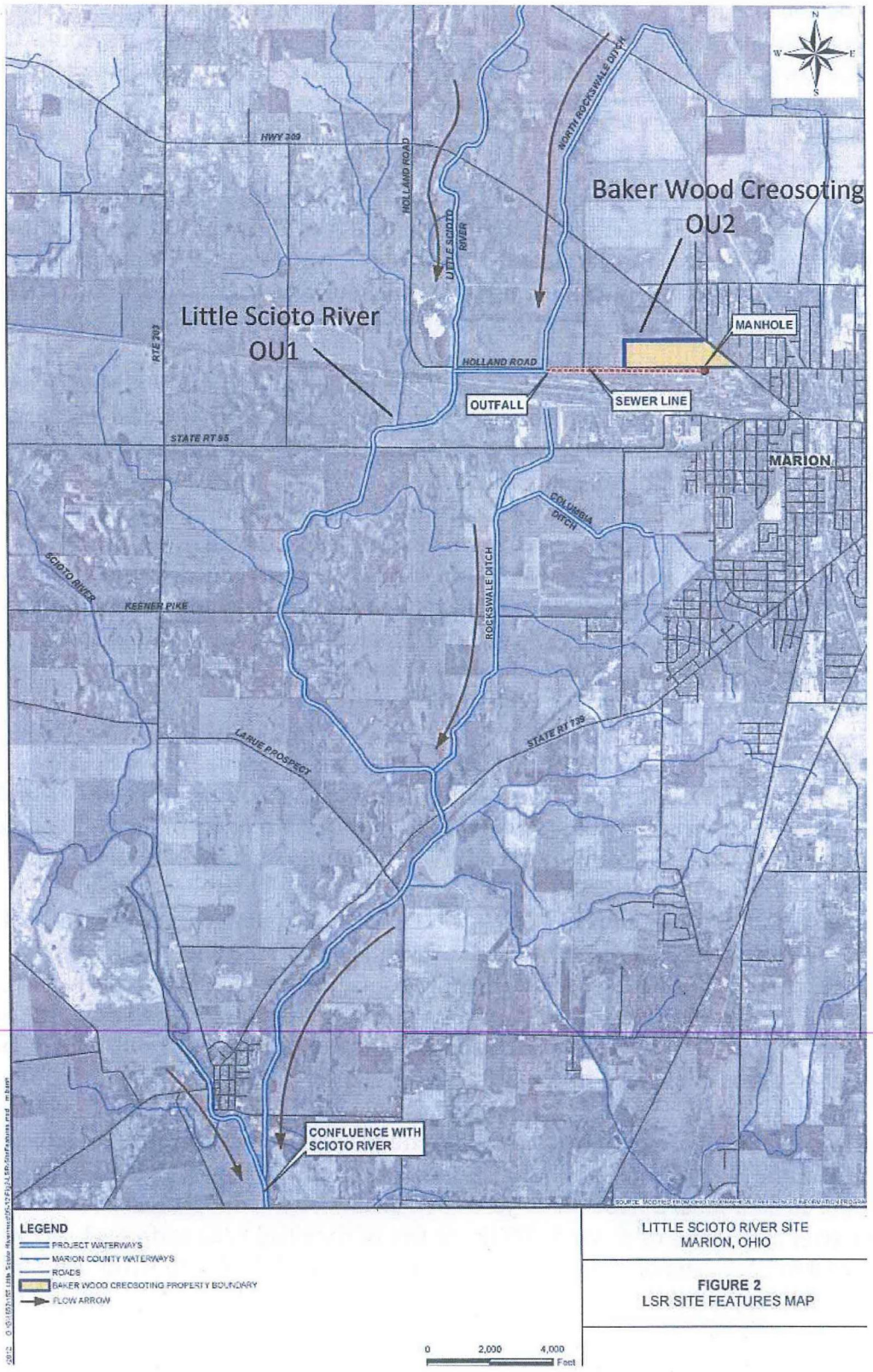


Figure 2: Site Features



On March 20, 1992, ODH issued an advisory against swimming in, wading in, and eating fish caught from the 4-mile length of the Little Scioto River west of Marion from Holland Road south to State Route 739. ODH, in cooperation with Ohio EPA and the Ohio Department of Natural Resources (Ohio DNR), issued consumption advisories under Ohio law (Ohio Revised Code Ch. 3701). In particular, ODH issued a sport fish consumption advisory that recommended not eating any fish from this area due to PAH contamination.

From August 1992 to February 1993, Ohio EPA conducted a biological, sediment, and water quality study of the Little Scioto River and its tributaries. The results of the 1994 study report were consistent with the 1988 report, with Ohio EPA concluding that heavy metals and organics contamination had caused severe biological and water quality degradation in downstream portions of the river.

In 1998, Ohio EPA conducted a biological and water quality study of Marion area streams including the Little Scioto River and its tributaries. The results of the study confirmed previous sample results reported by Ohio EPA in 1994, that the majority of the Little Scioto River will not support aquatic life. The study identified a severely metals- and PAH-contaminated section of the river beginning at Holland Road and continuing for 4 miles downstream. Contaminated sediments, combined with sewer overflows, low dissolved oxygen, and elevated ammonia levels, were associated with substantial impairment of fish and macroinvertibrate communities in the lower 6 miles of the Little Scioto River. The levels of PAH contamination documented in 1998 were comparable to those found during the previous studies that had prompted ODH to issue advisories on fish consumption for the lower section of the river.

From May 1999 through May 2000, EPA conducted a removal site evaluation of the NRD and Little Scioto River pertaining to creosote contamination. The EPA study concluded that approximately 4 miles of the river and 0.5 miles of the NRD contained an estimated 40,000 cubic yards of creosote-contaminated sediment.

In June 2002, EPA mobilized to the LSR site to begin a time-critical removal action under authority of the Oil Pollution Act. From June to December, EPA removed and staged about 7,500 cubic yards of creosote-contaminated sediment from the NRD and about 17,840 cubic yards of contaminated sediment from a portion of the Little Scioto River. In May 2003, EPA began transporting the staged material for off-site disposal. The removal action concluded in August 2003.

In May 2006, EPA mobilized to the LSR site to continue with sediment removal activity in the Little Scioto River under its CERCLA authority. When completed in September 2006, an additional 23,000 cubic yards of contaminated sediment had been removed from the river and a total of about 5,600 linear feet of river had been addressed. However, EPA and Ohio EPA estimated that about 3.25 miles of the Little Scioto River was still adversely impacted.

In 2007 and 2008, Ohio EPA conducted a site inspection (SI) and then an expanded site inspection (ESI) of the LSR site. Soil, sediment, surface water, and groundwater samples were collected. These investigations concluded that portions of the Little Scioto River continue to pose a threat to human health and the environment due to the historical discharges from BWC.

After NPL listing in 2009, EPA began a remedial investigation (RI) and feasibility study (FS) at the LSR site in 2010. The RI focused on (1) verifying whether residual PAHs and metals contamination in the river segment previously addressed during the removal actions were below screening levels, (2) further characterizing surface water and sediment quality in the river and in low-lying areas adjacent to the river, (3) assessing whether any unidentified upstream sources of contamination from connecting waterways existed, and (4) collecting additional background data. In addition, a limited groundwater investigation was conducted adjacent to the river to (1) evaluate the hydraulic connection between the river and shallow groundwater, and (2) assess whether any impacts to shallow groundwater have resulted from contaminants leaching from the sediment into the groundwater. EPA completed the RI report in August 2013 and the FS Report in August 2015.

Enforcement Activities

EPA was unable to identify any viable potentially responsible parties and has taken no enforcement actions at the LSR site.

2.3 Community Participation Activities

EPA made the Proposed Plan and other relevant and supporting documents for the LSR site, including the RI and FS Reports, available to the public in February 2016. Copies of all the documents supporting the remedy outlined in the Proposed Plan and contained in the Administrative Record file were made available to the public at the Marion Public Library, where an information repository has been set up. A notice of the availability of these documents was published on February 17, 2016 in the *Marion Star,* a newspaper covering the Marion area. A 30-day public comment period on the Proposed Plan was held from February 22 to March 23, 2016. EPA indicated that it would accept public comments via mail, email, and electronic submissions through its website. EPA's responses to the comments received during the public comment period are provided in the Responsiveness Summary (see Part 3) of this ROD.

2.4 Scope and Role of Operable Unit or Response Action

EPA and Ohio EPA agreed to divide the LSR site into two separate OUs in November 2014. OU 1 addresses PAH-contaminated sediment in the Little Scioto River (from Holland Road south to the confluence with the Scioto River in Green Camp) as well as in the NRD and the other smaller ditches just south of Holland Road (see Figure 2). OU 2 is the former BWC facility property, which was the source of PAH contamination in OU 1. Ohio EPA is currently evaluating a potential state-enforcement action for OU 2 (BWC)

jointly with an adjacent non-related facility due to the apparent co-mingling of groundwater contaminant plumes at the two properties.

This ROD presents the Selected Remedy for OU 1, which EPA plans as the final response action for OU 1. OU 2 will be addressed at a later date. A FS Report is being developed for OU 2 under state-lead. EPA may select the remedial action for OU 2 in a separate ROD.

2.5 Site Characteristics

Regional Setting

Marion County is located in north-central Ohio and is bordered by Wyandot County and Crawford County to the north, by Morrow County to the east, by Delaware County to the south, and by Union County and Hardin County to the west. The population of Marion County, based on the most recent census (2010), is about 65,000. Marion is its largest city. County-wide land use is mostly rural agricultural with scattered small towns or villages and state-designed recreational and wildlife areas.

Weatherbase.com reports an average annual temperature of approximately 50 degrees Fahrenheit for the city of Marion and states that precipitation averages about 33.2 inches per year.

Little Scioto River Setting

The Little Scioto River is located within the 6,510 square-mile Scioto River basin, which stretches from mid-central to southern Ohio and includes more than 4,000 linear miles of rivers and streams. The Little Scioto River's headwaters are in Crawford County and it flows south into the Scioto River at Green Camp, draining a 113 square-mile basin. The LSR site area contains a total of about 8.5 "river" miles that includes about 1.5 miles of the NRD, 2.2 miles of the Rockswale Ditch, 1.1 miles of the Columbia Ditch, and also includes various former oxbow lakes and low-lying areas adjacent to the present river channel. The river banks are mostly vegetated with trees and overgrown brush or bordered by agricultural fields. The river is a low-velocity, high turbidity waterway that ranges between 20 and 45 feet wide and from 6 inches to more than 5 feet deep in pooled areas. The ditches are all about 1 foot or less deep in most areas and cannot be navigated by boat.

At the LSR site, the Little Scioto River is located in a primarily low-density residential area with unrestricted access via agricultural fields, bridges, and recreational and wildlife areas. The river does not appear to serve as a significant recreational area for swimming or fishing activities, based on site observations. The NRD is located north of Holland Road and it drains to the south until it reaches Holland Road, where it then flows west for approximately 0.5 miles before it empties into the Little Scioto River. Rockswale Ditch is located south of Holland Road and does not appear to be connected to the NRD. Columbia Ditch is located east of the river and Rockswale Ditch and it flows west southwest into Rockswale Ditch, which then trends southwest until it reaches the river.

Regional Geology and Topography

The geology and topography of Marion County are influenced by the several episodes of glacial ice advances that had occurred in northwestern Ohio. Most glacial deposits in the county fall into four main types: till, outwash, and ice-contact sand and gravel (kames and eskers) deposits, and lacustrine deposits. End moraines in southern Marion County provide for steeper slopes, but for the most part overall topography is flat-lying to gently rolling with low relief.

LSR Site Geology, Topography and Hydrology

The topography of the LSR site area is generally flat (0 to 2 percent slopes) with a slight decline towards the Little Scioto River. The streambed consists primarily of sand with clay/silt fractions in some stretches. Sediment thickness in the river ranges from 2 to 84 inches, but in the connecting waterways (ditches) it ranges from 4 to 8 inches.

Surficial geology immediately surrounding the Little Scioto River changes little throughout the extent of the site area. Soil types surrounding the river and ditches include silty clay loams that are occasionally to frequently-flooded. Beneath the silty clay loam layers are clay loam and stratified gravelly sandy loam.

EPA conducted a groundwater investigation along the Little Scioto River, but did not encounter bedrock when placing soil borings, which were advanced between 20 and 40 feet below ground surface (bgs). Soil borings were advanced in four locations along the river. From north to south, soil borings placed at Holland Road generally encountered silt and silty clay to around 20 feet bgs and then alternating sand and clay layers; soil borings at State Route 95 encountered silt or silty clay to below 30 feet bgs; soil borings taken at Keener Pike encountered predominantly silty clay to below 30 feet bgs with infrequent sand and silt layers; and at State Route 739, soil borings encountered silt and sand sometimes in alternating layers to deeper than 30 feet bgs.

Area high-yield drinking water aquifers are comprised of Silurian and Devonian-age limestone and dolomite bedrock in the western and central portions of the county. Regional groundwater flow in the bedrock aquifers is most likely influenced by quarry operations located northeast of the site and by the municipal well field west of the site. Typically, groundwater flows westward in the direction of the Little Scioto River as surface water bodies influence groundwater flow direction in the unconsolidated deposits at ground surface. The relationship between the groundwater and the river appears to vary based on location. At Keener Pike and Holland Road, the river appears to be losing, while at State Route 95 and State Route 739, the river appears to be gaining.

LSR Site Habitat

The 9-mile stretch of the Little Scioto River and its tributaries Columbia Ditch, Rockswale Ditch, and NRD are predominantly vegetated with trees and overgrowth and border on agricultural fields. Ohio EPA conducted an ecological assessment of the site area and has

designated the river as warmwater habitat. However, only one portion of the LSR site area has natural stream habitat conditions present – the northernmost portion of the site where the Little Scioto River crosses Hillman Ford Road. At this location, Ohio EPA gave the river a Qualitative Habitat Evaluation Index (QHEI) score of 66.5, reflective of good stream habitat and adequate for supporting warmwater habitat biological communities. The remainder of the LSR site area received lower QHEI scores indicating poorer quality habitat.

The Little Scioto River supports a diversity of aquatic life, such as insects, mussels, and fish including several state endangered species; moreover, the river serves as a food source for mammals and birds of the area, including habitat for wading birds and possibly bald eagles. Surveys by Ohio EPA have generally concluded that the quality upstream riverine habitat supports a diverse fish community, including largemouth bass, rock bass, bluegill sunfish, shiners, native suckers, and native minnow species. Ohio EPA also noted a reduced number of species and a less productive fishery habitat downstream, possibly due to the increased levels of sediment contamination.

Nature and Extent of Contamination

EPA developed human health and ecological contaminant screening levels for sediment, soil, surface water, and groundwater media at the LSR site. Human health screening levels (HHSL) for sediment were developed using EPA Regional Screening Levels for residential soil. HHSLs for groundwater were developed using maximum contamination levels (MCLs) from the federal Safe Drinking Water Act. If a MCL was not promulgated for a site contaminant, then EPA Regional Screening Levels for tap water were used. HHSLs for fish and invertebrates were developed using EPA Regional Screening Levels for fish ingestion.

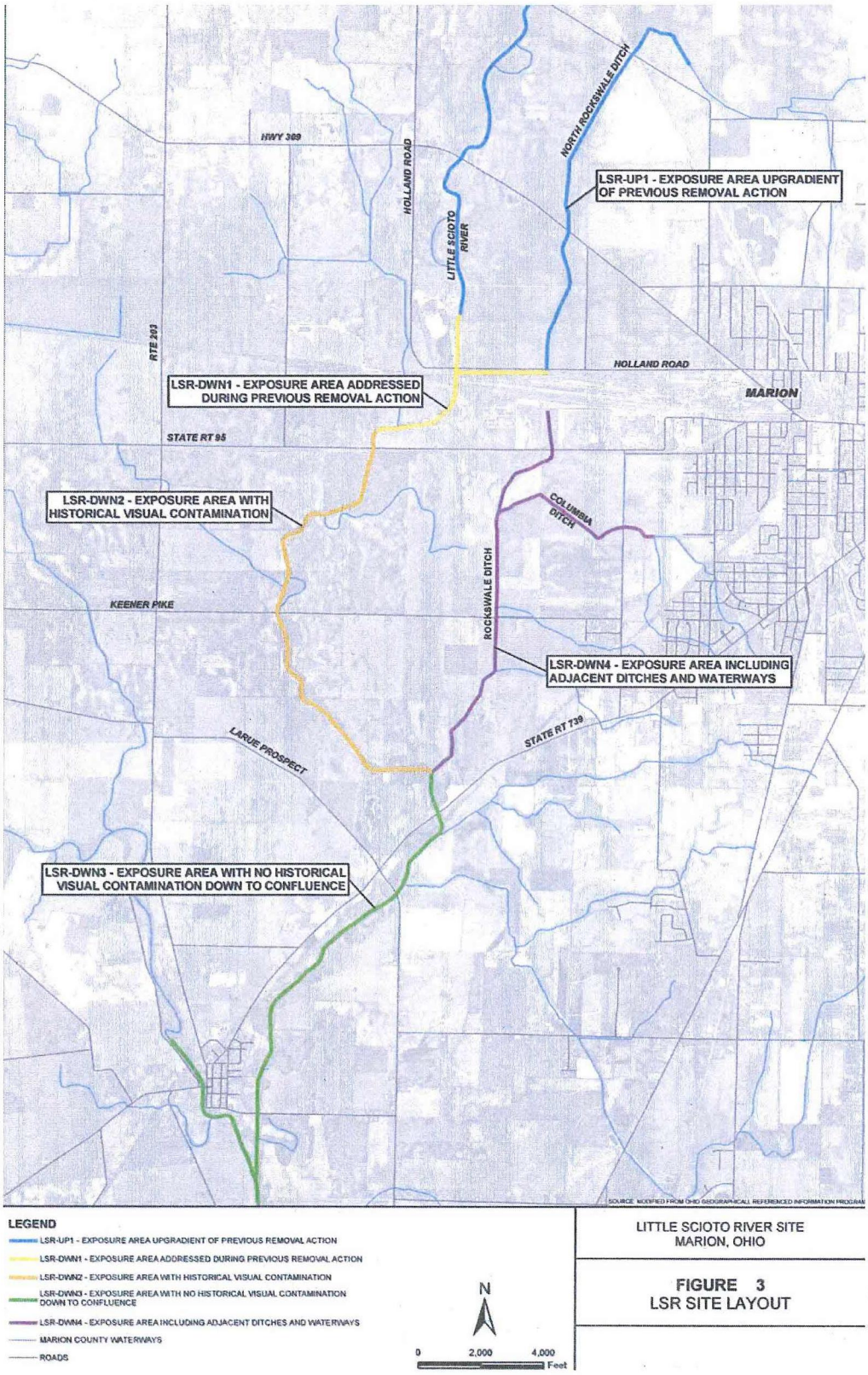
EPA developed Ecological Screening Levels (ESLs) for sediment using Ohio EPA's *Guidance on Evaluating Sediment Contamination Results* (2010) and *Sediment Reference Values* (2008). In addition, an ESL for polynuclear aromatic hydrocarbon (PAH) compounds was developed for Little Scioto River sediment whereby the total PAH concentration in a sediment sample is related to a cumulative ecological risk value. The total PAH concentration was calculated for each sediment sample by adding the concentrations of 16 individual PAH compounds (if detected over its sample quantitation limit). ESLs for surface water were developed using Ohio EPA Ohio River Basin Aquatic Life and Human Health Criteria.

EPA then divided the LSR site (OU 1) into five exposure areas (see Figure 3):

- LSR-UP1 – includes the segments of the Little Scioto River and NRD upgradient of the previous removal actions and the BWC facility
- LSR-DWN1 – includes the segments of the Little Scioto River and NRD that EPA addressed during the previous removal actions, downgradient of BWC facility
- LSR-DWN2 – is the segment of the Little Scioto River where visual contamination was identified during previous investigations, downgradient of the BWC facility

- LSR-DWN3 – is the segment of the Little Scioto River between LSR-DWN2 and its confluence with the Scioto River where no visual contamination was observed during previous investigations, downgradient of the BWC facility
- LSR-DWN4 – includes the ditches and waterways adjacent to and upgradient of the Little Scioto River, and not downgradient of the BWC facility

Figure 3: LSR Exposure Areas



The general types of contaminants in each exposure area are summarized below relative to HHSLs and ESLs:

Exposure Area LSR-UP1

- Sediment: EPA detected nine PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene) and seven heavy metals (arsenic, antimony, beryllium, copper, nickel, silver and zinc) at concentrations exceeding HHSLs and/or ESLs.
- Surface water: EPA detected cyanide and silver at concentrations exceeding their respective ESLs and no analytes that exceeded HHSLs.
- Invertebrates: EPA sampled aquatic life in the river and detected three PAHs (benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) at concentrations exceeding HHSLs.

Exposure Area LSR-DWN1

- Sediment: Despite the previous removal action, EPA detected fourteen PAHs (anthacene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluroanthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene) and eight metals (antimony, arsenic, beryllium, chromium, copper, nickel, silver and zinc) at concentrations exceeding HHSLs and/or ESLs.
- Surface water: EPA detected bis(2-ethylhexyl)phthalate) at concentrations exceeding its HHSL and ESL and copper and silver at concentrations exceeding ESLs, but no other analytes that exceeded HHSLs.
- Fish tissue: EPA detected four PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene) and arsenic at concentrations exceeding HHSLs. PAHs were detected in one fillet sample and four carcass samples and arsenic was detected in four fillet and six carcass samples.
- Groundwater: EPA did not detect PAHs at concentrations exceeding HHSLs and/or ESLs. Four metals (barium, copper, iron and lead) were detected at concentrations exceeding HHSLs and/or ESLs.

Exposure Area LSR-DWN2

- Sediment: EPA detected sixteen PAHs (2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene) and ten metals (antimony, arsenic, beryllium, cadmium, chromium, copper, mercury, nickel, silver, and zinc) at concentrations exceeding HHSLs and/or ESLs.
  - Detections of PAHs at concentrations exceeding both HHSLs and ESLs occurred throughout this entire exposure area at both surface and deeper locations.
  - Arsenic was the only metal that exceeded its HHSL in all surface and deep samples collected from this exposure area.

- Test results from five sediment samples collected from this exposure area indicate that the metals present in the sediment are bound as sulfides, which limits the bioavailability of the metals to fish and invertebrates.

- Surface water: EPA detected (bis(2-ethylhexyl)phthalate) at concentrations exceeding its HHSL and ESL.
- Fish tissue: EPA detected five PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) and arsenic at concentrations exceeding HHSLs.
- Invertebrate tissue: EPA detected seven PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, debenzo(a)anthracene, and indeno(1,2,3-cd)pyrene) and arsenic and copper at concentrations exceeding HHSLs.
- Soil (in the floodplain): EPA detected twelve PAHs (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a)anthracene, fluoranthene, fluorine, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) and seven metals (arsenic, beryllium, copper, nickel, silver, vanadium and zinc) at concentrations exceeding HHSLs and/or ESLs.
- Groundwater: EPA detected no PAHs at concentrations exceeding HHSLs or ESLs but found thirteen metals (arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, vanadium and zinc) at concentrations exceeding HHSLs and/or ESLs.

<u>Exposure Area LSR-DWN3</u>

- Sediment: EPA detected thirteen PAHs (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene) and eight metals (antimony, arsenic, cadmium, copper, mercury, nickel, silver and zinc) were detected at concentrations exceeding HHSLs and/or ESLs. Only arsenic exceeding its HHSL.
  - The highest PAH concentrations were detected at the confluence with the Scioto River at Green Camp, although upstream of the confluence the samples had much lower PAH concentrations.
  - Test results also indicate that metals present in the sediment are bound as sulfides, which limits the bioavailability of the metals to fish and invertebrates.
- Surface water: EPA detected indeno(1,2,3-cd)pyrene at concentrations exceeding its HHSL and arsenic, cyanide, and thallium at concentrations exceeding their respective HHSLs and/or ESLs.
- Fish tissue: EPA detected five PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a)anthracene, and indeno(1,2,3-cd)pyrene) and arsenic at concentrations exceeding HHSLs.
- Invertebrate tissue: EPA detected seven PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a)anthracene and indeno(1,2,3-cd)pyrene) and arsenic at concentrations exceeding HHSLs.
- Soil (in the floodplain): EPA detected thirteen PAHs (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene,

phenathrene, and pyrene) and eleven metals (aluminum, antimony, arsenic, beryllium, chromium, copper, mercury, nickel, silver, vanadium and zinc) at concentrations exceeding HHSLs and/or ESLs.

- Groundwater: EPA detected no PAHs or metals at concentrations exceeding HHSLs and/or ESLs.

Exposure Area LSR-DWN4

- Sediment: EPA detected thirteen 13 PAHs (3,3-dichlorobenzidine, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, phenanthrene, and pyrene) and eight metals (antimony, arsenic, beryllium, chromium, copper, nickel, silver and zinc) at concentrations exceeding HHSLs and/or ESLs.
- Surface water: EPA only detected bis(2-ethylhexyl)phthalate at concentrations exceeding its HHSL and ESL.

Contaminants of Concern

Based on the pervasiveness of certain chemical compounds found in samples taken at the LSR site, EPA has determined that fifteen PAH compounds and arsenic are contaminants of concern (COCs) at the site. The PAHs that are COCs include benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-c,d]pyrene, acenaphthylene, anthracene, benzo[g,h,i]perylene, fluoranthene, fluorene, phenanthrene, pyrene, and acenaphthene.

Conceptual Site Model

EPA developed Conceptual Site Models for OU 1 of the LSR site based on site characteristics and media sampling results (see Figures 4 and 5, next pages).

The primary source of contamination in OU 1 is sediment that contains elevated levels of PAHs and/or metals mostly as a result of industrial discharges from past wood treating operations at the BWC facility.

Three primary release/transport (R/T) mechanisms of COCs to affected media include:

- Suspension of contaminated sediment with subsequent redeposition downstream
- Potential dissolved-phase contamination in river water
- Leaching of contaminants from sediment to groundwater

Contaminants in sediment may either accumulated over time in depositional areas or be transported downstream as suspended solids. Chemicals adsorbed onto the sediments are primarily transported within the river system by physical processes. Import chemical and biological processes that facilitate uptake within the food chain include partitioning

coefficients, metabolic processes, and species-specific bioaccumulation or bioconcentration factors.

Flowing water is the primary transport mechanism for movement of contaminated sediment in the river and sediment transport is the primary mechanism for chemical movement.

Surface water transport mechanisms depend on the type of water body present. In the Little Scioto River, the water velocity and sediment particle characteristics are the two main factors that influence the physical movement of sediment and the chemicals adsorbed onto their surfaces.

Chemicals sorbed to sediments and organic matter may be transported in suspension or as bed load by river currents. Fine-grained material, such as silts and clays, will generally be entrained in the water column and migrate downstream as suspended solids. As water velocities increase during storm events or season runoff, coarser-grained material will become suspended or move along the river bottom as bed load. Chemicals may accumulate as deposits as river velocities decrease. After deposition, bottom sediments are subject to resuspension.

Significant R/T mechanisms at OU 1 include:

Suspension and Redeposition

Suspension and redeposition is an important R/T mechanism because PAHs are not very soluble and tend to sorb to sediment particles. PAHs are present in river sediment at concentrations above screening levels.

Figure 4: Human Health Conceptual Site Model

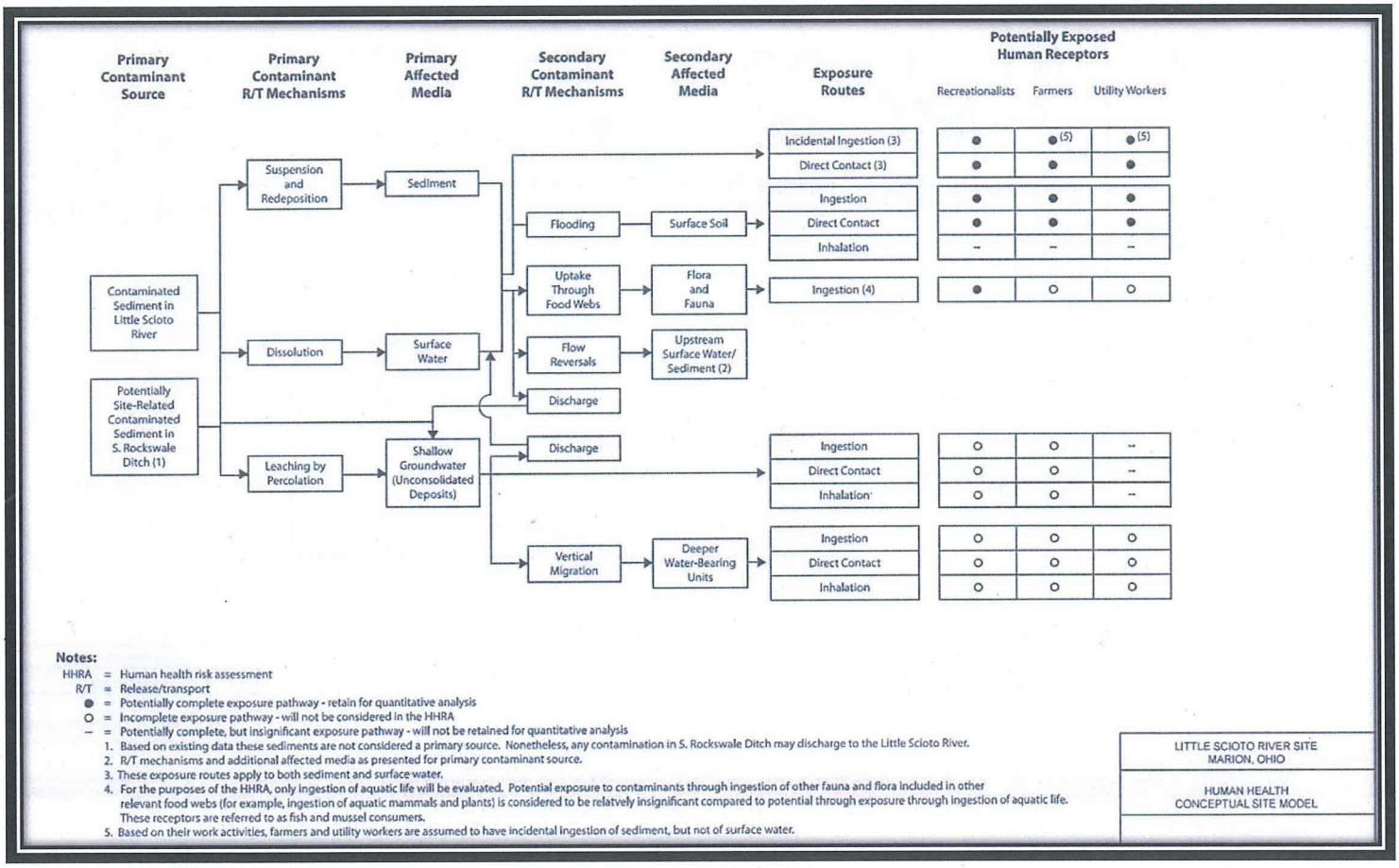
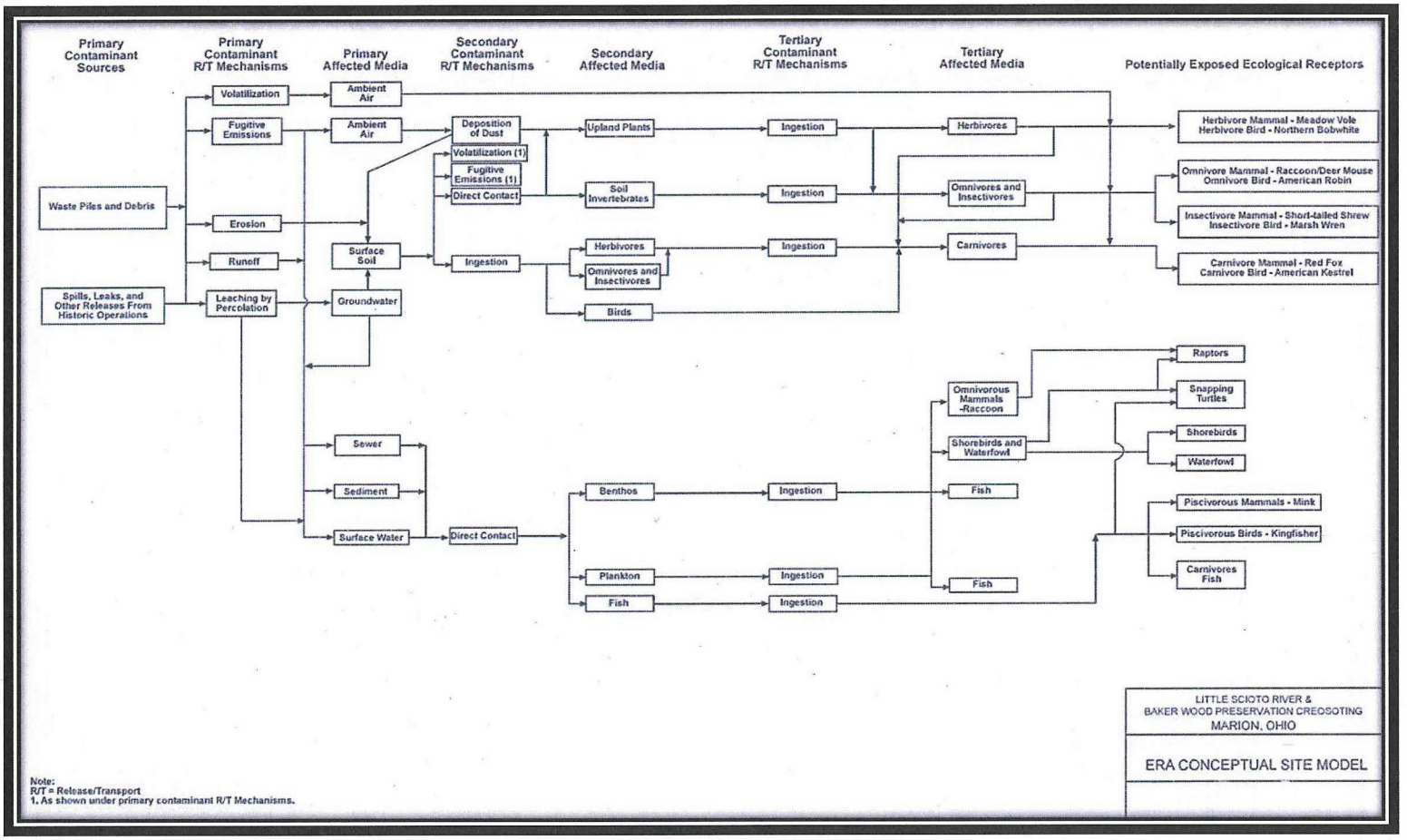


Figure 5: Ecological Risk Conceptual Site Model



Sediment samples collected both upstream and downstream of the previous removal areas indicated that flow reversals could also be transport mechanisms. Sediment and surface soil samples collected from adjacent floodplain areas contain COCs at concentrations above screening levels, indicating that river flooding and overtopping its banks may also be transport mechanisms.

Sediment to Biota (Bioaccumulation)

COC concentrations exceed screening levels in both sediment and biota samples (fish and invertebrates) are evidence of bioaccumulation. Although fish and humans are able to metabolize PAHs, the concentrations are elevated enough to be above HHSLs in fish. Although fishing is more common downstream in the Scioto River, the Little Scioto River is accessible and thus sediment to biota is a viable pathway at OU 1.

R/T mechanisms that are not significant at OU 1 include:

Sediment to Surface Water Pathway

Generally, COCs have the potential to migrate to surface water by dissolution when adsorbed to sediment particles. However, despite the widespread PAH detections in the river sediment, only bis(2-ethylhexyl)phthalate was detected in surface water samples above screening levels. Therefore, dissolution of PAHs from sediment to surface water does not appear to be a significant migration pathway at OU 1.

Cyanide, silver and thallium were detected in surface water samples at concentrations above screening levels but only silver was detected in sediment samples exceeding screening levels. Since silver was also detected in surface water samples well upstream of the previous removal actions, dissolution of inorganics from sediment to surface water also does not appear to be a significant migration pathway in OU 1.

Sediment to Groundwater

Temporary groundwater monitoring wells were installed next to the Little Scioto River and sampled to evaluate the potential for PAH contamination to migrate from sediment to shallow groundwater. The results indicate that PAHs were not present in groundwater and that only some inorganic COCs are present in shallow groundwater at concentrations exceeding screening levels. However, the majority of these elevated results were from samples collected from the temporary monitoring well cluster at State Route 95, which is located near a landfill. In addition, water levels measurements demonstrate that the river is a losing stream (the river is a recharge boundary for groundwater) in some areas and a gaining stream in others. Based on the analytical results and the variable relationship between groundwater and the LSR, migration of contaminants in sediment to shallow groundwater down not appear to be a significant migration pathway.

Sediment and Surface Water to Air

The sediment and surface water to air pathways are not considered to be significant because the OU 1 COCs are not easily volatilized.

2.6 Current and Potential Future Land and Resource Uses

The Little Scioto River (OU 1) is located west of Marion and the BWC facility in a mostly low-density residential area. There is unrestricted access to the river via agricultural fields, bridges, and state-designed recreational and wildlife areas. The river does not appear to support significant swimming or fishing activities based on site observations and perhaps because it is currently under a fish consumption advisory for all species of fish due to PAH contamination for the segments from Holland Road south to State Road 739.

Future OU 1 site use is projected to be similar to current levels, although once the PAHs in the sediment are addressed the fish consumption advisory could be revised, thereby encouraging more recreational use of the river.

2.7 Summary of Site Risks

EPA conducted baseline risk assessments to evaluate the potential for both human health and ecological risks due to LSR site-related contaminants. The human health risk assessment (HHRA) addressed potential risks to people due to ingestion of fish and mussels and/or dermal contact with contaminated sediment and surface water in the river. The ecological risk assessment (ERA) determined the potential for adverse impacts to fish, mussels, and benthic organisms due to contact or ingestion of contaminated sediment and surface water.

Floodplain soils were evaluated under several land-use scenarios and risks to human health were found only for the residential land-use scenario. The risk was an order of magnitude lower than the exposure to the sediment. It is not believed that the floodplain areas would be used in a residential capacity and was not further evaluated.

The PAHs that are COCs at the site are considered to be carcinogenic and/or toxic to humans. Arsenic is a naturally occurring element widely distributed in the earth's crust and is also considered to be carcinogenic and/or toxic to humans.

Human Health Risk Assessment

EPA evaluated human health risks for the following potential receptors at the LSR site:

- **Current and Future Recreationalist:** Current and future anglers were assumed to be exposed to sediment and surface water in the Little Scioto River via incidental ingestion and dermal contact, and to surface soil via incidental ingestion, dermal contact, and inhalation of fugitive dust.

- **Current and Future Farmers:** Current and future farmers were assumed to be exposed to sediment and surface water in the Little Scioto River via incidental ingestion and dermal contact, and to surface soil via incidental ingestion, dermal contact, and inhalation of fugitive dust.

- **Future Residents:** Future residents were assumed exposed to floodplain soil at exposure areas LSR-DWN2 and LSR-DWN3 via incidental ingestion, dermal contact, and inhalation of fugitive dust.

- **Current and Future Fish Consumer:** Current and future fish consumers were assumed to ingest fish tissue (fillets) from the river despite the existing fish advisory.

- **Current and Future Mussel Consumer:** Current and future mussel consumers were assumed to ingest mussels from the Little Scioto River despite the existing fish advisory, although the mussels collected from the river for testing were less than 1 inch in diameter.

- **Future Utility Worker:** Future utility workers were assumed to be exposed to sediment and surface water in the Little Scioto River via incidental ingestion and dermal contact, and to surface soil via incidental ingestion, dermal contact, and inhalation of fugitive dust.

In assessing the risks to humans, residential and industrial/commercial worker contaminant screening levels were based on a target excess lifetime cancer risk (ELCR) of 1×10^{-6}, or one additional instance of cancer in one million persons exposed over a lifetime, and a noncancer hazard index (HI) quotient of one (1). EPA's target risk range is 1×10^{-6} to 1×10^{-4} ELCR. The HI quotient is a way of expressing the potential for noncarcinogenic or toxic health effects that may occur due to exposure to a dose of a chemical. A HI quotient greater than one indicates that there may be a concern for potential health effects.

Table 1 gives a summary of site risks calculated for each receptor in the exposure areas (next page).

Table 1: Potential Human Health Risks for Sediment at each Exposure Area

Exposure Area	LSR-UP1	LSR-DWN1	LSR-DWN2	LSR-DWN3	LSR-DWN4
Receptor	**ECLR HI**	**ELCR HI**	**ELCR HI**	**ELCR HI**	**ELCR HI**
Recreation-alist	$< 1 \times 10^{-6}$ < 1	1.2×10^{-5} (child) < 1	1.9×10^{-4} < 1	8.8×10^{-5} (child) < 1	3.2×10^{-6} < 1
Farmer	$< 1 \times 10^{-6}$ < 1	$< 1 \times 10^{-6}$ < 1	4.2×10^{-5} < 1	1.2×10^{-5} < 1	$< 1 \times 10^{-6}$ < 1
Resident	$< 1 \times 10^{-6}$ < 1	---------- - < 1	1×10^{-3} 5.1 (child)	3.5×10^{-4} 6.4 (child)	---------- < 1
Utility worker	$< 1 \times 10^{-6}$ < 1	$< 1 \times 10^{-6}$ < 1	4.1×10^{-5} < 1	$< 1 \times 10^{-6}$ < 1	$< 1 \times 10^{-6}$ < 1
	LSR-UP1	**LSR-ALL**			
Fish Consumer	$< 1 \times 10^{-6}$ < 1	5.3×10^{-6} 1.3 (child)			
Mussel Consumer	1.7×10^{-5} < 1	1.4×10^{-4} <1			

Notes: Surface water exposure risks not included. Red = exceeds risk targets
Risks calculated for adult receptors unless noted (child).
Fish and mussel consumer risks calculated for LSR-DWN1-3 and shown as LSR-DWN-ALL.

HHRA Conclusions

Total HI quotient values are less than 1 and considered insignificant for all receptors with the following exceptions: the HI value for the child fish consumer is 1.3 (driven by potential exposure to thallium) and at LSR-DWN2 the HI value is 5.1 for the child resident (antimony) and at LSR-DWN3 the HI value is 6.4 for the child resident (antimony and arsenic).

Total ELCRs are less than 1×10^{-6} or are within EPA's target risk range for the adult farmer and adult utility worker at each exposure area.

Total ELCRs exceed EPA's target risk range for all recreational receptors in LSR-DWN2 and for residents at LSR-DWN2 and LSR-DWN3. All ELCRs are within EPA's target risk range for the other receptors at each of the exposure areas.

ELCRs are driven primarily by potential exposure of residents and recreationalists to carcinogenic PAHs in the sediment and to potential exposure to soil (in the floodplain) at LSR-DWN2 and LSR-DWN3. The likelihood of building houses in the floodplain is very low.

Primary uncertainties in the risk assessment are found in the assumptions made regarding fish and mussel consumption from the Little Scioto River - are individuals regularly fishing in the LSR and are sufficient quantities of mussels available to support the assumed mussel consumption amounts? Field sampling personnel observed no evidence of recreational fishing, including mussel collection, when sampling the river sediment. In addition, the fish species taken from the river are primarily bottom-feeders and a more recreationally attractive stream, the Scioto River, is located nearby.

The majority of the fish from which fillet samples were collected were bottom feeders (common carp and white sucker). Only single examples of sport fish (blue gill and white crappie) were caught for testing. EPA used fish ingestion rates (based on reasonable maximum exposure of the belted kingfisher) of 1.2 g/day (child), 1.3 – 2.6 g/day (adolescent), and 3.8 g/day (adult) to conduct the HHRA.

Ecological Risk Assessment

EPA evaluated the potential for adverse effects on ecological receptors by establishing baseline conditions at the site and then calculating potential impacts based on factors such as exposure levels of site contaminants and the potential effects that the chemicals could have on organisms. As for human health risks, EPA calculates a hazard quotient (HQ) for organisms, with a threshold value of 1. Generally, the higher the HQ, the greater the likelihood an effect will occur. Although probabilities cannot be specified based on a point-estimate approach, an HQ of 1 is usually regarded as indicating a low probability of adverse ecological effects. An HQ greater than 1, however, does not imply that adverse effects will occur – only that adverse effects could occur.

ERA Sediment Results

Similar to the HHRA, EPA divided the LSR site into the five exposure areas to calculate HQ values. Otherwise, habitat type, general vegetative cover, and adjacent land uses are generally consistent over the entire length of the site except for the upstream area, a portion of which is considered to be a high-quality stream. A qualitative summary follows.

LSR-UP1

For the upstream area, EPA identified 14 contaminants, including metals and PAHs, with HQs greater than 1. The metals are likely at background levels and are not derived from the BWC facility. The PAHs pose potential risks to ecological receptors, but these limited risks are not associated with releases from the BWC facility.

LSR-DWN1

For LSR-DWN1, where the sediment removal actions had occurred, EPA identified 25 contaminants, including metals and PAHs, with HQ values greater than 1. The risk from

contaminants in this area is slightly above EPA's acceptable risk range and believed to be attributable to background conditions and not the BWC facility.

LSR-DWN2

For LSR-DWN2, where visual contamination in sediment occurs, EPA identified 34 contaminants, including metals and PAHs, with HQs significantly greater than 1. Contaminants in sediment in this area may pose a significant risk to ecological receptors. PAHs are the major risk drivers and believed to be primarily attributable to the BWC facility.

LSR-DWN3

For LSR-DWN3 where no visual contamination in sediment occurs, EPA identified 29 contaminants, including metals, PAHs, and pesticides, with HQs significantly greater than 1. Sediment contaminants in this area may pose a significant risk to ecological receptors. PAHs and pesticides are the major risk drivers. The PAHs are believed to be primarily attributable to the BWC facility. The pesticides, however, are not derived from the BWC facility.

LSR-DWN4

For LSR-DWN4 (up- or side-gradient tributaries to the LSR), EPA identified 26 contaminants, including metals, PAHs, and pesticides, with HQs greater than 1. Sediments in this area may pose a significant risk to ecological receptors, and PAHs and pesticides are the major risk drivers. LSR-DWN4 is not downgradient of the BWC facility and is upgradient to LSR-DWN3. Contamination in this reach therefore is not site-related.

Sediment Summary

Based on the above results, EPA conducted an expanded SLERA that utilized limited site-specific data to further evaluate potential ecological exposures to metals and PAHs in the aquatic habitat of the Little Scioto River. Generally, the expanded SLERA concluded that metals are not likely to exhibit toxicity in the sediment because they were bound as sulfides and not bioavailable, but high levels of PAHs may have a major adverse impact on the benthic community. Further evaluation in a baseline ecological risk assessment (BERA) was considered to verify the extent of sediment toxicity and potential remedial options. However, EPA determined that the PAH sediment concentrations attributable to BWC in LSR-DWN2 and LSR-DWN3 are high enough to warrant remedial action and that collecting additional data in a BERA would not assist in the development of available remedial options or remedial goals. It was determined that the information developed in the expanded screening level ecological risk assessment (SLERA) was adequate to identify areas of concern and to determine remedial goals.

ERA Surface Water Results

For surface water, EPA found that iron and manganese had HQ values greater than 1, indicating a potential impact to aquatic receptors. However, these constituents are not associated with releases from the BWC site. The only organic constituent with a HQ value greater than 1 was bis(2-ethylhexyl)phthalate, which also is not associated with releases from the BWC facility.

ERA Conclusions

The Little Scioto River is the most ecologically valuable habitat associated with the LSR site. PAHs and several heavy metals in river sediment have HQ values greater than 1, but most of the metals are not likely to exhibit toxic effects on receptors. PAHs attributable to the BWC facility may have a major adverse impact on the benthic community in LSR-DWN2 and LSR-DWN3; and especially in exposure area LSR-DWN2 where visual PAH contamination is present. The metals and PAHs in the river sediment were found to have limited impact on mammalian and avian receptors within the area.

2.8 Remedial Action Objectives

RAOs are goals for protecting human health and the environment. RAOs are developed to address the contaminant levels and exposure pathways that present unacceptable current or potential future risk to human health and the environment.

EPA developed the following RAOs to protect the public and the environment from potential health risks posed by the PAHs in the Little Scioto River sediment:

Sediment

- Prevent direct contact with Little Scioto River sediment that contains PAHs at concentrations that exceed human health and/or ecological risk-based levels.
- Prevent ingestion of Little Scioto River sediment that contains PAHs at concentrations that exceed human health and/or ecological risk-based levels.

Tissue

- Prevent ingestion of fish or mussels containing PAHs at concentrations that exceed human health and/or ecological risk-based levels.

EPA did not develop a RAO for metals in sediment because PAHs are the major risk driver. Any remedial actions conducted in response to PAH levels in sediment would address the metals.

Target Cleanup Levels

Sediment sampling results from exposure area LSR-UP1 can be used to establish background concentrations for contaminants in exposure areas LSR-DWN1 and LSR-DWN2, as that segment was not affected by releases from the BWC facility. Similarly, exposure area LSR-DWN4 consists of waterways that are upstream of the LSR and were also unaffected by releases from BWC. Therefore, sediment sampling results from LSR-DWN4 can be used to establish a benchmark for minimum attainable concentrations in river segment LSR-DWN3, which is downstream of LSR-DWN4. Attaining lower concentrations in LSR-DWN3 than found in LSR-DWN4 could be impractical because it would likely be impacted by sediment discharge from LSR-DWN4 in the future.

Based on the extent of contamination and the receptors potentially at risk, EPA identified PAHs benzo(a)pyrene and its equivalents (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene) as COCs in sediment for human receptors. EPA also identified benzo(a)pyrene and its equivalents as COCs in sediment for ecological receptors.

Human Health Based Cleanup Levels

Rather than set PAH-specific cleanup levels, a cleanup level that addresses all the carcinogenic PAHs can be set as benzo(a)pyrene equivalents and is expressed as "BaPE." BaPE is calculated by multiplying the PAH-specific concentrations by each specific toxicity equivalency factor, and summing the results. Seven PAH toxicity equivalency factors are shown below:

Compound	Toxicity Eq. Factor
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Benzo(a)pyrene	1
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Sediment sampling results from exposure area LSR-UP1 show that the background level of PAHs is approximately 1.3 BaPE, which is an ECLR of about 5×10^{-6} for human receptors at the LSR site (based on 0.3 BaPE being a 1×10^{-6} ELCR). At LSR-DWN4, BaPE currently is 2.3, which is an ECLR of about 8×10^{-6} for human receptors. EPA believes that the appropriate PAH remediation goal would be 3.0 BaPE based on the remedial investigation data collected in LSR-DWN1 in 2011 and 2012. This limit corresponds to an ECLR of 1×10^{-5}. The river has since equilibrated with the upstream ambient surface water since the river cleanups in 2002 and 2006 and meets these ECLR levels. These BaPE levels would yield protective cleanup levels for downstream

segments of the Little Scioto River because the calculated ELCRs would fall within EPA's target risk range of $1x10^{-6}$ to $1x10^{-4}$ ELCR.

Ecologically-Based Cleanup Levels

The background total PAH level for sediment in LSR-UP1 is 2 milligrams/kilogram (mg/kg or "parts per million" (ppm)) and for LSR-DWN4 is 31 ppm. Ohio EPA refers to consensus-based sediment quality guidelines developed by MacDonald and others as a source for sediment remediation goals, and these guidelines are based on the total PAH concentrations in sediment. These guidelines provide threshold effects concentrations (TEC) and probable effects concentrations (PEC). The PEC values are based on lowest observed adverse effect levels and reflect concentrations above which impacts are likely to be observed. Consistent with other Ohio Superfund sites that have developed approved remedial action cleanup goals, EPA recommends the PEC sediment quality guideline of 22.8 ppm total PAHs be the target cleanup levels for exposure areas LSR-DWN1 and LSR-DWN2, and that 31 ppm total PAHs be the target cleanup level for LSR-DWN3.

Table 2: Preliminary Remediation Goals

PROPOSED PRELIMINARY REMEDIATION GOALS (PRG) FOR SEDIMENT

Contaminant	Human Health Risk Levels				Ecological Risk Level	BTV (UP1)	BTV (DWN4)	1E-06, HQ=1		1E-05, HQ=1	
	1E-06	1E-05	1E-04	HQ=1				PRG (DWN1 and DWN2)	PRG (DWN3)	PRG (DWN1 and DWN2)	PRG (DWN3)
Human Health											
Arsenic	8.5	85	850	360	-	8.6	11	8.6	11	85	85
BaPE	0.3	3.0	30	-	-	1.3	2.3	1.3	2.3	3.0	3.0
Ecological											
Total PAHs	-	-	-	-	22.8	2.0	31	22.8	31	22.8	31
Silver	-	-	-	-	NA	-	-	-	-	-	-
Antimony	-	-	-	-	NA	-	-	-	-	-	-
Beryllium	-	-	-	-	NV	3.7	3.1	3.7	3.1	3.7	3.1

Notes:

All PRGs are in units of milligrams per kilogram (mg/kg).

BaPE Benzo(a)pyrene equivalents were calculated using one-half the detection limit for non-detect samples.
BTV Background threshold value
PAH Polynuclear aromatic hydrocarbons
ESBTU Equilibrium Partitioning Sediment Benchmark Toxic Unit
HQ Hazard quotient
NA These two metals were included in the AVS/SEM analysis of the overall metals in the sediment and determined not to be expected to exhibit any toxicity based on a lack of bioavailability. These metals should not be included in the list of chemicals of ecological concern.
NV There are no toxicity-based sediment criteria or values. The only value provided by Ohio EPA (2008 and 2010) is a reference value, which is similar to a background levels. Therefore, either the background value is used as a PRG, or no PRG is set for beryllium.
PRG Preliminary remediation goal

The heavy metals silver, antimony, and beryllium were identified as potential COCs for ecological receptors. However, investigations showed that silver and antimony were not biologically available and therefore are not considered a health risk or COCs. The further evaluation of the sediment data noted that the metals are not likely to exhibit toxicity in the sediment due to lack of bioavailability, but the PAHs may well have a major impact

on the benthic community, specifically LSR-DWN2. The background level for beryllium is 3.7 ppm in LSR-UP1. The only exposure area that exceeds this concentration is LSR-DWN1, where EPA's removal actions were conducted. Here, beryllium levels were measured at about 4 ppm and 6.7 ppm in two sample areas, which are nearly at its background level.

Sampling locations where site COCs exceed cleanup goals in river segments LSR-DWN1, LSR-DWN2 and LSR-DWN3 are shown in Figures 5-7 (next pages).

Figure 5: PAH/BaPE Concentrations in LSR-DWN1

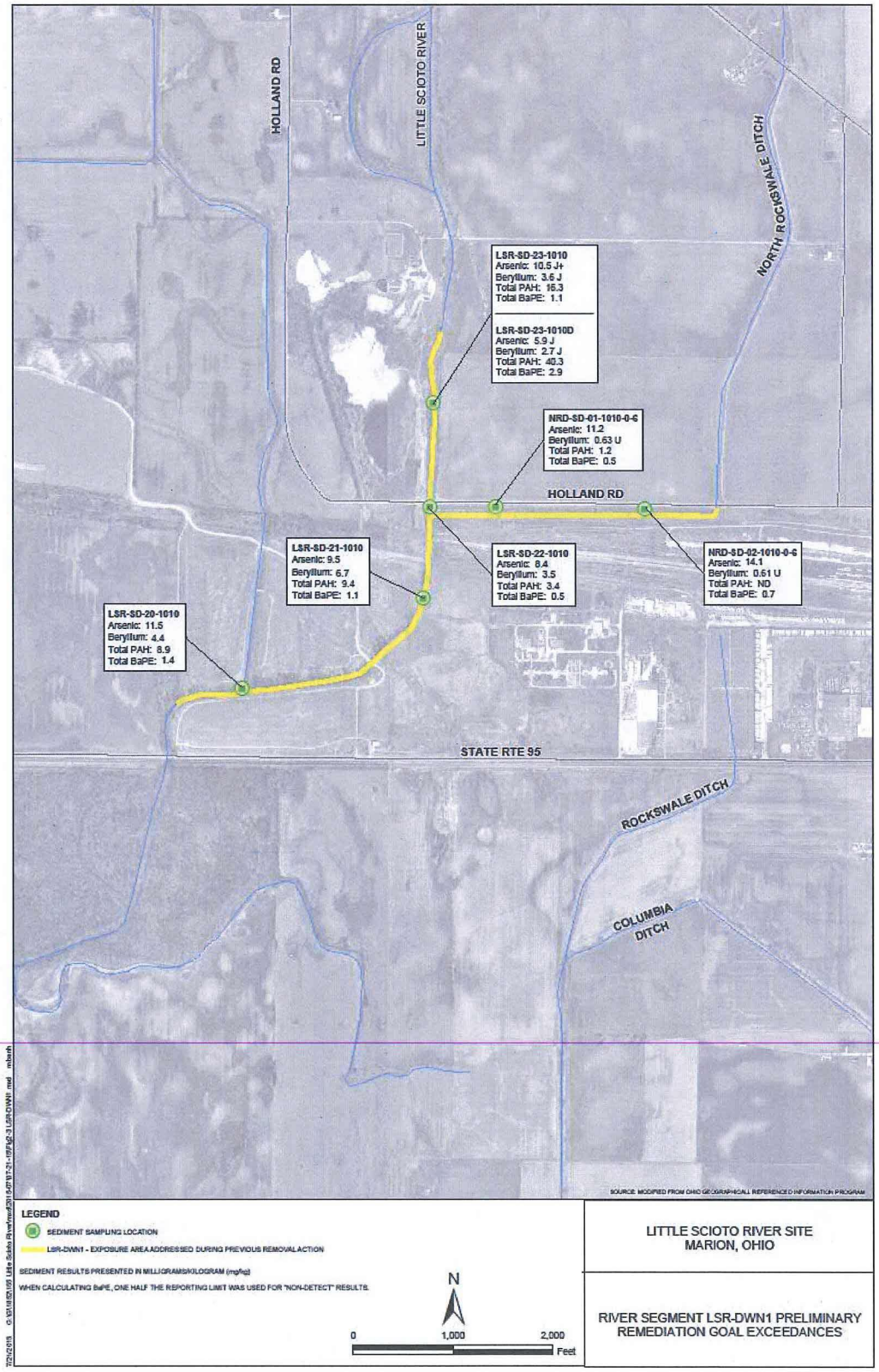


Figure 6: PAH/BaPE Concentrations in LSR-DWN2

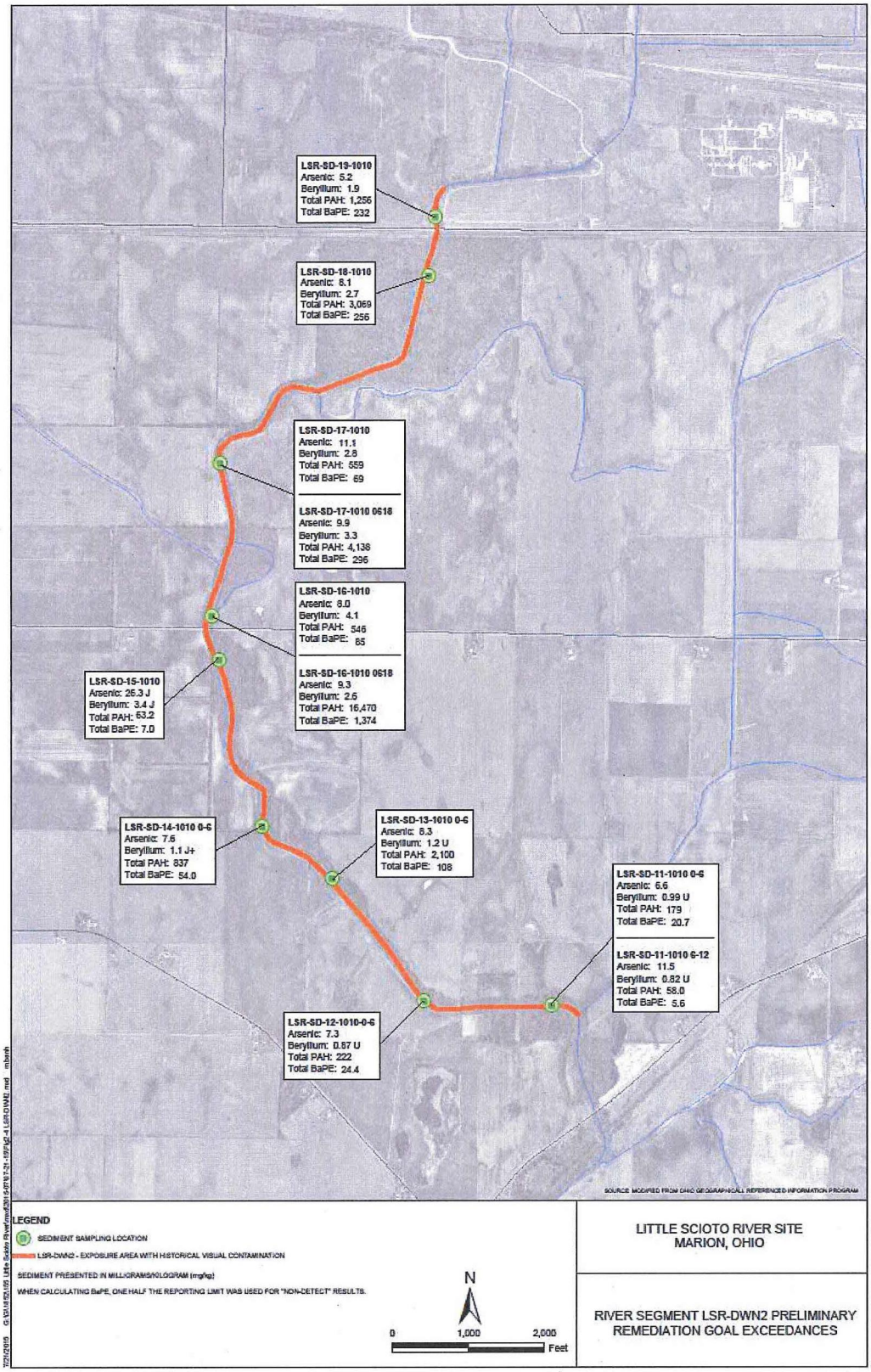
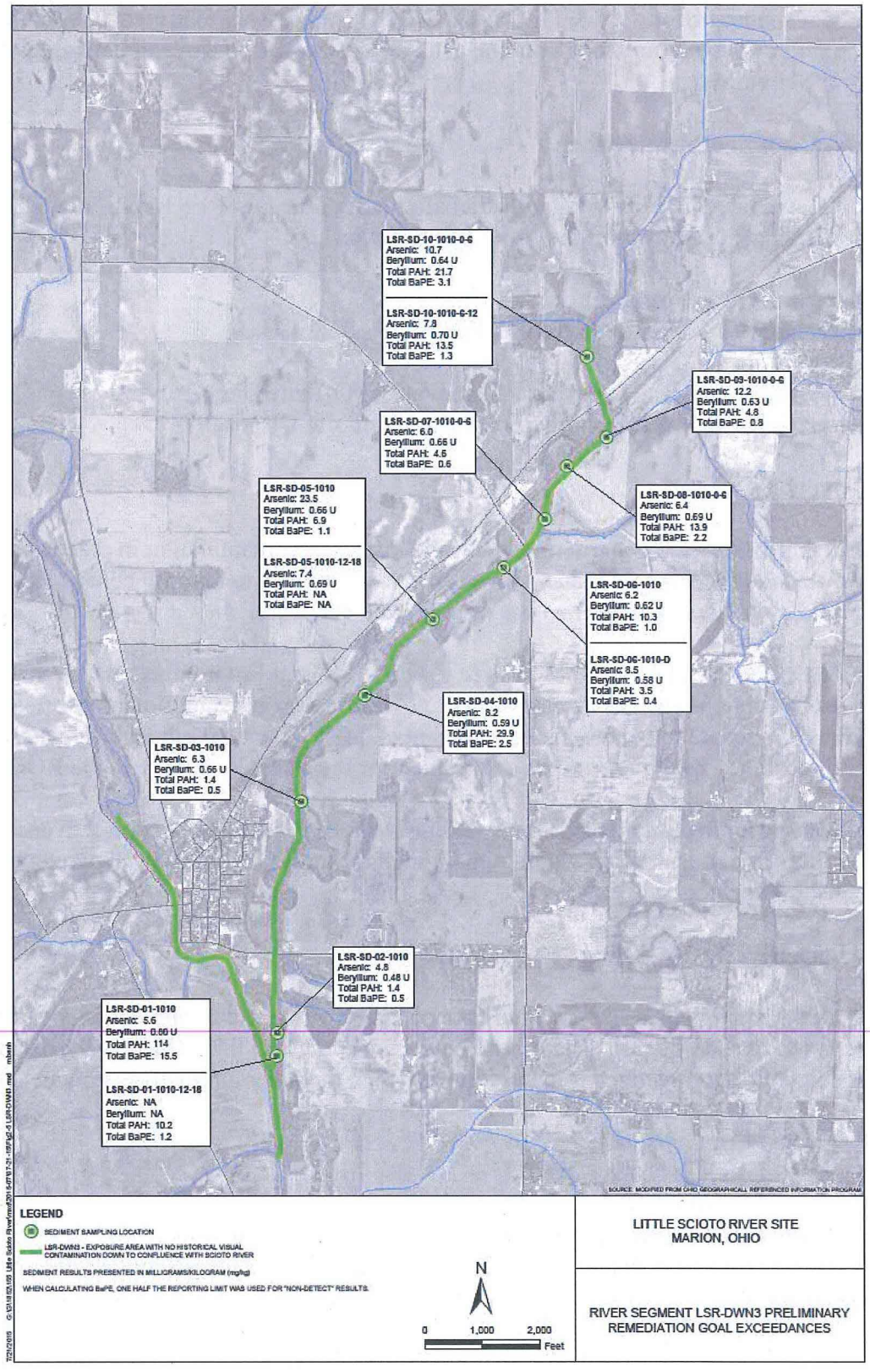


Figure 7: PAH/BaPE Concentrations in LSR-DWN3



Basis For Taking Action

The response action selected in this OU1 ROD is necessary to protect the public health or welfare or the environment from the actual or threatened releases of hazardous substances to the environment.

2.9 Description of Alternatives

EPA evaluated the following remedial alternatives the OU 1 FS Report to address PAH-contaminated sediment in the Little Scioto River:

Alternative 1 - No Action
Alternative 2 - Monitored Natural Recovery
Alternative 3 - Capping
Alternative 4a - Dry Excavation Removal and Off-site Disposal
Alternative 4b - Wet Dredge Removal and Off-site Disposal

Common elements

All alternatives, except Alternative 4a and 4b, leave contamination in place and therefore would require EPA to conduct five-year reviews at the site because contaminants levels would not allow for unlimited use or unlimited exposure.

Alternatives 2 and 3 would use ICs (*e.g.* Ohio Uniform Environmental Covenant Act deed restrictions such as an easement or covenant; fish consumption advisories) to limit human exposure to contaminated sediment and fish. The type of restriction and enforceability would need to be determined for the selected remedy in the ROD.

However, none of the remedies rely exclusively on ICs to achieve protectiveness. The IC limiting fish consumption would remain in place until fish sampling showed that human consumption was safe.

Alternative 1: No Action

Under this alternative, EPA would take no action at the site to prevent exposure to the sediment contamination. There is no cost associated with this alternative. This alternative is developed and retained as a baseline to which the other alternatives may be compared.

Estimated Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $0
Estimated Construction/Implementation Timeframe: None
Estimated time to Achieve RAOs: Does not achieve RAOs where contaminated sediment remains

Alternative 2: Monitored Natural Recovery (MNR)

Under this alternative, EPA would rely on the natural processes of sediment erosion, dispersion, deposition and mixing over time to achieve cleanup levels for PAHs in the river sediment. High molecular weight carcinogenic PAHs would biodegrade very slowly and metals do not biodegrade. Thus, this process would not be expected to reduce contaminant levels significantly compared to deposition, dispersion and mixing. Water movement in the river would either remove contaminated sediment and disperse it downstream or contain contaminated sediment by depositing new sediment layers on top. EPA would need to monitor (take samples) contaminant levels in sediment potentially for decades to evaluate the progress of recovery.

Alternative 2 would apply to exposure area LSR-DWN3 only because contaminant levels in LSR-DWN2 are too high for MNR to be feasible. At LSR-DWN3 contaminant levels are relatively low and are not of wide extent, making MNR feasible.

EPA would implement ICs such as bans or advisories against recreational activities such as fishing in the Little Scioto River. Signs informing the public of bans or advisories would be posted at all river access points and along riverbanks. A chain-link fence would restrict access to the river from private property. The ICs would remain in place until the sediment no longer poses an unacceptable risk.

Estimated Capital Cost: $0.4 MM
Estimated Annual O&M Cost: $1.4 MM
Estimated Total Present Worth Cost: $1.8 MM
Estimated Construction/Implementation Timeframe: decades
Estimated time to Achieve RAOs: decades

Alternative 3: Capping

Under this alternative, EPA would place a sand or a clay-aggregate composite layer over contaminated sediment in the Little Scioto River. In LSR-DWN2 and LSR-DWN3, contaminated sediment would first be removed so that placement of an 18-inch thick cap over the remaining contaminated sediment layer would not impede future river flow.

The approach for each river segment is detailed below:

LSR-DWN2: An 18-inch cap would be installed in the entire segment after removing 2 feet of contaminated sediment (approximately 45,000 cubic yards). During the RI, sheen was observed in LSR-DWN 2, suggesting the presence of nonaqueous-phase liquid. Where residual nonaqueous-phase liquid is present, the cap would be double-layered, with a reactive layer overlain by aggregate. The reactive layer would contain an oleophilic material such as organoclay designed to absorb and limit the migration of any nonaqueous-phase liquid. Fill material such as sand or a clay-aggregate blend would be placed over the reactive layer providing a habitat for benthic organisms. EPA would annually inspect the cap for damage and sample the surface for COCs.

The contaminated sediment would be mechanically dredged and the cap would be installed under submerged conditions. Turbidity in the water column would be controlled using dredging polymers and turbidity screens. Remediation-derived wastewater would be treated on site and discharged back into the river. Dredged material would be stockpiled and dewatered, and then characterized and transported off site for disposal at an appropriate licensed facility. Any wetland areas damaged during remediation would be restored. Native vegetation would be restored in areas disturbed during construction.

LSR-DWN3: The approach for capping LSR-DWN3 is the same as for LSR-DWN2, except that a lower volume of contaminated sediment (about 24,000 cubic yards) is projected to be removed. Where residual nonaqueous-phase liquid is present, the cap would be double-layered, with a reactive layer overlain by aggregate. Also, the cap would only be placed where contaminant levels exceed target cleanup levels and not over the entire segment.

To protect the caps, EPA would place ICs to prohibit recreational activities that could damage the capped areas. Signs would be posted at all access points and on riverbanks along capped areas. Existing permitting mechanisms would be used to control activities such as dredging. The same mechanisms would be used to restrict or place conditions on construction that may compromise the remedy.

Estimated Capital Cost: $22.0 MM
Estimated Annual O&M Cost: $5.7 MM
Estimated Total Present Worth Cost: $27.7 MM
Estimated Construction/Implementation Timeframe: 4 construction seasons
Estimated time to Achieve RAOs: more than 24 months

Alternative 4a: Dry Excavation Removal and Off-Site Disposal

Alternative 4b: Wet Dredge Removal and Off-Site Disposal

Under the dry excavation and wet dredge alternatives, EPA would remove sediment that exceeds target cleanup levels for PAHs, dewater it, and dispose of it at an appropriate licensed facility. Sediment would be removed using conventional removal techniques after flow is diverted and the segment is dewatered ("dry excavation") in Alternative 4a, or by mechanically dredging it under submerged conditions ("wet dredging") in Alternative 4b.

For dry excavation, Alternative 4a, work would be conducted from August through October when flows are typically lowest. Temporary sheet piling would be used to sequentially isolate each river segment and water would be diverted around the isolated segments using large mobile pump stations. Surface water in the isolated segment would be allowed to drain and conventional earthmoving equipment would be used to excavate contaminated sediment. A clean sand or clay aggregate fill layer would then be placed to provide a habitat for benthic organisms. The excavation option is more precise than

mechanical (wet) dredging and removal would be more complete. The work would be completed in 3-5 years.

For wet dredging, Alternative 4b, sediment removal is mechanically done in wet conditions. The sediment is removed while the river is flowing. Land-based equipment would be used to remove the sediment from the river. Dredging polymers and screens would be used to control turbidity. Clean fill, such as sand or a clay-aggregate, would be placed over the areas in submerged conditions where the sediment was removed. A reactive organoclay could also be placed on the river bottom beneath the clean fill layer if contamination is present. The wet dredging option is less precise than dry dredging and could leave some contaminated sediment in place. The work would be completed in 1-3 years. Confirmation sampling would be done after the remediation work to determine if contaminated sediment is still present.

Both alternatives would stockpile the removed material where it would be dewatered, characterized and transported off-site for disposal. The maximum thickness of the fill layer would depend on bank slope stability and the topography of adjoining riverbeds. Fill material would be graded to provide gradual transitions and a somewhat uniform surface, allowing for islands or shallow pools where appropriate. Remediation derived wastewater would be treated on-site and discharged to the river.

Any wetland areas damaged during remediation would be restored. Native vegetation would be restored in areas disturbed during construction.

Fish would continue to be sampled after remediation is complete.

The estimated volumes for each river segment are given below:

LSR-DWN2: The average thickness of sediment in LSR-DWN2 is 53 inches, but PAH contamination may not extend to the full sediment column. Further sampling during the remedial design phase will refine the amount of sediment to remove, but assuming that the full thickness of sediment will be removed, the total volume in LSR-DWN2 is approximately 98,000 cubic yards. Bank-to-bank sediment removal is anticipated, but actual extent will be determined during design.

LSR-DWN3: The average thickness of sediment in LSR-DWN3 is 40 inches, but only some of it may be contaminated. Further sampling during the design will refine the amount of sediment to remove. Assuming that all sediment within a targeted footprint will be removed, the total volume in LSR-DWN3 is approximately 39,000 cubic yards.

The estimated cost for Alternative 4a, which includes dry excavation work at the three river segments, is:

Estimated Capital Cost: $34.8 MM
Estimated Annual O&M Cost: $0.7 MM
Estimated Total Present Worth Cost: $35.5 MM
Estimated Construction/Implementation Timeframe: 5 construction seasons
Estimated time to Achieve RAOs: more than 42 months

The estimated total present worth cost for Alternative 4b, which includes mechanical dredging in wet conditions, is $39.7 MM and would be completed in 2-4 years.

2.10 Comparative Analysis of Alternatives

EPA to use nine criteria to evaluate and compare cleanup alternatives. Each criterion is described below, followed by a discussion of how each alternative meets or does not meet each criterion. More details regarding the evaluation and comparison of the cleanup alternatives against the nine criteria can be found in the 2015 OU1 FS Report. In addition, Table 3 provides a qualitative summary of how each cleanup alternative ranked against each of the nine criteria.

Table 3: Comparison of Remedial Alternatives against the Nine Criteria

Evaluation Criteria	Sediment Alternatives				
	1	2	3	4a	4b
Overall protection of human health and the environment	☐	☐	■	■	■
Compliance with ARARs	N/A	■	■	■	■
Long-term effectiveness and permanence	☐	☐	◻	■	■
Reduction of toxicity, mobility, or volume through treatment	☐	☐	☐	☐	☐
Short-term effectiveness	■	◻	■	■	■
Implementability	■	■	■	■	■
Cost	■	■	■	■	■
State Support/Agency Acceptance	☐	☐	☐	■	◻
Community Acceptance	☐	☐	☐	■	◻
Fully meets criterion ■	Partially meets criterion ◻		Does not meet criterion ☐		

1. Overall Protection of Human Health and the Environment

The No Action alternative where contaminated sediment remains is not protective of human health and the environment because no action would be taken to prevent human

receptors from contacting or ingesting the PAH contaminants in the sediment and/or in fish and mussel tissue.

The action alternatives would be protective of human health and the environment because actions would be taken to prevent receptors from contacting or ingesting the PAH contaminants in the sediment, either by removing it (Alternatives 4a and 4b), capping it (Alternative 3), or allowing for natural erosional forces and/or accretion to disperse or cover it (Alternative 2). Over time, contaminant concentrations in fish and mussel tissue would decrease.

2. Compliance with ARARs

There are no ARARs that apply to the No Action alternative.

Alternatives 2, 3, and 4a and 4b would meet all potential ARARs that would apply to the various technologies or approaches. Contaminated sediment removed for disposal would need to be classified so that it could be properly disposed of in a licensed facility.

3. Long-Term Effectiveness and Permanence

Alternatives 4a and 4b would be the most effective in the long term because they would permanently remove all PAH-contaminated sediment above target cleanup levels from the river for disposal offsite. Alternative 4a is expected to be more effective at removing contaminated sediment than Alternative 4b.

Alternative 3 would be less effective than Alternatives 4a and 4b in the long term because it would leave contaminated sediment in place and rely on the integrity of a cap to contain that sediment. It would also be less permanent because a breach in the cap could cause recontamination.

Alternative 2 would be the least effective in the long term because MNR would take a very long time to attain the RAOs in LSR-DWN3 and it is not feasible at all for LSR-DWN2.

The No Action alternative would not be effective because nothing would be done to address the contaminants in the sediment.

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

None of the alternatives use treatment methods to reduce the toxicity, mobility or volume of contaminants in the sediment.

5. Short-Term Effectiveness

Alternatives 3, 4a, and 4b would have comparable short-term effectiveness because they would quickly address the immediate risk posed by contaminated sediment, although they would cause short term disruption of the river bed environment during construction. Both

Alternatives 4a and 4b and Alternative 3 are estimated to take multiple years to implement, with Alternative 4a estimated to take the greatest amount of time to complete.

Alternative 2 has lesser short-term effectiveness because sampling methods are not disruptive of the river bed environment, but MNR would not address risks posed by contaminated sediment as quickly as Alternatives 3 and 4a and 4b.

Alternative 1 requires no time to implement and would have no short term impacts on the site because it includes no construction activities.

6. Implementability

The No Action alternative is readily implementable because nothing would be done to address sediment contaminants.

Alternative 2 is readily implementable because sampling sediment is routinely conducted. People and supplies are readily available to perform the work.

Alternatives 3 and 4a and 4b would be more difficult to implement than Alternative 2, as they are labor-intensive and the river presents a challenging environment for construction. However, people and materials are readily available and dredging is routinely conducted by contractors.

7. Cost

Table 4 summarizes the capital, annual operation and maintenance (O&M), and present worth costs for each alternative.

Table 4: Cost Comparison for the Remedial Alternatives

	Alternative	Capital Cost (in millions)	Annual O&M Cost (in millions) (30 years)	Total Present Worth Cost (in millions)
1	No Action	$ 0	$ 0	$ 0
2	MNR	$0.4	$1.4	$1.8
3	Capping	$22.0	$5.7	$27.7
4a	Excavate	$34.8	$0.7	$35.5
4b	Dredge	$39.0	$0.7	$39.7

8. State Support/Agency Acceptance

Ohio EPA, as the support agency for the LSR Superfund site, indicated concurrence with this ROD on April 28, 2016. The state's concurrence letter will be added to the Administrative Record upon receipt.

9. Community Acceptance

Written comments received during the public comment period expressed a preference for Alternative 4a. A full response to public comments is included in this ROD in *Part 3 – Responsiveness Summary*.

2.11 Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

EPA has not identified any principal threat wastes at OU 1 of the LSR site. The concentrations of PAHs in sediment at OU 1 are considered to be low-level threat waste material. The concentrations of PAHs that were found at OU 1 are below levels that would be expected to exhibit hazardous waste characteristics.

2.12 Selected Remedy

EPA selects Alternative 4a (Dry Excavation and Off-Site Disposal) to address the COCs in the Little Scioto River sediment.

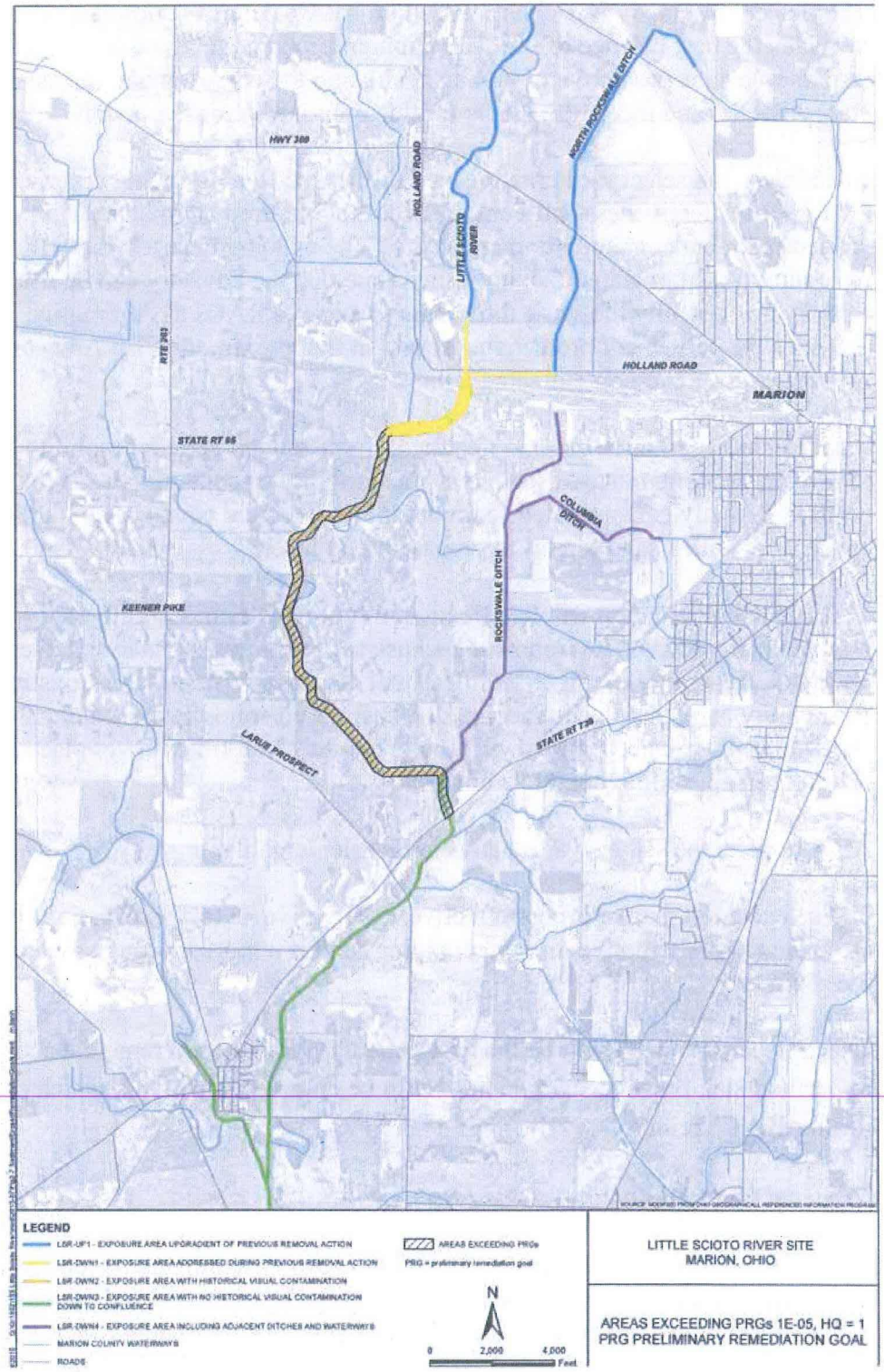
Description of the Selected Remedy

In segment LSR-DWN1, EPA plans on taking 'No Action' since this segment of the river was remediated by removing PAH-contaminated sediment in 2002 and 2006 and a clean fill layer was put in place at that time.

EPA's selected alternative is Alternative 4a to address COCs in LSR sediment from all of segment LSR-DWN2 and part of segment LSR-DWN3 which exceeds the 1×10^{-5} ELCR level (see Figure 8). The PAH contamination found at the confluence of the Little Scioto River to the Scioto River would remain since it meets the 1×10^{-5} ELCR level. This contamination likely occurred due to backflow from the Scioto River to the Little Scioto River or from water runoff from Green Camp into the river. This action provides a clean sediment layer to allow for a healthy benthic community in the river. The selected alternative's costs, maximum construction timeframes, and maximum time to achieve RAOs are shown below:

Estimated Capital Cost: $34.8 MM
Estimated Annual O&M Cost: $0.7 MM
Estimated Total Present Worth Cost: $35.5 MM
Estimated Construction/Implementation Timeframe: 3-5 dry seasons
Estimated time to Achieve RAOs: 5 years (sediment)

Figure 8: Areas to be addressed by the preferred alternative



Rationale for the Selected Remedy

The Selected Remedy was chosen based on EPA's determination that Alternative 4a provides the best balance of the evaluation criteria among all of the alternatives. Alternative 4a is protective of human health and the environment, meets all federal and state ARARs, and meets the RAOs for this proposed remedial action.

In addition, the selected alternative best fulfills the five balancing criteria. With respect to Long-term Effectiveness and Permanence, the preferred alternative will permanently reduce sediment contamination at the site. The existing Fish Advisory IC will prevent exposure to contaminated fish until such time that the advisory can be lifted. The selected remedy has virtually the same timeframe to achieve RAOs as Alternative 3, but it provides for permanent protectiveness and in the interim, the Fish Advisory IC will prevent exposure to contaminated fish.

The selected alternative uses no treatment to reduce the toxicity, mobility or volume by removing the contaminated sediment. The mobility of contaminants is limited through removing highly contaminated sediment in the river and covering contaminated sediment in the river with a sand or clay aggregate-blend layer.

The selected alternative will be effective in the short term. This alternative would protect human health and the environment because sediment posing unacceptable risk would be removed. Removing the river sediment will disrupt or eliminate the existing benthic community and temporarily increase the suspended solids in the water column in the short-term. However, benthos will recolonize the clean fill or cover placed on these areas resulting in a healthier benthic community.

All actions in the selected alternative are implementable.

The selected alternative is cost-effective. Alternative 4a (dry excavation) is more cost effective than Alternative 4b (wet dredging) and is a more thorough method of removing the sediment.

This Selected Remedy will be the first remedial decision and remedial action for the LSR Superfund site. An investigation has yet to be completed at OU 2, which consists of the former BWC facility

Expected Outcomes of the Selected Remedy

The Selected Remedy will reduce the risks to human health and the environment to levels within EPA's acceptable risk range by removing contaminated sediments from the river and disposing the contaminated sediment off-site. The sediments RAOs that were established for the OU1 remedial action will be met immediately upon completion of the remedial action construction work. The fish tissue RAOs will be met some time after the completion of the remedial action as determined by post-construction fish tissue sampling.

Cost of the Selected Remedy

The estimated cost of implementing the Selected Remedy is $35.5 million. This is based upon anticipated capital costs of $34.8 million and annual operation and monitoring costs of $0.7 million. The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.13 Statutory Determinations

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The Selected Remedy Alternative 4a, provides overall protection of human health and the environment from impacted soils. The Selected Remedy will meet RAOs and protect human health by preventing exposure to impacted soil through removal of site contaminants.

The maximum current potential human health risks associated with soil exceed the target levels of acceptable risk at the site. The Selected Remedy will reduce the cancer risks from their current levels to 1×10^{-5} and the non-cancer Hazard Index to less than 1.0. There are no short-term threats associated with the Selected Remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy is expected to comply with the state and federal ARARs that are specific to this remedial action. The federal and state ARARs for this action are listed in Appendix 3.

Cost-Effectiveness

In EPA's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (40 C.F.R. § 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is $35.5 million. Removing all the contaminated sediment from the river will be the most protective of human health and the environment. Capping the sediment will still require partial removal of the sediment and placing the cap material over the contaminated sediment will cost slightly less than removing all the sediment. MNR for LSR-DWN 3 and excavation for the same area is essentially the same cost. Therefore, the Selected Remedy is cost-effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable/Preference for Treatment as a Principal Element

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering state and community acceptance.

The Selected Remedy satisfies the criteria for long-term effectiveness by removing PAH-contaminated sediment from the river and replacing it with clean fill material. None of the alternatives evaluated for this decision utilize treatment to reduce the toxicity, mobility, or volume of the contaminants in soil. The sediment contamination at OU 1 does not lend itself to any cost-effective treatment.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants being excavated and removed off-site, there will be no requirement to conduct five-year reviews after the remedy is completed. The site will meet the requirements of Unlimited

Use and Unrestricted Exposure (UU/UE). UU/UE means that there are no restrictions placed on the land or other natural resources.

2.14 Documentation of Significant Changes

EPA released the Proposed Plan for OU 1 of the LSR Superfund site for public comment on February 22, 2016. The Proposed Plan identified Alternative 4a as the preferred alternative. The Proposed Plan public comment period ran from February 22, 2016, through March 23, 2016. CERCLA Section 117(b) and 40 C.F.R. § 300.430(f)(5)(iii) require an explanation of any significant changes from the remedy presented in the Proposed Plan that was published for public comment. Based upon its review of the written and oral comments submitted during the public comment period, EPA has determined that no significant changes to the remedy, as originally identified in the Proposed Plan, are necessary or appropriate.

Part 3 – Responsiveness Summary

In accordance with CERCLA Section 117, 42 U.S.C. Section 9617, EPA released the Proposed Plan and Administrative Record on February 22, 2016, and the public comment period ran through March 23, 2016, to allow interested parties to comment on the Proposed Plan.

This Responsiveness Summary provides both a summary of the public comments EPA received regarding the Proposed Plan and EPA's response to those comments. EPA received seven written comments (via regular mail and email) during the public comment period, all supportive of the proposed remedy. A copy of the comments received is included in the Administrative Record for the site. The Administrative Record index is attached as Appendix 2 to this ROD. EPA, in consultation with Ohio EPA, carefully considered all of the information in the Administrative Record prior to selecting the remedy documented in this ROD. Complete copies of the Proposed Plan, Administrative Record, and other pertinent documents are available at the Marion Public Library, 445 E. Church Street, Marion, Ohio and at the EPA Region 5 Superfund Division Records Center, 77 West Jackson Boulevard, 7th floor, Chicago, Illinois.

General Comments from the Community:

Comment:
Community members supported the cleanup action at OU 1. Responses were favorable for both Alternatives 4a and 4b.

Response:
EPA appreciates the responses from the community and their support for the cleanup action at OU 1.

Appendix 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR THE
LITTLE SCIOTO RIVER SITE
OPERABLE UNIT 1
MARION, MARION COUNTY, OHIO

ORIGINAL
DECEMBER, 2015
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	323612	9/4/46	Waring, F.H., Ohio Department of Health	Uncapher, E.O., City of Marion Water Dept.	Letter re: 8/22/46 Site Investigation- Reference #15A	2
2	323609	2/13/53	Porterfield, J., Ohio Department of Health	Hamilton, R.M., Baker Wood Preserving Co.	Letter re: Permit No. 636 for Baker wood Preserving Co.- Reference #14D	1
3	323610	3/27/56	Waring, F.H., Ohio Department of Health	Harper, W., City of Columbus Water Utility	Letter re: 3/9/59 Complaint Investigation- Reference #14E	2
4	323611	4/29/58	Waring, F.H., Ohio Department of Health	Shawhan, H., Baker Wood Creosoting	Letter re: 4/17/58-4/18/58 Site Investigation - Reference #14F	2
5	323602	1/1/61	U.S. Geological Survey	File	7.5 Minute Series Topographic Map- Reference #4	2
6	323601	1/1/70	U.S. Geological Survey	File	7.5 Minute Series Topographic Map- Revised- Reference #3	2
7	323599	12/14/90	U.S. EPA	File	Hazard Ranking System Final Rule- 40 Code of Federal Regulations Part 300, Appendiz A, FR 51533 Reference #1	139
8	323600	12/14/90	U.S. EPA	File	Superfund Chemical Data Matrix- January 2004 Excerpt- Reference #2	40
9	323619	1/1/95	U.S. Dept. of Interior	File	Wetlands Inventory Map- Prospect, Ohio- Reference #23	2

10	323620	1/1/95	U.S. Dept. of Interior	File	Wetlands Inventory Map- Marion West, Ohio- Reference #22	2
11	323608	10/30/96	Ohio EPA	Dyncorp	Letter re: Baker Wood Creosoting Case Number 25113 (With Attachments)	344
12	325151	3/5/98	Ohio EPA	File	Integrated Assesment Report- Reference #13	26
13	323607	3/5/98	Ohio EPA	File	Integrated Assesment Report- Baker Wood Creosoting Site- Reference #14B	52
14	323621	9/8/98	Snyder, S., Ohio EPA	U.S. Coast Guard	Letter re: Request for Sample Analysis (With Attachments)- Reference #25	12
15	325152	4/20/99	Durno, M., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum re: Request for Time-Critical Removal Action at Baker Wood Creosoting Site ***(Portions of this document have been redacted)***	16
16	268958	4/30/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #1- Initial- Funded Time Critical Removal	4
17	268957	5/7/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #2- Funded Time Critical Removal	4
18	268956	5/13/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #3- Funded Time Critical Removal	3
19	268955	5/21/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #4- Funded Time Critical Removal	3
20	268954	6/25/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #5- Funded Time Critical Removal	2
21	268953	7/12/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #6- Funded Time Critical Removal	4
22	268952	7/16/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #7- Funded Time Critical Removal	3
23	268951	10/26/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #8- Funded Time Critical Removal	3
24	205881	11/1/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #9- Funded Time Critical Removal	2

25	268950	11/8/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #10-Funded Time Critical Removal	3
26	268949	11/24/99	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #11-Funded Time Critical Removal	3
27	325150	4/18/00	Durno, M., U.S. EPA	Karl, R., U.S. EPA	Action Memorandum re: Request for an Exemption to the 12-month Statutory Limit for the Baker Wood Creosoting Site ***(Portions of this document have been redacted)***	27
28	268948	5/18/00	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #12-Funded Time Critical Removal	3
29	268939	5/25/00	Bowerman, J., Ecology & Environment, Inc.	U.S. EPA	Site Assessment Report-Reference #24	262
30	268947	6/30/00	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #13-Funded Time Critical Removal	3
31	268946	9/15/00	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #14-Funded Time Critical Removal	3
32	323605	9/28/00	Ohio EPA	File	Health Consultation- Reference #10	24
33	268945	5/24/01	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #15-Funded Time Critical Removal	3
34	268944	6/28/01	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #16-Funded Time Critical Removal	3
35	268943	8/15/01	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #17-Funded Time Critical Removal	3
36	268941	9/28/01	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #18-Funded Time Critical Removal	3
37	268942	10/1/01	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #18-Funded Time Critical Removal	3
38	268940	6/7/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #19-Funded Time Critical Removal	3
39	172640	6/21/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #1-Funded OPA Removal	4
40	422392	6/28/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #2-Funded OPA Removal	3

41	422393	7/2/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #3-Funded OPA Removal	3
42	178073	7/12/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #4-Funded OPA Removal	3
43	178072	7/19/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #5-Funded OPA Removal	3
44	178071	7/26/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #6-Funded OPA Removal	3
45	178070	8/2/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #7-Funded OPA Removal	3
46	422394	8/9/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #8-Funded OPA Removal	3
47	422395	8/16/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #9-Funded OPA Removal	3
48	323606	9/1/02	U.S. Department of Health and Human Services	Public	Toxicological Profile for Wood Creosote, Coal Tar Creosote, Coal Tar, Coal Tar Pitch, & Coal Tar Pitch Volatiles- Reference #12	395
49	178069	9/6/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #10-Funded OPA Removal	4
50	178068	9/13/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #11-Funded OPA Removal	3
51	178067	9/27/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #12-Funded OPA Removal	4
52	178066	10/11/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #13-Funded OPA Removal	4
53	178065	10/18/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #14-Funded OPA Removal	4
54	178064	10/25/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #15-Funded OPA Removal	3
55	169405	11/1/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #16-Funded OPA Removal	3
56	169406	11/8/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #17-Funded OPA Removal	3
57	169621	11/26/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #18-Funded OPA Removal	4

58	169970	12/11/02	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #19- Funded OPA Removal	3
59	178080	6/7/03	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #20- Funded OPA Removal	2
60	422396	6/14/03	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #21- Funded OPA Removal	3
61	178608	6/23/03	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #22- Funded OPA Removal	3
62	180357	7/31/03	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #23- Reference 14G	3
63	180718	8/1/03	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #20- Final	3
64	323616	1/1/04	Ohio Hospital Association	Public	Environmental and Occupational Safety Issues- Reference #19	8
65	266292	3/28/06	Durno, M., U.S. EPA	File	Memo re: Final Closeout for Removal Action- Baker Wood Creosoting Site	6
66	258512	6/23/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #1- Initial	5
67	258517	6/30/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #2	3
68	258518	7/7/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #3	3
69	260901	8/1/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #4	4
70	260900	8/15/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #5	4
71	261441	8/25/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #6	3
72	263807	9/12/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #7- Phase 2	4
73	264008	9/25/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #8	4
74	264231	10/6/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #9	3
75	323604	11/2/06	Ohio EPA	File	Preliminary Assessment Report	14

76	266168	11/8/06	Durno, M., U.S. EPA	Distribution List	Pollution Report (POLREP) #10- Final- Reference #14A	4
77	300596	4/16/07	Sigler, V., Ohio EPA	Islas, E., U.S. EPA	Site Inspection Report- Reference #7	129
78	323614	1/1/08	Ohio EPA	File	Website Article 2008 Ohio Sport Fish Consumption Advisory- Reference #17	2
79	323615	1/1/08	Land and Water Magazine	Public	Article: "Determining What's Wrong With Your Stream"	4
80	303067	1/30/08	Ohio EPA	File	Expanded Site Inspection Report- Reference #6	614
81	323613	2/1/08	Ohio EPA	Public	2008 Ohio Sport Fish Consumption Advisory- Reference #16	32
82	303066	5/22/08	Hafner, C., Ohio EPA	Islas, E., U.S. EPA	Letter re: Post-Expanded Site Inspection Recommendation	2
83	323617	9/2/08	Weston Solutions	File	15-Mile Target Distance Limit Map	3
84	323618	9/10/08	Weston Solutions	File	Conversation Record- Reference #21	2
85	323603	2/10/09	U.S. EPA	File	Longitude and Latitude Calculation Worksheet Based on EPA's SOP to Determine Longitude and Latitude Coordinates- Reference #5	13
86	323597	3/1/09	Islas, E., U.S. EPA	File	Hazard Ranking System Documentation Record	34
87	920106	11/1/09	SulTRAC	U.S. EPA	Final Community Involvement Plan	21
88	378779	7/30/10	SulTRAC	U.S. EPA	Revised Field Sampling Plan	280
89	378780	7/30/10	SulTRAC	U.S. EPA	Revised Field Sampling Plan Revised QAPP for RI/FS Activities	122
90	478981	6/27/11	McCarty, J., SulTRAC	Gielniewski, M., U.S. EPA	Data Validation Report	58
91	920108	8/2/13	McCarty, J., SulTRAC	Caine, H., U.S. EPA	Remedial Investigation Report for Little Scioto River and Baker Wood Creosoting Sites	1310

92	478979	3/3/15	Lifka, J., SulTRAC	Caine, H., U.S. EPA	Remedial Alternatives Screening Technical Memorandum	100
93	478982	7/10/15	Lifka, J., SulTRAC	Caine, H., U.S. EPA	Revised Appendix K of Final RI Report for Little Scioto River and Baker Wood Creosoting Sites	62
94	479005	8/7/15	Snyder, S., Ohio EPA	Caine, H., U.S. EPA	Email re: Draft Final LSR FS	1
95	478980	8/19/15	Lifka, J., SulTRAC	Caine, H., U.S. EPA	Final Feasibility Study Report	255
96	494247	9/23/15	Karl, R., U.S. EPA	Woolford, J., U.S. EPA	Memo re: National Remedy Review Board Review is Not Warranted for the Little Scioto River Superfund Site Proposed Response Action	4
97	479004	11/16/15	Lifka, J., SulTRAC	Caine, H., U.S. EPA	Final Revised Appendix K of Final Remedial Investigaiton Report for Little Scioto River and Baker Woods Creosoting Sites (With Cover Letter)	60
98	323598	No Date	U.S. EPA	File	References Index	3

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR THE
LITTLE SCIOTO RIVER SITE
OPERABLE UNIT 1
MARION, MARION COUNTY, OHIO

UPDATE 1
JANUARY, 2016
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	479015	1/25/16	Lifka, J., CHMM	Caine, H., U.S. EPA	Final Feasibility Study Report Addendum- Revised Cost Estimate	166

U.S. ENVIRONMENTAL PROTECTION AGENCY
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UPDATE 2
MAY, 2016
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	925170	3/3/16	Slaughterbeck, T., Board of Marion County Commissioners	U.S. EPA	Public Comment Sheet on the Board of Marion County Commissioners Resolution	2
2	925171	3/3/16	Private Citizen	U.S. EPA	Public Comment Sheet on the Cleanup of the Little Scioto River	2
3	925172	3/3/16	Private Citizen	U.S. EPA	Public Comment Sheet on the Cleanup of the Little Scioto River	2
4	925186	3/17/16	Marion Township	U.S. EPA	Resolution No. 2016-10	2
5	925173	3/22/16	Hall, P., Marion Area Chamber of Commerce	Pastor, S., U.S. EPA	Letter re: Support for Further Cleaning of the Little Scioto River	1
6	925174	3/22/16	Hall, P., Marion Area Chamber of Commerce	Pastor, S., U.S. EPA	Letter re: Little Scioto River	1
7	925177	3/23/16	Private Citizen	U.S. EPA	Public Comment Sheet on the Cleanup of the Little Scioto River	2
8	925178	3/23/16	Private Citizen	U.S. EPA	Public Comment Sheet on the Cleanup of the Little Scioto River	2
9	925179	3/30/16	Private Citizen	U.S. EPA	Public Comment Sheet on the Cleanup of the Little Scioto River	2

10	925180	4/5/16	Clabaugh, L., Marion Township	Pastor, S., U.S. EPA	Letter re: Follow-up to the Marion Township Trustee's Resolution 2016-10	1
11	925181	4/29/16	Comstock, G., Marion CAN DO	Pastor, S., U.S. EPA	Email re: Clarification of Public Comment on Little Scioto River Clean Up Plan	1

Appendix 2

Ohio EPA has indicated that it will concur with the Record of Decision. Once the concurrence letter is received, it will be added to the Administrative Record.

Appendix 3

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
Federal Requirement					
Construction in Waterway	Endangered Species	Location-specific	Provides a program for conservation of threatened and endangered plants and animals and the habitats in which they are found	ESA of 1973 7 U.S.C. Subsection 136 and 16 U.S.C. Subsection 460 et seq.	May be applicable if endangered species are observed in the vicinity of the site
	Flood Control	Location-specific	Provides the public with knowledge of flood hazards and promotes prudent use and management of flood plains	FCA of 1944 16 U.S.C. Subsection 460	May be applicable if portions of the site are located within floodplains.
Earthwork	Wetlands Disturbance	Location-specific	No activity that adversely affects a wetland shall be permitted if a practicable alternative with lesser effects is available	CWA of 1977 40 CFR 6.302(a) Appendix A	May be applicable to alternatives that will disturb wetlands
	Wetlands Disturbance	Location-specific	Allows for permitting of discharges of dredged or fill material to the waters of the United States if no practicable alternatives exists that are less damaging to the aquatic environment	CWA of 1977 40 CFR 22, 40 CFR 230 to 233, and 33 CFR 320 to 330	
	Corrective Action for Solid Waste Management Units	Action-specific	Requirements for Corrective Action Management Units at RCRA-permitted Transportation, Storage and Disposal facilities undergoing corrective action	RCRA of 1976 Subpart S 40 CFR Part 264	May be applicable to alternatives which involve re-depositing hazardous waste on-site
	Land Disposal Restrictions	Action-specific	Establishes land disposal restrictions and treatment requirements for materials subject to restrictions on land disposal	RCRA of 1976 40 CFR 268	May be applicable if alternatives trigger land disposal restrictions for characteristic contaminated soil

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	Historic Sites	Location-specific	Establishes a national registry of historic sites. Provides for preservation of historic or prehistoric resources.	NHPA of 1966 16 U.S.C. Subsection 470 et seq.	May be applicable if structures known to be listed in the National Registry of Historical Places are located on the site
State Requirement					
Construction in Waterway	Channel Modifications	Action-specific	No governmental body may modify the channel of any watercourse within a wild, scenic, or recreational river are outside the limits of a municipal corporation without approval from the director of ODNR	ORC, ODNR Section 1517.16	May be applicable to alternatives that involve rerouting areas of the river that meet specific channel characteristics
	Endangered Plant Species	Location-specific	Prohibits removal or destruction of endangered plant species	ORC, ODNR Section 1518.02	May be applicable to alternatives that involve work in areas containing endangered plant species
	Endangered Animal Species	Location-specific	Prohibits removal or destruction of endangered animal species	ORC, ODNR Section 1518.062	May be applicable to alternatives that involve work in areas containing endangered animals
	Prohibition of Nuisances	Location-specific	Prohibits noxious exhalations or smells and the obstruction of waterways	ORC, APC, DSW Section 3767.13	May be applicable to alternatives that could obstruct waterways
	Prohibition of Nuisances	Location-specific	Prohibits throwing refuse, oil, or filth into lakes, streams, or drains	ORC, APC, DSW Section 3767.14	May be applicable to alternatives that involve activities adjacent to streams or rivers
	Conservancy Districts	Location-specific	Board of Directors of a conservancy district may make and enforce rules and regulations pertaining to channels, ditches, pipes, sewers, etc.	ORC, DSW Section 6101.19	May be applicable to alternatives that involve construction within a conservancy district.
	Analytical and Collection Procedures	Action-specific	Specifies analytical methods and collection procedures for surface water discharges	ORC, DSW Section 3745-1-03	May be applicable to alternatives that discharge to surface waters as

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	The Five Freedoms for Surface Water	Action-specific	All surface waters of the state shall be free from A) objectionable suspended solids, B) floating debris, oil, and scum, C) materials that create a nuisance, D) toxic or lethal substances, E) nutrients that create nuisance growth	ORC, DSW Section 3745-1-04 (A-E)	a result of remediation and any on-site surface waters affected by site conditions
	Water Quality Criteria	Action-specific	Establishes water quality criteria for pollutants which do not have specific numerical or narrative criteria identified in tables 7-1 through 7-5 of this rule	ORC, DSW Section 3745-1-07 (C)	
	Water Use Designation for Scioto River	Location-specific	Establishes water use designations for stream segments within the Scioto River Basin	ORC, DSW Section 3745-1-09	May be applicable to alternatives that result in site conditions affect a stream or stream segment of the Scioto River Basin
	Water Quality Criteria for Decision by the Director	Action-specific	Specifies substantive criteria for Section 401 water quality criteria for dredging, filling, obstructing, or altering waters of the state	ORC, DSW Section 3745-32-05	May be applicable to alternatives that has or will affect waters of the state
	Prohibits Violation of Air Pollution Control Rules	Action-specific	Prohibits emission of an air contaminant in violation of Section 3704 or any rules, permit, order, or variance issued pursuant to that section of ORC	ORC, APC Section 3704.05, A-1	May be applicable to alternatives that result in emissions of air contaminant as a result of remedial activities.
Earthwork	Digging Where Hazardous or Solid Waste Was Located	Action-specific	Filling, grading, excavating, building, drilling or mining on land where hazardous waste or solid waste facility was operated is prohibited without prior authorization from the Director of Ohio EPA.	ORC, HW Section 3734.02 (H)	May be applicable to alternatives that involve excavation activities which may uncover solid and/or hazardous waste

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	Air Emissions from Hazardous Waste Facilities	Action-specific	No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor or odorous substance that interferes with the comfortable enjoyment of life or property or is injurious to public health	ORC, APC, HW Section 3704.05 (I)	May be applicable to alternatives that result in air emissions as a result of excavation activities
	Emission Restrictions for Fugitive Dust	Action-specific	All emissions of fugitive dust shall be controlled	ORC, APC Section 3745-17-08 (A1, A2, B, D)	May be applicable to alternatives that result in fugitive dust emissions as a result of excavation activities
	List of Endangered Animal Species	Location-specific	List of Ohio animal species considered endangered	ODNR, ORC, Section 1501-31-23, 01 (A-B)	May be applicable to alternatives where remedial activities could disturb existing habitats
	List of Endangered Plant Species	Location-specific	List of Ohio plant species considered endangered	ORC, ODNR Section 1501-18-1, 03 (A)	
	Wetland Narrative Criteria	Location-specific	Lists criteria to be protected in wetland environments	ORC, DSW Section 3745-1-51 (A-C)	May be applicable to alternatives that have impacted wetlands or where activities would impact wetlands
	Wetland Antidegradation	Location-specific	Requires that all wetlands be assigned a category classification and gives criteria for classification. Discuss requirement for avoidance and minimization of wetlands damage as well as compensatory mitigation	ORC, DSW Section 3745-1-54 (A-D)	
	Conditions Applicable to All Permits	Action-specific	Establishes general permit conditions applied to all hazardous waste facilities in Ohio. Includes conditions such as operation and maintenance, site access, monitoring, etc.	ORC, HW Section 3745-50-80 (E, I, J)	May be applicable to alternatives that will incorporate treatment, storage, or disposal of hazardous waste.

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	Evaluation of Wastes	Chemical-specific	Any person generating a waste must determine if that waste is a hazardous waste (either through listing or by characteristic)	ORC, HW Section 3745-52-11 (A-D)	May be applicable to alternatives that will generate solid or hazardous waste May be applicable to alternatives in which hazardous waste will be transported off-site for treatment, storage or disposal
	Generator Identification Number	Action-specific	A generator must not store, treat, dispose or transport hazardous wastes without a generator number	ORC, HW Section 3745-52-12 (A-C)	
	Hazardous Waste Manifest – Generator Requirements	Action-specific	Requires a generator who transports or offers for transportation hazardous waste for off-site treatment, storage, or disposal to prepare a uniform hazardous waste manifest	ORC, HW Section 3745-52-20	
	Hazardous Waste Manifest – Number of Copies	Action-specific	Specifies the number of manifest copies to be prepared	ORC, HW Section 3745-52-22	
	Hazardous Waste Manifest – Use	Action-specific	Specifies procedures for the use of hazardous waste manifests including a requirement that they be hand signed by the generator	ORC, HW Section 3745-52-22	
	Hazardous Waste Packaging	Action-specific	Requires a generator to package hazardous waste in accordance with U.S. DOT regulations for transportation off-site	ORC, HW Section 3745-52-30	
	Hazardous Waste Labeling	Action-specific	Requires packages of hazardous waste to be labeled in accordance with U.S. DOT regulations for transportation off-site	ORC, HW Section 3745-52-31	
	Hazardous Waste Marking	Action-specific	Specifies language for marking packages of hazardous waste prior to off-site transportation	ORC, HW Section 3745-52-32	
	Hazardous Waste Placarding	Action-specific	Generator shall placard hazardous waste prior to off-site transportation	ORC, HW Section 3745-52-33	

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	Accumulation Time of Hazardous Waste	Action-specific	Identifies maximum time periods that a generator may accumulate a hazardous waste without being considered an operator for a storage facility. Also establishes standards for management of hazardous wastes by generator.	ORC, HW Section 3745-52-34	May be applicable to alternatives which generate hazardous waste
	Recordkeeping Requirements, Three Year Retentions	Action-specific	Specifies records that shall be kept for three years	ORC, HW Section 3745-52-40 (A-D)	
	Annual Report	Action-specific	Requires generators to prepare annual report to Ohio EPA	ORC, HW Section 3745-52-41 (A-B)	May be applicable to alternatives that generate waste for off-site shipment
	General Analysis of Hazardous Waste	Action-specific	Prior to any treatment, storage or disposal of hazardous wastes, a representative sample of the waste must be chemically and physically analyzed	ORC, HW Section 3745-54-13 (A)	May be applicable to alternatives that treat, store, or dispose of hazardous waste
Institutional Controls	Uniform Environmental Covenants Act	Action-specific	Standards for environmental covenants	ORC, DERR Section 5301.00	May be applicable to alternatives that involve institutional controls or use restrictions
	Conditions for Disposal of Acute Hazardous Waste	Action-specific	Prohibits the disposal of acute hazardous waste unless it: (1) cannot be treated, recycled, or destroyed; (2) has been reduced to its lowest level of toxicity; and (3) has been completely encapsulated or protected to prevent leaching	ORC, HW Section 3734.14.1	May be applicable to alternatives that generate wastes
	Applicability of Treatment Standards	Chemical-specific	Detailed listing of chemical specific land treatment standards or required treatment technologies	ORC, HW Section 3745-270-40 (A-J)	May be applicable to alternatives that generate wastes

SUMMARY OF POTENTIAL ARARs FOR LITTLE SCIOTO RIVER SITE					
Description	**Prerequisite for ARAR**	**Type of ARAR**	**Requirement**	**Citation**	**Comments**
	Treatment Standards Expressed as Specified Technologies	Chemical-specific	List specific treatment technologies required for specific wastes	ORC, HW Section 3745-270-42 (A-D)	
	Universal Treatment Standards	Chemical-specific	Gives contaminant chemical specific standards for land disposal	ORC, HW Section 3745-270-50 (A-F)	

Notes:
APC = Air Pollution Control
ARAR = Applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
CWA = Clean Water Act
DERR = Department of Environmental Response and Revitalization
DSW = Division of Surface Water
ESA = Endangered Species Act
FCA = Flood Control Act
HW = Hazardous Waste
NHPA = National Historic Preservation Act
ODNR = Ohio Department of Natural Resources
Ohio EPA = Ohio Environmental Protection Agency
ORC = Ohio Revised Code
RCRA = Resource Conservation and Recovery Act
U.S.C. = United States Code
U.S. DOT = United States Department of Transportation
U.S.C. = United States Code