UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF ALABAMA

SOUTHERN DIVISION

----------x
UNITED STATES OF AMERICA,

Plaintiff,

Civil Action No. 1:20-cv-00602

v.

OLIN CORPORATION and
BASF CORPORATION,

Defendants.
----------x

AMENDMENT TO REMEDIAL DESIGN/REMEDIAL ACTION

CONSENT DECREE

FOR OPERABLE UNIT TWO OF THE

OLIN CORP. (MCINTOSH PLANT) SUPERFUND SITE

WHEREAS, the Olin Corp. (McIntosh Plant) Superfund Site ("Site") is located in McIntosh, Alabama. The Site comprises approximately 1,500 acres located at 1638 Industrial Road, in McIntosh, Washington County, Alabama. Operable Unit 2 (OU-2) of the Site comprises approximately 220 acres of the Site and includes the Olin Basin located east of the main Olin plant area and adjacent to the Tombigbee River, a floodplain, and a wastewater ditch leading to the Basin as more particularly described in the 2021 Decree (as defined below).

WHEREAS, on January 28, 2021, this Court entered a consent decree ("2021 Decree") the terms of which had been agreed to between the United States on behalf of the U.S. Environmental Protection Agency ("EPA") and Olin Corporation and BASF Corporation ("Defendants") and pursuant to which the Defendants, agreed among other things, to

implement an environmental cleanup at the Site which had been selected by EPA in a Remedy Selection Decision Document known as a "Record of Decision" dated April 23, 2014 ("2014 ROD").

WHEREAS, additional sampling performed by Defendants during a predesign investigation (PDI) conducted between October 2021 and May 2023 identified certain sediments and soils in the wastewater ditch (WWD) area and additional areas of the floodplain within OU-2 that exceeded sediment and/or soil cleanup levels (CULs) specified in the 2014 ROD.

WHEREAS, in accordance with section 117 of CERCLA and 40 C.F.R § 300.430(f), EPA, on January 15, 2024, issued a Proposed Plan describing the remedial alternatives considered to address the additional impacted areas of the WWD and additional floodplain areas within OU-2, and the EPA's preferred alternative ("Proposed Plan").

WHEREAS, EPA accepted written comments on the Proposed Plan from January 15, 2024 to February 28, 2024, and also held, on January 23, 2024, a public meeting to discuss the Proposed Plan and to record comments on the proposed remedy, at the McIntosh High School in McIntosh, Alabama. A summary of the comments received, and EPA's responses to those comments, is contained in the Amended Record of Decision ("Amended ROD"). The State of Alabama, through its Department of Environmental Management, concurred with the proposed remedy.

WHEREAS, EPA selected a remedial action to be implemented regarding the WWD and additional floodplain areas within OU-2, which is embodied in the Amended ROD executed on May 23, 2024. The remedial actions for the WWD ditch and additional floodplain areas specified in the Amended ROD are in addition to, and will be integrated with, the remedial actions chosen in the 2014 ROD for the Olin Basin and Round Pond areas within OU-2.

WHEREAS, the remedy selected by EPA in the Amended ROD includes the following components: (1) for the WWD: in-situ stabilization (ISS), with a protective cover, institutional and engineering controls, and habitat replacement/enhancement, and (2) for the floodplain: installation of an engineered cap, implementation of institutional and engineering controls, and habitat replacement/enhancement. As an alternative for the WWD: excavation of contaminated soils and sediments followed by off-site disposal in an EPA-approved landfill, may be used if ISS does not meet specified criteria based on a treatability study.

WHEREAS, it is necessary to modify the 2021 Decree to provide for changes to the 2021 Decree's Statement of Work (SOW) due to the modification of deliverables and schedule adjustments needed to integrate the new remedy for the WWD and additional floodplain areas within OU-2.

WHEREAS, the 2021 Decree, paragraph 90, requires that material modifications to the 2021 Decree, which include modifications to the SOW that implement a ROD amendment, must be in writing, signed by the United States and Defendants, and shall be effective upon approval by the Court.

WHEREAS, the United States of America and Defendants, entered into that certain Settlement Agreement, filed on March 28, 2024, at Docket Entry 29 in this Case and attached hereto at Appendix C ("Settlement Agreement") which also amends certain terms of the 2021 Decree and SOW.

WHEREAS, the Parties recognize, and the Court by entering this Amendment to the 2021 Decree finds, that this Amendment has been negotiated by the Parties in good faith, that implementation of this Amendment to the 2021 Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this

Amendment to the 2021 Decree is fair, reasonable, in the public interest, and consistent with CERCLA.

NOW THEREFORE, it is hereby **ORDERED** and **DECREED** as follows:

1. Paragraph 3 (Definitions) of the 2021 Decree is amended as follows:

"Consent Decree" or "CD" shall mean the 2021 Consent Decree as amended by the Settlement Agreement and this Amendment and the respective appendices and exhibits to all of the foregoing

"Statement of Work" or "SOW" shall mean the Amended and Restated Remedial Design/Remedial Action Statement of Work document describing the activities Defendants must perform to implement the RD, the RA, and O&M regarding OU-2 which is attached as Appendix A.

2. The Statement of Work that was attached as Appendix B to the 2021 Decree is superseded by the Amended and Restated Statement of Work which is attached hereto as Appendix A.

3. All other paragraphs of the 2021 Decree remain in effect without modification, except and to the extent modified by the Settlement Agreement.

4. The following appendices are attached to and incorporated into this Amendment to the 2021 Decree:

a. Appendix A is the Amended and Restated Statement of Work.

b. Appendix B is the Amended ROD.

c. Appendix C is the Settlement Agreement.

5. The undersigned representatives of the United States and each Settling Party certifies that he or she is fully authorized to enter into the terms and conditions of this Amended Decree and to execute and legally bind such Party to this document.

6. This Amended Decree will be lodged with the Court for at least 30 days for public notice and comment in accordance with section 122(d)(2) of CERCLA and 28 C.F.R. § 50.7. The United States may withdraw or withhold its consent if the comments regarding the Amended Decree disclose facts or considerations that indicate that the Decree is inappropriate, improper, or inadequate.

7. Olin Corporation and BASF Corporation agree not to oppose or appeal the entry of this Amended Decree.

8. Upon entry of this Amended Decree by the Court, this Amended Decree constitutes a final judgment under Fed. R. Civ. P. 54 and 58 among the Parties.

SO ORDERED this _____ day of _____, 20_____.

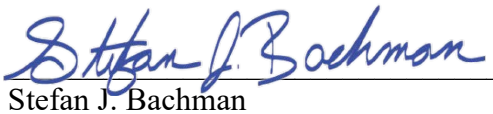
_____
United States District Judge

Signature page for Amendment to Remedial Design/Remedial Action Consent Decree regarding OU2 of the Olin Corp. (McIntosh Plant) Superfund Site

FOR THE UNITED STATES OF AMERICA:

Adam R.F. Gustafson
Acting Assistant Attorney General
U.S. Department of Justice
Environment and Natural Resources Division

Date: 8/29/2025



Stefan J. Bachman
Senior Attorney
U.S. Department of Justice
Environment and Natural Resources Division
Environmental Enforcement Section
PO Box 7611
Washington, DC 20044

Signature page for Amendment to Remedial Design/Remedial Action Consent Decree regarding OU2 of the Olin Corp. (McIntosh Plant) Superfund Site

12/12/24

CAROLINE FREEMAN Digitally signed by CAROLINE FREEMAN Date: 2024.12.12 19:00:01 -05'00'

Dated

Caroline Freeman
Superfund Emergency Management Division
U.S. Environmental Protection Agency
Region 4
61 Forsyth St., SW
Atltanta, GA 0 0

12/4/24

Digitally signed by DAMIAN YEMMA Date: 2024.12.04 07:24:11 -05'00'

Dated

Damian emma
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 4
61 Forsyth St., SW
Atltanta, GA 0 0

Signature page for Amendment to Remedial Design/Remedial Action Consent Decree regarding OU2 of the Olin Corp. (McIntosh Plant) Superfund Site

FOR OLIN CORPORATION:

11/25/24
Dated

Lisa A. Funderburg
Vice President & Chief EHS Counsel
Olin Corporation
190 Carondelet Plaza, Suite 1530
Clayton, MO 63105

Agent Authorized to Accept Service on Behalf of Above-signed Party

Name: _____

Title: _____

Company: CT Corporation System

Address: 27 N Jackson St., Ste 605

Montgomery County

Montgomery, AL 3

Phone: _____

Email: _____

Signature page for Amendment to Remedial Design/Remedial Action Consent Decree regarding OU2 of the Olin Corp. (McIntosh Plant) Superfund Site

FOR BASF CORPORATION:

11/25/2024
Dated

Catherine A. Trinkle
Vice President & Deputy General Counsel,
Regulatory, Environmental & Government Affairs
100 Park Avenue
Florham Park, NJ 07932

Agent Authorized to Accept Service on Behalf of Above-signed Party

Name: Linda Mirsky Brenneman
Title: Associate General Counsel
Company: BASF Corporation
Address: 100 Park Avenue
Florham Park, NJ 07932

Phone: 973-626-9526
Email: linda.brenneman@basf.com

Appendix A

AMENDED AND RESTATED REMEDIAL DESIGN/REMEDIAL ACTION

STATEMENT OF WORK

OPERABLE UNIT 2

OLIN CORP. (MCINTOSH PLANT) SUPERFUND SITE

McIntosh, Washington County, State of Alabama

EPA Region 4

October 2024

Table of Contents

1. INTRODUCTION

1.1 Purpose of the SOW. This Amended and Restated Statement of Work (SOW) sets forth the procedures and requirements for implementing the Work as amended by the Amended Record of Decision dated May 23, 2024 (AROD).

1.2 Structure of the SOW

- Section 2 (Community Involvement) sets forth EPA's and Settling Defendants' (SDs) responsibilities for community involvement.
- Section 3 (Remedial Design) sets forth the process for developing the RD, which includes the submission of specified primary deliverables.
- Section 4 (Remedial Action) sets forth requirements regarding the completion of the RA, including primary deliverables related to completion of the RA.
- Section 5 (Reporting) sets forth SDs' reporting obligations.
- Section 6 (Deliverables) describes the content of the supporting deliverables and the general requirements regarding SDs' submission of, and EPA's review of, approval of, comment on, and/or modification of, the deliverables.
- Section 7 (Schedules) sets forth the schedule for submitting the primary deliverables, specifies the supporting deliverables that must accompany each primary deliverable, and sets forth the schedule of milestones regarding the completion of the RA.
- Section 8 (State Participation) addresses State participation.
- Section 9 (References) provides a list of references, including URLs.
- Section 10 (Contingency Remedy) sets forth requirements regarding completion of the Contingency Remedy, if required, as described in the AROD.

1.3 This section provides a summary of the selected remedy as described in the ROD and AROD and is not intended to limit or modify the provisions of those documents taken as a whole. The scope of the remedy includes the actions described in Section 1.4 of the ROD, together with the additional actions described in Section 1.4 of the 2024 AROD, including:

> *OU-2 Basin and Round Pond Multi-layered Cap.* A multi-layered cap applied in-situ over approximately 80 acres of sediment exceeding the sediment cleanup levels. The cap will consist of three layers: 1) a mixing zone, 2) an effective cap layer, and 3) a habitat layer. The capping materials and their thicknesses will be determined during remedial design. These capping materials will be physically and chemically compatible with the environment in which they are placed. Geotechnical parameters will be evaluated to ensure compatibility among cap components, native sediment, and surface water. The placement method will minimize short-term risk from the release of contaminated pore water and resuspension of contaminated sediment during cap placement. Reactive materials may be used to reduce the potential for contaminants to migrate through the cap.

Additional Sampling and Analyses. Additional sampling and analyses will be performed in the channel connecting Round Pond to the Olin Basin and the perimeter of the Round Pond floodplain soils that are often inundated, as well as the former wastewater and discharge ditch, to further refine the remedial footprint. Depending on the results of this characterization, these floodplain soil areas may require installation of a cap.

Institutional Controls. The institutional controls (deed and restrictive covenant) that are currently in place as a result of OU-1 (Operable Unit 1) will be amended to include the OU-2 remedial footprint and use restrictions. Also, engineering controls, such as warning signs, including fish advisory signage, fencing, and security monitoring will be implemented to restrict access and prevent exposures to human receptors.

Construction Monitoring. Construction monitoring for capping will be designed to ensure that the design plans and specifications are followed in the placement of the cap and to monitor the extent of any contaminant releases during cap placement. Construction monitoring will likely include interim and post-construction cap material placement surveys, sediment cores, sediment profiling camera, and chemical resuspension monitoring for contaminants. In the initial period following cap construction, sediment samples will be taken to confirm that cleanup levels were achieved and benthic community assessments will be performed to evaluate restoration efforts.

Maintenance. Maintenance of the in-situ cap will include the repair and replenishment of the layers where necessary to prevent releases of contaminants.

Long-Term Monitoring. Long-term monitoring will include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving remedial action objectives (RAOs), attaining cleanup levels, and in reducing human health and environmental risk. In addition, long-term monitoring data is needed to complete the five-year review process.

OU-2 Wastewater Ditch (WWD) In-Situ Solidification/Stabilization (ISS). ISS of sediments and soil in the wastewater ditch will occur through mechanical mixing of the in situ material and one or more solidifying/stabilizing agent(s), selected based on the results of a series of bench-scale mix trials. Chemicals of concern (COC)-impacted sediment will be excavated and soil in tributaries and banks/side slopes will be incorporated in the wastewater ditch before solidification/stabilization, followed by the installation of a protective cover (sand, stone and/or riprap).

OU-2 Floodplain In Situ Engineered Cap. An in situ engineered cap will be constructed over the OU-2 floodplain remedial footprint (areas determined to contain COCs at concentrations that exceed Clean Up Levels (CULs) established in the ROD). At locations with the highest COC concentrations, an amendment

will be included in the cap to treat or reduce toxicity of the COCs. The type and dosage of this amendment will be determined during the remedial design using results of ongoing treatability studies. The uppermost layer of the cap will comprise a habitat layer with appropriate erosion protection where needed.

Habitat restoration. Areas disturbed by excavation such as the WWD banks and floodplain areas within the wetlands affected by installation of the engineered caps will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific applicable or relevant and appropriate requirements (ARARs) such as Clean Water Act Section 404(b)(1) regulations related to compensatory mitigation for adverse effects in wetlands and to be considered (TBC) related to actions in designated floodplains. Such restoration measures could include regrading and replacement of trees and other types of revegetation, as appropriate.

Maintenance of the engineered caps and protective cover. Inspections will be performed and repair and replenishment of the layers implemented where necessary to meet RAOs.

Long-Term Monitoring. Long-term monitoring will include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving remedial action objectives (RAOs), attaining CULs, and reducing human health and environmental risk. In addition, long-term monitoring data are needed to complete the five-year review process.

Implementation of institutional controls (ICs) and engineering controls (ECs). ICs include revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the remediated OU-2 areas. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of contamination in fish. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

OU-2 Wastewater Ditch Contingency Remedy. This contingency remedy may be implemented instead of ISS if ISS does not meet criteria specified in the "Selected Amended Remedy" section related to strength, hydraulic conductivity, and prevention of leaching of COCs based on the bench-scale mix trial. Under the contingency remedy, the soils and sediments with COC concentrations greater than CULs would be excavated until clean (below CULs) or to some lesser depth(s) determined appropriate by EPA, as verified by confirmation samples. Excavated soils and sediments would be disposed of at appropriate EPA-approved landfills based on COC concentrations. Areas disturbed by excavation, such as the WWD banks and areas within the wetlands affected by excavation, will be restored to the extent possible to provide similar or enhanced habitat. Such measures could include regrading and revegetation.

1.4 The terms used in this SOW that are defined in CERCLA, in regulations promulgated under CERCLA, or in the Consent Decree (CD), have the meanings assigned to them in CERCLA, in such regulations, or in the CD, except that the term "Paragraph" or "¶" means a paragraph of the SOW, and the term "Section" means a section of the SOW, unless otherwise stated.

2. COMMUNITY INVOLVEMENT

2.1 Community Involvement Responsibilities

(a) EPA has the lead responsibility for developing and implementing community involvement activities at the Site. Previously during the RI/FS phase, EPA developed a Community Involvement Plan (CIP) for the Site. Pursuant to 40 C.F.R. § 300.435(c), EPA shall review the existing CIP and determine whether it should be revised to describe further public involvement activities during the Work that are not already addressed or provided for in the existing CIP.

(b) If requested by EPA, SDs shall participate in community involvement activities, including participation in (1) the preparation of information regarding the Work for dissemination to the public, with consideration given to including mass media and/or Internet notification, and (2) public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site. SDs' support of EPA's community involvement activities may include providing online access to initial submissions and updates of deliverables to (1) any Community Advisory Groups, (2) any Technical Assistance Grant recipients and their advisors, and (3) other entities to provide them with a reasonable opportunity for review and comment. EPA may describe in its CIP SDs' responsibilities for community involvement activities. All community involvement activities conducted by SDs at EPA's request are subject to EPA's oversight.

(c) **SDs' CI Coordinator**. If requested by EPA, SDs shall, within 30 days, designate and notify EPA of SDs' Community Involvement Coordinator (SDs' CI Coordinator). SDs may hire a contractor for this purpose. SDs' notice must include the name, title, and qualifications of the SDs' CI Coordinator. SDs' CI Coordinator is responsible for providing support regarding EPA's community involvement activities, including coordinating with EPA's CI Coordinator regarding responses to the public's inquiries about the Site.

3. REMEDIAL DESIGN

3.1 **RD Work Plan**. SDs shall submit a Remedial Design (RD) Work Plan (RDWP) for EPA approval. The RDWP must include:

(a) Plans for implementing all RD activities identified in this SOW, in the RDWP, or required by EPA to be conducted to develop the RD;

(b) A description of the overall management strategy for performing the RD, including a proposal for phasing of design and construction, if applicable;

(c) A description of the proposed general approach to contracting, construction, operation, maintenance, and monitoring of the Remedial Action (RA) as necessary to implement the Work;

(d) A description of the responsibility and authority of all organizations and key personnel involved with the development of the RD;

(e) Descriptions of any areas requiring clarification and/or anticipated problems (e.g., data gaps);

(f) Description of any proposed pre-design investigation;

(g) Description of any proposed treatability study;

(h) Descriptions of any applicable permitting requirements and other regulatory requirements;

(i) Description of plans for obtaining access in connection with the Work, such as property acquisition, property leases, and/or easements; and

(j) The following supporting deliverables described in ¶ 6.7 (Supporting Deliverables): Health and Safety Plan; Emergency Response Plan, Field Sampling Plan, and Quality Assurance Project Plan.

3.2 SDs shall meet regularly with EPA to discuss design issues as necessary, as directed or determined by EPA.

3.3 **Pre-Design Investigation**. The purpose of the Pre-Design Investigation (PDI) is to address data gaps by conducting additional field investigations. The PDI will include geotechnical and chemical sampling of media in OU2 to support a proper and effective design of the sediment cap as needed to fill data gaps identified in the PDI work plan**.**

(a) **PDI Work Plan**. SDs shall submit a PDI Work Plan (PDIWP) for EPA approval. The PDIWP must include:

(1) An evaluation and summary of existing data and description of data gaps;

(2) A sampling plan including media to be sampled, contaminants or parameters for which sampling will be conducted, location (areal extent and depths), and number of samples; and

(3) Cross references to quality assurance/quality control (QA/QC) requirements set forth in the Quality Assurance Project Plan (QAPP) as described in ¶ 6.7(d).

(b) Following the PDI, SDs shall submit a PDI Evaluation Report. This report must include:

(1) Summary of the investigations performed;

(2) Summary of investigation results;

(3) Summary of validated data (i.e., tables and graphics);

(4) Data validation reports and laboratory data reports;

(5) Narrative interpretation of data and results;

(6) Results of statistical and modeling analyses, if performed; and

(7) Photographs documenting the work conducted; and

(8) Conclusions and recommendations for RD, including design parameters and criteria.

(c) EPA may require SDs to supplement the PDI Evaluation Report and/or to perform additional pre-design studies.

3.4 Treatability Study

(a) SDs shall submit to EPA their analysis and recommendation of the need to perform a Treatability Study (TS) for the purpose of evaluating capping materials, geotechnical parameters, and placement methods.

(b) If EPA determines a TS is needed, SDs shall submit a TS Work Plan (TSWP) for EPA approval. SDs shall prepare the TSWP in accordance with EPA's *Guide for Conducting Treatability Studies under CERCLA, Final* (Oct. 1992), as supplemented for RD by the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995).

(c) Following completion of the TS, SDs shall submit a TS Evaluation Report for EPA comment.

(d) EPA may require SDs to supplement the TS Evaluation Report and/or to perform additional treatability studies.

3.5 Preliminary (30%) RD. SDs shall submit a Preliminary (30%) RD for EPA's comment. The Preliminary RD must include:

(a) A design criteria report, as described in the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995);

(b) Preliminary drawings and specifications;

(c) Descriptions of permit requirements, if applicable;

(d) A description of how the RA will be implemented in a manner that minimizes environmental impacts in accordance with EPA's *Principles for Greener Cleanups* (Aug. 2009);

(e) A description of monitoring and control measures to protect human health and the environment, such as air monitoring and dust suppression, during the RA;

(f) Any proposed revisions to the RA Schedule that is set forth in ¶ 7.3 (RA Schedule); and OU2 Long Term Monitoring Plan; Construction Quality Assurance/Quality Control Plan; Transportation and Off-Site Disposal Plan; O&M Plan; O&M Manual; and Institutional Controls Implementation and Assurance Plan.

3.6 Integrated Intermediate (60%) RD. The Integrated Intermediate (60%) RD shall address all components of the OU-2 remedy, including updates and responses to EPA comments on the previously submitted 60% RD for the Basin and Round Pond, and incorporating new RD components for the Floodplains and WWD. The Integrated Intermediate (60%) RD shall include:

(a) Drawings and Specifications

(b) Updates to components of the Basin and Round Pond (60%) RD Deliverable including changes in response to EPA comments on the Treatability Study results, Physical Stability Pilot Study results, and other modeling results (i.e., CapSim, seepage, and geotechnical stability) throughout all relevant components of the Integrated Intermediate (60%) RD Deliverable.

(c) Incorporation of the results from WWD and Floodplain Data Gap Investigations.

(d) Incorporation of the ISS Mix Trials results , as appropriate, depending on the progress of the ISS Mix Trials Study and provided that EPA has issued its written decision that the contingency remedy will not be implemented in the WWD.

3.7 **Integrated Pre-Final (95%) RD**. SDs shall submit the Pre-final (95%) RD for EPA's comment. The Pre-final RD must be a continuation and expansion of the previous design submittal and must address EPA's comments regarding the Integrated Intermediate (60%) RD. The Integrated Pre-final RD will serve as the approved Integrated Final (100%) RD if EPA approves the Integrated Pre-final RD without comments. The Integrated Pre-final RD must include:

(a) A complete set of construction drawings and specifications that are: (1) certified by a registered professional engineer; (2) suitable for procurement; and (3) follow the Construction Specifications Institute's Master Format 2018 Edition.

(b) A survey and engineering drawings showing existing Site features, such as elements, property borders, easements, and Site conditions;

(c) Pre-Final versions of the same elements and deliverables as are required for the Integrated Intermediate (60%) RD;

(d) A specification for photographic documentation of the RA; and

(e) Pre-Final Operation and Maintenance (O&M) Plan and O&M Manual; and

(f) Updates of all supporting deliverables required to accompany the Integrated Intermediate (60%) RD.

3.8 **Integrated Final (100%) RD**. SDs shall submit the Integrated Final (100%) RD for EPA approval. The Final RD must address EPA's comments on the Integrated Pre-final (95%) RD and must include final versions of all Integrated Pre-final (95%) RD deliverables.

4. REMEDIAL ACTION

4.1 **RA Work Plan**. SDs shall submit a RA Work Plan (RAWP) for EPA approval that includes:

(a) A proposed RA Construction Schedule;

(b) An updated health and safety plan that covers activities during the RA; and

(c) Plans for satisfying permitting requirements, including obtaining permits for off-site activity and for satisfying substantive requirements of permits for on-site activity.

4.2 Independent Quality Assurance Team. SDs shall notify EPA of SDs' designated Independent Quality Assurance Team (IQAT). The IQAT will be independent of the Remedial Action Constructor. SDs may hire a third party for this purpose. SDs' notice must include the names, titles, contact information, and qualifications of the members of the IQAT. The IQAT will have the responsibility to determine whether Work is of expected quality and conforms to applicable plans and specifications. The IQAT will have the responsibilities as described in Section 2.1.3 of the *Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties*, EPA/540/G-90/001 (Apr. 1990).

4.3 Meetings and Inspections

(a) **Preconstruction Conference**. SDs shall hold a preconstruction conference with EPA and others as directed or approved by EPA and as described in the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995). SDs shall prepare minutes of the conference and shall distribute the minutes to all Parties.

(b) **Periodic Meetings**. During the construction portion of the RA (RA Construction), SDs shall meet regularly with EPA, and others as directed or determined by EPA, to discuss construction issues. The meetings may be in person or via teleconference. SDs shall distribute an agenda and list of attendees to all Parties prior to each meeting. SDs shall prepare minutes of the meetings and shall distribute the minutes to all Parties.

(c) **Inspections**

(i) EPA or its representative shall conduct periodic inspections of or have an on-site presence during the Work. At EPA's request, the Supervising Contractor or other designee shall accompany EPA or its representative during inspections. In addition to EPA directed periodic inspections, SDs may also request that EPA inspect individual remedy elements prior to construction completion described in section 4.6 below to confirm in writing completion of the individual remedy element(s).

(2) SDs shall provide on-site office space for EPA personnel to perform their oversight duties when requested. The minimum office requirements are an office desk with chair, access to reproduction, wireless internet access if feasible, and sanitation facilities.

(3) SDs shall provide personal protective equipment needed for EPA personnel and any oversight officials to perform their oversight duties.

(4) Upon notification by EPA of any deficiencies in the RA Construction, SDs shall take all necessary steps to correct the deficiencies and/or bring the RA Construction into compliance with the approved Final RD, any approved design changes, and/or the approved RAWP. If applicable, SDs shall comply with any schedule provided by EPA in its notice of deficiency.

4.4 Emergency Response and Reporting

(a) **Emergency Response and Reporting**. If any event occurs during performance of the Work that causes or threatens to cause a release of Waste Material on, at, or from the Site and that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, SDs shall: (1) immediately take all appropriate action to prevent, abate, or minimize such release or threat of release; (2) immediately notify the authorized EPA officer (as specified in ¶ 4.4(c)) orally; and (3) take such actions in consultation with the authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plan, the Emergency Response Plan, and any other deliverable approved by EPA under the SOW.

(b) **Release Reporting**. Upon the occurrence of any event during performance of the Work that SDs are required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, SDs shall immediately notify the authorized EPA officer orally.

(c) The "authorized EPA officer" for purposes of immediate oral notifications and consultations under ¶ 4.4(a) and ¶ 4.4(b) is the EPA Project Coordinator, the EPA Alternate Project Coordinator (if the EPA Project Coordinator is unavailable), or the EPA [Emergency Response Unit], Region 4 (if neither EPA Project Coordinator is available).

(d) For any event covered by ¶ 4.4(a) and ¶ 4.4(b), SDs shall: (1) within [14] days after the onset of such event, submit a report to EPA describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and (2) within 30 days after the conclusion of such event, submit a report to EPA describing all actions taken in response to such event.

(e) The reporting requirements under ¶ 4.4 are in addition to the reporting required by CERCLA § 103 or EPCRA § 304.

4.5 Off-Site Shipments

(a) SDs may ship hazardous substances, pollutants, and contaminants from the Site to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. SDs will be deemed to be in compliance with CERCLA § 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if SDs obtain a prior determination from EPA that the proposed

receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).

(b) SDs may ship Waste Material from the Site to an out-of-state waste management facility only if, prior to any shipment, they provide notice to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator. This notice requirement will not apply to any off-Site shipments when the total quantity of all such shipments does not exceed 10 cubic yards. The notice must include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. SDs also shall notify the state environmental official referenced above and the EPA Project Coordinator of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. SDs shall provide the notice after the award of the contract for RA construction and before the Waste Material is shipped.

(c) SDs may ship Investigation Derived Waste (IDW) from the Site to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), 40 C.F.R. § 300.440, *EPA's Guide to Management of Investigation Derived Waste*, OSWER 9345.3-03FS (Jan. 1992), and any IDW-specific requirements contained in the ROD. Wastes shipped off-Site to a laboratory for characterization, and RCRA hazardous wastes that meet the requirements for an exemption from RCRA under 40 CFR § 261.4(e) shipped off-site for treatability studies, are not subject to 40 C.F.R. § 300.440.

4.6 RA Construction Completion

(a) For purposes of this ¶ 4.6, "RA Construction" comprises, for any RA that involves the construction and operation of a system to achieve Performance Standards (for example, groundwater or surface water restoration remedies), the construction of such system and the performance of all activities necessary for the system to function properly and as designed.

(b) **Inspection of Constructed Remedy**. SDs shall schedule an inspection to review the construction and operation of the system and to review whether the system is functioning properly and as designed. The inspection must be attended by SDs and EPA and/or their representatives. A re-inspection must be conducted if requested by EPA.

(c) **RA Report**. SDs shall submit an "RA Report" requesting EPA's determination that RA Construction has been completed. The RA Report must: (1) include statements by a registered professional engineer and by SDs' Project Coordinator that construction of the system is complete and that the system is functioning properly and as designed; (2) include a demonstration, and supporting documentation, that construction of the system is complete and that the system is functioning properly and as designed; (3) include as-built drawings signed and

stamped by a registered professional engineer; (4) be prepared in accordance with Chapter 2 (Remedial Action Completion) of EPA's *Close Out Procedures for NPL Sites* guidance (May 2011), as supplemented by *Guidance for Management of Superfund Remedies in Post Construction*, OLEM 9200.3-105 (Feb. 2017); and (5) be certified in accordance with ¶ 6.5 (Certification).

(d) If EPA determines that RA Construction is not complete, EPA shall so notify SDs. EPA's notice must include a description of, and schedule for, the activities that SDs must perform to complete RA Construction. EPA's notice may include a schedule for completion of such activities or may require SDs to submit a proposed schedule for EPA approval. SDs shall perform all activities described in the EPA notice in accordance with the schedule.

(e) If EPA determines, based on the initial or any subsequent RA Report, that RA Construction is complete, EPA shall so notify SDs.

4.7 RA Completion

(a) **RA Monitoring Report**. SDs shall submit a RA Monitoring Report to EPA. The report must: (1) include certifications by a registered professional engineer and by SD's Project Coordinator that the RA is complete; (2) contain monitoring data to demonstrate that Performance Standards have been achieved; and (3) be certified in accordance with ¶ 6.5 (Certification).

(b) If EPA concludes that the RA is not Complete, EPA shall so notify SDs. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require SDs to submit a schedule for EPA approval. SDs shall perform all activities described in the notice in accordance with the schedule.

(c) If EPA concludes, based on the initial or any subsequent RA Monitoring Report requesting Certification of Work Completion, that the Work is Complete, EPA shall so certify to SDs in accordance with ¶ 4.9.

4.8 Periodic Review Support Plan (PRSP). SDs shall submit the PRSP for EPA approval. The PRSP addresses the studies and investigations that SDs shall conduct to support EPA's reviews of whether the RA is protective of human health and the environment in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c) (also known as "Five-year Reviews"). SDs shall develop the plan in accordance with *Comprehensive Five-year Review Guidance*, OSWER 9355.7-03B-P (June 2001), and any other relevant five-year review guidance.

4.9 Certification of Work Completion

(a) **Work Completion Inspection**. SDs shall schedule an inspection for the purpose of obtaining EPA's Certification of Work Completion. The inspection must be attended by SDs and EPA and/or their representatives.

(b) **Work Completion Report**. Following the inspection, SDs shall submit a report to EPA requesting EPA's Certification of Work Completion. The report must: (1) include certifications by a registered professional engineer and by SDs' Project Coordinator that the Work, including all O&M activities, is complete; and (2) be certified in accordance with ¶ 6.5 (Certification). If the RA Monitoring Report submitted under ¶ 4.7(a) includes all elements required under this ¶ 4.9(b), then the RA Monitoring Report/ suffices to satisfy all requirements under this ¶ 4.9(b).

(c) If EPA concludes that the Work is not complete, EPA shall so notify SDs. EPA's notice must include a description of the activities that SDs must perform to complete the Work. EPA's notice must include specifications and a schedule for such activities or must require SDs to submit specifications and a schedule for EPA approval. SDs shall perform all activities described in the notice or in the EPA-approved specifications and schedule.

(d) If EPA concludes, based on the initial or any subsequent report requesting Certification of Work Completion, that the Work is complete, EPA shall so certify in writing to SDs. Issuance of the Certification of Work Completion does not affect the following continuing obligations: (1) activities under the Periodic Review Support Plan; (2) obligations under Sections VIII (Property Requirements), XXI (Retention of Records), and XVIII (Access to Information) of the CD; (3) Institutional Controls obligations as provided in the ICIAP; and (4) reimbursement of EPA's Future Response Costs under Section X (Payments for Response Costs) of the CD.

5. REPORTING

5.1 **Progress Reports**. Commencing with the month following lodging of the CD and until EPA approves the Work Completion, SDs shall submit progress reports to EPA on a monthly basis, or as otherwise requested by EPA. The reports must cover activities that took place during the prior reporting period, including:

(a) The actions that have been taken toward achieving compliance with the CD;

(b) A summary of all results of sampling, tests, and all other data received or generated by SDs;

(c) A summary of all deliverables that SDs submitted to EPA;

(d) A summary of all activities relating to RA Construction that are scheduled for the next six weeks;

(e) An updated RA Construction Schedule, together with information regarding completed items, delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a summary of efforts made to mitigate those delays or anticipated delays;

(f) A summary of any modifications to the work plans or other schedules that SDs have proposed or that have been approved by EPA; and

(g) A summary of all activities undertaken in support of the Community Involvement Plan (CIP) during the reporting period and those to be undertaken in the next six weeks.

5.2 **Notice of Progress Report Schedule Changes**. If the schedule for an activity described in the Progress Reports, including activities required to be described under ¶ 5.1(d), changes, SDs shall notify EPA of such change at least 7 days before performance of the activity.

6. DELIVERABLES

6.1 **Applicability**. SDs shall submit deliverables for EPA approval or for EPA comment as specified in the SOW and Settlement Agreement (as defined below). If neither is specified, the deliverable does not require EPA's approval or comment. Paragraphs 6.2 (In Writing) through 6.4 (Technical Specifications) apply to all deliverables. Paragraph 6.5 (Certification) applies to any deliverable that is required to be certified. Paragraph 6.6 (Approval of Deliverables) applies to any deliverable that is required to be submitted for EPA approval. Notwithstanding the generality of the foregoing or any other provision of this Section 6, in the event of any inconsistency between this SOW and the terms and conditions of that certain Settlement Agreement by and among the United States of America and SDs, filed on March 28, 2024, at Docket Entry 29 in Case No. 1:20-cv-00602-KD-MU in the United States District Court for the Southern District of Alabama, a copy of which is attached below as Appendix C, ("Settlement Agreement") the terms of the Settlement Agreement shall control.

6.2 **In Writing**. As provided in ¶ 87 of the CD, all deliverables under this SOW must be in writing unless otherwise specified.

6.3 **General Requirements for Deliverables.** All deliverables must be submitted by the deadlines in the RD Schedule or RA Schedule, as applicable. SDs shall submit all deliverables to EPA in electronic form. Technical specifications for sampling and monitoring data and spatial data are addressed in ¶ 6.4. All other deliverables shall be submitted to EPA in the electronic form specified by the EPA Project Coordinator. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5" by 11", SDs shall also provide EPA with paper copies of such exhibits if requested by EPA.

6.4 **Technical Specifications**

(a) Sampling, monitoring and environmental data should be submitted in accordance with EPA Region 4 Superfund Environmental Data Submission Procedure (July2019). The standard Region 4 Electronic Data Deliverable (EDD) format is available at: https://www.epa.gov/superfund/region-4-superfund-electronic-data-submission. Other delivery methods may be allowed if electronic direct submission technology changes.

(b) Spatial data, including spatially-referenced data and geospatial data, should be submitted in accordance with EPA Region 4 Superfund Environmental Data Submission Procedure (July 2019). The standard Region 4 spatial format is available at: https://www.epa.gov/superfund/region-4-superfund-electronic-data-submission. Other delivery methods may be allowed if electronic direct submission technology changes. Spatial data submitted by SDs does not, and is not intended to, define the legal boundaries of the Site.

6.5 Certification. All deliverables that require compliance with this ¶ 6.5 must be signed by the SDs' Project Coordinator, or other responsible official of SDs, and must contain the following statement:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

6.6 Approval of Deliverables

(a) **Initial Submissions**

(1) After review of any deliverable that is required to be submitted for EPA approval under the CD or the SOW, EPA shall: (i) approve, in whole or in part, the submission; (ii) approve the submission upon specified conditions; (iii) disapprove, in whole or in part, the submission; or (iv) any combination of the foregoing.

(2) EPA also may modify the initial submission to cure deficiencies in the submission if: (i) EPA determines that disapproving the submission and awaiting a resubmission would cause substantial disruption to the Work; or (ii) previous submission(s) have been disapproved due to material defects and the deficiencies in the initial submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

(b) **Resubmissions**. Upon receipt of a notice of disapproval under ¶ 6.6(a) (Initial Submissions), or if required by a notice of approval upon specified conditions under ¶ 6.6(a), SDs shall, within 30 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the deliverable for approval. After review of the resubmitted deliverable, EPA may: (1) approve, in whole or in part, the resubmission; (2) approve the resubmission upon specified conditions; (3) modify the resubmission; (4) disapprove, in whole or in part, the

resubmission, requiring SDs to correct the deficiencies; or (5) any combination of the foregoing.

(c) **Implementation**. Upon approval, approval upon conditions, or modification by EPA under ¶ 6.6(a) (Initial Submissions) or ¶ 6.6(b) (Resubmissions), of any deliverable, or any portion thereof: (1) such deliverable, or portion thereof, will be incorporated into and be enforceable under the CD; and (2) SDs shall take any action required by such deliverable, or portion thereof. The implementation of any non-deficient portion of a deliverable submitted or resubmitted under ¶ 6.6(a) or ¶ 6.6(b) does not relieve SDs of any liability for stipulated penalties under Section XIV (Stipulated Penalties) of the CD.

6.7 Supporting Deliverables. SDs shall submit each of the following supporting deliverables for EPA approval, except as specifically provided. SDs shall develop the deliverables in accordance with applicable regulations, guidance, and policies (see Section 9 (References)). SDs shall update each of these supporting deliverables as necessary or appropriate during the course of the Work, and/or as requested by EPA.

(a) **Health and Safety Plan**. The Health and Safety Plan (HASP) describes all activities to be performed to protect on site personnel and area residents from physical, chemical, and all other hazards posed by the Work. SDs shall develop the HASP in accordance with EPA's Emergency Responder Health and Safety and Occupational Safety and Health Administration (OSHA) requirements under 29 C.F.R. §§ 1910 and 1926. The HASP should cover RD activities and should be, as appropriate, updated to cover activities during the RA and updated to cover activities after RA completion. EPA does not approve the HASP, but will review it to ensure that all necessary elements are included and that the plan provides for the protection of human health and the environment.

(b) **Emergency Response Plan**. The Emergency Response Plan (ERP) must describe procedures to be used in the event of an accident or emergency at the Site (for example, power outages, water impoundment failure, treatment plant failure, slope failure, etc.). The ERP must include:

(1) Name of the person or entity responsible for responding in the event of an emergency incident;

(2) Plan for meeting(s) with the local community, including local, State, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals;

(3) Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), consistent with the regulations under 40 C.F.R. Part 112, describing measures to prevent, and contingency plans for, spills and discharges;

(4) Notification activities in accordance with ¶ 4.4(b) (Release Reporting) in the event of a release of hazardous substances requiring reporting under

Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004; and

(5) A description of necessary actions to ensure compliance with Paragraph 11 (Emergencies and Releases) of the CD in the event of an occurrence during the performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency or may present an immediate threat to public health or welfare or the environment.

(c) **Field Sampling Plan**. The Field Sampling Plan (FSP) addresses all sample collection activities. The FSP must be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. SDs shall develop the FSP in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies*, EPA/540/G 89/004 (Oct. 1988).

(d) **Quality Assurance Project Plan**. The Quality Assurance Project Plan (QAPP) augments the FSP and addresses sample analysis and data handling regarding the Work. The QAPP must include a detailed explanation of SDs' quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance, and monitoring samples. SDs shall develop the QAPP in accordance with *EPA Requirements for Quality Assurance Project Plans*, QA/R-5, EPA/240/B-01/003 (Mar. 2001, reissued May 2006); *Guidance for Quality Assurance Project Plans*, QA/G-5, EPA/240/R 02/009 (Dec. 2002); and *Uniform Federal Policy for Quality Assurance Project Plans*, Parts 1-3, EPA/505/B-04/900A though 900C (Mar. 2005). The QAPP also must include procedures:

(1) To ensure that EPA and the State and their authorized representative have reasonable access to laboratories used by SDs in implementing the CD (SDs' Labs);

(2) To ensure that SDs' Labs analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring;

(3) To ensure that SDs' Labs perform all analyses using EPA-accepted methods (i.e., the methods documented in *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis*, ILM05.4 (Dec. 2006); *USEPA Contract Laboratory Program Statement of Work for Organic Analysis*, SOM01.2 (amended Apr. 2007); and *USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods (Multi-Media, Multi-Concentration)*, ISM01.2 (Jan. 2010)) or other methods acceptable to EPA;

(4) To ensure that SDs' Labs participate in an EPA-accepted QA/QC program or other program QA/QC acceptable to EPA;

(5) For SDs to provide EPA and the State with notice at least 28 days prior to any sample collection activity; except if site conditions warrant, prior notice can be shortened to 14 days or less upon approval by EPA.

(6) For SDs to provide split samples and/or duplicate samples to EPA and the State upon request;

(7) For EPA and the State to take any additional samples that they deem necessary;

(8) For EPA and the State to provide to SDs, upon request, split samples and/or duplicate samples in connection with EPA's and the State's oversight sampling; and

(9) For SDs to submit to EPA and the State all sampling and tests results and other data in connection with the implementation of the CD.

(e) **OU-2 Long-Term Monitoring Plan**. The purpose of the OU2 Monitoring Plan (LTMP) is to obtain baseline information regarding the extent of contamination in affected media at the Site; to obtain information, through short- and long- term monitoring, about the movement of and changes in contamination throughout the Site, before and during implementation of the RA; to obtain information regarding contamination levels to determine whether Performance Standards (PS) are achieved; and to obtain information to determine whether to perform additional actions, including further Site monitoring. The OU2 LTMP must include:

(1) Description of the environmental media to be monitored;

(2) Description of the data collection parameters, including existing and proposed monitoring devices and locations, schedule and frequency of monitoring, analytical parameters to be monitored, and analytical methods employed;

(3) Description of how performance data will be analyzed, interpreted, and reported, and/or other Site-related requirements;

(4) Description of deliverables that will be generated in connection with monitoring, including sampling schedules, laboratory records, monitoring reports, and monthly and annual reports to EPA and State agencies; and

(5) Summary of potential additional monitoring and data collection actions (such as increases in frequency of monitoring, and/or installation of additional monitoring devices in the affected areas) in the event that results from monitoring devices indicate changed conditions (such as higher than expected concentrations of the contaminants of concern or groundwater contaminant plume movement).

(f) **Construction Quality Assurance/Quality Control Plan (CQA/QCP)**. The purpose of the Construction Quality Assurance Plan (CQAP) is to describe planned and systemic activities that provide confidence that the RA construction will satisfy final design plans, specifications, and related requirements, including quality objectives. The purpose of the Construction Quality Control Plan (CQCP) is to describe the activities to verify that RA construction has satisfied final design, specifications, and related requirements, including quality objectives. The CQA/QCP must:

(1) Identify, and describe the responsibilities of, the organizations and personnel implementing the CQA/QCP;

(2) Describe the PS required to be met to achieve Completion of the RA;

(3) Describe the activities to be performed: (i) to provide confidence that PS will be met; and (ii) to determine whether PS have been met;

(4) Describe verification activities, such as inspections, sampling, testing, monitoring, and production controls, under the CQA/QCP;

(5) Describe industry standards and technical specifications used in implementing the CQA/QCP;

(6) Describe procedures for tracking construction deficiencies from identification through corrective action;

(7) Describe procedures for documenting all CQA/QCP activities; and

(8) Describe procedures for retention of documents and for final storage of documents.

(g) **Transportation and Off-Site Disposal Plan**. The Transportation and Off-Site Disposal Plan (TODP) describes plans to ensure compliance with ¶ 4.5 (Off-Site Shipments). The TODP must include:

(1) Proposed routes for off-site shipment of Waste Material;

(2) Identification of communities affected by shipment of Waste Material; and

(3) Description of plans to minimize impacts on affected communities.

(h) **O&M Plan**. The O&M Plan describes the requirements for inspecting, operating, and maintaining the RA. SDs shall develop the O&M Plan in accordance with *Guidance for Management of Superfund Remedies in Post Construction*, OLEM 9200.3-105 (Feb. 2017). The O&M Plan must include the following additional requirements:

(1) Description of PS required to be met to implement the ROD;

(2) Description of activities to be performed: (i) to provide confidence that PS will be met; and (ii) to determine whether PS have been met;

(3) **O&M Reporting**. Description of records and reports that will be generated during O&M, such as daily operating logs, laboratory records, records of operating costs, reports regarding emergencies, personnel and maintenance records, monitoring reports, and monthly and annual reports to EPA and State agencies;

(4) Description of corrective action in case of systems failure, including: (i) alternative procedures to prevent the release or threatened release of Waste Material which may endanger public health and the environment or may cause a failure to achieve PS; (ii) analysis of vulnerability and additional resource requirements should a failure occur; (iii) notification and reporting requirements should O&M systems fail or be in danger of imminent failure; and (iv) community notification requirements; and

(5) Description of corrective action to be implemented in the event that PS are not achieved; and a schedule for implementing these corrective actions.

(i) **O&M Manual**. The O&M Manual serves as a guide to the purpose and function of the equipment and systems that make up the remedy. SDs shall develop the O&M Manual in accordance with *Guidance for Management of Superfund Remedies in Post Construction*, OLEM 9200.3-105 (Feb. 2017).

(j) **Institutional Controls Implementation and Assurance Plan**. The Institutional Controls Implementation and Assurance Plan (ICIAP) describes plans to implement, maintain, and enforce the Institutional Controls (ICs) at the Site. SDs shall develop the ICIAP in accordance with *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*, OSWER 9355.0-89, EPA/540/R-09/001 (Dec. 2012), and *Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites*, OSWER 9200.0-77, EPA/540/R-09/02 (Dec. 2012). The ICIAP must include the following additional requirements:

(1) Locations of recorded real property interests (e.g., easements, liens) and resource interests in the property that may affect ICs (e.g., surface, mineral, and water rights) including accurate mapping and geographic information system (GIS) coordinates of such interests; and

(2) Legal descriptions and survey maps that are prepared according to current American Land Title Association (ALTA) Survey guidelines and certified by a licensed surveyor.

7. SCHEDULES

7.1 Applicability and Revisions. All deliverables and tasks required under this SOW must be submitted or completed by the deadlines or within the time durations listed in the RD and RA Schedules set forth below. SDs may submit proposed revised RD Schedules or RA Schedules for EPA approval. Upon EPA's approval, the revised RD and/or RA Schedules supersede the RD and RA Schedules set forth below, and any previously approved RD and/or RA Schedules.

7.2 RD Schedule

	Description of Deliverable, Task	**¶ Ref.**	**Deadline**
1	RDWP (Health & Safety Plan (6.7(a)), Emergency Response Plan (6.7(b)), Field Sampling Plan (6.7(c)),and Quality Assurance Project Plan (6.7(d))	3.1, 6.7(a), 6.7(b) 6.7(c), 6.7(d)	60 days after EPA's Authorization to Proceed regarding Supervising Contractor under CD ¶ 9.c
2	PDIWP	3.3(a)	60 days after EPA's Authorization to Proceed regarding Supervising Contractor under CD ¶ 9.c
3	Treatability Study WP	3.4	90 days after EPA's Authorization to Proceed regarding Supervising Contractor under CD ¶ 9.c
4	Preliminary (30%) RD (PDI Evaluation Report 3.3(b)), Treatability Study Evaluation Report (3.4(c)), Preliminary Construction Quality Assurance/Quality Control Plan (6.7(f)), Preliminary Transportation and Off-Site Disposal Plan (6.7(g)), Preliminary O&M Plan (6.7(h)), and Preliminary Institutional Controls Implementation Plan (6.7(j))	3.5, 3.3(b) 3.4(c), 6.7(f), 6.7(g), 6.7(h), and 6.7(i)	180 days after EPA approval of Final RDWP (includes PDI Evaluation and Treatability Study Evaluation)
5	Interim (Post-Phase 2) In-Situ Solidification/Stabilization (ISS) Mix Trials Evaluation Technical Memorandum	N/A	60 days after completion of the Phase 2 ISS Mix Trials bench tests.

6	Integrated Intermediate (60%) RD for WWD, Basin and Round Pond, and Floodplain	1.3, 3.6	120 days after the later of: (1) Entry of an order by the Court approving the Amendment to the CD to which this Amended and Restated SOW is attached, or (2) Receipt of EPA's written confirmation that the contingency remedy will not be invoked for the WWD, but in no event earlier than June 15, 2025. In the event EPA invokes the contingency remedy for the WWD, this deadline will be suspended pending EPA issuance of a modified SOW, as provided for in paragraph 13 of the Consent Decree.
7	Final (Post-Phase 3) In-Situ Solidification/Stabilization (ISS) Mix Trails Evaluation Report	N/A	60 days after completion of Phase 3 ISS Mix Trials bench tests.
7	Integrated Pre-final (95%) RD Updates to deliverables required by Integrated Intermediate (60%) RD for WWD, Basin and Round Pond, and Floodplain	3.7	90 days after receipt of EPA review comments on the Integrated Intermediate (60%) RD Deliverables or Final (Post-Phase 3) ISS Mix Trials Evaluation Report, whichever last occurs.
8	Integrated Final (100%) RD Final versions of all deliverables required by Integrated Pre-Final (95%) RD for WWD, Basin and Round Pond, and Floodplain	3.8	60 days after receipt of EPA comments on Integrated Pre-Final (95%) RD Deliverables

7.3 RA Schedule

	Description of Deliverable / Task	¶ Ref.	Deadline
1	Award RA contract		60 days after EPA Notice of Authorization to Proceed with RA
2	RAWP ((Health & Safety Plan (6.7(a)), Emergency Response Plan (6.7(b)), and Quality Assurance Project Plan (6.7(d))	4.1, 6.7(a), 6.7(b) 6.7(d)	90 days after EPA Notice of Authorization to Proceed with RA
3	OU2 Long-Term Monitoring Plan	6.7(e)	90 days after EPA Notice of Authorization to Proceed with RA
4	Designate IQAT	4.2	60 days after EPA's Authorization to Proceed regarding Supervising Contractor under CD ¶ 9.c
5	Pre-Construction Conference	4.3(a)	45 days after Approval of RAWP
6	Start of Construction		90 days after Approval of RAWP
7	RA Construction Pre-final Inspection	4.6(b)	30 days after completion of construction
8	RA Construction Pre-final Inspection Report	4.6(d)	15 days after completion of Pre-final Inspection
9	RA Construction Final Inspection	4.6(d)	30 days after Completion of Work identified in Pre-final Inspection Report
10	RA Construction Completion Report	4.6(d)	90 days after Final Inspection
11	RA Monitoring Report	4.7(a)	RA has been fully performed and the Performance Standards have been met.
12	Work Completion Report	4.9(b)	After O&M activities and Performance Standards have been met.
13	Periodic Review Support Plan ((Health & Safety Plan (6.7(a)), Emergency Response Plan (6.7(b)), and Quality Assurance Project Plan (6.7(d))	4.8, 6.7(a), 6.7(b) 6.7(d)	Five years after Completion of RA Construction

8. STATE PARTICIPATION

8.1 **Copies**. SDs shall, at any time they send a deliverable to EPA, send a copy of such deliverable to the State. EPA shall, at any time it sends a notice, authorization, approval, disapproval, or certification to SDs, send a copy of such document to the State.

8.2 **Review and Comment**. The State will have a reasonable opportunity for review and comment prior to:

(a) Any EPA approval or disapproval under ¶ 6.6 (Approval of Deliverables) of any deliverables that are required to be submitted for EPA approval; and

(b) Any approval or disapproval of the Construction Phase under ¶ 4.6 (RA Construction Completion), any disapproval of, or Certification of RA Completion under ¶ 4.7 (Certification of RA Completion), and any disapproval of, or Certification of Work Completion under ¶ 4.9 (Certification of Work Completion).

9. REFERENCES

9.1 The following regulations and guidance documents, among others, apply to the Work. Any item for which a specific URL is not provided below is available on one of the two EPA Web pages listed in ¶ 9.2:

(a) A Compendium of Superfund Field Operations Methods, OSWER 9355.0-14, EPA/540/P-87/001a (Aug. 1987).

(b) CERCLA Compliance with Other Laws Manual, Part I: Interim Final, OSWER 9234.1-01, EPA/540/G-89/006 (Aug. 1988).

(c) Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER 9355.3-01, EPA/540/G-89/004 (Oct. 1988).

(d) CERCLA Compliance with Other Laws Manual, Part II, OSWER 9234.1-02, EPA/540/G-89/009 (Aug. 1989).

(e) Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, OSWER 9355.5-01, EPA/540/G-90/001 (Apr.1990).

(f) Guidance on Expediting Remedial Design and Remedial Actions, OSWER 9355.5-02, EPA/540/G-90/006 (Aug. 1990).

(g) Guide to Management of Investigation-Derived Wastes, OSWER 9345.3-03FS (Jan. 1992).

(h) Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, OSWER 9355.7-03 (Feb. 1992).

(i) Guidance for Conducting Treatability Studies under CERCLA, OSWER 9380.3-10, EPA/540/R-92/071A (Nov. 1992).

(j) National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, 40 C.F.R. Part 300 (Oct. 1994).

(k) Guidance for Scoping the Remedial Design, OSWER 9355.0-43, EPA/540/R-95/025 (Mar. 1995).

(l) Remedial Design/Remedial Action Handbook, OSWER 9355.0-04B, EPA/540/R-95/059 (June 1995).

(m) EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis, QA/G-9, EPA/600/R-96/084 (July 2000).

(n) Comprehensive Five-year Review Guidance, OSWER 9355.7-03B-P, 540-R-01-007 (June 2001).

(o) EPA Region 4 Superfund Environmental Data Submission, Interim Final, SEMDPROC-009-R0, (July 2019)

(p) Guidance for Quality Assurance Project Plans, QA/G-5, EPA/240/R-02/009 (Dec. 2002).

(q) Institutional Controls: Third Party Beneficiary Rights in Proprietary Controls (Apr. 2004).

(r) Quality management systems for environmental information and technology programs -- Requirements with guidance for use, ASQ/ANSI E4:2014 (American Society for Quality, February 2014).

(s) Uniform Federal Policy for Quality Assurance Project Plans, Parts 1-3, EPA/505/B-04/900A though 900C (Mar. 2005).

(t) Superfund Community Involvement Handbook, SEMS 100000070 (January 2016), https://www.epa.gov/superfund/community-involvement-tools-and-resources.

(u) EPA Guidance on Systematic Planning Using the Data Quality Objectives Process, QA/G-4, EPA/240/B-06/001 (Feb. 2006).

(v) EPA Requirements for Quality Assurance Project Plans, QA/R-5, EPA/240/B-01/003 (Mar. 2001, reissued May 2006).

(w) EPA Requirements for Quality Management Plans, QA/R-2, EPA/240/B-01/002 (Mar. 2001, reissued May 2006).

(x) USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, ILM05.4 (Dec. 2006).

(y) USEPA Contract Laboratory Program Statement of Work for Organic Analysis, SOM01.2 (amended Apr. 2007).

(z) EPA National Geospatial Data Policy, CIO Policy Transmittal 05-002 (Aug. 2008), https://www.epa.gov/geospatial/geospatial-policies-and-standards and https://www.epa.gov/geospatial/epa-national-geospatial-data-policy.

(aa) Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration, OSWER 9283.1-33 (June 2009).

(bb) Principles for Greener Cleanups (Aug. 2009), https://www.epa.gov/greenercleanups/epa-principles-greener-cleanups.

(cc) USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods (Multi-Media, Multi-Concentration), ISM01.2 (Jan. 2010).

(dd) Close Out Procedures for National Priorities List Sites, OSWER 9320.2-22 (May 2011).

(ee) Groundwater Road Map: Recommended Process for Restoring Contaminated Groundwater at Superfund Sites, OSWER 9283.1-34 (July 2011).

(ff) Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance," OSWER 9355.7-18 (Sep. 2011).

(gg) Construction Specifications Institute's MasterFormat 2018 Edition, available from https://www.csiresources.org/home.

(hh) Updated Superfund Response and Settlement Approach for Sites Using the Superfund Alternative Approach, OSWER 9200.2-125 (Sep. 2012)

(ii) Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites, OSWER 9355.0-89, EPA/540/R-09/001 (Dec. 2012).

(jj) Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites, OSWER 9200.0-77, EPA/540/R-09/02 (Dec. 2012).

(kk) EPA's Emergency Responder Health and Safety Manual, OSWER 9285.3-12 (July 2005 and updates), https://www.epaosc.org/_HealthSafetyManual/manual-index.htm.

(ll) Broader Application of Remedial Design and Remedial Action Pilot Project Lessons Learned, OSWER 9200.2-129 (Feb. 2013).

(mm) Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions, OSWER 9355.0-129 (Nov. 2013).

(nn) Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind, OSWER 9200.2-144 (May 2014).

(oo) Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105 (Feb. 2017), https://www.epa.gov/superfund/superfund-post-construction-completion.

(pp) U.S. Environmental Protection Agency Region 4 Superfund Division, Environmental Data Submission, SFDPROC-009-R0 (January 27, 2017).

9.2 A more complete list may be found on the following EPA Web pages:

Laws, Policy, and Guidance: https://www.epa.gov/superfund/superfund-policy-guidance-and-laws

Test Methods Collections: https://www.epa.gov/measurements/collection-methods

9.3 For any regulation or guidance referenced in the CD or SOW, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Work only after SDs receive notification from EPA of the modification, amendment, or replacement.

10. CONTINGENCY REMEDY

10.1 Testing/Investigations. If testing and/or investigations are needed for EPA to make a determination whether the contingency remedy selected in the AROD needs to be implemented, SDs shall submit a plan for implementing such testing and/or investigations (if not already provided for within the Periodic Review Support Plan (¶4.8) or the OU-2 Long-Term Monitoring Plan (¶6.7(e)). The SDs shall implement such testing and/or investigations in accordance with EPA's approval and/or modification of such plan(s), and shall submit reports to EPA regarding the results of such testing and/or investigations.

10.2 Invocation of Contingency Remedy. If EPA determines that the contingency remedy selected in the AROD needs to be implemented, EPA shall so notify SDs, and shall include a copy of EPA's decision document invoking the contingency remedy explaining the decision and the areas where the contingency remedy will be implemented (whether in the entire WWD or portions thereof). Upon invocation of the contingency remedy, EPA will notify the SDs which of the deliverables listed in Section 3 (Remedial Design) and ¶6.7 (Supporting Deliverables) of this SOW need to be modified, together with a proposed schedule for submitting the revised deliverables to EPA for review and approval in accordance with ¶6.6 (Approval of Deliverables) that is generally consistent with the Work flow and schedule set forth in ¶7.2 (as applicable to the scope of the Contingency Remedy).

10.3 Implementation of Contingency Remedy. SDs shall implement the contingency remedy in accordance with the EPA notification and consistent with the requirements of Section 3 (Remedial Design) and Section 4 (Remedial Action) of this SOW.

10.4 Reports Regarding Performance of Contingency Remedy. SDs shall submit such reports specified in ¶ 4.8 (Periodic Review Support Plan) and ¶ 6.7(e) (OU-2 Long-Term Monitoring Plan) of the SOW, with modifications as needed based on the scope and timing of the Contingency Remedy.

Appendix B

Amended Record of Decision

Olin Corp. (McIntosh Plant) Site Operable Unit 2
McIntosh, Washington County, Alabama

May 2024

U.S. Environmental Protection Agency
Region 4

Table of Contents

Figures

Tables

Appendices

Acronyms and Abbreviations

<	Less Than
%	Percent
ADEM	Alabama Department of Environmental Management
AOC	Administrative Order By Consent
ARAR	Applicable or Relevant and Appropriate Requirements
AROD	Amended Record of Decision
BMP	Best Management Practice
CAP	Corrective Action Program
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemicals of Concern
CPC	Crop Protection Chemicals
CUL	Cleanup Level
CWA	Clean Water Act
DDE	Dichlorodiphenyldichloroethylene
DDD	Dichlorodiphenyldichloroethane
DDT	Dichlorodiphenyltrichloroethane
DDTR	Total dichlorodiphenyl choroethanes (Sum of p,p'-DDT; o,p'-DDT; p,p'-DDE; o,p'-DDE; p,p'-DDD and o,p'-DDD)
DU	Decision Unit
EC	Engineering Control
EFP	East Floodplain
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
FS	Feasibility Study
GRA	General Response Action
HCB	Hexachlorobenzene
IC	Institutional Control
ISM	Incremental Sampling Methodology
ISS	In Situ Solidification/Stabilization
mg/kg	Milligram per Kilogram
NAVD88	North American Vertical Datum of 1988
NCP	National Oil and Hazardous Substances Contingency Plan
NFP	North Floodplain Area
NEFP	Northeast Floodplain Area
NOD	Nonoperative Ditch
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NWFP	Northwest Floodplain Area
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCNB	Pentachloronitrobenzene
PDI	Predesign Investigation
RA	Remedial Action
RAO	Remedial Action Objective

ACRONYMS AND ABBREVIATIONS (continued)

RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
SD	Settling Defendant
SFP	South Floodplain Area
SWFP	Southwest Floodplain Area
SWMU	Solid Waste Management Units
TBC	To Be Considered
Terrazole	5-ethoxy-3trichloromethyl-1,2,4-thiadiazole
TMV	Toxicity, Mobility, and Volume
USFWS	U.S. Fish and Wildlife Service
U.S.C.	United States Code
WSP	WSP USA Inc.
WWD	Wastewater Ditch

PART 1

PART 1: DECLARATION

1.0 AMENDED RECORD OF DECISION

1.1 SITE NAME AND LOCATION

Olin Corp. (McIntosh Plant) Site Operable Unit 2
Washington County, Alabama

1.2 STATEMENT OF BASIS AND PURPOSE

This Amended Record of Decision (AROD) modifies the 2014 Selected Remedy for the Olin Corp. (McIntosh Plant) Superfund Site, Operable Unit 2 (OU-2). This amended remedy is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 United States Code (U.S.C.) §§ 9601–9675, and to the extent practicable the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. This decision document explains the factual and legal basis for selecting a remedy to address sediment and soil contamination at OU-2.

1.2.1 Rationale for Amendment

In the 2014 Record of Decision (ROD) for the approximately 220-acre OU-2, the U.S. Environmental Protection Agency (EPA) selected a multilayered cap (in situ engineered cap) over approximately 80 acres of sediment, mostly in the Olin Basin (Basin) and Round Pond. The 2014 ROD required further investigation and anticipated the potential for additional actions in OU-2 in the event the investigated areas exceeded specified cleanup levels (CULs). This AROD selects remedial actions for contaminated soils and sediments making up approximately 70 acres within the OU-2 boundary, known as the Wastewater Ditch (WWD) and floodplain areas. This AROD modifies the 2014 Selected Remedy by adding in situ solidification/stabilization (ISS) and a protective cover in the WWD, engineered caps in the floodplain areas along with restoration to disturbed habitat and wetlands, and ICs and ECs to restrict access/activities in the remediation areas and prevent unacceptable exposure. This amended remedy represents a fundamental change to the scope of the 2014 ROD because of the addition of a new remedial technology (ISS), the increase in volume/remediation areas, and the increase in cost. The need for these modifications to the remedy was identified by sediment and soil sampling and analysis conducted between 2021 and 2023, as part of the predesign investigation (PDI) undertaken pursuant to the 2014 ROD, which identified new information regarding significant quantities of contaminated sediment and soil above CULs. A revised focused feasibility study (FFS) was prepared in November 2023 to evaluate potential remedies to address contamination in the sediment and soil of the OU-2 WWD and floodplain areas. The State, through Alabama Department of Environmental Management (ADEM), concurs with the amended remedy.

1.3 ASSESSMENT OF THE SITE

The response action selected in this AROD is necessary to address actual or threatened releases of hazardous substances into the environment, which may present an imminent and

substantial endangerment to the public health or welfare. Sediment and soil in the WWD and floodplain areas are contaminated with hazardous substances including mercury, hexachlorobenzene (HCB), and dichlorodiphenyltrichloroethane (DDT), along with its metabolites dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE).

1.4 DESCRIPTION OF THE SELECTED AMENDED REMEDY

The selected amended remedy described in the "Selected Amended Remedy" section addresses portions of OU-2 involving contaminated sediment and soil in the Basin and Round Pond floodplain areas and the WWD, which are located within wetlands. The Basin and Round Pond floodplains are located east of the Olin main plant area and adjacent to the Tombigbee River. The WWD extends from the main plant to the Basin. This ditch formerly discharged into the southwest corner of the Basin, but currently discharges into the inlet channel to the Tombigbee River. The 2014 Selected Remedy for the Basin and Round Pond floodplain areas is unchanged.

The major remedy components for the WWD and floodplain remediation areas specified in this AROD include the following:

- *In Situ Solidification/Stabilization* - ISS of sediments and soil in the wastewater ditch will occur through mechanical mixing of the in situ material and one or more solidifying/stabilizing agent(s), selected based on the results of a series of bench-scale mix trial. Chemicals of concern (COC)-impacted sediment will be excavated and soil in tributaries and banks/side slopes will be incorporated in the wastewater ditch before solidification/stabilization, followed by the installation of a protective cover (sand, stone and/or riprap).

- *In Situ Engineered Cap* - An in situ engineered cap will be constructed over the OU-2 floodplain remedial footprint (areas determined to exceed CULs). At locations with the highest COC concentrations, an amendment will be included in the cap to treat or reduce toxicity of the COCs. The type and dosage of this amendment will be determined during the remedial design using results of ongoing treatability studies. The uppermost layer of the cap will comprise a habitat layer with appropriate erosion protection where needed.

- *Habitat restoration* – Areas disturbed by excavation such as the WWD banks and floodplain areas within the wetlands affected by installation of the engineered caps will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific applicable or relevant and appropriate requirements (ARARs) such as Clean Water Act Section 404(b)(1) regulations related to compensatory mitigation for adverse effects in wetlands and to be considered (TBC) related to actions in designated floodplains. Such restoration measures could include regrading and replacement of trees and other types of revegetation, as appropriate.

- *Maintenance of the engineered caps and protective cover* – Inspections will be performed and repair and replenishment of the layers implemented where necessary to prevent releases of contaminants.

- *Long-term monitoring* will include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving remedial action objectives (RAOs), attaining CULs, and reducing human health and environmental risk. In addition, long-term monitoring data are needed to complete the five-year review process.

- *Implementation of institutional controls (ICs) and engineering controls (ECs)* – ICs include revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the remediated OU-2 areas. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of contamination in fish. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. OU-2 is currently fenced along the west, north, and southwest boundaries. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

- *Contingency Remedy* – Alternative WWD-3B may be implemented instead of WWD-4 if ISS does not meet criteria specified in the "Selected Amended Remedy" section related to strength, hydraulic conductivity, and prevention of leaching of COCs based on the bench-scale mix trial. Under the contingency remedy, soils and sediments with COC concentrations greater than CULs would be excavated until clean (below CULs) or to depths determined by the EPA, as verified by confirmation samples. Excavated soils and sediments would be disposed of at appropriate EPA-approved landfills based on COC concentrations. Areas disturbed by excavation such as the WWD banks and areas within the wetlands affected by excavation will be restored to the extent possible to provide similar or enhanced habitat. Such measures could include regrading and re vegetation.

1.4.1 Scope and Role of Operable Unit

Because the problems at the Olin Site are complex, the Site has been organized into two OUs: OU-1 comprises the active production facility, solid waste management units, and the upland area of the Olin property and OU-2 comprises the Basin and Round Pond located east of the Olin main plant area and adjacent to the Tombigbee River, floodplain areas adjacent to the Basin, and a WWD leading to the Basin. This amended ROD for OU-2 addresses sediment and soil contamination in the WWD and floodplain remediation areas. The 2014 ROD for OU-2 addresses the Basin and the Round Pond floodplain areas. The ROD detailing the cleanup plan for OU-1 was issued on December 16, 1994. It addresses the source of the contamination on the Site as well as the groundwater contamination across the entire Site.

1.4.2 Principal Threat Waste

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed at a site wherever practicable (Section 300.430[a][1][iii][A]). Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The Olin OU-2 contaminated soils and sediments in the floodplain areas (including wetlands) are not known to pose a principal threat and are therefore considered low level threat wastes. Per the NCP at Section 300.430[a][1][iii][B], the EPA expects to use engineering controls, such as containment, for waste that poses relatively low

long-term threat or where treatment is impractical. Capping has been demonstrated to be a reliable containment remedy for this type of contamination and provides an element of treatment to reduce mobility and toxicity (bioavailability) through use of an amendment, chemical immobilization of the contaminants under the cap, and overall physical isolation. The Olin OU-2 mercury contaminated soils and sediments in the WWD are mostly considered as not posing a principal threat, but principal threat wastes may be present in the areas of the Upper and Upper Central WWD segments, where high-concentrations of mercury in subsurface soil is present up to about 2,000 mg/kg and HCB is present up to about 1,000 mg/kg. The EPA's selected remedy for the WWD includes treatment through ISS which will reduce mobility and toxicity (bioavailability) of contaminants in the WWD soils and sediments, consistent with the NCP's expectation to use treatment to address principal threats.

1.5 STATUTORY DETERMINATIONS

The Selected Amended Remedy (including the contingency remedy) is protective of human health and the environment, complies with federal and state environmental requirements that are applicable or relevant and appropriate to the remedial actions, is cost effective, and uses permanent solutions and treatment technologies to the maximum extent practicable.

The selected remedy, WWD-4, for the wastewater ditch uses ISS as the treatment technology for COCs in sediments and soil. Although ISS in the WWD will increase the volume of material through treatment via mixing with solidification materials, the mobility and toxicity of contaminated sediment and soil will be reduced. ISS and a protective cover are considered an effective and long-term permanent solution.

The selected remedy Floodplain (FP)-2 includes an in situ engineered cap, with an amendment in certain remediation areas, which will significantly reduce toxicity and mobility of mercury in sediments through physically and chemically isolating the contaminated sediments from the environment. In situ caps are generally reliable containment for contaminated sediments and soils.

The Selected Amended Remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that would allow unlimited use and unrestricted exposure. Therefore, statutory reviews pursuant to CERCLA Section 121(c) will be conducted every five years after the initiation of the remedial action to ensure the remedy continues to provide adequate protection of human health and the environment. The OU-1 remedy is subject to statutory reviews every five years. The next OU-1 five-year review is scheduled for 2026.

1.6 DATA CERTIFICATION CHECKLIST

The Decision Summary section of this Amended ROD includes the following information. The Administrative Record for the Site contains additional information.

- ✓ COCs and their respective concentrations.
- ✓ Baseline risk represented by the COCs.

- ✓ CULs established for COCs and the basis for these levels are in Section 6.0, “Remedial Action Objectives.”
- ✓ How source materials or COCs are addressed is discussed in Sections 3.0, “Site History and Contamination and 2014 ROD Selected Remedy,” and 10.0, “Selected Amended Remedy.”
- ✓ Current and reasonably anticipated future use assumptions used in the baseline risk assessment and ROD are in Section 5.0, “Summary of Site Risks.”
- ✓ Potential land and groundwater use that will be available at the Site as a result of the Selected Remedy.
- ✓ Estimated capital, operation and maintenance (O&M) and total present value costs, discount rate, and the number of years over which the remedy cost estimates are projected are discussed in Sections 10.0, “Selected Amended Remedy,” and 11.3, “Cost Effectiveness.”
- ✓ Key factors that led to selection of the remedy (i.e., how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decisions) are discussed in Section 8.0, “Comparative Analysis of Alternatives for ROD Amendment,” and Section 11.0, “Statutory Determinations.”

1.7 AUTHORIZING SIGNATURE

This ROD Amendment documents the selected amended remedy for sediments and soils at the Olin OU-2 Superfund Site. This remedy was selected by the EPA with concurrence from ADEM.

CAROLINE FREEMAN

Digitally signed by CAROLINE FREEMAN
Date: 2024.05.23 18:32:25 -04'00'

Date: _____

Caroline Y. Freeman
Director
Superfund & Emergency Management Division
U.S. Environmental Protection Agency – Region 4

PART 2

PART 2: DECISION SUMMARY

2.0 INTRODUCTION TO SITE AND STATEMENT OF PURPOSE

2.1 SITE NAME, LOCATION AND DESCRIPTION

The Olin Corp. (McIntosh Plant) Superfund Site (Site) is located at 1638 Industrial Road in McIntosh, Washington County, Alabama (**Figure 1**). The EPA is the lead regulatory agency, and ADEM is the support agency.

The Olin Corporation McIntosh Plant is located approximately 1 mile east–southeast of the town of McIntosh, in Washington County, Alabama. The Olin property is bounded on the east by the Tombigbee River; on the west by land not owned by Olin; on the north by the Ciba-Geigy Corp. Superfund Site; and on the south by River Road.

Because the problems at the Olin Site are complex, the Site has been organized into two operable units (OUs): OU-1 comprises the active production facility, solid waste management units (SWMUs), and the upland area of the Olin property and OU-2 comprises the Basin and Round Pond located east of the Olin main plant area and adjacent to the Tombigbee River, floodplain areas adjacent to the Basin, and a wastewater ditch leading to the Basin.

Based on extensive groundwater investigations in the early 1980s, Olin implemented a groundwater corrective action program (CAP) in 1987 under Resource Conservation and Recovery Act (RCRA). It included groundwater recovery and treatment for mercury and other COCs through five corrective action recovery wells with wellhead treatment under RCRA. As part of the post-closure RCRA permit, Olin implemented a compliance monitoring program and a corrective action monitoring program at the active production plant facility. Olin conducted more groundwater studies in the early 1990s for OU-1.

Following completion of a Remedial Investigation/Feasibility Study (RI/FS) in 1991, an OU-1 ROD selecting a remedy was issued in 1994. The ROD selected cleanup goals directed at protecting groundwater for domestic use. This RAO applies to soil and groundwater remedial components. Although a majority of the SWMUs did not require further corrective action under the RCRA permit, the ROD included a subset of SWMUs and areas of concern since these areas represented continuing sources of groundwater contamination. Remedial actions included extraction of groundwater, upgrade and extension of caps over specific SWMUs, monitoring and maintenance of caps over specific SWMUs, monitoring to determine effectiveness of groundwater treatment, and ICs to restrict land use. ADEM is working with the EPA to evaluate whether more actions are warranted beyond the ongoing monitoring done as part of the ADEM-approved RCRA CAP associated with Olin's RCRA permit.

OU-2 is east of the Olin main plant in McIntosh, Alabama, and consists of roughly 220 acres of open, ponded water and seasonally flooded wetlands (Figure 2). OU-2 is located off the Tombigbee River, with water and sediment exchange with the river taking place during flood events with water surface elevations exceeding 4 feet. Under base water flow (non-flooded) conditions, open water at OU-2 consists of the 76-acre Basin and the 4-acre Round Pond. The

Basin and Round Pond drain to the Tombigbee River through an inlet channel at the south end of the Basin. A berm sited at approximately 12 feet has been constructed around this part of OU-2, with a gated structure built on the southern end to control flows in and out of OU-2.

As shown in Figures 2 and 3, OU-2 also includes a WWD that is roughly 6,000 feet long and extends from the main plant to the inlet channel. This ditch formerly discharged into the southwest corner of Basin, but now discharges into the inlet channel to the Tombigbee River.

The OU-2 floodplain areas subject to remediation are subdivided into seven main areas as shown on Figure 4 and described as follows.

- South Floodplain Area (SFP) – The approximately 10.3-acre floodplain is located south of the berm, east of the bluff, and north of the Tombigbee River within the OU-2 boundary. The total extent of this area that is subject to remediation will be determined following the completion of additional proposed sampling.

- Southwest Floodplain Area (SWFP) – The 10.3-acre floodplain southwest of the Basin and north of the southern berm encompasses the floodplain area surrounding the nonoperative ditch (NOD) and floodplain surrounding the furthest downstream decision units (DUs) of the ditch.

- Nonoperative Ditch Area – This 0.87-acre floodplain area is the former and nonoperative wastewater ditch.

- Northwest Floodplain Area (NWFP) – The 12.1-acre floodplain west and north of Round Pond and south of the northern berm.

- North Floodplain Area (NFP) – The 9.6-acre floodplain is north of the northern berm. The boundary for the NFP area is the OU-2 berm to the south, the Ciba OU-3 boundary to the north, and the Olin OU-2 boundaries to the east and west.

- Northeast Floodplain Area (NEFP) – The 33.0-acre floodplain is north of the Basin, east of Round Pond, and south of the berm. The southern boundary of the floodplain follows the Basin and northern edge of the former boat ramp.

- East Floodplain Area (EFP) – The 19.0-acre floodplain area is south and east of the Basin and north of the berm. The northern boundary is the former boat ramp, and the Basin forms the western boundary.

2.2 OU-2 ENFORCEMENT ACTIVITIES

In an Administrative Order By Consent (AOC) between the EPA and Olin Corporation signed on May 8, 1990, Olin Corporation agreed to complete an RI/FS for both OU-2 and OU-1 (main plant area). Numerous studies and investigations have been conducted at OU-2 since the AOC was signed. A berm was constructed around the Basin and Round Pond in late 2006, and additional RI studies were completed from 2006 through 2010. The EPA issued the ROD for OU-2 in 2014 and documented the selection of in situ (i.e., in place) capping of contaminated soils and sediments as the remedy for OU-2. In 2021, a consent decree between the EPA, Olin

Corporation, and BASF Corporation regarding the implementation of Remedial Design/Remedial Action (RD/RA) activities for OU-2 was entered by the court. WSP USA Inc. (WSP), on behalf of Olin Corporation and BASF Corporation (settling defendants [SDs]), performed the PDI activities from 2021 through 2023 to fill previously identified data gaps and support the cleanup for OU-2. The FFS was prepared by WSP to address the wastewater ditch and floodplain areas for OU-2. The EPA revised the FFS because of a limited number of edits that were needed for clarification and corrections and inserted an EPA preface to the FFS. On January 9, 2024, the EPA approved the November 2023 revised FFS with the preface for purposes of supporting the selection of remedies for the wastewater ditch and floodplains.

2.3 COMMUNITY PARTICIPATION

In compliance with Section 117 of CERCLA and 40 CFR 300.435 (c)(2)(ii) of the NCP, on January 15, 2024, the EPA released the Proposed Plan for the amendment of cleanup of the sediment and soil of the WWD and the Basin and Round Pond floodplain areas and supporting documentation to the public for comments. The ROD Amendment and supporting documents will become part of the Administrative Record for OU-2, in compliance with NCP 40 CFR Section 300.825 (a)(2). The EPA made these documents available to the public in the Administrative Record file, which can be viewed online at the McIntosh Public Library, 83 Olin Road, McIntosh, Alabama 36553, and at the EPA Region 4 Superfund Records Center located at 61 Forsyth Street SW, Atlanta, Georgia 30303. McIntosh Public Library is open to the public from 10:00 a.m. to 6:00 p.m., Monday, Wednesday, and Thursday. The Administrative Record file is also available online at https://www.epa.gov/superfund/olin-corporation-mcintosh. The public comment period closed on February 28, 2024.

A public availability session and public meeting were held on January 23, 2024, at McIntosh High School, 7010 Highway 43, McIntosh, Alabama 36553, to discuss the history of OU-2, summarize the work done to investigate the Site, and present the EPA's Preferred Remedy. A second public availability session was held at McIntosh High School on February 20, 2024. The EPA received comments and responded to questions from the area residents and other attendees during the public meeting and availability sessions. Appendix I, Responsiveness Summary, provides the summarized comments and responses. No comments opposed the EPA Preferred Remedy.

2.4 SCOPE AND ROLE OF OPERABLE UNIT

As with many Superfund sites, the contamination problems at the Olin Site are complex. As a result, the EPA organized the work into OUs:

- Operable Unit 1 (OU-1) comprises the active production facility, SWMUs, and groundwater contamination in the upland area.

- Operable Unit 2 (OU-2) comprises the Basin and Round Pond located adjacent to the Tombigbee River, the surrounding floodplain, and a wastewater ditch leading to the Basin. Figure 2 presents OU-1 and OU-2.

OU-1 consists of the active production facility and the upland area of the Olin property. The production area contaminant sources include the following SWMUs: the former crop protection

chemicals (CPC) plant, the former strong brine ponds, the former mercury-cell plant, the well sand residue area, the former old plant CPC landfill, the sanitary landfills (SLFs), the lime ponds and the former weak brine pond (Figure 2). In addition, OU-1 includes the existing groundwater treatment system installed to address releases under the facilities' RCRA CAP. The upland area includes undeveloped land north and northwest of the production facility.

The ROD detailing the cleanup plan for OU-1 was issued on December 16, 1994. It addresses the source of the contamination on the Site as well as the groundwater contamination across the entire Site. The major components of the cleanup approach taken included 1) installing additional wells to remove and treat contaminated groundwater; 2) upgrading the existing cap, or cover, over the CPC landfill with a multimedia cap; 3) extending the clay cap that exists over the former CPC plant to an area west of the former plant; 4) conducting additional groundwater monitoring near the sanitary landfills; 5) analyzing the long-term effectiveness of the groundwater treatment in reducing groundwater contaminant migration; and 6) implementing ICs for land and groundwater use restrictions.

The April 23, 2014 ROD for OU-2 addressed contamination in the Basin and Round Pond, and required investigation of the floodplain adjacent to the Tombigbee River, and in a wastewater ditch that flows toward the Basin and the Tombigbee River to refine the remedial footprint (i.e., areas that exceed CULs). The 2014 ROD for the approximate 220-acre OU-2, the EPA selected a multilayered cap (in situ engineered cap) over approximately 80 acres of sediment, mostly in the Basin and Round Pond.

2.5 SITE CHARACTERISTICS

OU-2 is located adjacent to and east of the Olin Chlor-Alkali facility at 1638 Industrial Road in McIntosh, Washington County, Alabama. OU-2 consists of open ponded water, a wastewater ditch, and a floodplain area adjacent to the Tombigbee River, as shown in Figure 1. The permanent aquatic features in OU-2 include the wastewater ditch, Basin, and Round Pond. These features drain, during non-flood conditions, into the Tombigbee River through an engineered channel installed at the south end of the Basin (the inlet channel).

OU-2 is in a low-lying floodplain area with surficial elevations between about 3 feet (the non-flooding Tombigbee River elevation) and 14 feet (vertical elevation references herein are relative to the North American Vertical Datum of 1988 [NAVD88], the standard elevation reference used throughout this document, unless otherwise noted). A bluff, running north to south, rises along the western edge of OU-2 with typical ground surface elevations between 35 and 40 feet down to an elevation of 10 feet at the toe of the bluff. The top of the wastewater ditch bank is approximately 35 feet NAVD88 in the bluff areas, and the bank transitions to floodplain elevations outside of the bluff areas. The downstream sections of the wastewater ditch are within the floodplain.

The OU-2 floodplain area is moderately to thickly wooded (i.e., well-developed canopy) with mature cypress, other trees, and undergrowth. An access/perimeter road surrounds much of OU-2, extending generally east from the bluff near the northwest corner of OU-2 across the engineered, earthen berm, constructed in 2006 to 2007. From there, the access/perimeter road continues south, parallel to a drainage ditch (the former Ciba effluent ditch) on the east side of

the Basin, and then continues west on the berm across the southern part of OU-2, reconnecting to the bluff.

Historical use of the Basin was limited to storage of plant wastewater from 1952 until 1974 when Olin's wastewater discharge was rerouted south of the Basin. The plant wastewater historically and currently discharges from a single outfall. This outfall was the natural drainageway from the upland area into the Basin before the plant was built. From 1952 to 1968, wastewater, including neutralized spent acids from the chlorine and organics plants, lime slurry from waste chlorine gas streams, stormwater runoff, and filter backwash streams, discharged through the single outfall. Between 1968 and 1970, most mercury-containing streams were rerouted to ponds and treatment facilities or to the recirculating brine stream to reduce mercury discharges, and the other plant discharges continued through the single outfall. Until 1974, the wastewater discharge flowed along the WWD and through the Basin, before discharging to the river. After 1974, the wastewater discharge was rerouted to bypass the Basin and flow directly to the river. Currently, treated process wastewater, noncontact cooling water, cooling tower blowdown, stormwater runoff, treated sanitary wastewater, and noncontact well water is discharged to the WWD and the Tombigbee River, as permitted by National Pollutant Discharge Elimination System (NPDES) Permit AL0001945. Discharge is continuous during storm events, with flows averaging approximately 2.5 million gallons per day (MGD) with flows as high as 10 to 20 MGD. NPDES Permit AL0001945 is effective through August 31, 2025.

During flood events that overtop the berm, the Tombigbee River flows over the top of the existing berm (elevation +12 feet) across the Ciba OU-3 area (the Cypress Swamp within the bermed area) and then through OU-2 and southward back to the river channel. During non-flood conditions (river level less than (<) 12 feet and water in the Basin is higher than river), controlled by a berm gate that allows discharge of water from/to the Tombigbee River. Typical flood conditions vary and occur between November and April each year depending on rainfall weather in the drainage basin.

The floodplain remediation areas are located within wetlands. Portions of the east, southwest, and south floodplain contain freshwater emergent wetlands with the rest of the floodplain containing freshwater forested/shrub wetlands. The dominant vegetation communities compose the semipermanently flooded bottomland forest. In other portions they are reported as temporarily flooded bottomland forest, shrub-dominated bottomland forest, and herbaceous-dominated bottomland forest.

2.6 LAND AND GROUNDWATER USES

Land Use

Residential land use within 3 miles of OU-2 includes approximately 94 households. Commercial activity is generally related to basic domestic needs and services along Highway 43. The two main industries within a 3-mile radius of OU-2 are the Olin and BASF (formerly Ciba-Geigy) facilities. A compressed air power plant (Alabama Power) and a cement company are also within a 3-mile radius. Recreation areas include the town park next to River Road and a fishing camp at McIntosh Landing. Public use areas within a 3-mile radius include town government

buildings, public schools, a public library, churches, and cemeteries. The predominant land use with a 3-mile radius is forest, followed by wetland areas.

The U.S. Fish and Wildlife Service (USFWS) classifies OU-2 as seasonally flooded wetlands, and as such, not suitable for human habitation. Surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface. More than 95 percent of OU-2 is subject to flooding by the Tombigbee River. Under ADEM's Water Quality Program, the water use classification for the Tombigbee River near the Basin is Fish and Wildlife. The area surrounding OU-2 comprises a riverine ecoregion of large, sluggish rivers and backwaters with ponds, swamps, and oxbow lakes. River swamp forests of bald cypress and water tupelo and oak dominate bottomland hardwood forests and provide important wildlife corridors and habitat. Current and future off-site land use is expected to remain unchanged.

Groundwater Use

The McIntosh area is underlain by alternating beds of unconsolidated to consolidated sedimentary rocks that are collectively hundreds of feet thick. The McIntosh salt dome is the most distinctive structural feature of the area.

The groundwater near the Olin Site contains two major aquifers, the Alluvial and the Miocene. The Alluvial aquifer in the Olin main plant area varies in thickness from an average of about 55 to 80 feet. The Alluvial aquifer is generally unconfined throughout the area. The hydraulic conductivity was estimated to be between 4 and 40 feet/day. Groundwater in the Alluvial aquifer generally enters the main Site from the north. The southerly flow is divided into southeast and southwest components by a groundwater divide oriented north–south through the center of the Olin main plant area. Flow to the east of this divide is to the east and southeast, discharging to the Olin Basin in the northern part of the Site and farther south; flow continues in a southeasterly direction toward RCRA corrective action wells.

In off-site areas southeast of the facility, groundwater from the Alluvial aquifer discharges to the Tombigbee River. On the western side of the groundwater divide, flow is south and southwest toward the groundwater recovery area created by RCRA corrective action wells. A hydraulic mound farther to the west deflects westerly flow to the south in the brine field area. The groundwater flow patterns are affected by the seasonal rises in the Tombigbee River. During periods of high river stage, instead of groundwater discharging eastward, the Basin and Tombigbee River become recharge areas and groundwater flow is to the west toward the active facility.

The Miocene units are designated as Tm1 and Tm2. The Miocene confining unit (Tm1) consist of clays, sandy clays, or clayey sands. Boring logs from wells that penetrate the upper Miocene confining unit indicate that this unit is approximately 80 to 100 feet thick. The Miocene aquifer (Tm2) is composed primarily of thick-bedded coarse sand and gravel beds. The upper Miocene aquifer (Tm2) contains two main artesian sands that are separated by a clayey unit ranging from 10 to 20 feet thick. The sands are considered as one hydrogeologic unit because of a natural hydraulic connection and connection by gravel-packed wells. The combined transmissivity of the

two sands is considered to be in excess of about 25,000 square feet per day. The regional gradient of the Miocene aquifer is to the east–southeast; however, Olin Corporation continuously pumps two Miocene aquifer process water wells. The effect of pumping process water wells is to cause groundwater flow in the Miocene aquifer to be toward the process water wells across the plant area.

Groundwater near the Olin facility was used as a potable water supply. As part of the 1993 RI, a domestic well survey identified a total of 122 residential wells (active, inactive, and closed) within a 3-mile radius of the Olin facility, 34 of which were identified as drinking water wells. According to McIntosh Water and Fire Protection Authority, there are currently no domestic wells within a 5-mile radius of the Olin facility.

Alabama does not have specific groundwater classification regulations under any of its regulatory programs. According to the Code of Alabama Title 9, Chapter 10B Alabama Water Resources, Section 9-10B Legislative Findings, the use of state groundwaters for human consumption is recognized as a priority use, and such waters should be conserved and managed to enable the people of this state to realize the full beneficial use thereof. In the absence of a recognized State groundwater use designation or promulgated classification scheme, at CERCLA sites, the EPA relies upon its classification process provided in Guidelines for Ground-water Classification Under the EPA Ground-water Protection Strategy. Considering the historical use of groundwater for drinking water near the Olin facility and the aforementioned Alabama's Code on the beneficial use of groundwater, under EPA's guidelines, the groundwater at this Site would be considered Class II: Current and Potential Sources of Drinking Water.

3.0 SITE HISTORY, CONTAMINATION, AND 2014 RECORD OF DECISION SELECTED REMEDY

3.1 SITE HISTORY AND CONTAMINATION

Olin Corporation (Olin) operated a mercury-cell chlor-alkali plant (constructed in 1951) on part of the Site from 1952 through December 1982. In 1952, Calabama Chemical Company began operation of a chlorinated organics plant on property immediately south of the Olin plant. In 1954, Olin acquired Calabama Chemical and in 1955 began construction of a pentachloronitrobenzene (PCNB) plant on the acquired property. The plant was completed and PCNB production was started in 1956. The McIntosh plant was expanded in 1973 to produce trichloroacetonitrile and 5-ethoxy-3trichloromethyl-1,2,4-thiadiazole (Terrazole). The Terrazole manufacturing areas were collectively referred to as the CPC plant. In 1978, Olin began operation of a diaphragm cell caustic soda/chlorine plant, which is still in operation. In 1982, Olin replaced the mercury-cell facility with a diaphragm and membrane cell system that eliminated mercury from the manufacturing process. HCB was no longer produced when Olin discontinued operation of the CPC facility in 1982. Both facilities were demolished in 1984 with demolition debris from the mercury-cell process sent to a secure off-site landfill. The areas of each operation were capped. As a result of these actions, mercury and HCB were eliminated from the production process by 1982 through operational changes at the facility.

In September 1984, Olin's McIntosh Plant Site was placed on the National Priorities List (NPL). Groundwater contamination at the Site had been established based on the results of various investigations. In listing the Site on the NPL, the EPA found the following hazardous substances associated with the Site: mercury, gamma-hexachlorocyclohexane, hexachlorobenzene, 1,2,4 trichlorobenzene, and 1,4 dichlorobenzene. Mercury contamination was evidently caused by the operation of the mercury chlor-alkali plant during the period of 1952 to 1982.

Source control measures at the Olin McIntosh facility began in the early 1980s and extended into the early 2000s. Starting in 1984, Olin clean closed nine RCRA hazardous waste management units at the Site. One RCRA unit was closed with waste left in place. ADEM and/or the EPA approved these measures.

Extensive groundwater investigations were conducted in the early 1980s. In 1987, Olin initiated groundwater recovery and treatment for mercury and other COCs through five corrective action recovery wells with wellhead treatment under RCRA.

In 1989, the EPA and Olin entered into an AOC for Olin to conduct a RI/FS under the EPA's oversight. In 1990, Olin, under a removal AOC, removed 11,407 tons of HCB-contaminated soil from the Site.

Olin conducted additional groundwater studies in the early 1990s as part of OU-1. In 1995, Olin entered into a consent decree (CD) with the EPA to expand and centralize the groundwater recovery and treatment system for OU-1 under CERCLA. The expanded groundwater recovery system was installed in 2000/2001 and included additional corrective action recovery wells and centralized treatment units. The groundwater recovery system was shut down in 2017. ADEM administered the operation and monitoring of this system under the RCRA Part B Permit.

Olin also installed a multilayer cap over the former CPC landfill, implemented ICs, and prepared/implemented monitoring plans at OU-1 as part of the 1995 CD. These measures were performed to further control potential source areas and reduce risk to human health and the environment.

In 2001, restrictive covenants were placed on the OU-1 Site property, which were designed to prevent exposure to soil and groundwater contamination. One of the restrictive covenants prohibits the use of groundwater from the remediated part of the Alluvial aquifer as a source for potable water. In addition, the second restrictive covenant prohibits the use of remediated surfaces in OU-1 for uses other than approved industrial uses to prevent exposure to contaminated soil.

Today, the McIntosh plant produces chlorine, caustic soda, sodium hypochlorite, and sodium chloride, and blends and stores hydrazine compounds. Current active facilities at the plant include a diaphragm cell chlorine and caustic production process area; a caustic plant salt process area; a hydrazine blending process area; shipping and transport facilities; process water storage, transport, and treatment facilities; and support and office areas. Olin mines a salt dome through a series of brine production wells located to the west of the active plant facility. Nine brine wells have been completed in the salt dome for the production of brine. The first six wells were associated with the mercury-cell chlor-alkali plant and are no longer in service. The other three brine production wells were developed in a different part of the salt dome, have been used exclusively for the diaphragm cell plant, and are still in use. A tenth cavity was developed in the dome by Olin for use by the Alabama Electric Cooperative to store high-pressure air for off-peak power production.

The WWD currently carries the NPDES-regulated discharge and stormwater runoff from the manufacturing areas of Olin property to the Tombigbee River. From 1952 to 1974, plant wastewater discharge was routed through the Basin and then to the Tombigbee River. In 1974, Olin ceased discharge of process waters from their mercury-cell chlor-alkali and CPC facilities to the Basin. A discharge ditch was constructed to reroute the wastewater directly to the Tombigbee River. Two of the three COCs, mercury and HCB, are associated with this former discharge.

The third COC, DDT, along with its metabolites (DDD and DDE), is likely the result of indirect discharges from a Superfund site located immediately north of OU-2. Ciba-Geigy (currently owned by BASF) manufactured DDT at this Superfund site beginning in 1952. DDT manufacturing ceased in the 1960s.

The COCs were deposited in the Basin, Round Pond, wastewater ditches, and surrounding floodplain. The deposition pattern of the chemicals was influenced by wastewater discharges, Basin bathymetry, floods, water level conditions, wind effects, and geochemical and physical parameters.

3.2 ORIGINAL (2014) RECORD OF DECISION SELECTED REMEDY

In April 2014, the EPA issued a ROD for Olin Corp. (McIntosh Plant) Superfund Site OU-2, with ADEM concurrence. This AROD adds remedial components to the OU-2 remedy and does not

change the components of the 2014 ROD for the Basin and Round Pond. The major components of the 2014 ROD were specified as follows:

- *Multilayered Cap.* A multilayered cap applied in situ over the areas of sediment exceeding the sediment CULs, consisting of approximately 80 acres. The cap will consist of three layers: 1) a mixing zone, 2) an effective cap material layer, and 3) a habitat layer. The cap materials and thickness will be determined during remedial design. Reactive materials may be used to reduce the potential for contaminants to migrate through the cap. The cap will meet the following criteria:
    - The cap material will be physically and chemically compatible with the environment in which it is placed.
    - In habitat areas, the uppermost layers of caps will be designed using suitable habitat materials and, if needed, armoring to prevent erosion. Cap thickness may vary due to the gradient in the Basin to prevent sloughing and erosion.
    - Geotechnical parameters will be evaluated to ensure compatibility among cap components, native sediment, and surface water.
    - The placement method will minimize short-term risk from the release of contaminated pore water and resuspension of contaminated sediment during cap placement.
    - The cap material will immobilize the COCs and have a cap life of at least 100 years or more.
- *Additional Sampling and Analyses.* Additional sampling and analyses will be performed in the channel connecting Round Pond to the Basin and the perimeter of the Round Pond floodplain soils that are often inundated, and the former wastewater and discharge ditch to further refine the remedial footprint.
- *Institutional Controls.* ICs, including deed and use restrictions currently in place as a result of OU-1, will be amended to include the OU-2 remedial footprint and use restrictions. Also, ECs, such as warning signs, including fish advisory signage, fencing, and security monitoring, to restrict access and prevent exposures to human receptors will be implemented as necessary. Water levels will be managed through the berm and gate system through the completion of construction to maintain a consistent water level for equipment mobility and limit the influence of flooding.
- *Construction Monitoring.* Construction monitoring will be designed to ensure design plans and specifications are followed in the placement of the cap and to monitor the extent of any contaminant releases during cap placement. Construction monitoring will likely include interim and post-construction cap material placement surveys, sediment cores, sediment profiling cameras, and chemical resuspension monitoring for contaminants. In the initial period following cap construction, sediment samples will be taken to confirm the CULs were achieved and benthic community assessments will be performed to evaluate restoration efforts.

- *Maintenance.* Maintenance of the in situ cap will include the repair and replenishment of the layers where necessary to prevent releases of contaminants.

- *Long-Term Monitoring.* Long-term monitoring will include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving RAOs, attaining CULs, and reducing human health and environmental risk. In addition, long-term monitoring data are needed to complete the five-year review process.

The 2014 Selected Remedy has not been implemented. The 30 percent (%) RD has been completed for the Basin and Round Pond. The 60% RD is underway.

The 2014 ROD provided a range for the estimated cost of the remedy selected for OU-2 to reflect that different reactive materials may be used to reduce the potential for contaminants to migrate through the cap. The 2014 ROD also stated that "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" and that "changes in cost for the selected remedy may be documented in the Remedial Design, an Explanation of Significant Differences, or an Amendment to the ROD depending upon NCP requirements for the change in question." Accordingly, the costs in the following table reflect updated information, including an escalation from the 2014 cost. The EPA documented the updated costs in a January 2024 Technical Memorandum, which can be found in the Administrative Record.

2014 ROD Selected Remedy for Basin and Round Pond	**Estimated Costs (2014)**	**Estimated Costs (Current Day)**
Characterization	Not specified	$972,000
Engineered Cap	$21.8 Million	$32.3 Million
Contingency Costs	1%–15%	20%–30%
Total	$22 Million	$33.3 Million

4.0 BASIS FOR THE RECORD OF DECISION AMENDMENT

In the April 23, 2014 ROD for the approximate 220-acre OU-2, the EPA selected a multilayered cap (in situ engineered cap) over approximately 80 acres of sediment, mostly in the Basin and Round Pond floodplain areas. The 2014 ROD required additional investigation and anticipated the potential for additional remedial actions in OU-2. The need for these modifications to the remedy were identified by sediment and soil sampling and analysis conducted between 2021 and 2023, as part of the PDI, which identified significant quantities of contaminated sediment and soil above CULs.

This AROD is based on new information on the extent of contamination within OU-2 obtained since 2014, which is summarized in the following subsections. The new information led to the development of the 2023 revised FFS for the wastewater ditch and floodplain. An amendment to the 2014 ROD is necessary because additional actions are needed in the wastewater ditch and floodplain, which significantly increase the volume of waste/remediation areas, cost of the cleanup, and the type of treatment technology needed. This section summarizes the PDI conducted from 2021 to 2023, which supports a fundamental change to the remedy selected in the 2014 ROD. Additional detail may be found in supporting documents in the Site's Administrative Record.

4.1 SOIL/SEDIMENT SAMPLING

From 2021 to 2023, a PDI was performed to support the development of the remedial design and characterize the nature, extent, range, distribution, and variability of OU-2 COCs, with additional considerations for methylmercury, across media in the investigation area including the floodplain and wastewater ditch to establish pre-remedial action conditions. For the PDI, the WWD was split up into four segments, with a total of 26 DUs (Figure 3). The four segments were the Upper Wastewater Ditch, Upper Central Wastewater Ditch, Lower Central Wastewater Ditch, and Lower Wastewater Ditch. The 26 DUs were named WWD-DU1 through WWD-DU 26. The floodplain was subdivided into six areas (Figure 4) known as SFP, SWFP, NWFP, NFP, NEFP, and EFP.

Soil and sediment sampling in the abovementioned WWD DUs and floodplain areas was conducted in 2022 and 2023. The sampling methods included sampling of a single soil/sediment core, a composite sample, or use of Incremental Sampling Methodology (ISM). An ISM approach was used to develop reasonably unbiased estimates of mean concentrations with set depth intervals for a specific DU. PDI analytical results are presented in Table 2.

Wastewater Ditch

Figures 5 through 7 depict WWD CUL exceedances. Soil and sediment concentrations of mercury and HCB in the Upper and Upper Central WWD segments were higher (greater than 3 to 2,000 milligrams per kilogram [mg/kg] for mercury and greater than 7.6 to 1,000 mg/kg for HCB) than concentrations in the Lower and Lower Central WWD segments (greater than 3 to 9.9 mg/kg for mercury and greater than 7.6 to 12 mg/kg for HCB). Significant concentrations of mercury (up to 2,000 mg/kg) were detected in subsurface sediments and soils (up to or greater than 6 feet below the ditch bottom), well above the sediment CUL for mercury (3 mg/kg). Sediment HCB concentrations in portions of the ditch also were above the sediment CUL for

HCB (7.6 mg/kg) and were up to 1,000 mg/kg at 5 feet or greater below the ditch bottom. Sediment DDTR concentrations (i.e., Total dichlorodiphenyl choroethanes (Sum of p,p'-DDT; o,p'-DDT; p,p'- DDE; o,p'-DDE; p,p'-DDD and o,p'-DDD) above the sediment DDTR CUL (0.21 mg/kg) also were found in parts of the ditch, though less often than the mercury and HCB exceedances. None of the DDTR sediment CUL exceedances were significantly greater (at least 10 times) than the CUL. The depths and concentrations of the mercury and HCB exceedances in the WWD soils and sediments indicate there is likely contamination below the maximum sampling depth that potentially extends into the groundwater. Thus, there also may be COC transport from the deeper WWD soils and sediments to groundwater and then surface water.

Floodplain Areas

Following are descriptions of COC concentrations in the OU-2 floodplain, broken down by floodplain subareas:

- NFP – As shown in **Figure 8**, the NFP area was sampled using ISM techniques and the results indicate that most of the 18 DUs had COCs at concentrations above at least one of the CULs. The estimated remedial footprint included all NFP DUs except for five DUs for which no COCs were detected at concentrations above respective CULs. Pre-PDI samples collected in the NFP did not indicate the presence of COCs at concentrations exceeding CULs.

- SFP, SWFP, NWFP – Most of the SFP, SWFP, and NWFP were sampled using ISM, and samples in nearly all DUs exceeded at least one CUL. Since DUs did not cover the entirety of the floodplain, particularly within NWFP, PDI sample results (i.e., individual core locations, grab samples) and neighboring DUs were assessed and used to infer that the remedial footprint extends beyond the DUs. Therefore, the estimated remedial footprint was developed to contain the entirety of the NWFP and SWFP. The remedial footprint covers nearly the entirety of the SFP, except for two small, unsampled areas adjacent to the inlet channel, and the western DU of the SFP, which had COC concentrations below CULs.

- EFP and NEFP – The EFP and NEFP included extensive PDI sampling but did not include ISM sampling. Unlike the other floodplain areas, fewer than one half of the cores in the NEFP and EFP had exceedances of DDTR or mercury above the associated CUL. Indicator kriging was applied as a spatial interpolation method, using both pre-PDI and PDI data, to determine the preliminary extent of the remedial footprints within the NEFP and EFP. These footprints were then conservatively expanded to maintain continuity along the Basin shoreline areas and to address areas with potential data gaps. The interpreted remedial footprint in the EFP and NEFP contains all floodplain sample locations with mercury and/or DDTR above respective CULs.

- Limited additional sampling is needed as part of the remedial design to refine footprint boundaries and may be needed following RA to confirm that soils exceeding CULs have been addressed. The results of this sampling may increase the extent of the OU-2 remedial footprint.

5.0 SUMMARY OF SITE RISKS

The overall risk posed by the Site and future land use assumptions are unchanged from those documented in the 2014 ROD. The EPA conducted baseline risk assessments to determine the current and future effects of contaminants on human health and the environment. Based on discussions with Olin Corporation and local officials, the reasonably anticipated use for OU-2 is expected to remain as a floodplain with limited use and restricted access. The Olin McIntosh Plant is an active manufacturing facility and is expected to remain active in the future.

The response action selected in this AROD is necessary to address actual or threatened releases of hazardous substances into the environment, which may present an imminent and substantial endangerment to the public health or welfare. Sediment and soil in the WWD and floodplain areas are contaminated hazardous substances, including mercury, HCB, and DDT, along with its metabolites DDD and DDE.

5.1 HUMAN HEALTH RISK ASSESSMENT

The human health risk assessment assumed that no residential construction would ever occur within the boundaries of OU-2, in part because OU-2 floods on a yearly basis during years with normal precipitation. The risk assessment assumed that nearby residents might trespass onto OU-2 under current conditions and use the Basin and floodplain for recreation (swimming and fishing) and that fishermen would eat fish from the Basin. Carcinogenic risk for all scenarios fell within the acceptable risk range for all COCs. In contrast, the hazard index for noncarcinogenic risk exceeds the acceptable risk number of 1 for adults and adolescents in future use time frames. For all scenarios, the hazard index was driven by ingestion of fish caught from OU-2, with minimal contribution from dermal contact with surface water and soils, and inhalation of soil particulates. Mercury (methylmercury) in fish tissue is identified as the primary COC for human health at OU-2. The Alabama Department of Public Health has issued a fish consumption advisory for the area of Tombigbee River near the Site because of mercury contamination levels in fish.

5.2 ECOLOGICAL RISK ASSESSMENT

As described in the 2014 ROD, the ecological risk assessment evaluated exposure of plants and animals at OU-2 to contaminants in sediments, soils, surface water and the food chain, and concluded that risk exists to insect- and fish-eating aquatic birds, fish-eating mammals, fish, and insect-eating terrestrial birds from exposure to methylmercury, HCB, and DDTR. Under conditions commonly found in lakes and wetlands, inorganic mercury is converted to the organic form known as methylmercury, which is readily taken up into the food chain. Bioaccumulation in fish tissue for methylmercury, HCB, and DDTR is the greatest concern.

6.0 REMEDIAL ACTION OBJECTIVES

RAOs are established to support the evaluation of remedial alternatives for areas with the potential for unacceptable risk as identified in the human health and ecological risk assessments. The RAOs are established by specifying contaminants and media of concern, potential exposure pathways, and remediation goals. The RAOs for Olin OU-2 were established in the 2014 ROD for the Basin and Round Pond cleanup and are applicable to the cleanup of the OU-2 WWD and floodplain, as well. They are:

- Reduce, or mitigate, risk to piscivorous birds from ingestion of fish exposed to mercury-contaminated sediments.
- Reduce, or mitigate, risk to piscivorous mammals from incidental ingestion of HCB-contaminated sediments.
- Reduce, or mitigate, risk to piscivorous birds from ingestion of fish exposed to DDTR-contaminated sediments.
- Reduce risk to humans from ingestion of fish.
- Reduce fish tissue concentrations of mercury to levels protective of fish and piscivorous wildlife.
- Reduce fish tissue concentrations of DDTR to levels protective of fish and piscivorous wildlife.
- Reduce, or mitigate, risk to ecological receptors exposed to COCs in contaminated floodplain soils.
- Restore surface water to meet water quality standards.

6.1 Cleanup Levels

The following table provides a summary of the CULs established for OU-2. The 2014 ROD refers to DDTR for the CUL established for the protection of surface water. The surface water CUL applies to the individual isomers 4,4′-DDD; 4,4′-DDE; and 4,4′-DDT. Tables 1 and 1a provide additional information regarding the CULs.

Olin OU-2 Cleanup Levels				
Media	**COC**	**CUL**	**Units[1]**	**Notes**
Sediments	Mercury	3	mg/kg	-
	HCB	7.6	mg/kg	-
	DDTR	0.21	mg/kg	-

Olin OU-2 Cleanup Levels				
Media	**COC**	**CUL**	**Units[1]**	**Notes**
Floodplain Soils	Mercury	1.7	mg/kg	-
	DDTR	0.63	mg/kg	-
Surface Water	HCB	0.0002	µg/L	Alabama Surface Water Criteria
	4,4′-DDD	0.0002	µg/L	
	4,4′-DDE	0.0001	µg/L	
	4,4′-DDT[2]	0.0001	µg/L	
	4,4-DDT[3]	0.001	µg/L	
	Mercury (dissolved)	0.012	µg/L	
	Mercury (dissolved)	0.042	µg/L	
Fish Tissue	Mercury	0.2	mg/kg	Mosquitofish–Whole Body
		0.3	mg/kg	Largemouth Bass–Filets
		0.28	mg/kg	Largemouth bass–Whole Body
	DDTR	0.23	mg/kg	Mosquitofish–Whole Body
		0.64	mg/kg	Largemouth Bass–Whole Body

Notes:
1. mg/kg - milligram(s)/kilogram, µg/L - microgram(s)/liter.
2. human health criteria for consumption of fish.
3. chronic freshwater criteria for protection of aquatic life.

7.0 DESCRIPTION OF NEW ALTERNATIVES IN THE FOCUSED FEASIBILITY STUDY FOR RECORD OF DECISION AMENDMENT

The November 2023 revised FFS developed and evaluated four active remedial alternatives for the WWD area and three active remedial alternatives for the floodplain together with the No Action alternative for each. The following are the remedial alternatives considered for this ROD Amendment. The phrase “habitat restoration” was used in the revised FFS for each of remedial alternatives and is retained in this amended ROD. The Proposed Plan issued by the EPA used the phrase “habitat replacement/enhancement.” Appendices III, Responsiveness Summary provides a more detailed explanation of EPA’s rationale and decision to use “habitat restoration.”

7.1 WASTEWATER DITCH REMEDIAL ALTERNATIVES

Remedial alternatives developed for the WWD target the Upper and Upper Central segments of the WWD (Figure 9). The Lower Central and Lower WWD segments have similar elevations to the floodplain and are subject to seasonal flooding, so those segments are considered to be part of the SWFP Area and are included in the scope of the floodplain alternatives. With the exception of Alternative WWD-1, implementation of each of the WWD alternatives is expected to be completed in less than one year.

ICs and ECs, as described in the 2014 OU-2 ROD, will be implemented for WWD-2 and WWD-4 to achieve RAOs to reduce or mitigate the potential risks to humans. Implementation of ICs for these alternatives include revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the areas that are remediated. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of contamination in fish. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. OU-2 is currently fenced along the west, north, and southwest boundary. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

7.1.1 WWD-1: No Action

The No Action alternative is intended to establish a baseline for comparison with the other remedial alternatives as required by the NCP. Given that the No Action alternative assumes no treatment, ECs, or ICs would be used, the WWD would be left in its current condition. Under this alternative, the RAOs would not be accomplished in the WWD within the time frame specified in the revised FFS. The current Olin security monitoring and restrictions on trespassing would not be enforced. Possible risks presented by sediment and soil in the WWD would not be mitigated.

Cost: No Cost

7.1.2 WWD-2: Engineered Cap, Institutional Controls, Engineering Controls, and Habitat Restoration

Under this alternative, an in situ engineered cap would be constructed over the WWD soils and sediments with COC concentrations that exceed CULs. This cap would serve as a barrier between the environment and COCs in the soils and sediments, thereby reducing risks to receptors. The cap would have a base layer, an isolation layer (an impermeable liner), and a

protective cover (sand, stone, and/or riprap) as needed. Additional sampling would confirm the lateral extent of the remedial footprint along the ditch and in overbank material. The effectiveness of the cap to prevent COCs from leaching into groundwater, even if contact is intermittent, would also need to be evaluated. ICs and ECs, as described in the 2014 OU-2 ROD, would be implemented to achieve RAOs to reduce or mitigate the potential risks to humans. ICs and ECs required under the ROD include amending deed and restrictive covenants to include the OU-2 remedial footprint and use restrictions and ECs (such as warning signs, fencing, and security monitoring) to restrict access and prevent exposure to human receptors. Areas disturbed by excavation such as the WWD banks and floodplain areas within the wetlands will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific ARARs and TBCs. Such measures could include regrading and replacing trees and other types of revegetation as appropriate. Monitoring and O&M for the 100-year remedy lifespan would be conducted as required in the 2014 OU-2 ROD.

Cost: $10.3 million

7.1.3 WWD-3: Wastewater Ditch Removal Alternatives

Alternatives WWD-3A and WWD-3B would use a combination of the removal and containment general response actions (GRAs) through mechanical excavation, dewatering consolidation for on- or off-site disposal, ICs, and ECs.

7.1.4 WWD-3A: Excavation, On-Site Consolidation in Basin, and Habitat Restoration

Alternative WWD-3A would involve excavation and transportation of soils and sediments with COC concentrations above CULs until they are below CULs, as verified by confirmation samples. Once excavation and testing of soils and sediments are completed, soils and sediments with lower COC concentrations (less than 100 mg/kg of mercury) would be transported and placed in the deepest part of the Basin. Placement in the Basin would be performed with best management practices (BMPs) to mitigate resuspension of contaminated sediment. Before disposal in an off-site RCRA-permitted landfill, sediments and soils with higher mercury COC concentrations would be characterized to determine whether they are deemed RCRA toxicity characteristic waste and treated, if necessary, in accordance with identified ARARs. Areas disturbed by excavation such as the WWD banks and floodplain areas within the wetlands will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific ARARs and TBCs. Such measures could include regrading and replacing trees and other types of revegetation as appropriate.

Cost: $30 million

7.1.5 WWD-3B: Excavation, Off-Site Disposal, and Habitat Restoration

Alternative WW-3B would involve excavation, transportation, and disposal of soils and sediments in off-site landfills. Soils and sediments with COC concentrations greater than CULs would be excavated horizontally and vertically until clean (below CULs) or to depths determined by the EPA, as verified by confirmation samples. Before disposal in an EPA-approved off-site RCRA-permitted landfill, excavated soils and sediments would be characterized to determine whether they were deemed RCRA toxicity characteristic waste and would be treated, if

necessary, in accordance with identified ARARs. Habitat restoration would be as described for WWD-3A.

Cost: $33.4 million

7.1.6 WWD-4: In Situ Stabilization with Protective Cover, Institutional Controls, Engineering Controls, and Habitat Restoration

Alternative WWD-4 would treat soils and sediments by ISS and place a protective cover over the stabilized soils and sediments to prevent erosion and weathering. Soils and sediments with COC concentrations greater than CULs would be mixed in place with an admixture (such as Portland cement, bentonite, fly ash) to immobilize the COCs. The depth for ISS will likely vary depending on COC concentrations and possibility of leaching and cross media contamination. The success of solidification/stabilization would first be demonstrated through a testing program that measures critical properties (i.e., unconfined compressive strength, hydraulic conductivity, and leaching potential). Habitat restoration would be carried out as described for WWD-3A. ICs and ECs as described for Alternative WWD-2 would be used for this alternative as well. Monitoring and O&M for the 100-year remedy lifespan would be conducted as required in the 2014 OU-2 ROD.

If the EPA determines ISS does not sufficiently meet specified criteria related to strength, hydraulic conductivity, and potential leaching of COCs based upon a treatability study (e.g., bench-scale mix study), then a different remedy (such as Alternative WWD-3B excavation, transportation, and disposal of soils and sediments in an off-site landfill) would be implemented in all or parts of the WWD remedial footprint.

Cost: $12.4 million

7.2 FLOODPLAIN REMEDIAL ALTERNATIVES

Remedial alternatives developed for the floodplain target the portions of the floodplain where COCs have been identified at concentrations exceeding CULs, encompassing approximately 64 acres (Figure 8). The floodplain remedial footprint includes portions of the following: NWFP, SWFP, NEFP, EFP, SFP, NFP, Lower Central WWD, and Lower WWD. These remedial areas are located within designated wetlands and the 100-year floodplain and are subject to identified location-specific ARARs, including Clean Water Act (CWA) Section 404(b)(1) regulations and TBCs related to actions in designated floodplains. With the exception of Alternative FP-1, the estimated construction duration for each of the floodplain alternatives is approximately three years (seven to nine working months per year are assumed because of seasonal flooding).

ICs and ECs, as described in the 2014 OU-2 ROD, will be implemented for FP-2 to achieve RAOs to reduce or mitigate the potential risks to humans. Implementation of ICs for this alternative includes revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the areas that are remediated. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of fish contamination. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. OU-2 is

currently fenced along the west, north, and southwest boundaries. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

7.2.1 FP-1: No Action

The No Action alternative is evaluated to establish a baseline for comparison with the other remedial alternatives as required by the NCP. The No Action alternative assumes no treatment, ECs, or ICs would be used, and the floodplain would be left in its current condition. The sediment RAOs in the floodplain would not be accomplished in the time frame specified in the revised FFS. The current Olin security monitoring and restrictions on trespassing would not be enforced. Possible risks presented by sediment and soil in the floodplain would not be mitigated.

Cost: No Cost

7.2.2 FP-2: Engineered Cap, Institutional Controls, Engineering Controls, and Habitat Restoration

Under this alternative, an in situ engineered cap would be constructed over the floodplain remedial footprint, in combination with implementation of ICs and ECs. At locations with the highest COC concentrations, an amendment will be included in the cap to treat or reduce toxicity of the COCs. The cap would serve as a barrier between the environment and COCs in the floodplain sediments and soils, thus reducing risks to acceptable levels. Trees and other vegetation in the subdivided floodplain areas would be removed to the extent needed to allow for the construction of the engineered cap in those areas that achieve the RAOs for the floodplain, comply with ARARs, minimize mercury methylation, and maintain long-term stability of the cap. Limited additional sampling would be performed to confirm portions of the remedial footprint. Areas disturbed by excavation or installation of an engineered cap in the floodplain areas within the wetlands will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific ARARs and TBCs. Such measures could include regrading and replacing trees and other types of revegetation as appropriate. ICs and ECs as described for Alternative WWD-2 would be used for this alternative as well. Monitoring and O&M for the 100-year remedy lifespan would be conducted as required in the 2014 OU-2 ROD.

Cost: $26.3 million

7.2.3 FP-3: Floodplain Excavation Alternatives

Alternatives FP-3A and FP-3B would use a combination of removal and containment GRAs using mechanical excavation, dewatering for floodplain soil removal, and on-site placement or off-site disposal.

7.2.4 FP-3A: Excavation, Consolidation in Basin, and Habitat Restoration

Alternative FP-3A would excavate and transport sediments and soils with COC concentrations greater than CULs for placement in the deepest part of the Basin following BMPs to mitigate resuspension of contaminated sediments. Floodplain sediments and soils with COC concentrations greater than CULs would be excavated until clean (below CULs), as verified by confirmation samples. Off-site disposal in an EPA-approved RCRA-permitted landfill of excavated materials may be used if the excavated materials are incompatible with the Basin

(elevated COC concentrations, geotechnical composition, or volume). Habitat restoration would be carried out as described for FP-2. Monitoring and maintenance related to the restoration of the wetland and floodplain habitat would be required. Long-term monitoring and O&M for the floodplain would not be required where removal has been completed.

Cost: $72.3 million

7.2.5 FP-3B: Excavation, Off-Site Disposal, and Habitat Restoration

Sediments and soils with COC concentrations greater than CULs would be excavated, transported, and disposed of at an EPA-approved off-site RCRA-permitted landfill. Sediments and soils with COC concentrations greater than CULs would be excavated until clean, as verified by confirmation samples. The excavated sediments and soils would be dewatered, loaded to on-road trucks, and transported to appropriate landfills for disposal. Habitat restoration would be carried out as described for FP-2. Monitoring and maintenance related to the restoration of the wetland and floodplain habitat would be required. Long-term monitoring and O&M for the floodplain would not be required where removal has been completed.

Cost: $97.3 million

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR RECORD OF DECISION AMENDMENT

This ROD Amendment does not change the 2014 Selected Remedy for the Basin and Round Pond. As a result, this section will compare the new alternatives from the 2023 revised FFS for the wastewater ditch and floodplain areas with each other but will not compare them to the original remedy for the Basin and Round Pond.

The NCP at 40 CFR 300.430(e)(9)(iii) requires that the EPA evaluate the Preferred Amended Remedy against nine criteria. Any selected remedy must satisfy all nine criteria before it can be implemented. The nine criteria described in the following table are divided into the following groupings: two threshold criteria, five balancing criteria, and two modifying criteria. Alternatives must satisfy the threshold criteria and be protective of human health and the environment, as well as be compliant with ARARs (unless a waiver is justified). If they are not compliant, they are rejected without further considering the remaining criteria. Appendix B presents the ARARs. The balancing criteria comprise long-term effectiveness and permanence; reduction in toxicity, mobility, and volume achieved through treatment; implementability; short-term effectiveness; and cost. The modifying criteria, state and community acceptance, were fully evaluated following state and public input, as discussed in this document and the Responsiveness Summary (Appendix I).

The following sections and table provide a description of the nine criteria and a comparative analysis of the remedial alternatives.

Evaluation Criteria for Comparison of Remedial Alternatives
Threshold Criteria
Overall Protection of Human Health and the Environment determines if an alternative adequately eliminates, reduces, or controls threats to public health and the environment through ICs, ECs, or treatment.
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether an alternative meets all federal and stricter state environmental statutes and regulations, or whether such requirements can be formally waived in accordance with CERCLA.
Primary Balancing Criteria
Long-term Effectiveness and Permanence compares the capacity of alternatives to maintain reliable protection of human health and the environment over time once response objectives have been met.

Evaluation Criteria for Comparison of Remedial Alternatives
Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment compares alternatives' use of treatment to reduce the harmful effects of principal containments, their ability to move in the environment, and the amount of contamination present.
Short-Term Effectiveness compares the length of time needed to implement alternatives and the risks the alternatives pose to workers, residents, and the environment during implementation.
Implementability compares the technical and administrative feasibility of implementing alternatives, including factors such as availability of goods and services, administrative feasibility, and coordination with other governmental entities.
Cost compares estimated capital and annual O&M costs expressed as present-worth costs. Present worth is the total cost of an alternative over time in terms of current value. Cost estimates are expected to be accurate within a range of +50% to -30%.
Modifying Criteria
State Acceptance considers whether the State and/or support agency agrees with the EPA's analyses and remedy selection as compiled in the Proposed Plan.
Community Acceptance considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

The remedial alternatives evaluated in this ROD Amendment were developed based on the RAOs described in Section 5.0. Section 6.0 provides descriptions of the remedial alternatives evaluated for OU-2 (WWD and floodplain). The remedial alternatives for the WWD and the floodplain are evaluated based on the NCP criteria in the following sections.

8.1 WASTEWATER DITCH

This section of the ROD Amendment presents the detailed evaluation of each of the remedial alternatives for the WWD using the evaluation process and criteria described above. This evaluation of the WWD alternatives encompasses the Upper and Upper Central segments of the WWD. The Lower Central and Lower WWD segments have been incorporated in, and are evaluated as part of, the floodplain remedial alternatives.

All of the WWD alternatives except for Alternative WWD-1 (No Action) would require a laydown area for staging, cleaning, and storage as well as access roads (unpaved) to the work areas for implementation. The Olin property has ample land available near the OU-2 floodplain for construction logistics and to accommodate access to the WWD. A new bridge over the WWD was constructed to provide access for heavy equipment and delivery of supplies and bulk materials, as part of the OU-2 remedy.

8.1.1 Overall Protection of Human Health and the Environment

WWD-1: The NCP requires the consideration of no action to serve as a baseline alternative. The No Action alternative assumes that no treatment, ECs, or ICs would be used. The No Action alternative would not be protective of human health and the environment.

WWD-2: The in situ engineered cap alternative would be protective of human health and the environment once it is properly maintained, but underlying contamination would remain at OU-2. It would be necessary to confirm that the cap would prevent this contamination from leaching into groundwater, even if contact is intermittent. The primary function of an in situ cap would be containment and isolation. Isolation prevents exposure of contaminated soil and sediment to ecological receptors, downstream transport of contaminated sediment, and migration of COCs to ground and surface water. This alternative would reduce contaminant mobility; however, the reduced mobility of contaminants would not be accomplished through treatment. Capping would be considered to have long-term permanence with appropriate protection against erosion/resuspension and proper maintenance.

WWD-3A: Removal of contaminated sediment and soil above CULs from the WWD would satisfy RAOs. This alternative would be protective of WWD ecological receptors by removal. It also would protect aquatic receptors by isolation under the Basin capping remedy. Excavation of WWD sediments would include mass removal of COCs in WWD sediments and soil with COCs greater than CULs, which would prevent COC migration into surface water and downstream contaminated sediment transport. Placement and capping in the Basin would be consistent with the EPA-approved capping remedy for OU-2. This alternative would also remove the potential source of recontamination to the floodplain.

WWD-3B: Removal of contaminated sediment and soil above the CULs from the WWD and off-site disposal in a permitted landfill would be protective of human health and the environment. The significant difference of this alternative from the WWD-3A alternative is that all excavated soil would be transported for disposal in an appropriate off-site landfill, which would transfer residuals to a managed facility where mobility of the COCs would be controlled. Implementation of this alternative will negate the need for long-term monitoring and maintenance of the remediated part of the WWD. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: In situ treatment and containment of WWD sediments would be protective of human health and the environment. The significant differences of this alternative from the WWD-2 alternative are: (1) reduction of mobility of COCs through treatment and (2) prevention of weathering and erosion of the treated sediment and soil using isolation and protective cover components of this alternative. This alternative is the preferred remedy for the WWD.

8.1.2 Compliance with Applicable or Relevant and Appropriate Requirements

The 2023 revised FFS identified ARARs and TBC guidance for all remedial alternatives. Tables 3 through 5 of this AROD present the specific ARARs/TBC that concern remediation at OU-2 WWD and floodplain areas.

WWD-1: The No Action alternative would not comply with ARARs.

WWD-2: The in situ engineered cap alternative is expected to comply with chemical-, action-, and location-specific ARARs. This alternative would prevent exposure to COCs in the WWD sediments and direct exposure to COCs and downstream transport of COCs in surface water. The WWD would be divided into working sections, and the flow would be redirected using BMPs from the upstream side of the active work area to the downstream side, where the flow would be restored in the ditch. Water would be contained in the working area, and accumulated water would be managed to comply with CWA requirements before discharging to the downstream ditch segment. BMPs would minimize disruption of, impact to, or alteration of wetlands during implementation and on-site restoration that would occur. Surface water discharges would meet CWA requirements.

WWD-3A: This alternative would comply with chemical-, action-, and location-specific ARARs. The removal of sediment and soil above CULs from the WWD would prevent direct exposure to receptors and downstream transport of COCs. If generated as waste, it is assumed that the WWD sediment and soils placed in the Basin would be non-hazardous. Sediments and soils with higher concentrations of COCs would be shipped for off-site disposal at appropriately licensed facilities and transported by qualified transporters. Relocation of sediment within OU-2 does not constitute construction of an industrial landfill as defined by ADEM. CWA Section 404(b)(1) guideline regulations are location-specific requirements and would apply to remedial activities in this alternative. The factual determinations related to discharge of fill into an aquatic ecosystem are acceptable for approval of placement of the WWD sediment in the Basin. Water quality effects inside the Basin would be temporary and reversible using BMPs during construction. BMPs would minimize disruption during implementation, and on-site restoration would occur.

WWD-3B: This alternative would comply with chemical-, action-, and location-specific ARARs. As described above for Alternative WWD-3A, the removal of COC-contaminated sediment and soil from the WWD along with off-site disposal complies with ARARs. However, CWA Section 404(b)(1) ARARs associated with the placement of WWD sediment into the Basin would not be relevant for this alternative. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: This alternative would comply with the chemical-, action-, and location-specific ARARs consistent with the description for Alternative WWD-2. Additionally, the ISS mixing activities would include BMPs to contain dust during delivery and handling of dry admixture materials, and the materials would be mixed into a slurry for application during ISS activities. This alternative is the preferred remedy for the WWD.

8.1.3 Long-Term Effectiveness and Permanence

WWD-1: The No Action alternative would not inhibit migration of COCs downstream. The duration to achieve remedial goals would be lengthy beyond the time frame considered in the 2023 revised FFS.

WWD-2: The in situ engineered cap alternative is expected to provide long-term isolation of COCs in the WWD sediments to accomplish RAOs and CULs prescribed in the OU-2 ROD. The cap would stabilize the ditch long term without adversely affecting hydraulic capacity. In general,

this alternative can provide an equivalent level of protectiveness as the sediment removal alternatives, but this alternative would need proper monitoring and O&M over the long term. It would also be necessary to confirm that capping would prevent COCs from leaching into groundwater, even if contact is intermittent.

WWD-3A: Removal of sediment and soil above CULs from WWD segments would be effective, permanent, and reliable in eliminating sediment exposure risk receptors, migration to surface water, and downstream transport. The RD would sequence the WWD excavation before completing remediation activities in the floodplain and/or the Basin to avoid potential recontamination. No long-term WWD O&M would be required under this alternative.

WWD-3B: This alternative would have the same long-term effectiveness as the WWD-3A alternative, except the transfer of the sediment and soil from the WWD into a properly designed landfill would remove these media from OU-2 and provide long-term, effective control of the COCs. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: This alternative would have the same long-term effectiveness as the WWD-2 alternative, including the following additions: (1) This alternative would provide long-term stabilization of COCs and isolation of the WWD sediments and soils to accomplish the RAOs and CULs as prescribed in the 2014 OU-2 ROD; (2) ISS provides direct treatment of the contaminated sediment and soil and has been approved by the EPA for implementation at other remediation sites; (3) both the ISS treatment and the protective cover reduce permeability. The stabilized material would be below the protective isolation layer. In general, this alternative can provide an equivalent level of protectiveness as the capping alternative with proper monitoring and O&M over the long term. The removal alternatives would also be effective and have the benefit of not requiring long-term O&M since contaminated sediment and soil would not be left in place. This alternative is the preferred remedy for the WWD.

8.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

WWD-1: The No Action alternative would not include any measures to reduce TMV.

WWD-2: The in situ engineered cap alternative would not reduce TMV of contaminated media through treatment. Capping the WWD would reduce the mobility of COCs in sediment by creating a barrier, preventing contact with surface water receptors, reducing infiltration, and controlling erosion with an impermeable layer overlain by a protective cover. A liner that would prevent the underlying sediment from breaching the integrity of the cap from below would cover the mixing layer at the bottom of the cap and immediately above the sediment.

WWD-3A: Under this alternative, the transfer of material from the WWD to the Basin would not reduce TMV through treatment. Removal of contaminated sediment and soil from the WWD would transfer the mass of COCs to the Basin and might, temporarily, increase COC mobility through release and resuspension during placement. BMPs would need to be used to mitigate resuspension of contaminated sediments during implementation of this alternative. A capping remedy would reduce the mobility of contaminated sediment by providing a barrier. The barrier would prevent contact with surface water receptors, thus mitigating unacceptable exposure.

WWD-3B: Under this alternative, portions of the material from the WWD would be transferred to a landfill that would not reduce TMV through treatment. However, the most highly contaminated material would be treated at a retort facility resulting in a reduction of TMV through treatment. Containment in a properly designed and maintained off-site landfill reduces the mobility of COCs in sediment by creating a barrier and preventing contact with surface water and groundwater receptors. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: This alternative is superior to the other wastewater ditch alternatives because ISS of the WWD sediments would reduce the mobility of COCs through treatment. A protective cover would further reduce the mobility of contaminated sediment and soil by creating a physical isolation and erosion barrier over the stabilized sediment and soil, thereby preventing exposure. The volume of material would increase through treatment via mixing with solidification agents; however, less fill material would be required. This alternative is the preferred remedy for the WWD.

8.1.5 Short-Term Effectiveness

WWD-1: The No Action alternative would have no short-term impact.

WWD-2: With the completion of the cap installation, RAOs within the WWD would be achieved. During remedial activities, there should be no unacceptable risks to the community. Following ECs, BMPs, appropriate personal protective equipment (PPE) protocols, and administrative controls would mitigate short-term risks to workers during construction.

WWD-3A: Completing the sediment and soil removal from the WWD and restoring vegetation along the outer ditch banks would achieve RAOs. Short-term impacts to the vegetation would be temporary and reversible. Following ECs, BMPs, appropriate PPE protocols, and administrative controls would mitigate short-term risks to workers during construction. The temporary impacts to surface water quality in the Basin during the placement of removed sediments and soils into the Basin, as described above, could be contained during non-flood conditions. Aquatic habitat impacts at the placement area in the Basin would occur consistent with the ROD required cap remedy for the Basin.

WWD-3B: The removal of contaminated sediment and soil from the WWD and off-site disposal in a landfill would have the same short-term effectiveness as the WWD-3A alternative, with the following exceptions: (1) There would be no temporary aquatic habitat impact in the Basin and (2) This alternative would include an increased consumption of resources and risk/nuisance to the public compared to all other alternatives because of the soil transport via trucks on public roadways to a landfill. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: This alternative would have the same short-term effectiveness as the WWD-2 alternative, including the following additions: (1) This alternative would have a considerably lower volume of material imported to OU-2; (2) This alternative would have considerably lower truck traffic to move materials on-site and supply truck traffic on public roads; (3) This alternative would stabilize the ditch surface, making the work less susceptible to potential delays

associated with storm runoff, which would reduce uncertainty in the construction schedule. This alternative is the preferred remedy for the WWD.

8.1.6 Implementability

WWD-1: Under the No Action alternative, no active implementation would be required.

WWD-2: The in situ engineered cap alternative would be technically and administratively implementable. Capping technologies, equipment, and materials to implement BMPs and ditch flow rerouting would be readily available. Under this alternative, sediment dewatering would not be required, and sediment loading and transport via surface water would be avoided. Vegetation removal and restoration would be readily implemented, but it would be less than for Alternative 3A, which would need a transportation route to the Basin. Delineation and confirmation sampling would be limited to the banks and not the whole ditch. Long-term O&M would be required to monitor the condition and performance of the alternative.

WWD-3A: This alternative would be technically and administratively implementable. The equipment, materials, and technology needed to implement BMPs, reroute WWD flow, and perform excavation, material handling, transport, and placement in the Basin would be readily available. Vegetation removal for excavation alternatives would be more extensive than in situ remedial alternatives (i.e., WWD-2 and WWD-4) because of the moderate site access required, and restoration would be more intensive but implementable. Soil and sediment removal may require a longer construction period than in situ alternatives if removal extent is not predetermined and there is the need for consistently confirming that CULs are being attained. Conventional excavation, transport, and placement requires multiple sediment handling steps, which are implementable. Placement of sediment into the Basin would require additional BMPs to isolate the placement area from other parts of the Basin. No long-term wastewater ditch O&M would be required.

WWD-3B: The implementability of this alternative generally would be the same as Alternative WWD-3A. However, this alternative would include in-stream bed drying (admixture addition), conventional excavation and transfer to a staging area, loading onto on-road trucks, and transport and placement into an appropriately permitted landfill. Transporting contaminated sediment and soil over public roads for treatment and/or disposal also would require hundreds of truckloads. Dewatering of excavated sediment and soil would be required to meet paint filter test requirements before transport to a landfill for disposal and could be accomplished with readily available equipment, materials, and technologies. Disposing contaminated sediment and soil at the nearest approved Subtitle D landfill would consume available landfill capacity. This alternative is the contingency remedy in the event WWD-4 is not implemented.

WWD-4: This alternative would have similar technical and administrative implementability as Alternative WWD-2. In situ mixing technology, equipment, and materials would be readily available to implement BMPs, temporarily reroute WWD flow, implement ISS, and place the protective cover. Large debris would need to be removed to facilitate mixing, and small debris would be integrated into the sediment and soil mixture. Because the ISS process results in the bulking of some material and the materials generally are graded during the mixing process, limited amounts of fill (if any) would be required. ISS mixing would innately accomplish

dewatering of the sediment and soil and provide a firm sediment and soil surface for placement of the protective cover. This alternative would require a mix trial bench study to select an appropriate additive and associated dosage. Alternative WWD-4 would involve less materials management and handing than the removal alternatives. Fewer vegetation clearing/access road requirements are needed under this alternative than Alternative 3A. Confirmation sampling for COCs would be limited to the ditch banks for this alternative. Unlike the removal alternatives, long-term O&M and monitoring would be required to monitor the condition and performance of the Alternative WWD-4 remedy. This alternative is the preferred remedy for the WWD.

8.1.7 Cost

Table 6 includes cost summaries for the WWD alternatives. The total costs for each of the alternatives are estimated with expected accuracies of -30% to +50%, in accordance with EPA guidance. The range of cost estimates for the active alternatives is from $10.3 million for Alternative WWD-2 to $33.4 million for Alternative WWD-3B. Alternatives WWD-2 ($10.3 million) and WWD-4 ($12.4 million) similarly manage the sediment on-site with considerably lower costs and less uncertainty in the quantities and schedule than the excavation alternatives. Despite the higher cost of Alternative WWD-4 compared to Alternative WWD-2, Alternative WWD-4 has the advantage of active treatment. The excavation alternatives include the removal and containment of the WWD sediments and would have higher estimated costs ($30 million for WWD-3A and $33.4 million for WWD-3B) and greater uncertainty in implementability and schedule.

The following table summarizes the costs for the WWD remedial alternatives.

WWD Remedial Alternatives	**Estimated Costs**
WWD-1 No Action	$0
WWD-2 Engineered Cap	$10.3 Million
WWD-3A Removal with Consolidation in Basin/Off-Site Disposal	$30 Million
WWD-3B Removal with Off-Site Disposal	$33.4 Million
WWD-4 ISS	$12.4 Million

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8.1.8 State Acceptance

The state of Alabama (represented as ADEM) concurs with the selected remedy for the WWD. ADEM provided a letter of concurrence on April 30, 2024, and is attached as Appendix II.

8.1.9 Community Acceptance

In general, public comments supported the preferred alternative presented in the Proposed Plan. The Proposed Plan was made available January 10, 2024, and presented at a formal public meeting held on January 23, 2024. Because of public interest and at the public's request,

an availability session was held February 20, 2024. The public comment period was extended two weeks to accommodate the public availability session. The public comment period was January 14 to February 28, 2024. Appendix I, which is the Responsiveness Summary for this ROD Amendment, includes all comments and responses.

8.2 FLOODPLAIN

This section of the ROD Amendment presents the detailed evaluation of each of the remedial alternatives for the floodplain using the evaluation process and criteria described in Section 6.0. This evaluation of the floodplain alternatives encompasses the NEFP, EFP, SFP, NFP, SWFP (including the Lower and Lower Central segments of the WWD), and the NWFP.

All floodplain alternatives, except for Alternative FP-1 (No Action), would require a laydown area for staging, cleaning, and storage, as well as access roads (unpaved) to the work areas for implementation. The Olin property has ample land available near the OU-2 floodplain for construction logistics and to accommodate access to the floodplain. A new bridge over the WWD would be constructed to provide access for heavy equipment and delivery of supplies and bulk materials to the floodplain, as part of the OU-2 remedy.

8.2.1 Overall Protection of Human Health and the Environment

FP-1: The No Action alternative would not be protective of human health and the environment. A lack of IC maintenance would result in unacceptable risk to human health. This alternative would not reduce exposure of ecological receptors to COCs in the floodplain.

FP-2: The in situ engineered cap alternative for the floodplain would be protective of human health and the environment. The cap would provide a physical barrier to contain and separate the floodplain soil above CULs from other media. Isolation prevents exposure of contaminated soil and sediment to ecological receptors, migration of COCs into surface water, and potential erosion/transport to other portions of OU-2. Capping would be considered permanent with appropriate protection against erosion/resuspension and proper maintenance. As required in the OU-2 ROD, ICs and ECs would be implemented to achieve the RAO to reduce the potential risk to humans. This alternative is the preferred remedy for the floodplain areas.

FP-3A: The removal of COC-contaminated soils from the floodplain would be protective of human health and the environment. This alternative would protect ecological receptors by the removal of COCs to CULs from the floodplain soils and would protect aquatic receptors under the Basin cap by isolation. Excavation of the floodplain would require clearing and grubbing, including the removal of mature trees from the remedial footprint. This disruption to the habitat would be temporary, and habitat restoration activities would be accomplished following the completion of the remedial action. Restoration under this alternative would be more difficult and would require a longer period than restoration under the FP-2 alternative. Placement in the Basin would be consistent with the EPA-approved capping remedy for OU-2.

FP-3B: The removal of COCs to CULs from floodplain and off-site disposal in a permitted landfill would be protective of human health and the environment. The significant difference of this alternative from the FP-3A alternative is that all excavated soil would be transported for disposal in an appropriate off-site landfill, which would transfer residuals to a managed facility where

mobility of the COCs would be controlled. This considerable difference would eliminate the potential for recontamination for other portions of OU-2.

8.2.2 Compliance with Applicable or Relevant and Appropriate Requirements

ARARs, TBC, and other guidance were identified in the 2023 revised FFS for all of the remedial alternatives. Tables 3 through 5 of this AROD present the specific ARARs/TBC that concern the OU-2 WWD and floodplain areas. CWA Section 404(b)(1) guideline regulations related to discharge of dredged or fill material and wetlands mitigation are location-specific requirements and would apply to remedial alternatives, except for the No Action alternative.

FP-1: The No Action alternative would not comply with chemical-, action-, or location-specific ARARs.

FP-2: This alternative would comply with chemical-, action-, and location-specific ARARs. This alternative would prevent direct exposure to COCs and potential resuspension and transport of COCs during flood events. The floodplain would be divided into working sections and BMPs would be used to control surface water in the working area to avoid incidental discharges outside of the working area. Trees and other vegetation in the different floodplain areas would be removed to the extent needed to allow the construction of an in situ engineered cap in those areas that achieve the RAOs for the floodplain, complies with ARARs, minimizes mercury methylation, and maintains long-term stability of the cap. On-site restoration of the wetland and floodplain habitat would be completed to preserve the current natural and beneficial uses currently served by the floodplain/wetlands in accordance with identified location-specific ARAR and TBCs. ECs would be used to minimize the disruption of, impact to, or alteration of wetlands. This alternative is the preferred remedy for the floodplain areas.

FP-3A: This alternative would comply with chemical-, action-, and location-specific ARARs given the following 2023 revised FFS conclusions: (1) The removal of contaminated soil from the floodplain would eliminate the potential for direct exposure of floodplain biota and potential for resuspension or partitioning of contaminants into surface water; (2) floodplain soil would not be classified as hazardous waste based on characteristic testing; (3) factual determinations related to discharge of fill into aquatic ecosystems are acceptable for approval of placement of the excavated floodplain soil into the Basin; (4) short-term effects to surface water would be temporary and managed by BMPs to isolate the Basin from the river during construction to meet CWA and confined aquatic disposal permit requirements; (5) on-site restoration of wetlands and floodplain habitat would preserve the preconstruction natural and beneficial values served by floodplain/wetlands.

FP-3B: This alternative would comply with the same chemical-, action-, and location-specific ARARs as the FP-3A alternative, noting the following exceptions: (1) The ARARs regarding the placement of materials in the Basin as listed above would not apply; (2) the excavated floodplain soils would be transported to and disposed into a licensed landfill, and the operations would be performed by qualified subcontractors following the appropriate standards; (3) to comply with Alabama dredging regulations, the installation of clean backfill in the excavated areas of the floodplain would be required. On-site restoration of wetlands and floodplain habitat

would preserve/enhance the preconstruction natural and beneficial values served by floodplain/wetlands.

8.2.3 Long-Term Effectiveness and Permanence

FP-1: The No Action alternative would not inhibit migration of COCs. The duration to achieve remedial goals would be lengthy beyond the time frame considered in the 2023 revised FFS.

FP-2: The in situ engineered cap alternative would provide effective long-term isolation of COCs in the floodplain soils to achieve RAOs and CULs with the appropriate monitoring and O&M. The EPA has approved capping of contaminated soil for numerous soil and sediment remediation sites. Retaining mature trees at OU-2 would accelerate on-site restoration of the floodplain habitat, and the technical challenges posed by the retention of mature trees can be addressed through design and long-term O&M to provide long-term effectiveness. To prevent potential recontamination of the cap after placement, the engineered cap would be constructed following the completion of upstream remedial operations (WWD and Ciba-OU03) and before Basin remedial actions, ensuring the effectiveness of this alternative. This alternative is the preferred remedy for the floodplain areas.

FP-3A: If feasible, the removal of COC-contaminated soil from the floodplain would be effective, permanent, and reliable in eliminating soil exposure risks to receptors. To prevent potential recontamination, the floodplain excavation would be completed following the completion of upstream remedial operations (WWD and Ciba-OU03) and before Basin remedial actions. This alternative provides an effective long-term remedy given proper cap design and maintenance. This alternative would not involve floodplain O&M, and there would be no change to the Basin cap O&M.

FP-3B: This alternative would have the same long-term effectiveness as the FP-3A alternative, with the exception that the transfer of the contaminated floodplain soil to a properly designed landfill would remove the soil from OU-2 and provide long-term effective control of the COCs.

8.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

FP-1: The No Action alternative would not include any measures to reduce TMV.

FP-2: The capping alternative would reduce the toxicity and mobility of contaminated media through capping, and the amendment would provide some level of treatment. The volume of contaminated material would remain relatively unchanged. Capping the floodplain soils would reduce the mobility of COCs in soils by creating a physical barrier to prevent erosion and contact with surface water and receptors. This alternative is the preferred remedy for the floodplain areas.

FP-3A: This removal of contaminated soil from the floodplain and transfer to the Basin would not reduce the TMV of contaminated media through treatment. The EPA-approved capping remedy for the Basin would reduce the mobility of the contaminants in the capped soil and sediment by providing a physical barrier that prevents contact with surface water and receptors. The removal of sediment from the floodplain and capping in the Basin would be considered effective and permanent.

FP-3B: The removal of contaminated soil from the floodplain and transfer to a landfill would not reduce TMV of contaminated media through treatment. Transferring the mass of COCs to a properly designed and maintained off-site landfill would reduce the mobility of COCs in soil by isolating and preventing the release of containments.

8.2.5 Short-Term Effectiveness

FP-1: The No Action alternative would have no immediate short-term impact.

FP-2: Upon completion of the cap installation and on-site restoration of floodplain and wetland habitat, RAOs would be achieved within the floodplain. This alternative would not include full clearing and grubbing or excavation of floodplain soils that would be common to all other floodplain alternatives. Thus, this alternative would create the least disruption to the floodplain. By limiting clearing of the floodplain to retain mature trees, more effective and rapid on-site restoration of the floodplain would be facilitated. The impacts to the floodplain under this alternative would be temporary and reversible and mitigated through the on-site restoration. Short-term risks to workers during construction would be manageable with the appropriate ECs and administrative controls. There would be no unacceptable risks to the community during remedial activities. This alternative is identified as the preferred remedy for the floodplain areas.

FP-3A: Upon completion of the floodplain soil removal and habitat restoration, RAOs would be achieved. This alternative would include excavation, transportation, and placement of soil into the Basin followed by importation of fill as needed to restore the grade according to the final design. It would be anticipated for full clearing and grubbing of the remediation footprint to require extended and difficult on-site restoration. Short-term risks to workers during construction would be manageable with the appropriate ECs and administrative controls. There would be no unacceptable risks to the community during remedial activities. Aquatic habitat impacts at the placement site would occur via ROD-required cap remedy.

FP-3B: The removal of contaminated soil from the floodplain and off-site disposal in a landfill would have the same short-term effectiveness as the FP-3A alternative, with the following exceptions: (1) To isolate the working areas, BMPs would be implemented in the floodplain, and there would be no temporary impacts to the surface water quality in the Basin; (2) there would be no impacts to the aquatic habitat in the Basin; (3) this alternative would include an increased consumption of resources and risk/nuisance to the public compared to all other alternatives because of soil transport via trucks on public roadways to a landfill; (4) under this alternative, the full removal of floodplain soil with COC concentrations above CULs from OU-2 would be accomplished.

8.2.6 Implementability

FP-1: Under the No Action alternative, no active implementation would be required.

FP-2: The in situ engineered cap alternative would be technically and administratively implementable. Capping technologies, equipment, and materials to implement BMPs, material handling, and cap placement in the floodplain would be readily available and reliable. Limited underbrush clearing would be required, and habitat restoration on-site would be feasible and accelerated because of the retention of mature trees. Compared to the floodplain excavation

alternatives, the FP-2 alternative would have less uncertainty for implementation and the schedule because of the following: (1) Remedial design would only require lateral delineation; (2) uncertainty associated with excavation confirmation sampling would be eliminated; (3) floodplain soil dewatering would not be required; (4) numerous handling and transport of excavated soil using off-road trucks on-site and/or on-road trucks off-site over public roads would be avoided. This alternative would be implementable throughout the floodplain, but construction would be limited to non-flood conditions. Long-term O&M would be required to monitor the condition and performance of the alternative. This alternative is the preferred remedy for the floodplain areas.

FP-3A: This alternative has the potential to be both technically and administratively implementable. Equipment and materials would be readily available to implement BMPs, excavation, material handling, transport, and placement of soil in the Basin. This alternative would require full clearing and grubbing of the remediation footprint, which would extend the difficulty and duration to complete on-site floodplain restoration. Excavation of the floodplain would have ample implementable challenges, including: (1) Full lateral and vertical delineation of impacted soil would be required; (2) sufficient dewatering of excavated soil would be required for off-road transport within OU-2; (3) excavated soil would be handled multiple times from the point of removal to placement in the Basin, including truck transport within OU-2; (4) comprehensive confirmation sampling would be required to document excavation completion; (5) construction activities would be limited to non-flood conditions; (6) excavation dewatering would be impractical for excavation deeper than 2 to 3 feet in most locations; (7) potential failure to complete excavation or collect representative confirmation samples below the water table could result in the need to install an engineered cap in the floodplain. Placement in the Basin would be readily implementable and would not result in a net decrease in flood storage capacity. Long-term O&M would not be required for the excavated floodplain. This alternative would be feasible and easier to implement than the FP-3B alternative under optimum conditions, but it would be significantly more difficult to implement than Alternative FP-2.

FP-3B: The implementability of this alternative would be the same as the FP-3A alternative, with the following exceptions: (1) Transporting contaminated soil over public roads would require thousands of truckloads and would have a higher risk for workers and the public compared to the FP-3A alternative; (2) dewatering of excavated soil would be required to meet paint filter test requirements before transport to a landfill for disposal and could be accomplished with readily available equipment, materials, and technologies; (3) disposing the contaminated soil at the nearest approved Subtitle D landfill would consume valuable landfill capacity.

8.2.7 Cost

Table 7 includes cost summaries for the floodplain alternatives. The total costs for each of the alternatives are estimated with expected accuracies of -30% to +50%, in accordance with EPA guidance. The range of cost estimates for the active alternatives is from $26.3 million for Alternative FP-2 to $97.3 million for Alternative FP-3B. Alternative FP-2 ($26.3 million) does not require excavation; therefore, it would have the lowest estimated cost and the least uncertainty in implementation and schedule. The excavation alternatives include the removal and containment of all floodplain soil with COC concentrations above CULs and would have

considerably higher estimated costs ($72.3 million for FP-3A and $97.3 million for FP-3B) and significant uncertainty in implementability and schedule.

The following table summarizes the costs for the floodplain remedial alternatives.

Floodplain Remedial Alternatives	**Estimated Costs**
FP-1 No Action	$0
FP-2 Engineered Cap (with Amendment)	$26.3 Million
FP-3A Removal with Consolidation in Basin	$72.3 Million
FP-3B Removal with Off-Site Disposal	$97.3 Million

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8.2.8 State Acceptance

The state of Alabama (represented by ADEM) concurs with the preferred remedy for the Floodplain. ADEM provided a letter of concurrence on April 30, 2024 and is attached as Appendix II.

8.2.9 Community Acceptance

Twenty-six comments were received during the public comment period (January 15, 2024 through February 28, 2024) and formal public meeting (January 23, 2024) for the Proposed Plan. In general, the comments supported the preferred alternative presented in the Proposed Plan. Appendix I, which is the Responsiveness Summary for this AROD, includes all comments and the responses.

9.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed at a site wherever practicable (Section 300.430[a][1][iii][A]). Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur.

Per the NCP at Section 300.430[a][1][iii][B], the EPA expects to use engineering controls, such as containment, for waste that poses relatively low long-term threat or where treatment is impractical. The Olin OU-2 contaminated soils and sediments in the floodplain areas (including wetlands) are not known to pose a principal threat and are therefore considered low level threat wastes. Capping has been demonstrated to be a reliable containment remedy for this type of contamination and provides an element of treatment to reduce mobility and toxicity (bioavailability) through use of an amendment, chemical immobilization of the contaminants under the cap, and overall physical isolation.

The Olin OU-2 mercury contaminated soils and sediments in the WWD are mostly considered as not posing a principal threat, but principal threat wastes may be present in the areas of the Upper and Upper Central WWD segments, where high-concentrations of mercury in subsurface soil is present up to about 2,000 mg/kg and HCB is present up to about 1,000 mg/kg.

The EPA’s selected remedy for the WWD includes treatment through ISS which will reduce mobility and toxicity (bioavailability) of contaminants in the WWD soils and sediments, consistent with the NCP’s expectation to use treatment to address principal threats.

10.0 SELECTED AMENDED REMEDY

10.1 SUMMARY OF THE RATIONALE FOR THE AMENDED SELECTED REMEDY

Four alternatives were evaluated for the wastewater ditch. The No Action alternative would not achieve RAOs. Of the remaining alternatives, all of which could achieve the RAOs, Alternatives WWD-2 and WWD-4 would not require removal of sediments/soils; would have the least uncertainty in implementation and schedule; and would have considerably lower costs. The decisive balancing factors that led to selection of Alternative WWD-4 are its use of treatment to address the mobility of contaminants and its long-term effectiveness, permanence, and cost effectiveness. Alternative WWD-4 includes treatment to stabilize and reduce the mobility of the contaminants; provides additional protection against the migration of COCs from deeper sediments/soils; and is accordingly more effective and permanent in the long term than Alternative WWD-2.

For the wastewater ditch contingency remedy, should testing show that ISS is not successful, Alternative WWD-3B also provides protection against migration of COCs from deeper sediments/soils through excavation and off-site disposal.

For the floodplain areas, the No Action alternative would not achieve the RAOs. While Alternatives FP-2, FP-3A, and FP-3B would be protective of human health and the environment and compliant with ARARs, the removal alternatives (FP-3A and FP-3B) include varying degrees of increased disruption of wetlands, consumption of resources and risk/nuisance to the public because of soil and sediment transport on public roadways to a landfill depending on which removal sub-alternative is pursued, and are substantially more costly than the engineered cap alternative.

The EPA believes the combination of Alternatives WWD-4 and FP-2 satisfies the threshold criteria and offers the best tradeoffs among the other alternatives in terms of the balancing and modifying criteria. Additionally, the EPA believes Alternative WWD-3B satisfies the threshold criteria and offers the best tradeoffs among the remaining alternatives to serve as a contingency remedy should treatability testing indicate that ISS criteria cannot be achieved for Alternative WWD-4.

10.2 DETAILED DESCRIPTION OF THE AMENDED SELECTED REMEDY – WASTEWATER DITCH

The EPA's Selected Remedy for remediation of the WWD sediments and soils is ISS with a protective cover, ICs and ECs, and habitat restoration, which is identified as Alternative WWD-4 in the 2023 revised FFS.

- **In Situ Solidification/Stabilization** – ISS of sediments and soil in the wastewater ditch will be accomplished by mechanical mixing of the in situ material and one or more solidifying/stabilizing agent(s) that will be selected based on the results of a series of bench-scale mix trial. COC-impacted sediment and soil in tributaries and banks/side slopes will be excavated and incorporated in the wastewater ditch, before solidification/stabilization, followed by the installation of a protective cover. Upon

completion of the data gaps investigation, design of the ISS remedy for the wastewater ditch will proceed. The components of the design will include the following:

- Excavation of bank soils for consolidation with sediments in the bottom of the wastewater ditch. Confirmation sampling of any exposed bank soil that will be left uncovered will be performed. This is to verify removal of contaminated material from ditch banks before completing the ISS for the consolidated, contaminated material in the ditch bottom and installing the protective cover.

- Flow into areas of the ditch where work is actively being performed will be temporarily bypassed as construction progresses using items such as check dams with sumps, pumps, and piping (as appropriate) to route water around the active work area.

- Using conventional mechanical equipment such as excavators and/or specialty soil mixing equipment (e.g., ALLU Processor), the selected additive will be applied to the targeted sediments and soils.

- Following the solidification/stabilization process, a certain amount of volume increase (often referred to as swell) is expected. This increased volume can remain in the ditch because it is not expected to adversely affect the ditch hydraulics and the remedy design will account for this expectation of swell. Successful solidification/stabilization will be determined through ongoing quality control testing during implementation.

- The depth of ISS in the upper ditch will vary by including sediment and soil areas to at least a 2-foot depth with an average depth of approximately 5 feet, as well as deeper in areas with high concentrations of COCs. However, deeper areas of contamination located in the lower reaches of the WWD will be evaluated to determine whether it may be a potential source of COC transport downgradient into surface water and/or floodplain sediments and therefore require treatment.

- The extent of areas requiring ISS will be refined in the EPA-approved Remedial Design and Remedial Action Work Plan using data from the data gaps investigation.

- The implementation of this remedy is estimated to be completed in less than one year.

- **Data Gap Investigations** – Before completing the design, a data gaps investigation and a bench-scale mix trial will be performed. The data gap investigation will involve the following:

  - Subsurface soil and sediment samples will be collected from select drainage features, the ditch, and ditch banks to completely define the nature and extent of contamination, both laterally and vertically, using grab, composite, and incremental sampling methodologies.

- Soil borings, geotechnical borings, and installed and existing monitoring wells/piezometers will be used to define the underlying soil characteristics (including extent of any clay present) and the depth to groundwater.

- This investigation will also evaluate whether groundwater quality would be adversely affected near the solidified/stabilized sediments and soils, consistent with the groundwater monitoring specified in the 2014 ROD. To achieve this objective, a minimum of four groundwater monitoring wells will be installed near the WWD. The depths and concentrations of the mercury and HCB exceedances in the WWD soils and sediments indicate that there may be contamination below the maximum sampling depth that extends into the groundwater. Thus, there may also be COC transport from the deeper WWD soils and sediments to groundwater (Figure 10).

- **Bench-Scale Mix Trial** – A bench-scale mix trial will be performed to select one or more additives (e.g., Portland cement, bentonite, fly ash, etc.) and appropriate dosages for use in the ISS.

  - Performance goals for three critical properties have been established and include unconfined compressive strength, hydraulic conductivity, and leaching potential. These goals include an unconfined compressive strength equal to or greater than 20 pounds per square inch, a hydraulic conductivity of 10-6 centimeters per second or less, and reduction of COC leaching from the treated materials to levels that do not adversely impact ground or surface water. If one or more of these performance goals cannot be met, the EPA may still allow the use of ISS if it is determined and/or demonstrated that the proposed mix ratio will be sufficiently protective.

- **Protective Cover** – Following bank soil consolidation and treatment of the soils and sediments with ISS, a protective cover (sand, stone, and/or riprap) will be placed over the solidified/stabilized areas across the entire upper ditch to prevent erosion and weathering, and it will act as a physical barrier between the environment and the treated sediments and soils.

  - The cover is expected to generally consist of a geocomposite liner or equivalent overlain with a protective layer (e.g., 4 inches sand + 4 inches gravel + 4 inches riprap) as needed to trap sediment that facilitates vegetative growth for habitat replacement purposes. The design and thickness of the cover will be determined during the remedial design.

- **Habitat Restoration** – Areas disturbed by excavation such as the WWD banks and floodplain areas within the wetlands will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific ARARs such as CWA Section 404(b)(1) regulations related to compensatory mitigation for adverse effects in wetlands and TBCs related to actions in designated floodplains. Such measures could include regrading and replacing trees and other types of revegetation as appropriate.

- There are two areas of palustrine scrub-shrub wetlands located adjacent to the central wastewater ditch. Further details on habitat restoration elements and their characteristics will be determined during the remedial design.

- The existing WWD concrete weir and flume structure will be removed and replaced. Concrete debris will be disposed of at an EPA-approved, RCRA-permitted landfill.

- **Maintenance** – Following construction of the engineered caps and protective cover, periodic inspections will be performed and repairs and replenishment of the layers will be undertaken where necessary to prevent releases of contaminants.

- **Long-Term Monitoring** – Following construction, long-term monitoring will be performed and include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving RAOs, attaining CULs, and reducing human health and environmental risk. In addition, long-term monitoring data are needed to complete the five-year review process.

- **Implementation of ICs and ECs** – ICs include revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the areas that are remediated. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of fish contamination. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. OU-2 is currently fenced along the west, north, and southwest boundaries. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

10.2.1 Contingency Remedy for the Wastewater Ditch

Alternative WWD-3B in the 2023 revised FFS, which includes excavation of contaminated soils and sediments followed by off-site disposal in EPA-approved landfills, may be implemented instead of ISS if ISS does not meet specified criteria related to strength, hydraulic conductivity, and potential leaching of COCs based on the bench-scale mix trial. If the EPA determines to invoke the contingency remedy, the EPA will issue an Explanation of Significant Differences explaining the decision and the areas where the contingency remedy will be implemented.

Components of Alternative WWD-3B include the following:

- **Excavation and Off-Site Disposal** - Soils and sediments with COC concentrations greater than CULs would be excavated until clean (below CULs) or to depths determined by the EPA, as verified by confirmation samples. Excavated soils and sediments would be characterized to determine if deemed RCRA toxicity characteristic waste, and treated, if necessary, in accordance with identified ARARs before disposing in an off-site RCRA-permitted landfill approved by the EPA or other approved landfills as determined by COC concentration.

    - Implementation of this remedy is estimated to be completed in less than one-year

- **Habitat Restoration** – Any habitat in floodplain portions of the ditch disturbed by excavation would be restored through vegetation replacement and enhanced after the ditch is suitably recontoured to accommodate necessary flow capacity consistent with location-specific ARARs.

10.3 DETAILED DESCRIPTION OF THE AMENDED SELECTED REMEDY – FLOODPLAIN AND WETLANDS

The EPA's Selected Remedy for remediation of the floodplain areas is installation of an in situ engineered cap, ICs and ECs, and habitat restoration, which is identified as Alternative FP-2 in the 2023 revised FFS. The floodplain remediation areas are located within wetlands. Portions of the east, southwest, and south floodplains contain freshwater emergent wetlands with the rest of the floodplain containing freshwater forested/shrub wetlands. The dominant vegetation communities compose semi-permanently flooded bottomland forest. In other portions they are reported as temporarily flooded bottomland forest, shrub-dominated bottomland forest, and herbaceous-dominated bottomland forest. Wetlands mitigation as required by CWA Section 404(b)(1) regulations, which are location-specific ARARs, will be performed and likely include restoration/rehabilitation/enhancement in the affected wetlands.

The following is a description of each of the remedy components for Alternative FP-2:

- **In Situ Engineered Cap** – An in situ engineered cap will be constructed over the OU-2 floodplain remedial footprint (areas determined to exceed CULs).
    - Consistent with the 2014 ROD, the cap will include a mixing zone, an effective layer (i.e., a chemical isolation layer), and a habitat and/or erosion control layer, as appropriate. The design and thickness of the cover will be determined during the remedial design.
    - It is anticipated that the cap design will differ for different portions of the floodplain because of the types and concentrations of COCs present. For example, the NFP has exceedances of DDTR but does not have exceedances of the mercury CULs.
    - The SFP and SWFP have the highest concentration of mercury across the various floodplain areas. At these higher mercury concentration areas and at other areas identified during design, an amendment such as activated carbon or similar will be integrated into the chemical isolation/effective layer of the cap. The amendment is intended to effectively control contaminant migration and reduce contaminant bioavailability to receptors.
    - The design will also contain provisions for removal of smaller vegetation, and the EPA will specify whether removal of large trees is necessary to construct and maintain the remedy, minimize mercury methylation, and reduce the potential for deep-rooted vegetation from compromising the integrity and function of the cap.
    - Excavation, transportation, and disposal of floodplain soils, sediments, and vegetation in an EPA-approved off-site RCRA-permitted landfill may be implemented as necessary for cap installation and remedy performance.

  - Assuming the floodplain is accessible seven months per year given the seasonal flooding, the implementation of this remedy is expected to take up to three years to complete.

- **Data Gap Investigation** – Before completing the design, a limited data gaps investigation will be performed to further define the extent of remediation at OU-2.

  - Soil and sediment samples will be collected for chemical analysis and geotechnical testing. Samples to be collected for chemical analysis will use composite sampling and ISM within DUs during collection. The size of the DUs and the number of subsamples collected will be consistent with similar prior sampling at OU-2.

  - A tree survey and an evaluation of the transitional zone between the Basin and floodplains will be performed.

- **Habitat Restoration** – Areas disturbed by excavation in the floodplain areas, which are located within the wetlands, will be restored to the extent possible to provide similar or enhanced habitat to comply with identified location-specific ARARs such as CWA Section 404(b)(1) regulations related to compensatory mitigation for adverse effects in wetlands and TBCs related to actions in designated floodplains. Such measures could include regrading and replacing trees and other types of revegetation as appropriate.

- **Maintenance** – Following construction of the engineered caps and protective cover, periodic inspections will be performed and repairs and replenishment of the layers will be undertaken where necessary to prevent releases of contaminants.

- **Long-Term Monitoring** – Following construction, long-term monitoring will be performed and include physical, chemical, and biological measurements in various media to evaluate long-term remedy effectiveness in achieving RAOs, attaining CULs, and reducing human health and environmental risk. In addition, long-term monitoring data are needed to complete the five-year review process.

- **Implementation of ICs and ECs** – ICs include revision to the existing recorded environmental-restrictive covenant to include land use and activity restrictions in the areas that are remediated. ADEM has posted fish advisory signs along the Tombigbee River to inform the public of fish contamination. These ICs help prevent unacceptable exposures to humans. ECs would consist of warning signs, fencing (some of which are already present at OU-2), and continuation of security measures. OU-2 is currently fenced along the west, north, and southwest boundaries. Existing ECs on the Olin property deter unauthorized access and prevent disturbance of the OU-2 remediation areas.

10.4 COST ESTIMATE FOR THE AMENDED SELECTED REMEDY

The estimated cost for the WWD remedy is approximately $12.4 million and for the floodplain remedy is approximately $26.3 million, for a combined total of approximately $38.7 million. Table 8 presents a summary of the overall costs for the selected remedy and Tables 9 and 10

present a cost breakdown of the WWD and floodplain components of the selected amendment remedy. The information in these cost estimate summary tables is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur because of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or another ROD Amendment. This is an order-of-magnitude engineering cost estimate expected to be within –30% to +50% of the actual project cost.

10.5 EXPECTED OUTCOMES OF THE AMENDED SELECTED REMEDY

The selected remedy is expected to attain the RAOs and address the exposure pathways and contaminant levels in the exposure media. The EPA has selected Alternative WWD-4 and Alternative FP-2 because they are expected to achieve substantial and long-term risk reduction through isolation and immobilization of COCs. These alternatives are expected to protect wildlife populations and allow the property to be used for the reasonably anticipated future land use, which is a floodplain with fish and wildlife habitat according to ADEM Water Use Classifications. Recovery, which as noted in the 2014 ROD, is estimated to occur in 10 years, will be achieved when mercury, DDTR, and HCB levels in biota in the Basin and adjacent floodplain are low enough to be protective of human health and not pose an unacceptable ecological risk. If needed, the wastewater ditch contingency remedy, Alternative WWD-3B, would achieve substantial and long-term risk reduction and allow for reasonable anticipated future land use.

As noted in the 2014 ROD, unacceptable risk to the community is not anticipated during remedial activities. ECs such as appropriate PPE will be used to mitigate short-term risks during construction, and short-term impacts to wastewater ditch and floodplain habitat are expected to be temporary.

The CULs for each medium (i.e., contaminant-specific CULs, basis for CULs, and risk at CULs) are presented in Tables 1 and 1a.

11.0 STATUTORY DETERMINATIONS

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions be "protective of human health and the environment, [be] cost effective, [and use] permanent solutions and alternative treatment technologies or resource recovery alternatives to the maximum extent practicable." Section 121(b)(1) also establishes a preference for remedial actions that use, as a principal element, treatment to reduce the TMV of the hazardous substances, pollutants, and contaminants at a site permanently and significantly. CERLCA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state environmental laws, unless a waiver can be justified.

The EPA has determined that the selected remedy complies with the CERCLA Section 121 Cleanup standards and NCP provisions for remedy selection in 40 CFR § 300.430(f), meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. These provisions require the selection of remedies that are protective of human health and the environment, comply with ARARs (or justify a waiver from such requirements), are cost effective, and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that use treatment that permanently and significantly reduce the TMV of hazardous substances as a principal element (or justify not satisfying the preference). The following sections discuss how the selected remedy meets these statutory requirements.

The State of Alabama concurs with the selected remedy. ADEM provided a letter of concurrence on April 30, 2024, which is attached as Appendix II.

11.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy, Alternatives WWD-4 and FP-2, will protect human health and the environment through a combination of capping, ISS, ICs, and remedy performance monitoring. The ISS included in Alternative WWD-4 will immobilize COCs detected in sediment/soils within the wastewater ditch at concentrations above CULs, effectively reducing the recontamination and transport risk. The capping and clean cover included with Alternatives WWD-4 and FP-2 will eliminate all significant direct-contact risks to human health and the environment associated with contaminated-exposed sediment/soil of the wastewater ditch and floodplain remedial areas. In the event the contingency remedy for the WWD is necessary, Alternative WWD-3B would be protective of human health and the environment since contaminated sediment and soil that exceed CULs in identified areas would be excavated and disposed of in an off-site landfill, thereby permanently eliminating any direct-contact risks to human and ecological receptors as well as removing potential source of groundwater and surface water contamination.

Short-term effects from capping may occur because of resuspension during cap placement and destruction of habitat, but ECs, use of appropriate PPE, and administrative controls should effectively mitigate these potential effects to workers and surrounding community. Wetlands mitigation as required by CWA Section 404(b)(1) regulations, which are location-specific ARARs, will be performed and likely include restoration/rehabilitation in the affected wetlands.

11.2 COMPLIANCE WITH ARARS

Section 121(d) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are ARARs to the hazardous substances or particular circumstances at a site unless such ARARs are waived under CERCLA section 121(d)(4). See also 40 CFR § 300.430(f)(1)(ii)(B). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. The 40 CFR § 300.150 requires compliance with Occupational Safety and Health Administration (OSHA) standards; therefore, the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the part of any removal or remedial action conducted entirely on-site as defined in 40 CFR § 300.5. See also 40 CFR §§ 300.400(e)(1) & (2). Also, CERCLA actions must only comply with the "substantive requirements," not the administrative requirements of a regulation. Administrative requirements include permit applications, reporting, record keeping, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements such as those typically identified as location-specific ARARs.

Applicable requirements, as defined in 40 CFR § 300.5, "means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable." Relevant and appropriate requirements, as defined in 40 CFR § 300.5, "means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not 'applicable' to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate."

In addition to ARARs, the lead and support agencies may identify other measures to be considered for a particular release. "The TBC category consists of advisories, criteria, or guidance that were developed by the EPA, other federal agencies, or states that may be useful in developing CERCLA remedies." See 40 CFR § 300.400(g)(3).

The selected amended remedy (including the contingency remedy) complies with identified chemical-, location-, and action-specific ARARs as well as TBCs. No waiver is necessary for implementation of the amended selected remedy. The ARARs for the selected remedy include location-specific requirements from the CWA Section 404(b)(1) guidelines and regulations related to discharges from dredged or fill material as well as compensatory mitigation for actions in wetlands and Federal Emergency Management Agency regulations for actions in floodplains.

Sediments that are resuspended in the removal and capping alternatives may result in temporary noncompliance with chemical-specific ARARs such as ADEM water quality criteria, meaning that precautions (i.e., implementation of BMPs) would be used to minimize that outcome. Action-specific ARARs include requirements for characterization, temporary staging, and disposal of contaminated sediment/soil as well as requirements for control of fugitive dust and stormwater runoff during land disturbing activities including excavation. Tables 3 through 5 include identified ARARs, TBCs, and other guidance for the selected remedy are included in.

11.3 COST-EFFECTIVENESS

The EPA has determined that the selected remedy is cost effective and represents reasonable value for the money to be spent. A cost-effective remedy is one in which costs are proportional to its overall effectiveness (NCP at 40 CFR § 300.430(f)(1)(ii)(D)). The EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and ARAR-compliant). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence, reduction in TMV through treatment, and short-term effectiveness. Overall effectiveness was then compared to costs to determine the cost-effectiveness of each of the alternatives that were subjected to a detailed cost analysis. In that analysis, capital, annual O&M, and performance monitoring costs were estimated and used to develop present-worth costs.

The estimated present-worth cost of the selected alternatives is $12,400,000 and $26,300,000 for Alternative WWD-4 is and Alternative FP-2, respectively. The estimated cost for Alternative FP-2 is less than the estimated costs for Alternatives FP-3A and FP-3B. Alternative WWD-4 is estimated to cost less than Alternatives WWD-3A and WWD-3B but is more expensive than Alternative WWD-2. The selected remedy is cost effective because it has been determined to provide the greatest overall protectiveness for its present-worth cost.

The EPA has determined that the amended remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner for this OU. Of those alternatives that are protective of human health and the environment and comply with ARARs (or provide a basis for invoking an ARAR waiver), the EPA has determined that the selected remedy provides the best balance of tradeoffs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, the bias against off-site disposal without treatment, and State/support agency and community acceptance.

The selected Alternative FP-2 would likely include an element of treatment via the inclusion of reactive materials to reduce the potential for contaminants to migrate through the cap to reduce mobility and toxicity (bioavailability) through physical isolation, stabilization, and chemical immobilization of the contaminants in sediment/soils under the cap. WWD-4 would stabilize the ditch sediments/soils and immobilize the COCs using a material such as Portland cement, bentonite, or fly ash.

11.4 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

CERCLA Section 121(b) specifies remedial actions, which permanently and significantly reduce the TMV of the hazardous substances, pollutants, and contaminants as a principal element, are to be preferred over remedial actions not involving such treatment. By using amendments in the

engineered capping materials under FP-2 that reduce toxicity of the COCs and in situ stabilization in WWD-4 that reduces mobility of the COCs, the amended remedy addresses contamination at OU-2 using treatment technologies. By using treatment as a significant part of the remedy, the statutory preference for remedies that use treatment as a principal element is satisfied. As stated in Section 9.0, the Olin OU-2 mercury contaminated soils and sediments in the WWD are mostly considered as not posing a principal threat, but principal threat wastes may be present in the areas of the Upper and Upper Central WWD segments, where high-concentrations of mercury in subsurface soil is present up to about 2,000 mg/kg and HCB is present up to about 1,000 mg/kg. The EPA's selected remedy for the WWD includes treatment through ISS which will reduce mobility and toxicity (bioavailability) of contaminants in the WWD soils and sediments, consistent with the NCP's expectation to use treatment to address principal threats.

11.5 FIVE-YEAR REVIEW REQUIREMENTS

Because the amended remedy will result in hazardous substances and contaminants remaining on-site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after the initiation of the remedial action, and every five years thereafter until the levels of COCs allow for unrestricted use with unlimited exposure to effected media. The Five-Year Reviews will be conducted to ensure that the remedy is, or will be, protective of human health and the environment. If results of the Five-Year Reviews reveal that remedy integrity is compromised and protection of human health is insufficient, then additional remedial actions will be evaluated by the EPA in consultation with ADEM. The statutory Five-Year Reviews will be conducted in accordance with CERCLA Section 121(c) and the NCP and will be consistent with EPA guidance.

12.0 DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The Proposed Plan for OU-2 of the Olin (McIntosh) Superfund Site was initially released for a public comment period of 30 days, running from January 15, 2024, through February 14, 2024. The public comment period was then extended an additional two weeks and ran until February 28, 2024. The Proposed Plan identified a combination of Alternatives WWD-4 and FP-2 (short description) as the preferred alternative for OU-2 of the Site. The EPA reviewed all written and verbal comments submitted during the public comment period and has determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, are necessary or appropriate.

A comment was provided during the public comment period with respect to nomenclature the EPA used in the title of the remedial alternatives presented in the Proposed Plan, which differed from remedial alternatives titles used in the EPA-approved November 2023 revised FFS. The commenter requested that the phrase, habitat restoration, be used instead of “habitat replacement/enhancement.” The EPA decided to use the phrase, habitat replacement/enhancement, in the Proposed Plan because it represents the type of restoration that likely will be implemented to satisfy identified location-specific ARARs related to activities in floodplains and wetlands. In addition, the EPA was concerned that the term, restoration, could be misunderstood in the context of “restoration or rehabilitation” in the natural resource damage assessment regulations at 43 CFR § 11.13. Despite this reasonable rationale, the EPA has decided to revert to the phrase, “habitat restoration”. in the remedial alternatives presented in this amended ROD because it may be understood to encompass a wider range of restorative actions that could be undertaken. In the context of wetlands mitigation, restoration is one of the available options for satisfying the requirement for compensatory mitigation under the CWA Section 404(b)(1) guidelines regulations. The EPA has provided a written response with respect to use of the phrase, habitat restoration, in lieu of “habitat replacement/enhancement” in the Responsiveness Summary (Appendix I).

In addition, the 2024 Proposed Plan for OU-2 stated that “Olin OU-2 contaminated soils and sediments are not readily classifiable as principal threat wastes despite the inherent toxicity of the contaminants and demonstrated mobility which has contaminated surface water.” However, further evaluation of the mercury concentrations in portions of the WWD subsurface soils and sediments indicates that high concentrations of mercury in subsurface soil (up to about 2,000 mg/kg) and HCB in subsurface soils (up to about 1,000 mg/kg) in the areas of the Upper and Upper Central WWD segments may be considered principal threat waste. Notwithstanding this re-classification, the EPA’s selected remedy for the WWD includes treatment through ISS which will reduce mobility and toxicity (bioavailability) of contaminants in the WWD soils and sediments, consistent with the NCP’s expectation to use treatment to address principal threats. The Olin OU-2 contaminated soils and sediments in the floodplain areas (including wetlands) are not known to pose a principal threat and are generally considered low level threat wastes.

Per the NCP at Section 300.430[a][1][iii][B], the EPA expects to use engineering controls, such as containment, for waste that poses relatively low long-term threat or where treatment is impractical. Capping has been demonstrated to be a reliable containment remedy for this type of contamination and provides an element of treatment to reduce mobility and toxicity

(bioavailability), chemical immobilization of the contaminants under the cap, and overall physical isolation.

FIGURES

NOTICE

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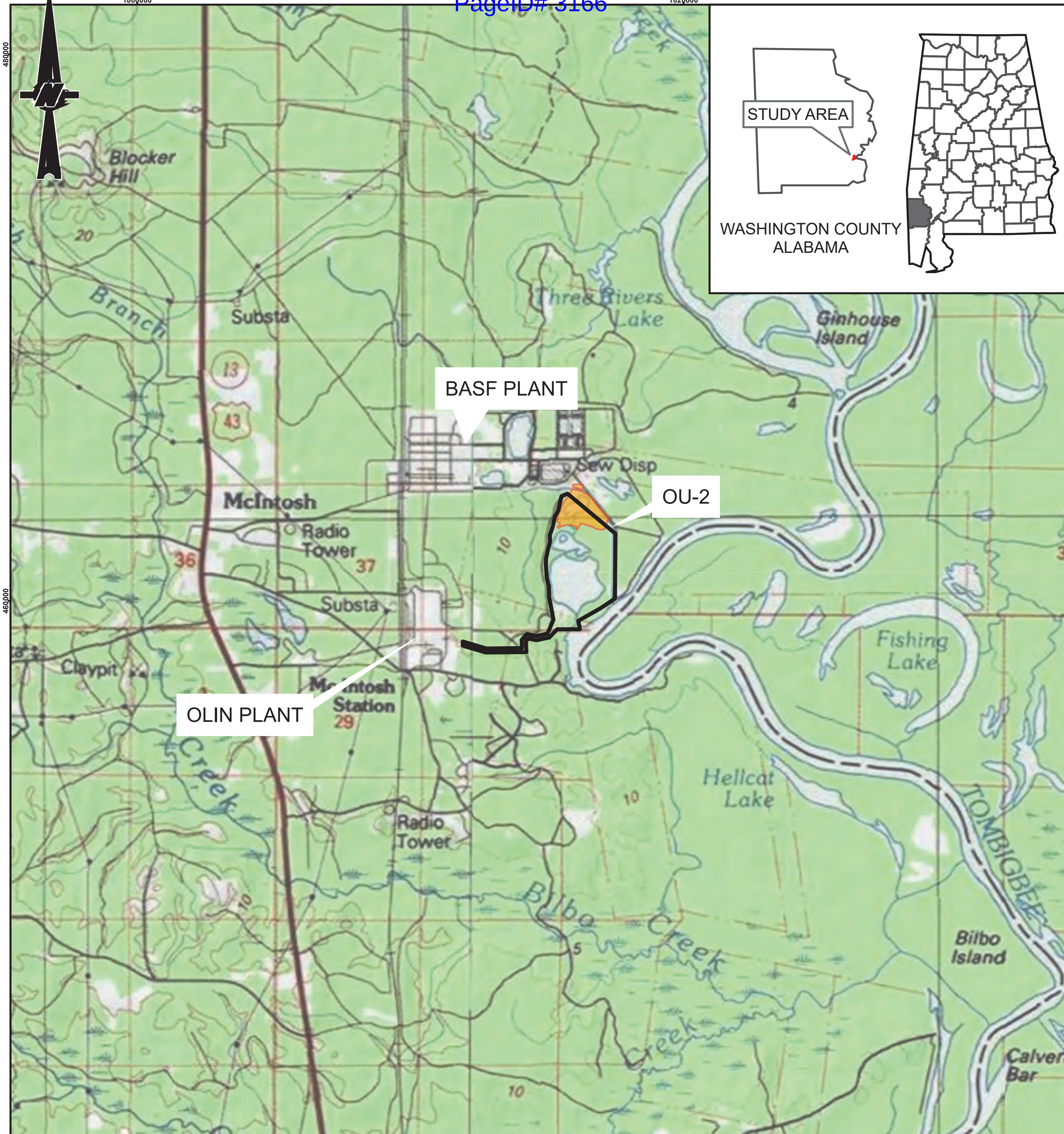

Approximate OU-2 Boundary

Existing Sand Cover at Ciba-Geigy Superfund Site OU-3 (Cypress Swamp)

0 1 2
Miles

Figure 1. McIntosh and Project Location

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

REFERENCE(S)

1. BASE IMAGERY: USA_TOPO_MAPS: COPYRIGHT:© 2013 NATIONAL GEOGRAPHIC SOCIETY, I-CUBED

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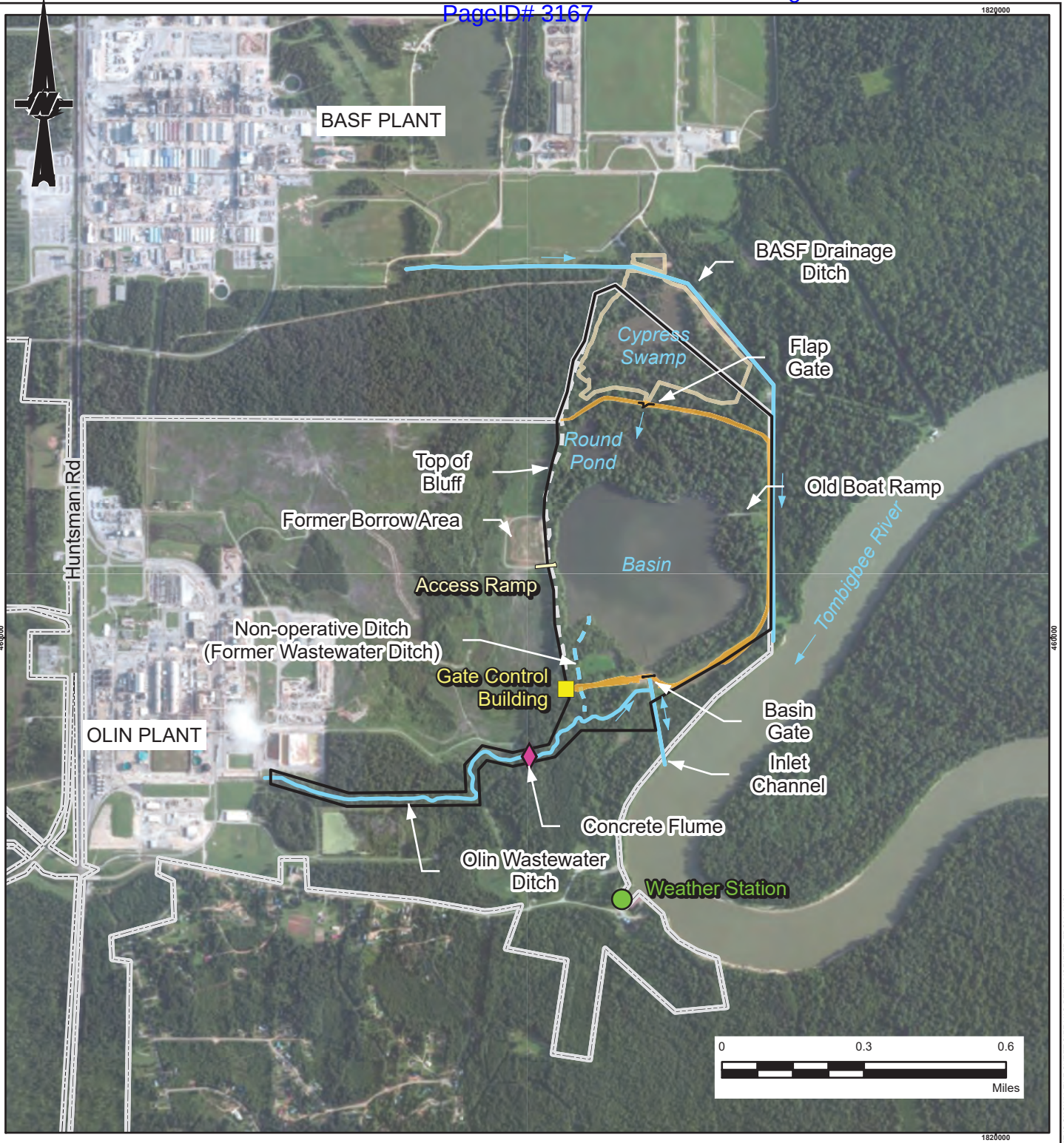


- Weather Station
- Gate Control Building
- Concrete Flume
- Basin Gate
- Flap Gate
- Top of Bluff
- Drainage Feature
- Non-operative Ditch
- Access Ramp
- Berm Extent
- Approximate OU-2 Boundary
- Property Boundary
- Existing Sand Cover at Ciba-Geigy Superfund Site OU-3 (Cypress Swamp)

REFERENCE(S)
1. BASE IMAGERY: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 2. Project Location Details

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

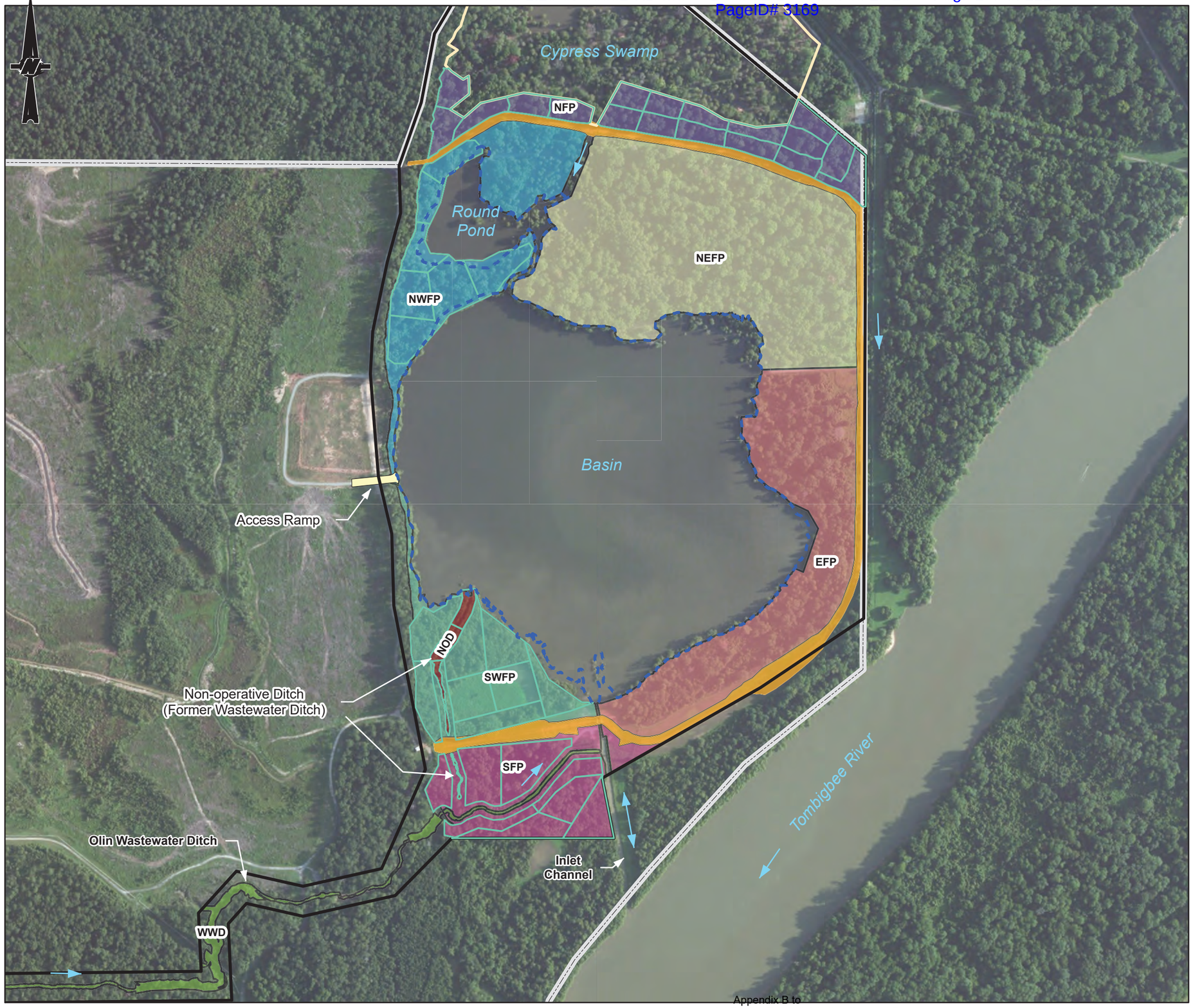
NOTE(S)
1. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
2. ISM DECISION UNITS (DU) SHOWN ON THIS FIGURE WERE SAMPLED BETWEEN JANUARY 2022 AND MAY 2023.
3. TOPOGRAPHIC CONTOURS ARE IN 1-FOOT INTERVALS (NAVD88).

REFERENCE(S)
1. TOPOGRAPHIC AND BATHYMETRIC ELEVATION CONTOURS BASED ON LIDAR AND BATHYMETRIC SURVEYS, SURVTECH, 2022.
2. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 3. Wastewater Ditch and Overbank Decision Units

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

Appendix B to
Amendment to Remedial Design/Remedial Action Consent Decree
For Operable Unit Two of the Olin Corp. (McIntosh Plant) Superfund Site



- 3-Foot Elevation Contour (NAVD88)
- ISM Decision Unit
- Existing Sand Cover at Ciba-Geigy Superfund Site OU-3 (Cypress Swamp)
- Approximate OU-2 Boundary
- OU-2 Berm Extent
- Access Ramp
- Property Boundary

Approximate Floodplain Areas

- EFP - East Floodplain
- NEFP - Northeast Floodplain
- NFP - North Floodplain
- NOD - Non-operative Ditch Floodplain
- NWFP - Northwest Floodplain
- SFP - South Floodplain
- SWFP - Southwest Floodplain
- Wastewater Ditch (WWD) and Overbank

0 500 1,000
Feet

NOTE(S)

1. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
2. ISM SAMPLING FROM PDI WAS COMPLETED FOR ALL DECISION UNITS (DUS).

REFERENCE(S)

1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY
2. TOPOGRAPHY FROM SURVTECH 2021 AND 2022.

Figure 4. Floodplain Areas

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

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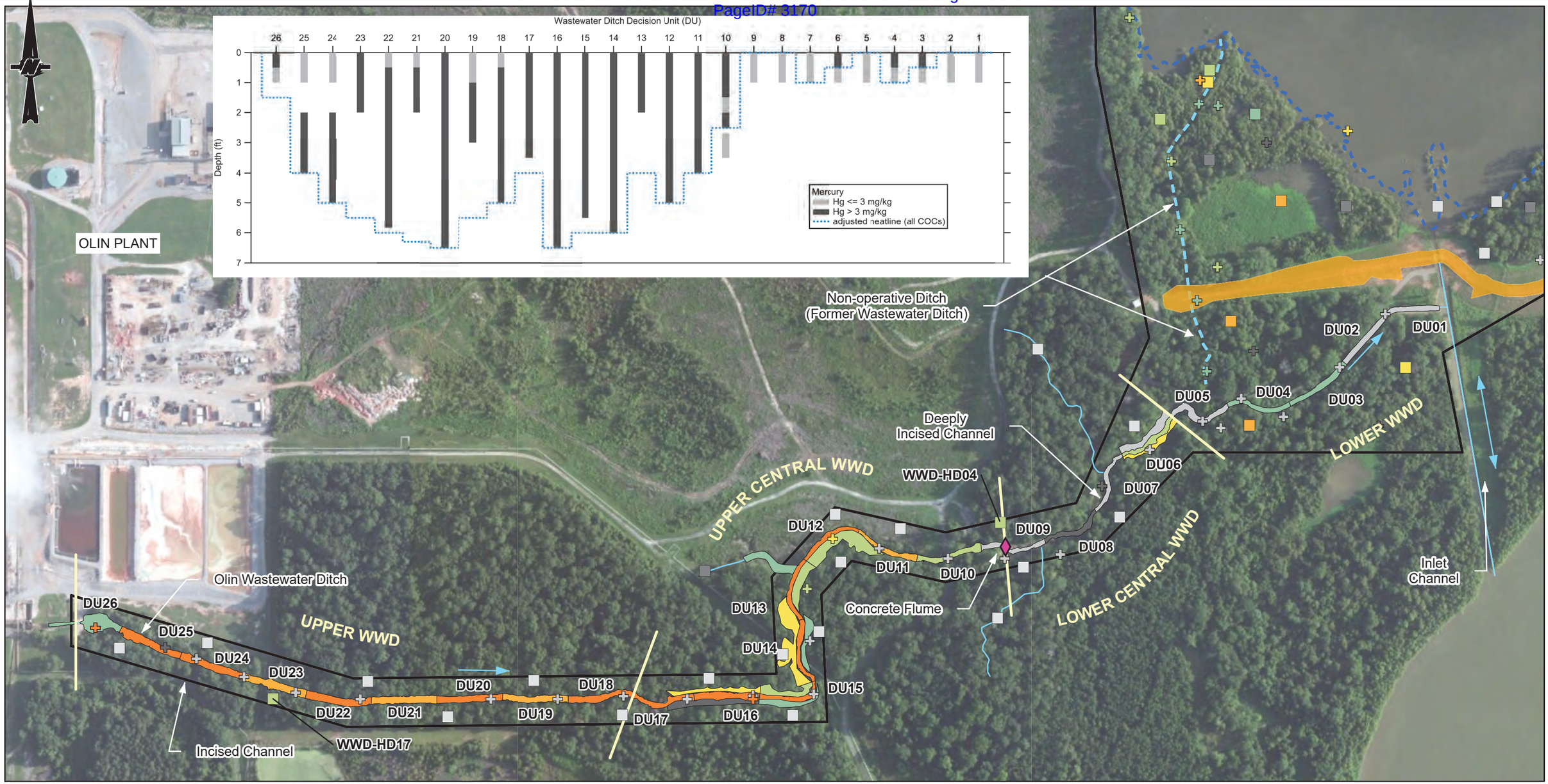


Concrete Flume
Drainage Feature
Non-operative Ditch
Wastewater Ditch Segment
3-Foot Elevation Contour (NAVD88)
OU-2 Berm Extent
Approximate OU-2 Boundary

Maximum Concentration
- 0 - 1.7 mg/kg
- >1.7 - 3 mg/kg
- >3 - 5 mg/kg
- >5 - 10 mg/kg
- >10 - 25 mg/kg
- >25 - 50 mg/kg
- > 50 mg/kg

0 300 600
Feet

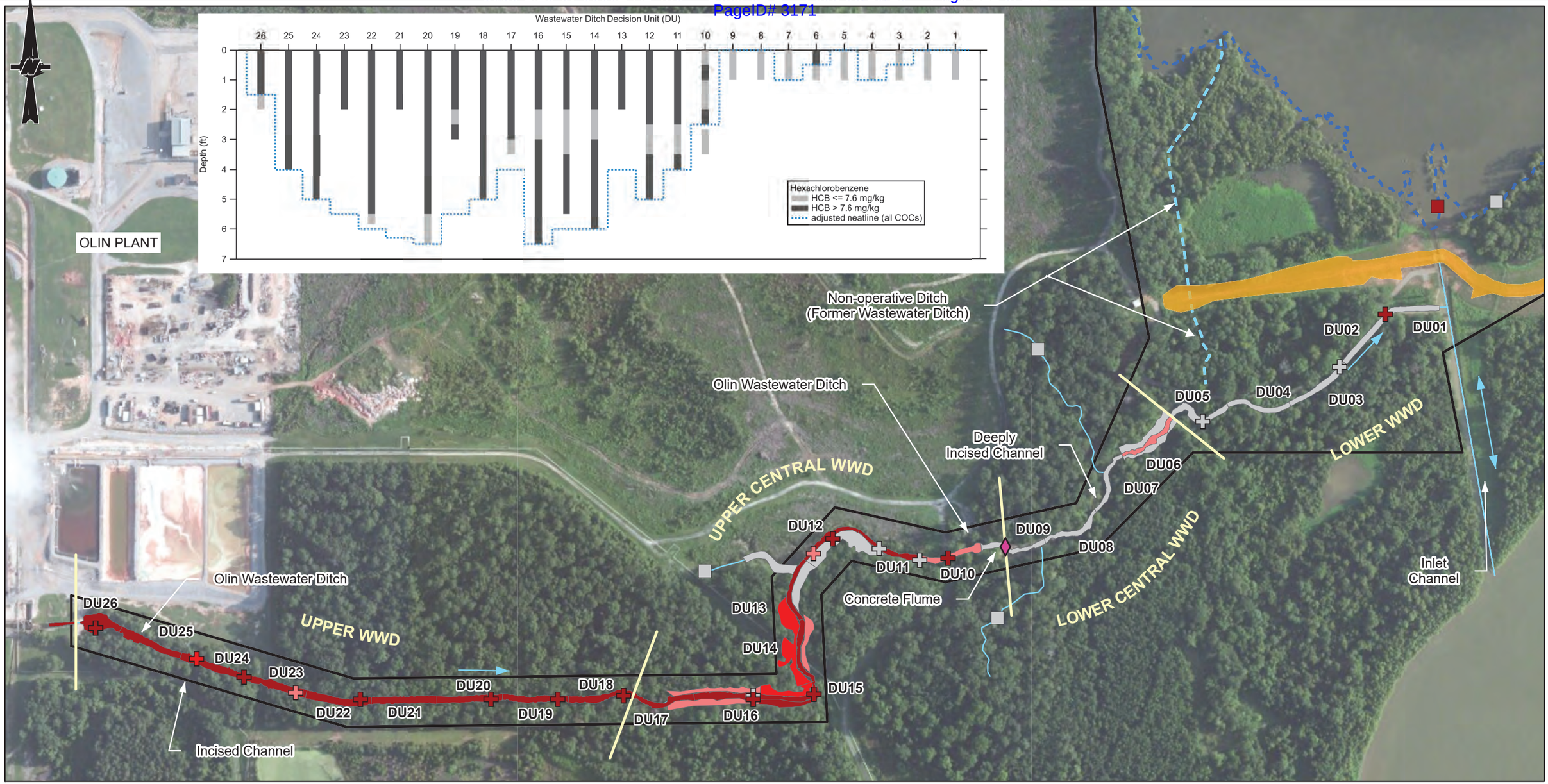
Media	COC	Cleanup Level	Units
Sediment	Mercury	3	mg/kg
Soil	Mercury	1.7	mg/kg

NOTE(S)
1. MAXIMUM CONCENTRATIONS FOR EACH LOCATION ARE FOUND FROM MAXIMUM VALUE FROM ALL INTERVALS, INCLUDING INTERVALS WITH DUPLICATE VALUES. FOR WWD DECISION UNITS (DUS) WITH DEEPER CORES FROM PDI, MAXIMUM CONCENTRATION WAS INTERPRETED AS MAXIMUM CONCENTRATION FROM ISM INTERVALS AND DEEPER CORE INTERVALS.
2. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
3. DU SAMPLE LOCATION AREAS ARE NOT SHOWN WITH SYMBOLS, BUT DU POLYGONS ARE SHOWN.
4. FLOODPLAIN SOIL DUS NOT SHOWN FOR THIS FIGURE.

REFERENCE(S)
1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 5. Maximum Mercury Concentration in the Wastewater Ditch and Overbank

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023



Concrete Flume
Drainage Feature
Non-operative Ditch
Wastewater Ditch Segment
3-Foot Elevation Contour (NAVD88)
OU-2 Berm Extent

Approximate OU-2 Boundary

Maximium Concentration

0 - 7.6 mg/kg
>7.6 - 10 mg/kg
>10 - 25 mg/kg
>25 - 50 mg/kg
> 50 mg/kg

0 300 600
Feet

Media	COC	Cleanup Level	Units
Sediment	HCB	7.6	mg/kg

NOTE(S)
1. MAXIMUM CONCENTRATIONS FOR EACH LOCATION ARE FOUND FROM MAXIMUM VALUE FROM ALL INTERVALS, INCLUDING INTERVALS WITH DUPLICATE VALUES. FOR WWD DECISION UNITS (DUS) WITH DEEPER CORES FROM PDI, MAXIMUM CONCENTRATION WAS INTERPRETED AS MAXIMUM CONCENTRATION FROM ISM INTERVALS AND DEEPER CORE INTERVALS.
2. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
3. DU SAMPLE LOCATION AREAS ARE NOT SHOWN WITH SYMBOLS, BUT DU POLYGONS ARE SHOWN.
4. FLOODPLAIN SOIL DUS NOT SHOWN FOR THIS FIGURE.
5. HCB RESULTS FOR SOILS ARE NOT SHOWN, DUE TO ABSENCE OF CUL.

REFERENCE(S)
1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 6. Maximum HCB Concentration in the Wastewater Ditch and Overbank

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

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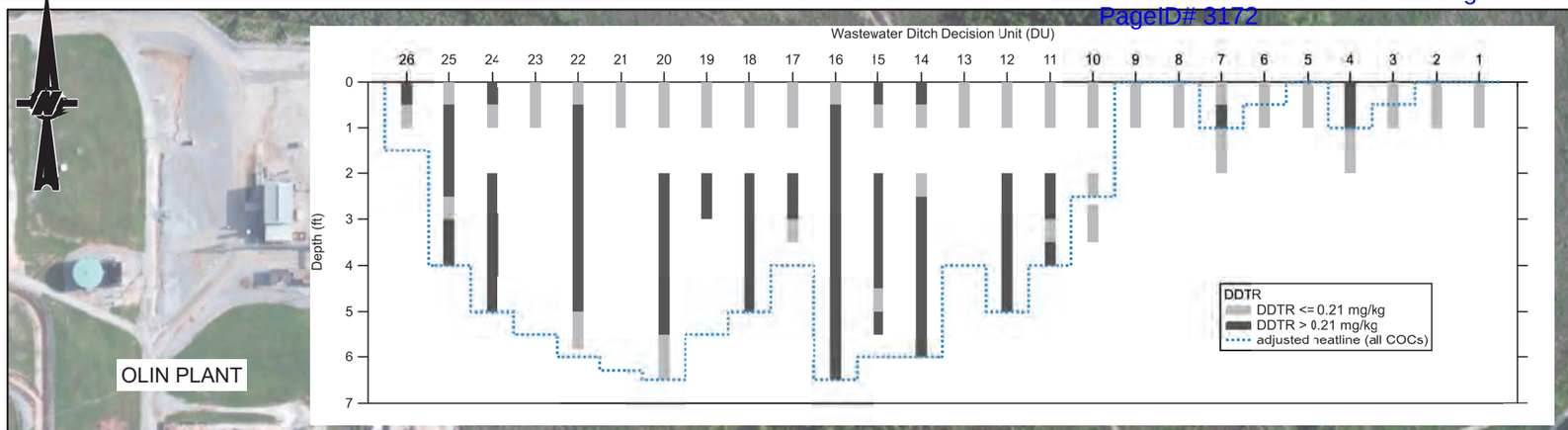

OLIN PLANT

Non-operative Ditch
(Former Wastewater Ditch)

Olin Wastewater Ditch

UPPER CENTRAL WWD

LOWER CENTRAL WWD

LOWER WWD

UPPER WWD

DU01 DU02 DU03 DU04 DU05 DU06 DU07 DU08 DU09 DU10 DU11 DU12 DU13 DU14 DU15 DU16 DU17 DU18 DU19 DU20 DU21 DU22 DU23 DU24 DU25 DU26

Concrete Flume

Inlet Channel

Olin Wastewater Ditch

Incised Channel

DDTr Location
Concrete Flume
Drainage Feature
Non-operative Ditch
Wastewater Ditch Segment

3-Foot Elevation Contour (NAVD88)
OU-2 Berm Extent
Approximate OU-2 Boundary

Maximum Concentration
0 - 0.21 mg/kg
>0.21 - 0.63 mg/kg
>0.63 - 2 mg/kg
>2 - 5 mg/kg
>5 - 10 mg/kg
>10 - 25 mg/kg
>25 mg/kg

0 300 600
Feet

Media	COC	Cleanup Level	Units
Sediment	DDTR	0.21	mg/kg
Soil	DDTR	0.631	mg/kg

NOTE(S)
1. MAXIMUM CONCENTRATIONS FOR EACH LOCATION ARE FOUND FROM MAXIMUM VALUE FROM ALL INTERVALS, INCLUDING INTERVALS WITH DUPLICATE VALUES. FOR WWD DECISION UNITS (DUS) WITH DEEPER CORES FROM PDI, MAXIMUM CONCENTRATION WAS INTERPRETED AS MAXIMUM CONCENTRATION FROM ISM INTERVALS AND DEEPER CORE INTERVALS.
2. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
3. DU SAMPLE LOCATION AREAS ARE NOT SHOWN WITH SYMBOLS, BUT DU POLYGONS ARE SHOWN.
4. FLOODPLAIN SOIL DUS NOT SHOWN FOR THIS FIGURE.
5. THE DDTR VALUES SHOWN ARE CALCULATED AS THE SUM OF 2,4' & 4,4' ISOMERS OF DDT, DDD AND DDE (USING 1/2 THE REPORTING LIMIT FOR ND)
6. FOR SELECT SAMPLES 2,4' ISOMERS WERE NOT ANALYZED FOR A SET OF HISTORICAL SAMPLES, AND DDTR RESULTS (SUM OF 4,4' ISOMERS OF DDT, DDD AND DDE (USING 1/2 THE DETECTION LIMIT FOR ND) ARE SHOWN. SEE YELLOW PRE-PDI SAMPLE.

REFERENCE(S)
1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 7. Maximum DDTR Concentration in the Wastewater Ditch and Overbank

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

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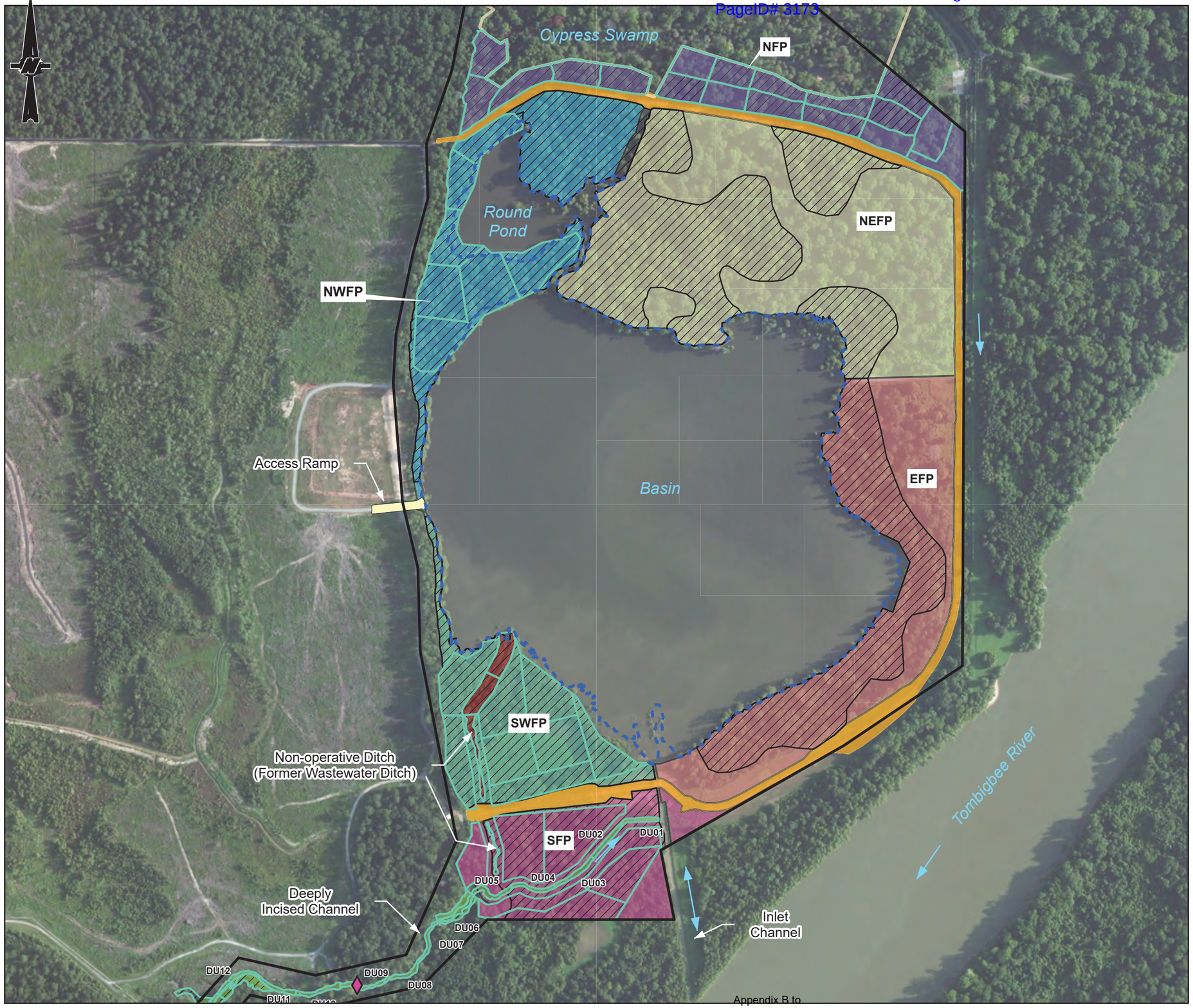

- 3-Foot Elevation Contour (NAVD88)
- Access Ramp
- Estimated Remedial Footprint (The extent of the remedial footprint may expand)
- Existing Sand Cover at Ciba-Geigy Superfund Site OU-3 (Cypress Swamp)
- ISM Decision Unit
- OU-2 Berm Extent
- Approximate OU-2 Boundary

Approximate Floodplain Areas

- EFP - East Floodplain
- NEFP - Northeast Floodplain
- NFP - North Floodplain
- NOD - Non-operative Ditch Floodplain
- NWFP - Northwest Floodplain
- SFP - South Floodplain
- SWFP - Southwest Floodplain
- Wastewater Ditch (WWD) and Overbank
- Concrete Flume

0 400 800
Feet

NOTE(S)

1. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
2. ISM SAMPLING FROM PDI WAS COMPLETED FOR ALL DECISION UNITS (DUS).
3. ISM SAMPLE LOCATION AREAS ARE NOT SHOWN WITH SYMBOLS, BUT DU POLYGONS ARE SHOWN.
4. RESULTS OF PDI TREATABILITY SAMPLES WERE NOT USED TO ESTIMATE REMEDIAL FOOTPRINT AREAS (SHOWN FOR REFERENCE ONLY).
5. METHODS FOR ESTIMATION OF REMEDIAL FOOTPRINT AREAS ARE ADDRESSED IN APPENDIX C.
6. THE OU-2 FLOODPLAIN DATASET INCLUDED SOIL SAMPLES AND NEARSHORE SEDIMENTS (WITHIN 10-FOOT BUFFER OF THE 3-FOOT NAVD88 ELEVATION CONTOUR). FLOODPLAIN BOUNDARIES EXCLUDED AREAS WITHIN BASIN SEDIMENT DUS ESTABLISHED IN THE PDI (I.E., THE SOUTHWEST AND SOUTHEAST AREAS OF BASIN). FOR THESE REASONS, SOME DISCRETE SOIL SAMPLE LOCATIONS USED WITHIN THE FLOODPLAIN DATASET WERE LOCATED OUTSIDE THE FLOODPLAIN AND IMPACTED FOOTPRINTS, BUT WITHIN THE 10-FOOT BUFFER.

REFERENCE(S)

1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 8. Estimated Remedial Footprint in Floodplains

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

- Concrete Flume
- 3-Foot Elevation Contour (NAVD88)
- Drainage Feature
- Non-operative Ditch
- Wastewater Ditch Segment
- Estimated Remedial Footprint
- ISM Decision Unit
- OU-2 Berm Extent
- Approximate OU-2 Boundary

0 300 600
Feet

NOTE(S)
1. ISM = ASSESSED USING AN INCREMENTAL SAMPLING METHODOLOGY (ISM) APPROACH.
2. ISM SAMPLING FROM PDI WAS COMPLETED FOR ALL DECISION UNITS (DUS).
3. ISM SAMPLE LOCATION AREAS ARE NOT SHOWN WITH SYMBOLS, BUT DU POLYGONS ARE SHOWN.
4. FLOODPLAIN SOIL DUS NOT SHOWN FOR THIS FIGURE

REFERENCE(S)
1. SERVICE LAYER CREDITS: WORLD IMAGERY (CLARITY): SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, IGN, AND THE GIS USER COMMUNITY

Figure 9. Estimated Remedial Footprint in the Wastewater Ditch and Overbank

Source: Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains – November 2023

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

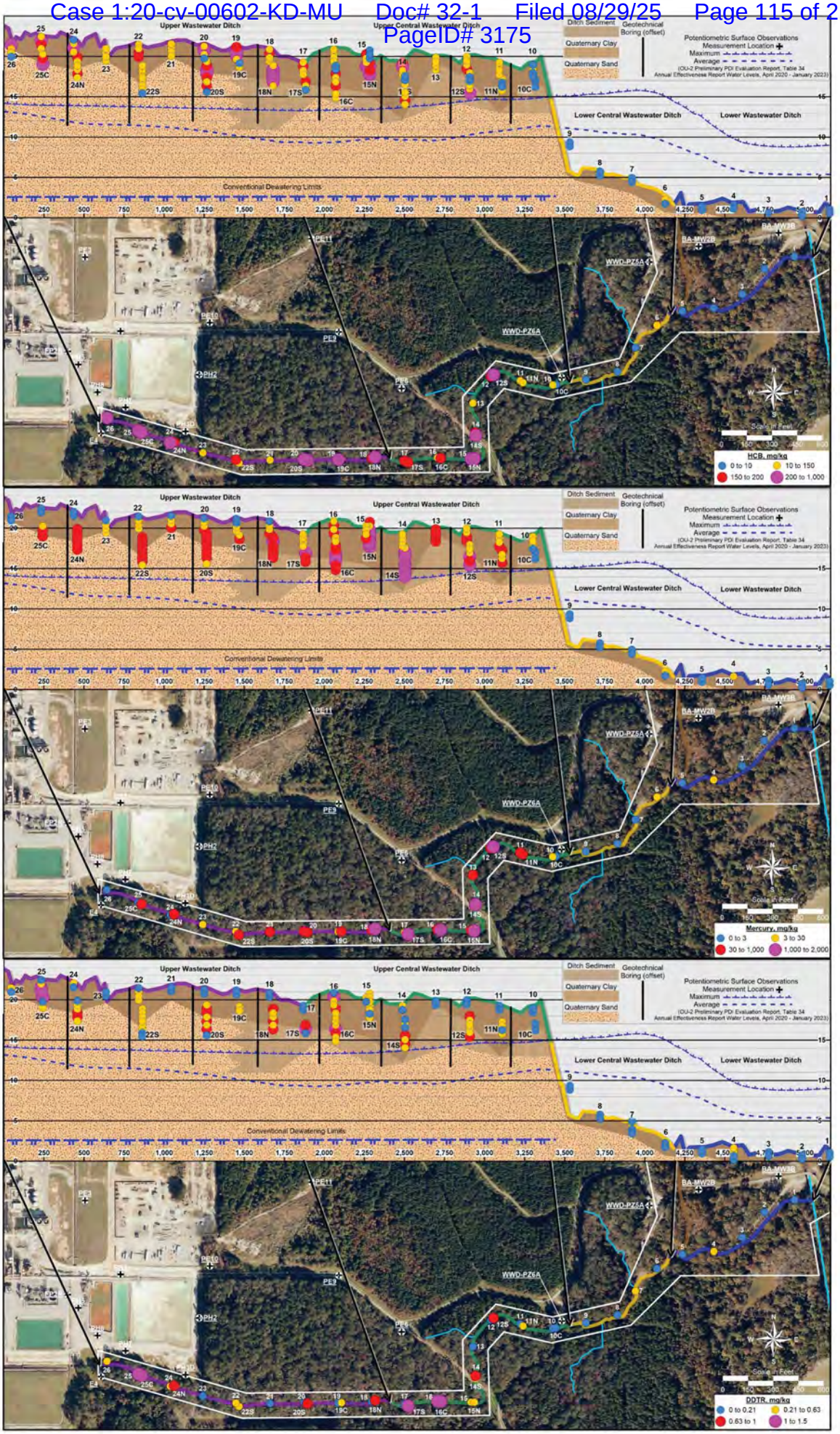

Figure 10. Wastewater Ditch Contamination and Potentiometric Surface Observations.

TABLES

NOTICE

Data are used for reference purposes only. U.S. EPA makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained in these tables.

Table 1: Summary of OU-2 Cleanup Levels

Media	COC	Cleanup Level	Units [1]	Basis	Notes
Sediments[2]	Mercury	3	mg/kg	Risk Assessment	-
	HCB	7.6	mg/kg		-
	DDTR	0.21	mg/kg		-
Floodplain Soils[2]	Mercury	1.7	mg/kg	Risk Assessment	-
	DDTR	0.63	mg/kg		-
Surface Water	HCB	0.0002 [3]	µg/L	ARAR	Alabama Surface Water Criteria
	4,4′-DDD	0.0002 [3]	µg/L		
	4,4′-DDE	0.0001 [3]	µg/L		
	4,4′-DDT	0.0001 [3]	µg/L		
	4.4-DDT	0.001 [4]	µg/L		
	Mercury (dissolved)	0.012 [4]	µg/L		
	Mercury (dissolved)	0.042 [5]	µg/L		
Fish Tissue	Mercury	0.2 0.3 0.28	mg/kg mg/kg mg/kg	Risk Assessment	Mosquitofish - whole body Largemouth bass - filet Largemouth bass - whole body
	DDTR	0.23 0.64	mg/kg mg/kg		Mosquitofish - whole body Largemouth bass - whole body

Notes:

1. mg/kg - milligram(s)/kilogram, µg/L - microgram(s)/liter.

2. CULs for sediments and floodplain soils are applied on a point-by-point basis (i.e., composites, grabs, and increments).The Site is divided into DUs where representative sampling, such as incremental sampling methodology (ISM), is applied for remedy decision-making. The existing decision units that have exceeded CULs will be remediated. Additional sampling using DUs may be needed to confirm clean boundaries at certain locations.

3. As calculated by Eq. 19 specified in ADEM Admin. Code r. 335-6-10-.07(1)(d)(2)(ii), relating to calculation of human health criteria for consumption of fish only for those toxic pollutants classified by EPA as carcinogens, applicable to all waters of the State of Alabama. See ADEM Admin. Code r. 335-6-10-.07(1)(e).

4. This is the chronic freshwater criteria for protection of aquatic life. The value shown for 4,4′-DDT applies to DDT and its six metabolites (i.e., the total concentration of DDT and its six metabolites should not exceed this value).

5. As calculated by Eq. 17 specified in ADEM Admin. Code r. 335-6-10-.07(1)(d)(1)(ii), relating to calculation of human health criteria for consumption of fish only for those toxic pollutants classified by EPA as non-carcinogens, applicable to all waters of the State of Alabama. See ADEM Admin. Code r. 335-6-10-.07(1)(e).

Table 1a. COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors

Exposure Medium	COC	Protective Level	Units	Basis	Assessment Endpoint
Sediment	Mercury	1.6 to 10.7	mg/kg	Lower end of range based on geometric mean of NOAEL and LOAEL RGs for little blue heron derived using sediment to fish BSAF uptake model. Upper end of range based on NOAEL RG derived from SERAFM mercury uptake model.	Protection of piscivorous birds (little blue heron)
	HCB	7.6	mg/kg	NOAEL	Protection of piscivorous mammals (mink)
	DDTR	0.21 (protection of predatory fish) 0.32 – 0.91 (protection of piscivorous birds) 0.63 (protection of forage fish)	mg/kg	Predatory fish goal based on sediment concentration resulting in biomagnification into piscivorous fish exceeding the 10th percentile LER fish tissue protective goal. Range of goals based on protection of piscivorous birds ingesting fish at OU-2. Forage fish goal based on sediment concentration resulting in forage fish tissue concentration exceeding the 10th percentile LER fish protective level.	Protection of fish. Protection of piscivorous birds (little blue heron and great blue heron)
Floodplain Soil	Mercury	0.54 – 1.9	mg/kg	RG range based on NOAEL PRG for Carolina wren modeled with varying diets of different invertebrate types.	Protection of terrestrial insectivorous birds
	DDTR	0.18 – 1.12	mg/kg	RG range based on geometric mean of NOAL and LOAEL PRGs for Carolina wren modeled with varying diets of different invertebrate types.	Protection of terrestrial insectivorous birds
Fish Tissue (forage fish)	Mercury	0.20 – 0.28	mg/kg	Lower end of range represents piscivorous bird goal based on geometric mean of NOAEL and LOAEL PRGs for little blue heron. Upper end of range represents 10th percentile value protective of fish.	Protection of fish and piscivorous birds
	DDTR	0.23 (protection of predatory fish) 0.42 – 0.52 (protection of piscivorous birds)	mg/kg	Low value (0.23) represents forage fish concentration resulting in biomagnification into bass tissue equal to fish tissue protective level for bass. Piscivorous bird range based on protection of birds using the geometric mean of the NOAEL and LOAEL.	Protection of fish and protection of piscivorous birds (little blue heron and great blue heron)
Fish Tissue (Large Mouth Bass)	Mercury	0.28 (Predatory Fish RG for fish protection – whole body) 0.43 (Predatory Fish RG for piscivorous eating birds – whole body) 0.3 (Predatory Fish human health RG - filets)	mg/kg	Fish protection goal based on t-TEL from Beckvar et al, 2005) Piscivorous bird goal based on geometric mean of NOAEL and LOAEL RGs for great blue heron. Human health goal is ARAR for human consumption.	Protection of fish and protection of piscivorous birds (little blue heron and great blue heron). Protection of human health.
	DDTR	0.64	mg/kg	Fish protection goal based on t-TEL from Beckvar et al, 2005)	Protection of Fish

Table 2: Summary of PDI Sampling Depths and Analytical Results for COCs

Floodplain or Wastewater Ditch Unit	Decision Unit (DU) or Location ID	Sample Date	Longitude	Latitude	Sample Matrix	Sampling Method	Sampled depth (ft)	Neatline depth (ft)	*Maximum Concentration (mg/kg)*			*Concentration at Deepest Sample Interval (mg/kg)*		
									Hg	HCB	DDTR	Hg	HCB	DDTR
Northwest Floodplain (NWFP)	FPRP-DU01	3/10/2022	-87.99081	31.268077	Soil	ISM	0.5	0.5	2.1	0.0047	6.93	2.1	0.0047	6.93
	FPRP-DU02	3/10/2022	-87.99012	31.268765	Soil	ISM	0.5	0.5	3.6	0.011	5.89	3.6	0.011	5.89
	FPRP-DU03	3/16/2022	-87.99077	31.268665	Soil	ISM	0.5	0.5	3.4	0.023	33.01	3.4	0.023	33.01
	FPRP-DU04	3/13/2022	-87.99069	31.269312	Soil	ISM	0.5	0.5	11	0.017	5.66	11	0.017	5.66
	FPRP-DU05	3/10/2022	-87.98938	31.269036	Soil	ISM	0.5	0.5	8.3	0.025	0.787	8.3	0.025	0.787
	FPRP-DU06	2/18/2022	-87.99059	31.270058	Soil	ISM	0.5	0.5	0.24	0.0029	104	0.24	0.0029	104
	FPRP-DU07	3/15/2022	-87.99013	31.270578	Soil	ISM	0.5	0.5	2.6	0.0038	119	2.6	0.0038	119
	HRC18-RP	11/8/2022	-87.989615	31.2702902	Soil	Single Core	2.0	1.0	3.9	0.039	1.29	1.2	0.024	0.0156
	HRC06-RPFP	3/29/2022	-87.990536	31.2687826	Soil	Single Core	2.0	0.8	3.7	0.033	6.18	0.35	0.015	0.0616
	HRC20-RPFP	11/2/2022	-87.9880051	31.2705545	Soil	Single Core	1.5	1.0	0.64	0.024	1.56	0.11	NA	NA
	PD-NEFP01	4/4/2022	-87.988898	31.2707208	Soil	Composite	1.0	1.0	26	0.029	12.9	3	NA	1.09
	PD-RP02	3/24/2022	-87.989494	31.2700905	Soil	Composite	0.5	0.5	1.7	0.05	0.981	1.7	0.05	0.981
	PD-RP03	3/24/2022	-87.988588	31.270094	Soil	Composite	0.5	0.5	6.3	0.049	1.4	6.3	0.049	1.4
	PD-RP08	3/24/2022	-87.990799	31.2689128	Soil	Composite	0.5	0.5	1.3	0.067	2.02	1.3	0.067	2.02
	PD-RP09	3/24/2022	-87.98994	31.2689225	Soil	Composite	0.5	No Impact	0.87	0.041	0.461	0.87	0.041	0.461
	PD-RP10	3/24/2022	-87.989125	31.2691451	Soil	Composite	0.5	0.5	1.9	0.056	0.584	1.9	0.056	0.584
North Floodplain (NFP)	NFP-DU01	5/30/2023	-87.9901158	31.2715721	Soil	ISM	1.0	1.0	0.7	0.014	143	0.11	0.014	45.4
	NFP-DU02	5/30/2023	-87.9902564	31.2710214	Soil	ISM	1.0	1.0	0.75	0.014	101	0.45	0.0092	23.2
	NFP-DU03	5/31/2023	-87.9896297	31.2712154	Soil	ISM	1.0	1.0	0.51	0.016	11.3	0.22	0.014	5.72
	NFP-DU04	5/31/2023	-87.9888361	31.2713676	Soil	ISM	1.0	1.0	1.4	0.015	1.46	0.95	0.015	1.46
	NFP-DU05	6/2/2023	-87.9881744	31.2712843	Soil	ISM	1.0	1.0	1.7	0.017	1.41	1.7	0.016	1.41
	NFP-DU06	6/5/2023	-87.9871842	31.2714791	Soil	ISM	1.0	No Impact	0.64	0.017	0.532	0.64	0.015	0.532
	NFP-DU07	6/5/2023	-87.9873443	31.2711804	Soil	ISM	1.0	0.5	1.5	0.018	0.88	1.5	0.017	0.51
	NFP-DU08	6/6/2023	-87.9866355	31.2713621	Soil	ISM	1.0	1.0	0.55	0.0099	0.657	0.12	0.0099	0.657
	NFP-DU09	6/7/2023	-87.9867372	31.2710834	Soil	ISM	1.0	No Impact	0.92	0.017	0.302	0.92	0.016	0.302
	NFP-DU10	6/13/2023	-87.9859969	31.2712068	Soil	ISM	1.0	1.0	2.8	0.018	13.1	0.62	0.016	0.695
	NFP-DU11	6/13/2023	-87.9860432	31.2709725	Soil	ISM	1.0	0.5	1.4	0.018	1.41	0.37	0.016	0.476
	NFP-DU12	6/14/2023	-87.9850560	31.2709942	Soil	ISM	1.0	1.0	0.87	0.017	2.97	0.71	0.016	0.834
	NFP-DU13	6/14/2023	-87.9851914	31.2707985	Soil	ISM	1.0	0.5	0.83	0.016	1.27	0.19	0.015	0.32
	NFP-DU14	6/15/2023	-87.9842078	31.2711214	Soil	ISM	1.0	1.0	0.9	0.019	3.41	0.9	0.017	2.49
	NFP-DU15	6/15/2023	-87.9843307	31.2708424	Soil	ISM	1.0	1.0	0.97	0.018	1.74	0.71	0.016	0.827
	NFP-DU16	6/6/2023	-87.9844259	31.2705737	Soil	ISM	1.0	No Impact	0.34	0.0099	0.16	0.34	0.0099	0.16
	NFP-DU17	6/7/2023	-87.9837813	31.2706323	Soil	ISM	1.0	No Impact	0.33	0.023	0.0552	0.14	0.023	0.0552
	NFP-DU18	6/8/2023	-87.9835571	31.2703409	Soil	ISM	1.0	No Impact	0.094	0.013	0.0927	0.07	0.013	0.0572
	HRC01-RPFP	3/31/2022	-87.987909	31.2705127	Soil	Single Core	2.0	1.0	2.7	0.031	2.88	0.1	0.014	0.0209
	HRC02-RPFP	3/30/2022	-87.987457	31.2690687	Soil	Single Core	2.0	1.0	10.1	0.045	0.356	1	0.016	0.0114
	HRC03-BAFP	3/31/2022	-87.984725	31.2681972	Soil	Single Core	2.0	2.0	13.8	0.044	6.4	1.1	0.02	0.813
	HRC21-RPFP	11/2/2022	-87.9863774	31.2686708	Soil	Single Core	2.0	No Impact	0.68	0.02	0.203	0.063	0.014	0.000832
	PD-BA002	3/21/2022	-87.98858	31.2685388	Soil	Composite	0.5	0.5	2.6	0.027	0.214	2.6	0.027	0.214
	PD-BA005	3/21/2022	-87.987202	31.2681715	Soil	Composite	0.5	0.5	8.9	0.046	0.338	8.9	0.046	0.338
	PD-BA008	3/21/2022	-87.985034	31.2684874	Soil	Composite	0.5	0.5	3.3	0.045	0.397	3.3	0.045	0.397
	PD-BA014	3/21/2022	-87.984955	31.267775	Soil	Composite	0.5	0.5	2.7	0.023	0.457	2.7	0.023	0.457
	PD-NEFP02	4/6/2022	-87.985428	31.2701394	Soil	Composite	1.0	1.0	3.9	0.021	0.574	3.9	NA	NA
	PD-NEFP03	4/7/2022	-87.984625	31.2699964	Soil	Composite	0.5	No Impact	0.56	0.027	0.535	0.56	0.027	0.535
	PD-NEFP04	4/7/2022	-87.983793	31.2699145	Soil	Composite	0.5	No Impact	0.18	0.025	0.223	0.18	0.025	0.223
	PD-NEFP05	4/6/2022	-87.985898	31.2696379	Soil	Composite	0.5	No Impact	1.3	0.02	0.471	1.3	0.02	0.471
	PD-NEFP06	4/7/2022	-87.983856	31.26942	Soil	Composite	0.5	No Impact	0.046	0.016	0.0116	0.046	0.016	0.0116
	PD-NEFP07	4/4/2022	-87.987487	31.269434	Soil	Composite	1.0	1.0	7.1	0.026	1.14	2.5	NA	0.797
	PD-NEFP08	4/4/2022	-87.986774	31.2693233	Soil	Composite	1.0	1.0	4.3	0.027	0.47	4.3	NA	NA
	PD-NEFP09	4/6/2022	-87.986093	31.2691703	Soil	Composite	0.5	0.5	1.4	0.026	0.655	1.4	0.026	0.655
	PD-NEFP10	4/7/2022	-87.984921	31.2692887	Soil	Composite	0.5	No Impact	0.92	0.033	0.24	0.92	0.033	0.24

Table 2: Summary of PDI Sampling Depths and Analytical Results for COCs

Floodplain or Wastewater Ditch Unit	Decision Unit (DU) or Location ID	Sample Date	Longitude	Latitude	Sample Matrix	Sampling Method	Sampled depth (ft)	Neatline depth (ft)	*Maximum Concentration (mg/kg)*			*Concentration at Deepest Sample Interval (mg/kg)*		
									Hg	HCB	DDTR	Hg	HCB	DDTR
Northeast Floodplain (NEFP)	PD-NEFP11	4/7/2022	-87.984297	31.269108	Soil	Composite	0.5	No Impact	0.45	0.026	0.0722	0.45	0.026	0.0722
	PD-NEFP12	4/6/2022	-87.987147	31.2688437	Soil	Composite	1.0	1.0	5.5	0.026	2.15	3.3	NA	1.7
	PD-NEFP13	4/7/2022	-87.983665	31.2688151	Soil	Composite	0.5	No Impact	0.044	0.019	0.00768	0.044	0.019	0.00768
	PD-NEFP14	4/6/2022	-87.984511	31.2686642	Soil	Composite	0.5	No Impact	0.84	0.019	0.123	0.84	0.019	0.123
	PD-NEFP15	4/6/2022	-87.984192	31.2682789	Soil	Composite	0.5	No Impact	0.39	0.023	0.1	0.39	0.023	0.1
	PD-NEFP16	4/7/2022	-87.983649	31.2683151	Soil	Composite	0.5	No Impact	0.068	0.021	0.00884	0.068	0.021	0.00884
	PD-NEFP17	4/6/2022	-87.9837	31.267792	Soil	Composite	0.5	No Impact	0.044	0.018	0.00804	0.044	0.018	0.00804
	PD-RP04	3/24/2022	-87.987768	31.2700238	Soil	Composite	0.5	No Impact	0.7	0.047	0.337	0.7	0.047	0.337
	PD-RP06	3/24/2022	-87.98819	31.2696578	Soil	Composite	0.5	0.5	5	0.045	1.09	5	0.045	1.09
	PD-RP12	3/24/2022	-87.988166	31.2692714	Soil	Composite	0.5	No Impact	0.63	0.048	0.207	0.63	0.048	0.207
	PD-NEFP18	11/30/2022	-87.9875644	31.270443	Soil	Composite	1.0	0.5	0.98	0.015	1.94	0.98	0.015	0.226
	PD-NEFP19	11/30/2022	-87.9871803	31.2707409	Soil	Composite	1.0	No Impact	0.35	0.015	0.149	0.18	0.015	0.0303
	PD-NEFP20	11/30/2022	-87.9870986	31.2698788	Soil	Composite	1.0	No Impact	0.68	0.015	0.4	0.68	0.015	0.115
	PD-NEFP21	11/30/2022	-87.9867018	31.2703226	Soil	Composite	1.0	No Impact	0.67	0.015	0.289	0.67	0.015	0.289
	PD-NEFP22	11/30/2022	-87.9862234	31.2705833	Soil	Composite	1.0	No Impact	0.2	0.015	0.293	0.11	0.015	0.293
	PD-NEFP23	11/30/2022	-87.9864028	31.2697377	Soil	Composite	1.0	1.0	0.69	0.017	1.3	0.69	0.016	1.3
	PD-NEFP24	11/30/2022	-87.9858774	31.2702041	Soil	Composite	1.0	No Impact	1.2	0.016	0.532	1.2	0.016	0.532
	PD-NEFP25	11/30/2022	-87.9854942	31.2704416	Soil	Composite	1.0	1.0	0.33	0.015	0.904	0.33	0.014	0.904
	PD-NEFP26	11/30/2022	-87.9855001	31.2694315	Soil	Composite	1.0	No Impact	0.2	0.015	0.099	0.2	0.015	0.00893
	PD-NEFP27	11/30/2022	-87.9854336	31.2690116	Soil	Composite	1.0	No Impact	1.3	0.015	0.182	1.3	0.015	0.0533
	PD-NEFP28	11/30/2022	-87.9849177	31.2688035	Soil	Composite	1.0	No Impact	0.37	0.015	0.0983	0.37	0.011	0.00963
	PD-NEFP29	12/1/2022	-87.9857405	31.2686124	Soil	Composite	1.0	No Impact	0.92	0.038	0.0401	0.92	0.018	0.0209
	PD-NEFP30	12/1/2022	-87.9874117	31.2684504	Soil	Composite	1.0	No Impact	0.24	0.07	0.0416	0.21	0.031	0.00523
	PD-NEFP31	12/1/2022	-87.9865141	31.2688528	Soil	Composite	1.0	No Impact	0.92	0.058	0.12	0.92	0.058	0.12
East Floodplain (EFP)	HRC04-BAFP	3/31/2022	-87.984638	31.2667811	Soil	Single Core	2.0	2.0	11.6	0.029	0.845	3.1	0.017	0.572
	HRC07-BAFP	3/30/2022	-87.985659	31.2634847	Soil	Single Core	2.0	1.3	18	0.05	32.4	0.12	0.014	0.00106
	PD-BA022	3/21/2022	-87.984491	31.2673795	Soil	Composite	0.5	No Impact	0.53	0.035	0.0402	0.53	0.035	0.0402
	PD-BA028	3/23/2022	-87.984941	31.266989	Soil	Composite	0.5	No Impact	1.3	0.03	0.0526	1.3	0.03	0.0526
	PD-BA040	3/23/2022	-87.984947	31.2662198	Soil	Composite	0.5	No Impact	1.2	0.028	0.0571	1.2	0.028	0.0571
	PD-BA048	3/24/2022	-87.984493	31.2658327	Soil	Composite	0.5	0.5	1.8	0.029	0.104	1.8	0.029	0.104
	PD-BA049	3/24/2022	-87.98395	31.2658929	Soil	Composite	0.5	No Impact	0.18	0.021	0.0121	0.18	0.021	0.0121
	PD-BA071	5/23/2023	-87.984034	31.264668	Soil	Composite	0.5	No Impact	1.3	0.022	0.0484	1.3	0.022	0.0484
	PD-BA078	5/23/2023	-87.984485	31.2642775	Soil	Composite	0.5	0.5	2	0.078	0.216	2	0.078	0.216
	PD-BA085	3/22/2022	-87.984935	31.263887	Soil	Composite	0.5	No Impact	1.7	0.04	0.0655	1.7	0.04	0.0655
	PD-BA089	3/21/2022	-87.986291	31.2634932	Soil	Composite	0.5	0.5	2.7	0.049	0.115	2.7	0.049	0.115
	PD-BA092	3/21/2022	-87.986742	31.2631026	Soil	Composite	0.5	0.5	2.7	0.051	0.0908	2.7	0.051	0.0908
	PD-BA093	3/21/2022	-87.985837	31.2631061	Soil	Composite	0.5	No Impact	1.4	0.065	0.0619	1.4	0.065	0.0619
	PD-BA094	3/21/2022	-87.987192	31.2627121	Soil	Composite	0.5	No Impact	0.069	0.045	0.101	0.069	0.045	0.101
	PD-BA095	3/21/2022	-87.986427	31.2628358	Soil	Composite	0.5	No Impact	0.64	0.026	0.0455	0.64	0.026	0.0455
	PD-SEFP01	11/30/2022	-87.9835786	31.2654061	Soil	Composite	1.0	No Impact	0.13	0.045	0.00786	0.13	0.017	0.00786
	PD-SEFP02	11/30/2022	-87.9836867	31.2647061	Soil	Composite	1.0	No Impact	0.48	0.02	0.243	0.48	0.02	0.243
	PD-SEFP03	11/29/2022	-87.9839414	31.2641634	Soil	Composite	1.0	No Impact	0.61	0.014	0.0851	0.61	0.014	0.0851
	PD-SEFP04	11/29/2022	-87.9845315	31.2637631	Soil	Composite	1.0	No Impact	1.1	0.015	0.0984	1.1	0.015	0.0984
South Floodplain (SFP) and Non-Operative Ditch (NOD) South of OU-2 Berm														
South Floodplain (SFP)	WWFP-DU02	2/22/2022	-87.99025	31.261788	Soil	ISM	1.0	No Impact	0.35	0.11	0.177	0.24	0.04	0.114
	WWFP-DU03	5/26/2022	-87.9882	31.261865	Soil	ISM	2.0	2.0	6.3	0.32	0.489	6.3	NA	NA
	WWFP-DU05	5/25/2022	-87.98956	31.261898	Soil	ISM	2.0	2.0	84	3.6	1.52	84	NA	NA
	WWFP-DU06	4/14/2022	-87.98944	31.261237	Soil	ISM	2.0	2.0	20	3.7	0.23	14	NA	NA
	WWFP-DU07	4/13/2022	-87.98889	31.262068	Soil	ISM	2.0	2.0	57	0.41	0.335	57	NA	NA
	WWFP-DU14	11/28/2022	-87.98884617	31.26113857	Soil	ISM	1.0	1.0	29	140	0.946	29	140	0.946
	WWFP-DU15	11/28/2022	-87.988116	31.261577	Soil	ISM	1.0	1.0	0.98	0.36	1.45	0.98	0.22	1.45

Table 2: Summary of PDI Sampling Depths and Analytical Results for COCs

Floodplain or Wastewater Ditch Unit	Decision Unit (DU) or Location ID	Sample Date	Longitude	Latitude	Sample Matrix	Sampling Method	Sampled depth (ft)	Neatline depth (ft)	*Maximum Concentration (mg/kg)*			*Concentration at Deepest Sample Interval (mg/kg)*		
									Hg	HCB	DDTR	Hg	HCB	DDTR
SFP (cont'd)	WWFP-DU16	11/29/2022	-87.987751	31.261313	Soil	ISM	1.0	No Impact	0.82	0.41	0.0514	0.82	0.15	0.0321
	HRC35-WWDFP	11/1/2022	-87.9896957	31.2621233	Soil	Single Core	2.0	2.0	29	5.4	2.48	29	5.4	0.149
	HRC36-WWDFP	11/1/2022	-87.9895073	31.2612419	Soil	Single Core	1.5	1.5	39	29	1.55	34	29	0.597
	HRC37-WWDFP	11/2/2022	-87.9879681	31.2617387	Soil	Single Core	1.3	1.3	15	0.1	2.04	15	0.04	2.04
Non-operative Ditch (NOD)	WWNOD-DU05	5/24/2022	-87.99001	31.262062	Soil	ISM	2.0	0.5	5.2	8.1	0.179	NA	0.055	NA
	WWNOD-DU06	2/17/2022	-87.98995	31.261703	Soil	ISM	2.0	2.0	24	0.52	0.356	24	NA	0.178
Southwest Floodplain (SWFP) and Non-Operative Ditch (NOD) North of OU-2 Berm														
Southwest Floodplain (SWFP)	WWFP-DU01	4/12/2022	-87.99041	31.263964	Soil	ISM	2.0	2.0	73	8.8	2.44	48	NA	2.44
	WWFP-DU04	3/16/2022	-87.98906	31.263161	Soil	ISM	2.0	2.0	4.8	4.7	0.544	2.6	NA	NA
	WWFP-DU08	5/26/2022	-87.98928	31.262682	Soil	ISM	2.0	2.0	88	8.4	1.16	23	NA	0.859
	WWFP-DU09	4/11/2022	-87.98982	31.263671	Soil	ISM	2.0	2.0	49	3.6	1.09	32	NA	0.614
	WWFP-DU10	3/17/2022	-87.98843	31.263088	Soil	ISM	2.0	2.0	60	4.6	2.02	60	NA	0.576
	WWFP-DU11	3/17/2022	-87.98926	31.263741	Soil	ISM	2.0	2.0	58	67	2.47	42	NA	2.46
	WWFP-DU12	7/12/2022	-87.98977	31.263005	Soil	ISM	2.0	2.0	46	4.8	0.561	38	NA	NA
	WWFP-DU13	2/24/2022	-87.99048	31.26294	Soil	ISM	2.0	1.0	5.1	0.2	0.115	0.51	NA	NA
	SO21-SB-13	11/4/2021	-87.991129	31.266022	Soil	Soil Boring	2.0	No Impact	0.21	0.022	0.00022	0.21	0.022	0.00022
	SO21-SB-16	11/4/2021	-87.991257	31.26618	Soil	Soil Boring	2.0	No Impact	0.36	0.0039	0.00024	0.36	0.0039	0.00024
	SO21-SB-17	11/4/2021	-87.991161	31.266105	Soil	Soil Boring	2.0	No Impact	0.34	0.012	0.00023	0.34	0.012	0.00023
	SO21-SB-18	11/4/2021	-87.991047	31.266088	Soil	Soil Boring	2.0	No Impact	0.04	0.012	0.00024	0.04	0.012	0.00024
	HRC05-BAFP	3/30/2022	-87.989206	31.2631488	Soil	Single Core	2.0	2.0	44.6	25	1.31	25.1	10	0.29
	PD-BA079	3/24/2022	-87.990402	31.2638355	Soil	Composite	0.5	0.5	7.2	0.06	0.425	7.2	0.06	0.425
	PD-BA080	3/21/2022	-87.989464	31.263885	Soil	Composite	0.5	0.5	3.9	0.93	0.263	3.9	0.93	0.263
	PD-BA086	3/24/2022	-87.989914	31.2634945	Soil	Composite	0.5	0.5	2.9	0.059	0.195	2.9	0.059	0.195
	PD-BA090	3/21/2022	-87.988562	31.2631041	Soil	Composite	0.5	0.5	2.8	0.098	0.272	2.8	0.098	0.272
Non-operative Ditch (NOD)	WWNOD-DU01	6/2/2022	-87.98986	31.26425	Soil	ISM	2.0	2.0	96	1.2	1.19	47	NA	1.14
	WWNOD-DU02	6/1/2022	-87.99017	31.263755	Soil	ISM	2.0	2.0	50	0.25	0.578	50	NA	0.292
	WWNOD-DU03	6/1/2022	-87.99029	31.263234	Soil	ISM	2.0	2.0	32	1.4	1.06	32	NA	NA
	WWNOD-DU04	5/31/2022	-87.99016	31.262683	Soil	ISM	2.0	2.0	26	3.7	0.618	26	NA	NA
	HRC32-WWDFP	11/3/2022	-87.9899317	31.2641538	Soil	Single Core	2.0	2.0	14	9.7	1.31	14	9.7	0.176
	PD-BA072	3/24/2022	-87.989916	31.264257	Soil	Composite	0.5	0.5	7	0.11	0.33	7	0.11	0.33
Nearshore Sediment or Sediment DU														
Nearshore Sediment	HRC33-BAFP	11/3/2022	-87.984994	31.264296	Sediment	Single Core	2.0	0.8	10	0.038	0.233	1.1	0.018	0.00465
	HRC34-BAFP	11/2/2022	-87.9870754	31.2631508	Sediment	Single Core	2.0	No Impact	1	0.14	0.21	0.1	0.015	0.00186
	PD-BA041	3/23/2022	-87.990829	31.2658087	Sediment	Composite	0.5	0.5	5.4	0.037	1.04	5.4	0.037	1.04
Samples Located in Sediment DUs	PD-BA091	3/21/2022	-87.987657	31.2631076	Sediment	Composite	0.5	0.5	1.3	67	0.0787	1.3	67	0.0787
	HRC27-BA	11/10/2022	-87.9842971	31.2651052	Sediment	Single Core	2.0	2.0	14	0.031	2.7	11	0.015	1.19
	PD-BA056*	3/24/2022	-87.984228	31.2654426	Soil	Composite	0.5	No Impact	1.1	0.024	0.116	1.1	0.024	0.116
Wastewater Ditch (WWD)														
Lower WWD	WWD-DU01	2/2/2022	-87.98788	31.262247	Sediment	ISM	1.0	No Impact	0.82	0.48	0.0175	0.82	0.085	0.0175
	WWD-DU02	2/2/2022	-87.98837	31.261974	Sediment	ISM	1.0	No Impact	0.85	0.26	0.0316	0.78	0.16	0.0262
	WWD-DU03	2/1/2022	-87.98883	31.261559	Sediment	ISM	1.0	0.5	3.7	2.2	0.102	2.2	0.24	0.0481
	WWD-DU04	2/1/2022	-87.98941	31.2614	Sediment	ISM	2.0	1.0	4.8	2.1	0.409	NA	NA	0.106
	WWD-DU05	2/1/2022	-87.98997	31.261283	Sediment	ISM	1.0	No Impact	0.75	0.37	0.0466	0.75	0.37	0.0466
Lower Central WWD	WWD-DU06	2/8/2022	-87.99049	31.261114	Sediment	ISM	1.0	0.5	9.9	12	0.0948	1.2	0.94	0.0029
	WWD-DU07	2/8/2022	-87.9909	31.260745	Sediment	ISM	2.0	1.0	1.4	0.79	0.262	NA	NA	0.01
	WWD-DU08	2/8/2022	-87.9912	31.260324	Sediment	ISM	1.0	No Impact	3	4.3	0.0224	2	4.3	0.0224
	WWD-DU09	2/9/2022	-87.99182	31.260171	Sediment	ISM	1.0	No Impact	1.6	0.79	0.0134	1.6	0.54	0.0134
	WWD-DU10	1/25/2022	-87.99247	31.26013	Sediment	ISM	2.0	1.5	6.2	13	0.0533	1.3	2.5	NA
	WWD-DU10-C	12/1/2022	-87.99241	31.260136	Sediment	Single Core	3.5	2.5	4.5	17	0.0593	0.1	0.6	0.00024
	WWD-DU11	1/25/2022	-87.99308	31.260159	Sediment	ISM	2.0	2.0	44	37	0.164	44	37	NA
	WWD-DU11-N	11/28/2022	-87.99304	31.260165	Sediment	Single Core	4.0	4.0	33	72	0.567	33	72	0.363

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									Hg	HCB	DDTR	Hg	HCB	DDTR
Upper Central WWD	WWD-DU12	1/24/2022	-87.99365	31.260263	Sediment	ISM	2.0	2.0	99	180	0.136	99	180	NA
	WWD-DU12-S	11/29/2022	-87.9936	31.260291	Sediment	Single Core	5.0	5.0	1200	220	0.739	1200	220	0.739
	WWD-DU13	1/20/2022	-87.994008	31.2598284	Sediment	ISM	2.0	2.0	150	73	0.173	140	47	NA
	WWD-DU13OB1	2/17/2022	-87.99423	31.260058	Sediment	ISM	2.0	1.0	3.5	0.14	0.0392	0.28	NA	NA
	WWD-DU14	1/14/2022	-87.99395	31.259302	Sediment	ISM	2.0	2.0	14	510	0.221	14	27	NA
	WWD-DU14-S	11/29/2022	-87.99394	31.259344	Sediment	Single Core	6.0	6.0	1900	160	0.952	1000	100	0.379
	WWD-DU15	1/20/2022	-87.99402	31.258916	Sediment	ISM	2.0	2.0	80	290	0.429	80	270	NA
	WWD-DU15-N	11/30/2022	-87.99396	31.258915	Sediment	Single Core	5.5	5.5	2000	430	0.581	1800	430	0.557
	WWD-DU16	1/19/2022	-87.99466	31.25893	Sediment	ISM	2.0	2.0	270	100	1.06	270	61	0.433
	WWD-DU16-C	11/30/2022	-87.9946	31.258925	Sediment	Single Core	6.5	6.5	1600	1000	1.02	740	110	0.534
	WWD-HD20	12/7/2022	-87.9948822	31.2599847	Sediment	Single Core	1.0	No Impact	2	0.013	0.00845	2	0.013	0.00845
Upper WWD	WWD-DU17	1/19/2022	-87.99529	31.258844	Sediment	ISM	2.0	2.0	29	190	0.192	19	38	NA
	WWD-DU17-S	11/30/2022	-87.99522	31.258851	Sediment	Single Core	3.5	3.5	1400	230	1.12	190	2	0.00802
	WWD-DU18	1/19/2022	-87.99591	31.25892	Sediment	ISM	2.0	2.0	94	160	0.176	94	61	NA
	WWD-DU18-N	11/30/2022	-87.99585	31.258936	Sediment	Single Core	5.0	5.0	1700	510	0.943	210	93	0.75
	WWD-DU19	1/18/2022	-87.99655	31.258892	Sediment	ISM	2.0	2.0	12	480	0.115	12	49	NA
	WWD-DU19-C	11/30/2022	-87.99649	31.258896	Sediment	Single Core	3.0	3.0	31	12	0.456	31	12	0.408
	WWD-DU20	1/18/2022	-87.9972	31.258894	Sediment	ISM	2.0	2.0	39	970	0.146	39	9	NA
	WWD-DU20-S	12/1/2022	-87.99714	31.258879	Sediment	Single Core	6.5	6.5	900	360	0.88	5.4	1.4	0.00274
	WWD-DU21	1/18/2022	-87.99785	31.258881	Sediment	ISM	2.0	2.0	45	140	0.185	45	22	NA
	WWD-DU22	1/17/2022	-87.9985	31.258885	Sediment	ISM	2.0	2.0	21	190	0.579	21	190	0.503
	WWD-DU22-S	12/1/2022	-87.99844	31.25883	Sediment	Single Core	5.8	5.8	680	100	0.507	6.8	0.15	0.00092
	WWD-DU23	1/27/2022	-87.99913	31.258996	Sediment	ISM	2.0	2.0	27	85	0.124	27	85	NA
	WWD-DU24	1/26/2022	-87.99975	31.259153	Sediment	ISM	2.0	2.0	2.4	360	0.329	NA	85	NA
	WWD-DU24-N	12/1/2022	-87.99968	31.259164	Sediment	Single Core	5.0	5.0	920	170	0.89	920	110	0.393
	WWD-DU25	1/26/2022	-88.00036	31.259351	Sediment	ISM	2.0	2.0	2.1	220	1.47	NA	100	1.25
	WWD-DU25-C	12/1/2022	-88.0003	31.259327	Sediment	Single Core	4.0	4.0	66	320	1.29	31	320	0.467
	WWD-DU26	2/9/2022	-88.00096	31.259558	Sediment	ISM	2.0	1.5	3.3	720	0.544	NA	4.5	NA
Wastewater Ditch Overbank DUs and HD Cores														
Lower WWD OB	WWD-HD22	12/5/2022	-87.9916008	31.2618799	Sediment	Single Core	1.0	No Impact	0.14	0.013	0.00294	0.14	0.013	0.00294
Lower Central WWD Overbank (OB) and -HD Cores	WWD-DU06OB1	6/3/2022	-87.99053	31.26113	Soil	ISM	1.0	No Impact	0.86	0.99	0.0177	0.86	0.19	0.0046
	WWD-DU06OB2	6/3/2022	-87.99045	31.261054	Soil	ISM	2.0	2.0	17	6.3	0.0201	3.3	NA	NA
	WWD-HD01	12/6/2022	-87.9903694	31.2608942	Soil	Single Core	1.0	No Impact	0.14	0.48	0.00161	0.028	0.48	0.00024
	WWD-HD02	12/5/2022	-87.9906441	31.2612323	Soil	Single Core	1.0	No Impact	0.49	0.013	0.00261	0.1	0.013	0.0011
	WWD-HD03	12/6/2022	-87.9907845	31.2604589	Soil	Single Core	1.0	No Impact	0.081	0.018	0.00026	0.05	0.0062	0.00024
	WWD-HD05	12/5/2022	-87.991734	31.260028	Soil	Single Core	1.0	No Impact	0.06	0.012	0.00165	0.05	0.012	0.00158
	WWD-HD21	12/5/2022	-87.9919875	31.2595968	Sediment	Single Core	1.0	No Impact	0.86	0.012	0.00173	0.2	0.012	0.00119
Upper Central WWD Overbank and -HD Cores	WWD-DU12OB1	2/15/2022	-87.99352	31.260284	Soil	ISM	2.0	2.0	8.1	7.1	0.145	2.9	NA	NA
	WWD-DU13OB2	2/15/2022	-87.99394	31.259887	Soil	ISM	2.0	2.0	6.8	7.2	0.101	2.7	NA	NA
	WWD-DU14OB1	2/14/2022	-87.99403	31.25936	Soil	ISM	1.0	0.5	12	30	0.208	1.1	9	0.208
	WWD-DU14OB2	2/15/2022	-87.99387	31.259396	Soil	ISM	2.0	2.0	4.1	22	0.0676	3.2	NA	NA
	WWD-DU15OB1	2/15/2022	-87.99408	31.258969	Soil	ISM	2.0	2.0	6.2	27	0.492	6.2	NA	NA
	WWD-DU15OB2	2/16/2022	-87.99406	31.258877	Soil	ISM	2.0	2.0	4	120	0.153	2.3	NA	NA
	WWD-DU16OB1	2/16/2022	-87.99476	31.25897	Soil	ISM	2.0	2.0	13	13	0.0885	13	NA	NA
	WWD-DU16OB2	2/16/2022	-87.99483	31.258866	Soil	ISM	2.0	1.5	2.6	14	0.0636	1.6	NA	NA
	WWD-HD04	12/6/2022	-87.9919634	31.2604072	Soil	Single Core	1.0	1.0	7.3	25	0.0302	7.2	0.72	0.00956
	WWD-HD06	12/6/2022	-87.9929517	31.2603522	Soil	Single Core	1.0	No Impact	0.33	0.046	0.00619	0.049	0.01	0.00224
	WWD-HD07	12/6/2022	-87.9935379	31.2600647	Soil	Single Core	1.0	No Impact	0.018	0.013	0.00323	0.018	0.013	0.00323
Upper Central WWD -HD Cores (cont'd)	WWD-HD08	12/7/2022	-87.9935965	31.2604706	Soil	Single Core	1.0	No Impact	0.18	0.012	0.00417	0.058	0.012	0.00023
	WWD-HD09	12/6/2022	-87.9937526	31.2594731	Soil	Single Core	1.0	No Impact	0.02	0.016	0.0048	0.017	0.013	0.00025
	WWD-HD10	12/7/2022	-87.9941101	31.2592819	Soil	Single Core	1.0	No Impact	0.96	0.74	0.00627	0.96	0.74	0.00131
	WWD-HD11	12/6/2022	-87.9940059	31.2587615	Soil	Single Core	1.0	No Impact	0.018	0.012	0.00357	0.016	0.012	0.00174
	WWD-HD12	12/7/2022	-87.9948359	31.2590706	Soil	Single Core	1.0	No Impact	0.2	0.013	0.00289	0.048	0.012	0.00025
	WWD-HD13	12/6/2022	-87.9956911	31.2587593	Soil	Single Core	1.0	No Impact	0.018	0.024	0.00274	0.016	0.012	0.00024

Table 2: Summary of PDI Sampling Depths and Analytical Results for COCs

Floodplain or Wastewater Ditch Unit	Decision Unit (DU) or Location ID	Sample Date	Longitude	Latitude	Sample Matrix	Sampling Method	Sampled depth (ft)	Neatline depth (ft)	*Maximum Concentration (mg/kg)*			*Concentration at Deepest Sample Interval (mg/kg)*		
									Hg	HCB	DDTR	Hg	HCB	DDTR
Upper WWD -HD Cores	WWD-HD14	12/7/2022	-87.9965673	31.2590468	Soil	Single Core	1.0	No Impact	0.19	0.012	0.00622	0.06	0.012	0.00622
	WWD-HD15	12/6/2022	-87.9974151	31.2587373	Soil	Single Core	1.0	No Impact	0.24	0.013	0.00284	0.24	0.012	0.00127
	WWD-HD16	12/7/2022	-87.9982064	31.2590327	Soil	Single Core	1.0	No Impact	0.15	0.012	0.00148	0.025	0.012	0.000731
	WWD-HD17	12/6/2022	-87.9991428	31.2588842	Soil	Single Core	1.0	0.5	5.9	0.014	0.0521	0.045	0.0085	0.00113
	WWD-HD18	12/6/2022	-87.9997935	31.2593553	Soil	Single Core	1.0	No Impact	0.27	0.3	0.00688	0.24	0.0086	0.00688
	WWD-HD19	12/6/2022	-88.0006614	31.2593081	Soil	Single Core	1.0	No Impact	1.4	1.2	0.104	0.047	0.032	0.0103

Notes:
1. Gray-shaded cells indicate exceedance over the associated CUL.
2. Neatline depths are the deepest, bottom interval depths of samples or DUs for intervals with at least one COC exceeding soil or sediment cleanup levels (CUL).
3. Several sediment samples (HRC33-BAFP, HRC34-BAFP, PD-BA041, PD-BA091, HRC27-BA, PD-BA056) are listed with the floodplain set for reference. These are sample locations that are within 10 feet of the sediment/soil bounding contour.
4. PDI data for specific intervals are tabulated in Appendix B of the November 2023 FFS.
5. Pre-PDI (historical) data are excluded from this table, but are included in Table 3 and in Appendix A of the November 2023 FFS.
6. For samples with field duplicates, the maximum COC concentration was used.
7. For some of the locations, samples were collected on more than one date. The sample date reflects the most recent date, but the maximum reportable COC concentration from all dates is used.

*PD-BA056 falls outside of the 3ft contour and is considered soil. However it was located within a sediment DU and does not fall within the floodplain boundaries.

ABBREVIATIONS AND DEFINITIONS

mg/kg milligrams per kilogram
DU Decision Unit
ft feet
NA Not analyzed
HD horizontal delineation

RSK 11/08/23

Table 3: Chemical-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action/Media	Requirements	Prerequisite	Citation
Risk-Based Fish Tissue Residue Criterion for Mercury	Recommends a fish tissue residue water quality criterion of 0.3 mg methylmercury/kg.	Mercury and/or methylmercury in fish tissue residue **– To Be Considered (TBC)**	EPA, Office of Science and Tech., Office of Water, EPA-823-R-01-001, *Final Water Quality Criterion for the Protection of Human Health: Methylmercury* (Jan. 2001).
Protection of Surface Water	State waters shall be free from substances attributable to sewage, industrial wastes or other wastes in concentrations or combinations which are toxic or harmful to human, animal or aquatic life to the extent commensurate with the designated usage of such waters.	Pollution of waters of the State of Alabama, as defined by ADEM Admin. Code r. 335-6-10-.02– **Relevant and Appropriate**	ADEM Admin. Code r. 335-6-10-.06(c) *Minimum Conditions Applicable to All State Waters*
Protection of Surface Water *con't*	Toxic substances attributable to sewage, industrial wastes, or other wastes shall be only in such amounts, whether alone or in combination with other substances, as will not exhibit acute toxicity or chronic toxicity, as demonstrated by effluent toxicity testing or by application of numeric criteria given in ADEM Admin. Code r. 335-6-10-.07, to fish and aquatic life, including shrimp and crabs in estuarine or salt waters or the propagation thereof.	Pollution of waters of the State of Alabama classified for Fish and Wildlife use per ADEM Admin. Code r. 335-6-11-.02 – **Relevant and Appropriate**	ADEM Admin. Code r. 335-6-10-.09(5)(e)(5) *Specific Water Quality Criteria*
Protection of Surface Water *con't*	There shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of	Discharges to waters of the State of Alabama classified for Fish and Wildlife use per ADEM Admin.	ADEM Admin. Code r. 335-6-10-.09(5)(e)(9)

Table 3: Chemical-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action/Media	Requirements	Prerequisite	Citation
	waters or interfere with any beneficial uses which they serve. Furthermore, in no case shall turbidity exceed 50 [NTU] above background. Background will be interpreted as the natural condition of the receiving waters without the influence of man-made or man-induced causes. Turbidity levels caused by natural runoff will be included in establishing background levels.	Code r. 335-6-11-.02 – **Relevant and Appropriate**	*Specific Water Quality Criteria*
Restoration of Surface Water	Concentrations of toxic pollutants in State waters shall not exceed the criteria indicated to the extent commensurate with the designated usage of such waters: • 4,4′-DDD: 0.0002 µg/L [1] • 4,4′-DDE: 0.0001µg/L [1] • 4,4′-DDT: 0.001 µg/L[2] • 4,4′-DDT: 0.0001µg/L [1] • Hexachlorobenzene: 0.0002 µg/L [1] • Mercury: 0.012 µg/L[2] • Mercury: 0.042 µg/L[3]	Concentrations of toxic pollutants in waters of the State of Alabama as defined by ADEM Admin. Code r. 335-6-10-.02 – **Relevant and Appropriate**	ADEM Admin. Code r. 335-6-10-.07(1), Table 1*Toxic Pollutant Criteria*

ADEM = Alabama Department of Environmental Management

[1] As calculated by Eq. 19 specified in ADEM Admin. Code r. 335-6-10-.07(1)(d)(2)(ii), relating to calculation of human health criteria for consumption of fish only for those toxic pollutants classified by EPA as carcinogens, applicable to all waters of the State of Alabama. *See* ADEM Admin. Code r. 335-6-10-.07(1)(e). This criterion applies to DDT and its metabolites (i.e, DDTR).
[2] This is the chronic freshwater criteria for protection of aquatic life. This criterion applies to DDT and its metabolites (i.e., DDTR).
[3] As calculated by Eq. 17 specified in ADEM Admin. Code r. 335-6-10-.07(1)(d)(1)(ii), relating to calculation of human health criteria for consumption of fish only for those toxic pollutants classified by EPA as non-carcinogens, applicable to all waters of the State of Alabama. *See* ADEM Admin. Code r. 335-6-10-.07(1)(e).

ARAR = Applicable or Relevant and Appropriate Requirement [Ref. 40 C.F.R. § 300.5 Definitions of 'Applicable requirements' and 'Relevant and appropriate requirements']

TBC = To Be Considered [Ref. 40 C.F.R. § 300.405(g)(3) "The 'to be considered' (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies."]

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	Floodplains		
Presence of 100-year floodplain or floodplain as defined by ADEM Admin. Code r. 335-13-1-.03(54)	Land-based disposal unit shall not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste, so as to pose a hazard to human health and the environment.	Construction of industrial landfill as defined by ADEM Admin. Code r. 335-13-1-.03(54) – **Relevant and Appropriate**	ADEM Admin. Code r. 335-13-4-.01(1)(a)
Presence of floodplain, designated as such on a map1	Shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.	Federal actions that involve potential impacts to, or take place within, floodplains – **TBC** NOTE: Federal agencies required to comply with E.O. 11988 requirements.	Executive Order 11988 – Section 1. Floodplain Management
	Shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain		Executive Order 11988 - Section 2.(a)(2) Floodplain Management
	Section 2(a)(2) of EO 11988 is amended by inserting the following sentence after the first sentence: Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.	NOTE: Federal agencies required to comply with E.O. 13690 requirements.	Executive Order 13690 Section 2 (C) Establishing a Federal Flood Risk Management Standard and a Process
Presence of floodplain designated as such on a map	Step 4. Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action;	Federal actions affecting or affected by Floodplain as defined in 44 C.F.R. § 9.4 – **Relevant and Appropriate**	44 C.F.R. § 9.6(b) Decision-making Process

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	Step 5. Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see § 9.11);		
	NOTE: Identification of potential direct and indirect impacts associated with occupancy or modification of floodplains can be performed in an FS when evaluating remedial alternatives against criteria in the NCP at 40 CFR 300.430(e)(9) including Long-term effectiveness and permanence.		
	The Agency shall design or modify its actions so as to minimize2 harm to or within the floodplain.		44 C.F.R. § 9.11(b)(1) Mitigation
	The Agency shall restore and preserve natural and beneficial floodplain values.		44 C.F.R. § 9.11(b)(3) Mitigation
	The Agency shall minimize: • Potential harm to lives and the investment at risk from base flood, or in the case of critical actions[3], from the 500-year flood; • Potential adverse impacts that action may have on floodplain values	Federal actions affecting or affected by Floodplain as defined in 44 C.F.R. § 9.4 – **Relevant and Appropriate**	44 C.F.R. § 9.11(c)(1) and (3) Minimization provisions
Endangered and/or Threatened Species			
Presence of federally endangered or threatened species, as designated in 50 C.F.R. §§ 17.11 and	Actions that jeopardize the existence of a listed species or results in the destruction or adverse modification of critical habitat must be avoided or reasonable and prudent mitigation measures taken.	Action that is likely to jeopardize fish, wildlife, or plant species or destroy or adversely modify critical habitat – **Applicable**	16 U.S.C. § 1538(a) ADEM Admin. Code r. 335-13-4-.01(1)(b)

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
17.12 -or- critical habitat of such species listed in 50 C.F.R. § 17.95			
	Each Federal agency shall, in consultation with and with the assistance of the Secretary [of DOI], ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by [DOI] to be critical.	Actions authorized, funded, or carried out by any Federal agency, pursuant to 16 U.S.C. § 1536 – **Relevant and Appropriate**	16 U.S.C. § 1536(a)(2); 50 C.F.R. §§ 402.13(a), 402.14
Migratory Birds			
Presence of any migratory bird, as defined by 50 C.F.R. § 10.13	It shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or eggs of any such bird.	Actions that have, or are likely to have, a measurable negative effect on migratory bird populations – **Applicable**	16 U.S.C. § 703(a) Migratory Bird Treaty Act[4] Taking, killing, or possessing migratory birds unlawful
Wetlands			
Presence of wetlands, as defined by ADEM Admin. Code r. 335-8-1-.02(nnn)	Impacts to wetlands shall be mitigated through the creation of wetlands or the restoration and enhancement of existing degraded wetlands.	Actions in wetlands – **Relevant and Appropriate**	ADEM Admin. Code r. 335-8-2-.02(4), 335-8-2-.03(1)

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Presence of wetlands (as defined in 44 C.F.R. § 9.4)	Shall take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance beneficial values of wetlands.	Federal actions that involve potential impacts to, or take place within, wetlands – **TBC** NOTE: Federal agencies required to comply with E.O. 11990 requirements.	Executive Order 11990 – Protection of Wetlands Section 1.(a)
Presence of wetlands (as defined in 44 C.F.R. § 9.4)	Shall avoid undertaking construction located in wetlands unless: (1) there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.		Executive Order 11990, Section 2.(a) Protection of Wetlands
	Step 4. Identify the potential direct and indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action; Step 5. Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see § 9.11); NOTE: Identification of potential direct and indirect impacts associated with occupancy or modification of wetlands can be performed in a FS when evaluating remedial alternatives against criteria in the NCP at 40 CFR 300.430(e)(9) including Long-term effectiveness and permanence.	Federal actions affecting or affected by Wetlands including the destruction and modification of wetlands and the direct or indirect support of new construction in wetlands as defined in 44 C.F.R. § 9.4 – **Relevant and Appropriate**	44 C.F.R. § 9.6(b) Decision-making Process

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	The Agency shall minimize5 the destruction, loss or degradation of wetlands.		44 C.F.R. § 9.11(b)(2) Mitigation
Presence of Wetlands (as defined in 44 C.F.R. § 9.4)	The Agency shall preserve and enhance the natural and beneficial wetlands values.Natural Values of Flood Plains and Wetlands means the qualities of or functions served by floodplains and wetlands which include but are not limited to: (a) Water resource values (natural moderation of floods, water quality maintenance, groundwater recharge); (b) living resource values (fish, wildlife, plant resources and habitats); (c) cultural resource values (open space, natural beauty, scientific study, outdoor education, archeological and historic sites, recreation); and (d) cultivated resource values (agriculture, aquaculture, forestry).	Federal actions affecting or affected by Wetlands including the destruction and modification of wetlands and the direct or indirect support of new construction in wetlands as defined in 44 C.F.R. § 9.4 – **Relevant and Appropriate**	44 C.F.R. § 9.11(b)(4) Mitigation
	The Agency shall minimize: ▪ Potential adverse impacts the action may have on others; and ▪ Potential adverse impact the action may have on wetland values.		44 C.F.R. § 9.11(c)(2) and (3) Minimization provisions

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Compensatory Mitigation for Losses of Aquatic Resources			
Compensatory Mitigation[6] for Losses of Aquatic Resources	The Agency shall preserve and enhance the natural and beneficial wetlands values. Natural Values of Flood Plains and Wetlands means the qualities of or functions served by floodplains and wetlands which include but are not limited to: (a) Water resource values (natural moderation of floods, water quality maintenance, groundwater recharge); (b) living resource values (fish, wildlife, plant resources and habitats); (c) cultural resource values (open space, natural beauty, scientific study, outdoor education, archeological and historic sites, recreation); and (d) cultivated resource values (agriculture, aquaculture, forestry).	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.93(a)(1) General compensatory mitigation requirements
	Compensatory mitigation may be performed using the methods of restoration, enhancement, establishment, and in certain circumstances preservation. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.		40 C.F.R. § 230.93(a)(2) General compensatory mitigation requirements
	Required compensatory mitigation should be located within the same watershed as the impact site and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses.	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.93(b) Type and location of mitigation

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Compensatory Mitigation for Losses of Aquatic Resources (cont.)	Project site must be ecologically suitable for providing the desired aquatic resource functions. In determining the ecological suitability of the compensatory mitigation project site, the district engineer must consider, to the extent practicable, the factors in subsections (i) thru (vi). Should propose compensation sites adjacent to existing aquatic resources or where aquatic resources previously existed.	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.93(d)(1) & (3) Site selection
	In general, in-kind mitigation is preferable to out-of-kind mitigation because it is most likely to compensate for the functions and services lost at the impact site. Except as provided in paragraph (e)(2) of this section, the required compensatory mitigation shall be of a similar type to the affected aquatic resource.		40 C.F.R. § 230.93(e)(1) Mitigation Type
	The amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. Where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required. If a functional or condition assessment or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used.		40 C.F.R. § 230.93(f)(1) Mitigation Type
Compensatory Mitigation Planning	Prepare a mitigation plan addressing objectives, site selection, site protection, baseline information, determination of credits, mitigation work plan, maintenance plan, performance standards, monitoring requirements, long-term management, and adaptive management. NOTE: Plan would be part of CERCLA document, such as a Remedial Action Work Plan. Plan to include items described in 40 C.F.R. § 230.94(c)(2) through (c)(14).[7]	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.94(c) Mitigation Plan

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	Shall obtain ecological performance standards based on best available science.		40 C.F.R. § 230.95 Ecological Performance Standards
Compensatory Mitigation Project Monitoring	Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. The mitigation plan must address the monitoring requirements for the compensatory mitigation project, including the parameters to be monitored, the length of the monitoring period, the party responsible for conducting the monitoring, the frequency for submitting monitoring reports to the district engineer, and the party responsible for submitting those monitoring reports to the district engineer. NOTE: Mitigation Plan would be part of CERCLA document, such as a Remedial Action Work Plan.	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.96(a)(1) Mitigation Plan - Monitoring
Compensatory Mitigation Project Monitoring	Compensatory mitigation project monitoring period shall be sufficient to demonstrate that project has met performance standards, but not less than five (5) years. A longer monitoring period must be required for aquatic resources with slow development rates (e.g., forested wetlands, bogs). NOTE: Monitoring Plan would be part of CERCLA document, such as a Remedial Action Work Plan and/or Operations & Maintenance Plan.	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.96(b) Monitoring Period

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Compensatory Mitigation Project Management	The aquatic habitats, riparian areas, buffers, and uplands that comprise the overall compensatory mitigation project must be provided long-term protection through real estate instruments or other available mechanisms, as appropriate. Long-term protection may be provided through real estate instruments such as conservation easements held by entities such as federal, tribal, state, or local resource agencies, non-profit conservation organizations, or private land managers; the transfer of title to such entities; or by restrictive covenants. NOTE: Plan would be part of CERCLA document, such as a Remedial Action Work Plan and/or Operations and Maintenance Plan.	Unavoidable impacts to waters of the U. S. requiring compensatory mitigation to offset environmental losses to aquatic resources including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.97(b) Sustainability
CWA Section 404(b)(1) Guidelines – Specification of Disposal Sites for Dredged or Fill Material into Waters of the United States and/or State of Alabama			
Location encompassing aquatic ecosystem[8]	Except as provided under section 404(b)(2) [of the Clean Water Act] no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.10(a) Restrictions on Discharge
	For the purpose of this requirement, practicable alternatives include, but are not limited to: (i) Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters; (ii) Discharges of dredged or fill material at other locations in waters of the United States or ocean waters;		40 C.F.R. § 230.10(a)(1) Restrictions on Discharge

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered.		40 C.F.R. § 230.10(a)(2) Restrictions on Discharge
Location encompassing aquatic ecosystem con't	No discharge of dredged or fill material shall be permitted if it:▪ • Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard; • Violates any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act; • Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, or results in the likelihood of the destruction or adverse modification of critical habitat; • Violates any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under title III of the Marine Protection, Research, and Sanctuaries Act of 1972.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.10(b) Restrictions on Discharge
	Except as provided under CWA section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts.		40 C.F.R. § 230.10(c) Restrictions on Discharge

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Location encompassing aquatic ecosystem con't	Under these Guidelines, effects contributing to significant degradation considered individually or collectively, include: (1) Significantly adverse effects of the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites. (2) Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their by-products outside of the disposal site through biological, physical, and chemical processes; (3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or (4) Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.10(c)(1)-(4) Restrictions on Discharge
	No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. NOTE: There are many actions which can be undertaken in response to §230.10(d) to minimize the adverse effects of discharges of dredged or fill material. Some of these, grouped by type of activity, are listed in this subpart H Actions To Minimize Adverse Effects. Additional criteria for compensation measures are provided in subpart J of this part.		40 C.F.R. § 230.10(d) Restrictions on Discharge

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Determination of effects from discharge of dredged or fill material into an aquatic ecosystem	The permitting authority shall determine in writing the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment in light of subparts C through F. Such factual determinations shall be used in § 230.12 in making findings of compliance or non-compliance with the restrictions on discharge in § 230.10. The evaluation and testing procedures described in § 230.60 and § 230.61 of subpart G shall be used as necessary to make, and shall be described in, such determination. NOTE: Written evaluation of potential short-term and long-term effects of proposed discharge of dredged or fill material on the aquatic environment will be provided in CERCLA documents including but not limited to a RI Report, FS or a Technical Memorandum.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.11 Factual Determinations
	The determinations of effects of each proposed discharge shall include the following: (a) Physical substrate determinations. (b) Water circulation, fluctuation, and salinity determinations. (c) Suspended particulate/turbidity determinations. (d) Contaminant determinations. (e) Aquatic ecosystem and organism determinations. (f) Proposed disposal site determinations. (g) Determination of cumulative effects on the aquatic ecosystem (h) Determination of secondary effects on the aquatic ecosystem.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.11(a) through (h) Factual Determinations

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	NOTE: Refer to the regulatory requirements in each of the above subparagraphs of 40 C.F.R. § 230.11. Any documentation of factual determinations will be provided in CERCLA documents including but not limited to a RI Report, FS, a Technical Memorandum, or other remedy selection document.		
Determining compliance with the CWA 404(b) Guidelines for discharge of dredged or fill material into an aquatic ecosystem	On the basis of these Guidelines (subparts C through G) the proposed disposal sites for the discharge of dredged or fill material must be: (1) Specified as complying with the requirements of these Guidelines; or (2) Specified as complying with the requirements of these Guidelines with the inclusion of appropriate and practicable discharge conditions (see subparts H and J) to minimize pollution or adverse effects to the affected aquatic ecosystems; or (3) Specified as failing to comply with the requirements of these Guidelines where: (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences; or (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem under § 230.10(b) or (c); or (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or (iv) There does not exist sufficient information to make a reasonable judgment as to whether the proposed discharge will comply with these Guidelines.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.12(a) Findings of compliance or non-compliance with the restrictions on discharge

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Determining compliance with the CWA 404(b) Guidelines for discharge of dredged or fill material into an aquatic ecosystem con't	Findings under this section shall be set forth in writing by the permitting authority for each proposed discharge and made available to the permit applicant. These findings shall include the factual determinations required by § 230.11, and a brief explanation of any adaptation of these Guidelines to the activity under consideration. In the case of a General permit, such findings shall be prepared at the time of issuance of that permit rather than for each subsequent discharge under the authority of that permit. NOTE: Findings of compliance with the CWA 404(b) Guidelines will be documented in a CERCLA FS, Technical Memorandum, or other remedy selection document (e.g. ROD, Amended ROD).		40 C.F.R. § 230.12(b) Findings of compliance or non-compliance with the restrictions on discharge
Evaluation of dredged or fill material for contamination and placement (i.e., sediments from wastewater ditch and floodplain soils)	To reach the determinations in § 230.11 involving potential effects of the discharge on the characteristics of the disposal site, the narrative guidance in subparts C through F shall be used along with the general evaluation procedure in § 230.60 and, if necessary, the chemical and biological testing sequence in § 230.61. Where the discharge site is adjacent to the extraction site and subject to the same sources of contaminants, and materials at the two sites are substantially similar, the fact that the material to be discharged may be a carrier of contaminants is not likely to result in degradation of the disposal site. In such circumstances, when dissolved material and suspended particulates can be controlled to prevent carrying pollutants to less contaminated areas, testing will not be required. *NOTE*: Previous sampling and analysis performed as part of the RI, a post-ROD Design Investigation, a Treatability or Pilot Study can be used to demonstrate the chemical or other properties of the sediment and/or soil (dredged or fill material).	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **Relevant and Appropriate**	40 C.F.R. § 230.60(c) *General evaluation of dredged or fill material*

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Evaluation of chemical and biological effects from discharge of dredged or fill material into an aquatic ecosystem	Dredged or fill material may be excluded from the evaluation procedures specified in paragraphs (b) (2) and (3) of this section if it is determined, on the basis of the evaluation in § 230.60, that the likelihood of contamination by contaminants is acceptably low, unless the permitting authority, after evaluating and considering any comments received from the EPA, determines that these procedures are necessary. The EPA may require, on a case-by-case basis, testing approaches and procedures by stating what additional information is needed through further analyses and how the results of the analyses will be of value in evaluating potential environmental effects.NOTE: Determination of testing procedures will be made as part of EPA review and approval of CERCLA documents including a Treatability or a Pilot Study.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.61(b)(1)Chemical, biological, and physical evaluation and testing
	Sediments normally contain constituents that exist in various chemical forms and in various concentrations in several locations within the sediment. An elutriate test may be used to predict the effect on water quality due to release of contaminants from the sediment to the water column. However, in the case of fill material originating on land which may be a carrier of contaminants, a water leachate test is appropriate. NOTE: Determination of testing procedures will be made as part of EPA review and approval of CERCLA documents including a Treatability or a Pilot Study.		40 C.F.R. § 230.61(b)(2)(i) Water column effects

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Evaluation of water column effects from discharge of dredged or fill material into an aquatic ecosystem	Major constituents to be analyzed in the elutriate are those deemed critical after evaluating and considering any comments received from the EPA, and considering results of the evaluation in § 230.60. Elutriate concentrations should be compared to concentrations of the same constituents in water from the disposal site. Results should be evaluated in light of the volume and rate of the intended discharge, the type of discharge, the hydrodynamic regime at the disposal site, and other information relevant to the impact on water quality. The permitting authority should consider the mixing zone in evaluating water column effects. The permitting authority may specify bioassays when such procedures will be of value. NOTE: Per CERCLA 121(e)(1) permits are not required for on-site response actions. For purposes of this section EPA is the permitting authority. Determination of testing procedures will be made as part of EPA review and approval of CERCLA documents including a Treatability or a Pilot Study.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.61(b)(2)(ii) Water column effects
Evaluation of effects on benthic community from discharge of dredged or fill material into an aquatic ecosystem	The permitting authority may use an appropriate benthic bioassay (including bioaccumulation tests) when such procedures will be of value in assessing ecological effects and in establishing discharge conditions. NOTE: Per CERCLA 121(e)(1) permits are not required for on-site response actions. For purposes of this section EPA is the permitting authority. Determination of testing procedures will be made as part of EPA review and approval of CERCLA documents, including a Treatability or a Pilot Study.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.61(b)(3) Effects on benthos

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Procedure for comparison of contaminants in sediments at excavation and disposal sites	When an inventory of the total concentration of contaminants would be of value in comparing sediment at the dredging site with sediment at the disposal site, the permitting authority may require a sediment chemical analysis. Markedly different concentrations of contaminants between the excavation and disposal sites may aid in making an environmental assessment of the proposed disposal operation. Such differences should be interpreted in terms of the potential for harm as supported by any pertinent scientific literature. NOTE: Per CERCLA 121(e)(1) permits are not required for on-site response actions. For purposes of this section EPA is the permitting authority. Determination of testing procedures will be made as part of EPA review and approval of CERCLA documents, including a Treatability or a Pilot Study.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.61(c)
Evaluation of effects on physical substrate and water quality from discharge of dredged or fill material into an aquatic ecosystem	The effect of a discharge of dredged or fill material on physical substrate characteristics at the disposal site, as well as on the water circulation, fluctuation, salinity, and suspended particulates content there, is important in making factual determinations in § 230.11. Where information on such effects is not otherwise available to make these factual determinations, the permitting authority shall require appropriate physical tests and evaluations as are justified and deemed necessary. Such tests may include sieve tests, settleability tests, compaction tests, mixing zone and suspended particulate plume determinations, and site assessments of water flow, circulation, and salinity characteristics. NOTE: Per CERCLA 121(e)(1) permits are not required for on-site response actions. For purposes of this section EPA is the permitting authority. Determination of testing/evaluation procedures will be made as part of EPA review and approval of CERCLA documents, including a Treatability or a Pilot Study.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.61(d) Physical tests and evaluation

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Actions to minimize effects of discharge of dredged or fill material into an aquatic ecosystem	The effects of the discharge can be minimized by the choice of the disposal site. Some of the ways to accomplish this are by: (a) Locating and confining the discharge to minimize smothering of organisms; (b) Designing the discharge to avoid a disruption of periodic water inundation patterns; (c) Selecting a disposal site that has been used previously for dredged material discharge; (d) Selecting a disposal site at which the substrate is composed of material similar to that being discharged, such as discharging sand on sand or mud on mud; (e) Selecting the disposal site, the discharge point, and the method of discharge to minimize the extent of any plume; (f) Designing the discharge of dredged or fill material to minimize or prevent the creation of standing bodies of water in areas of normally fluctuating water levels, and minimize or prevent the drainage of areas subject to such fluctuations.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.70 Actions concerning the location of the discharge
	The effects of a discharge can be minimized by treatment of, or limitations on the material itself, such as: (a) Disposal of dredged material in such a manner that physiochemical conditions are maintained and the potency and availability of pollutants are reduced; (b) Limiting the solid, liquid, and gaseous components of material to be discharged at a particular site; (c) Adding treatment substances to the discharge material; (d) Utilizing chemical flocculants to enhance the deposition of suspended particulates in diked disposal areas.		40 C.F.R. § 230.71 Actions concerning the material to be discharged

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Actions to minimize effects of discharge of dredged or fill material into an aquatic ecosystem	The effects of the dredged or fill material after discharge may be controlled by: (a) Selecting discharge methods and disposal sites where the potential for erosion, slumping or leaching of materials into the surrounding aquatic ecosystem will be reduced. These sites or methods include, but are not limited to: (1) Using containment levees, sediment basins, and cover crops to reduce erosion; (2) Using lined containment areas to reduce leaching where leaching of chemical constituents from the discharged material is expected to be a problem; (b) Capping in-place contaminated material with clean material or selectively discharging the most contaminated material first to be capped with the remaining material; (c) Maintaining and containing discharged material properly to prevent point and nonpoint sources of pollution; (d) Timing the discharge to minimize impact, for instance during periods of unusual high wat r flows, wind, wave, and tidal actions.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.72 Actions controlling the material after discharge
Actions to minimize effects of discharge of dredged or fill material into an aquatic ecosystem	The effects of a discharge can be minimized by the manner in which it is dispersed, such as: (a) Where environmentally desirable, distributing the dredged material widely in a thin layer at the disposal site to maintain natural substrate contours and elevation; (b) Orienting a dredged or fill material mound to minimize undesirable obstruction to the water current or circulation pattern, and utilizing natural bottom contours to minimize the size of the mound; (c) Using silt screens or other appropriate methods to confine suspended particulate/turbidity to a small area where settling or removal can occur; (d) Making use of currents and circulation patterns to mix, disperse and dilute the discharge; (e) Minimizing water column turbidity by using a submerged diffuser system. A similar effect can be accomplished by submerging pipeline dis- charges or	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.73 Actions affecting the method of dispersion

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	otherwise releasing materials near the bottom; (f) Selecting sites or managing discharges to confine and minimize the release of suspended particulates to give decreased turbidity levels and to maintain light penetration for organisms; (g) Setting limitations on the amount of material to be discharged per unit of time or volume of receiving water.		
Actions to minimize effects of discharge of dredged or fill material into an aquatic ecosystem	Discharge technology should be adapted to the needs of each site. In determining whether the discharge operation sufficiently minimizes adverse environmental impacts, the applicant should consider:(a) Using appropriate equipment or machinery, including protective devices, and the use of such equipment or machinery in activities related to the discharge of dredged or fill material;(b) Employing appropriate maintenance and operation on equipment or machinery, including adequate training, staffing, and working procedures;(c) Using machinery and techniques that are especially designed to reduce damage to wetlands. This may include machines equipped with devices that scatter rather than mound excavated materials, machines with specially designed wheels or tracks, and the use of mats under heavy machines to reduce wetland surface compaction and rutting;(d) Designing access roads and channel spanning structures using culverts, open channels, and diversions that will pass both low and highwater flows, accommodate fluctuating water levels, and maintain circulation and faunal movement;(e) Employing appropriate machinery and methods of transport of the material for discharge.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.74 Actions related to technology

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
Actions to minimize effects of discharge of dredged or fill material into an aquatic ecosystem	Minimization of adverse effects on populations of plants and animals can be achieved by: (a) Avoiding changes in water current and circulation patterns which would interfere with the movement of animals; (b) Selecting sites or managing discharges to prevent or avoid creating habitat conducive to the development of undesirable predators or species which have a competitive edge ecologically over indigenous plants or animals; (c) Avoiding sites having unique habitat or other value, including habitat of threatened or endangered species; (d) Using planning and construction practices to institute habitat development and restoration to produce a new or modified environmental state of higher ecological value by displacement of some or all of the existing environmental characteristics. Habitat development and restoration techniques can be used to minimize adverse impacts and to compensate for destroyed habitat. (e) Timing discharge to avoid spawning or migration seasons and other biologically critical time periods; (f) Avoiding the destruction of remnant natural sites within areas already affected by development.	Action that involves discharge of dredged or fill material into waters of the U. S., including wetlands – **TBC**	40 C.F.R. § 230.75 Actions affecting plant and animal populations
Dredging and/or Filling State of Alabama Water Bottoms or Adjacent Wetlands			
Presence of State water bottoms or adjacent wetlands, as defined by ADEM Admin. Code r. 335-8-1-.02(a)	Dredging and/or filling of State waterbottoms or adjacent wetlands may be permitted provided that: • There will be no dredging or filling in close proximity to existing submersed grassbeds; • Dredging, filling or trenching methods and techniques are such that reasonable assurance is provided that applicable water quality standards will be met; and no alternative project site or design I feasible and the	Dredging and/or filling of a State waterbottom or adjacent wetland – **Relevant and Appropriate**	ADEM Admin. Code r. 335-8-2-.02(1)(c) & (d)

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
	adverse impacts to coastal resources have been reduced to the greatest extent practicable.		
	Dredging, filling, or trenching resulting in a temporary disturbance may be permitted provided that all areas are returned to pre-project elevations and all wetland areas are revegetated and the requirements of ADEM Admin. Code r. 335-8-2-.02(1)(b) thru (d) are met.		ADEM Admin. Code r. 335-8-2-.02(2)
	Any fill material placed on State waterbottoms or in wetlands shall be free to toxic pollutants in toxic amounts and shall be devoid of sludge and/or solid waste.		ADEM Admin. Code r. 335-8-2-.02(5)
	The salinity of return waters from dredge disposal sites shall be similar to that of the receiving waters and reasonable assurance provided that applicable water quality standards met.		ADEM Admin. Code r. 335-8-2-.02(8)
Presence of non-adjacent wetlands, as defined by ADEM Admin. Code r. 335-8-1-.02(nnn)	Dredging or filling of non-adjacent wetlands may be permitted provided that: • No alternative project sites or designs which avoid the dredging or filling are feasible and the adverse impacts have been reduced to the greatest extent possible; and • The non-adjacent wetlands to be dredged or filled have a limited functional value.	Dredging and/or filling of non-adjacent wetland – **Relevant and Appropriate**	ADEM Admin. Code r. 335-8—2-.02(3)
Drainage of Waterbodies			
Presence of any stream or other body of water proposed to be impounded, diverted, controlled,	Whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license, such department or	Federal actions that propose to impound, divert, control, or modify waters of any stream or body of water – **Relevant and Appropriate**	16 U.S.C. § 662(a) Impounding, diverting, or controlling of waters Fish and Wildlife Coordination Act

Table 4: Location-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Location	Requirements	Prerequisite	Citation
or modified for drainage	agency first shall consult with the United States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular State wherein the impoundment, diversion, or other control facility is to be constructed, with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with such water-resource development. NOTE: Consultation is recommended in order to determine actions as part of project in view of conservation of wildlife resources.		
Coastal Areas			
Location encompassing coastal zone, as defined by 16 U.S.C. § 1453(1)	Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs.	Federal actions within coastal zones – **Relevant and Appropriate**	16 U.S.C. § 1456(c)(1)(A)

[1] Under 44 C.F.R. § 9.7 Determination of proposed action's location, Paragraph (c) Floodplain determination. One should consult the FEMA Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (FBFM) and the Flood Insurance Study (FIS) to determine if the Agency proposed action is within the base floodplain. Per Executive Order 13690, "To determine whether an agency action is located in a floodplain, the agency shall use one of the approaches in Section 6(c) of this Order based on the best-available information and the Federal Emergency Management Agency's effective Flood Insurance Rate Map''.

[2] Minimize means to reduce to smallest amount or degree possible. 44 C.F.R. § 9.4 Definitions.

[3] See 44 C.F.R. § 9.4 Definitions, Critical action means an action for which even a slight chance of flooding is too great. The minimum floodplain of concern for critical actions is the 500-year floodplain, i.e., critical action floodplain. Critical actions include, but are not limited to, those which create or extend the useful life of structures or facilities: Such as those that produce, use or store highly volatile, flammable, explosive, toxic or water-reactive materials.

[4] Migratory Bird Treaty Reform Act of 2004 - (Sec. 102) Amends the Migratory Bird Treaty Act (MBTA) to clarify that the MBTA's prohibition on taking, killing, or possessing migratory birds applies only to native migratory bird species whose occurrence in the United States results from natural biological or ecological conditions.

[5] Minimize means to reduce to smallest amount or degree possible. 44 C.F.R. § 9.4 Definitions.

[6] 40 C.F.R. § 230.92 “Compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.” For impacts authorized under section 404, compensatory mitigation is not considered until after all appropriate and practicable steps have been taken to first avoid and then minimize adverse impacts to the aquatic ecosystem pursuant to 40 CFR part 230 (i.e., the CWA Section 404(b)(1) Guidelines).

[7] If mitigation obligations will be met by securing credits from approved mitigation banks or in-lieu fee programs, mitigation plan need include only items described in Section 230.94(c)(5) and (c)(6), and name of mitigation bank or in-lieu fee program. 40 C.F.R. § 230.94(c)(1).

[8] 40 C.F.R. § 230.3(b) The terms aquatic environment and aquatic ecosystem mean waters of the United States, including wetlands, that serve as habitat for interrelated and interacting communities and populations of plants and animals.

ADEM = Alabama Department of Environmental Management
ADPH = Alabama Department of Public Health
ARAR = Applicable or Relevant and Appropriate Requirement [Ref. 40 C.F.R. § 300.5 Definitions of ‘Applicable requirements’ and ‘Relevant and appropriate requirements’]
AWPCA = Alabama Water Pollution Control Act
C.F.R. = *Code of Federal Regulations*
CWA = Clean Water Act
DOI = U.S. Department of the Interior
E.O. = Executive Order
FS = Feasibility Study
> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
RI = Remedial Investigation
ROD =Record of Decision
TBC = To Be Considered [Ref. 40 C.F.R. § 300.405(g)(3) “The ‘to be considered’ (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.”]
U.S. = United States
USACE = U.S. Army Corps of Engineers

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
General Construction Standards – All Land Disturbing Activities			
Activities causing stormwater runoff (*e.g.*, clearing, grading, excavation)	Shall fully implement and regularly maintain effective best management practices (BMPs) to the maximum extent practicable, and in accordance with the operator's Construction Best Management Practices Plan (CBMPP). Appropriate, effective pollution abatement/prevention facilities, structural and nonstructural BMPs, and management strategies shall be fully implemented prior to and concurrent with commencement of the regulated activities and regularly maintained during construction as needed at the site to meet or exceed the requirements of this chapter until construction is complete, effective reclamation and/or stormwater quality remediation is achieved. NOTE – CBMPP will be included as part of a CERCLA document such as the Remedial Design or Remedial Action Work Plan.	All new and existing construction activities as defined in ADEM Admin. Code r. 335-6-12-.02(e) disturbing one (1) acre or more in size – **Applicable**	ADEM Admin. Code r. 335-6-12-.05(2)
	The operator shall take all reasonable steps to prevent and/or minimize, to the maximum extent practicable, any discharge in violation of this chapter or which has a reasonable likelihood of adversely affecting the quality of groundwater or surface water receiving the discharge(s).		ADEM Admin. Code r. 335-6-12-.06(4)
	Implement a comprehensive CBMPP appropriate for site conditions consistent with the substantive requirements of ADEM Admin. Code r. 335-6-12-.21 that has been prepared and certified by a Qualified Credentialed Professional (QCP). The CBMPP shall include a description of appropriate, effective water quality BMPs to be implemented at the site as needed to ensure compliance with this chapter and include but not limited to the measures provided in subsections 1. thru 14.		ADEM Admin. Code r. 335-6-12-.21(2)(a) & (b)
	BMPs shall be designed, implemented, and regularly maintained to provide effective treatment of discharges of pollutants in stormwater resulting from runoff generated by probable storm events expected/predicted during construction disturbance based on historic precipitation information, and during extended periods of adverse weather and seasonal conditions		ADEM Admin. Code r. 335-6-12-.21(4)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Activities causing fugitive dust emissions	Shall not cause, suffer, allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used . . . without taking reasonable precautions to prevent particulate matter from becoming airborne. Shall not cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.	Fugitive emissions from construction operations, grading, or the clearing of land – **TBC**	ADEM Admin. Code r. 335-3-4-.02(1) & (2)[1]
In-Situ Capping of Contaminated Sediments			
Design of in-situ subaqueous cap of contaminated sediments	Provides guidance for planning and design of in-situ, subaqueous capping projects, including cap design, equipment and placement techniques, and monitoring and management considerations. NOTE: Relevant provisions of the guidance will be considered in the Remedial Design and Remedial Action Work Plan.	In-situ, subaqueous capping of contaminated sediments – **TBC**	U.S. Army Corps of Engineers, Tech. Report DOER-1, *Guidance for Subaqueous Dredged Material Capping* (1998).

[1] ADEM Admin. Code r. 335-3-4-.02(1) and (2) were held unconstitutional for being unduly vague (335-3-4-.02(1)) and too restrictive (335-3-4-.02(2)). See Ross Neeley Express, Inc. v. Ala. Dep't of Envtl. Mgmt., 437 So.2d 82 (Ala. 1983).

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Waste Characterization — Primary Wastes (e.g., contaminated sediments and soil samples) and Secondary Wastes (e.g., contaminated equipment/PPE and wastewaters)			
Characterization of solid waste	Must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to Applicable RCRA regulations. A hazardous waste determination is made using the following steps: (a) Must be made at the point of waste generation, before any dilution, mixing, or other alteration of the waste occurs, and at any time in the course of its management that it has, or may have, changed its properties as a result of exposure to the environment or other factors that may change the properties of the waste such that the RCRA classification of the waste may change (b) Must determine whether the waste is excluded from regulation under 40 C.F.R. § 261.4 (c) Must use the knowledge of the waste to determine whether waste meets any of the listing descriptions under subpart D of 40 C.F.R. Part 261. Acceptable knowledge that may be used in making an accurate determination as to whether the waste is listed may include waste origin, composition, the process producing the waste, feedstock, and other reliable and relevant information	Generation of solid waste as defined in 40 C.F.R. § 261.2 –**Applicable**	40 C.F.R. § 262.11(a), (b) and (c) ADEM Admin. Code r. 335-14-3-.01(2)
	The person then must also determine whether the waste exhibits one or more hazardous characteristics as identified in subpart C of 40 C.F.R. part 261 by following the procedures in paragraph (d)(1) or (2) of this section, or a combination of both.	Generation of solid waste which is not excluded under 40 C.F.R. § 261.4(a) – **Applicable**	40 C.F.R. § 262.11(d) ADEM Admin. Code r. 335-14-3-.01(2)(d)
Determination of characteristic hazardous waste through knowledge	The person must apply knowledge of the hazard characteristic of the waste in light of the materials or the processes used to generate the waste. Acceptable knowledge may include process knowledge (e.g., information about chemical feedstocks and other inputs to the production process); knowledge of products, by-products, and intermediates produced by the manufacturing process; chemical or physical characterization of wastes; information on the chemical and physical properties of the chemicals used or produced by the process or otherwise contained in the waste; testing that illustrates		40 C.F.R. § 262.11(d)(1) ADEM Admin. Code r. 335-14-3-.01(2)(d)(1)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	the properties of the waste; or other reliable and relevant information about the properties of the waste or its constituents. A test other than a test method set forth in subpart C of 40 C.F.R. part 261, or an equivalent test method approved by the Administrator under 40 C.F.R. 260.21, may be used as part of a person's knowledge to determine whether a solid waste exhibits a characteristic of hazardous waste. However, such tests do not, by themselves, provide definitive results. Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 C.F.R. 260.10.		
Determination of characteristic hazardous waste through testing	When available knowledge is inadequate to make an accurate determination, the person must test the waste according to the Applicable methods set forth in subpart C of 40 C.F.R. part 261 or according to an equivalent method approved by the Administrator under 40 C.F.R. § 260.21; or and in accordance with the following: (i) Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 C.F.R. § 260.10. (ii) Where a test method is specified in subpart C of 40 C.F.R. part 261, the results of the regulatory test, when properly performed, are definitive for determining the regulatory status of the waste.	Generation of solid waste which is not excluded under 40 C.F.R. § 261.4(a) – **Applicable**	40 C.F.R. § 262.11(d)(2) ADEM Admin. Code r. 335-14-3-.01(2)(d)(2)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous – **Applicable**	40 C.F.R. § 262.11(e)
Identifying hazardous waste numbers for small and large quantity generators	If the waste is determined to be hazardous, small quantity generators and large quantity generators must identify all Applicable EPA hazardous waste numbers (EPA hazardous waste codes) in 335-14-2-.03 and .04. Prior to shipping the waste off site, the generator also must mark its containers with all Applicable EPA hazardous waste numbers (EPA hazardous waste codes) according to 335-14-3-.03(3).		40 C.F.R. § 262.11(g) ADEM Admin. Code r. 335-14-3-.01(2)(g)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 C.F.R. Parts 264 and 268.	Generation of RCRA-hazardous waste for storage, treatment or disposal – **Applicable**	40 C.F.R. § 264.13(a)(1) ADEM 335-14-5-.01(1)(j)(2)
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) Applicable to the waste in order to determine the Applicable treatment standards under subpart D of this part. This determination may be made concurrently with the hazardous waste determination required in § 262.11 of this chapter. For purposes of part 268, the waste will carry the waste code for any Applicable listed waste (40 C.F.R. part 261, subpart D). In addition, where the waste exhibits a characteristic, the waste will carry one or more of the characteristic waste codes (40 C.F.R. part 261, subpart C), except when the treatment standard for the listed waste operates in lieu of the treatment standard for the characteristic waste, as specified in paragraph (b) of this section.	Generation of hazardous waste for storage, treatment or disposal – **Applicable**	40 C.F.R. § 268.9(a) ADEM Admin. Code r. 33-14-9-.01
Determinations for management of characteristic hazardous waste	Must determine the underlying hazardous constituents [as defined in 40 C.F.R. § 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **Applicable**	40 C.F.R. § 268.9(a) ADEM Admin. Code r. 33-14-9-.01
Determinations for land disposal of hazardous waste	Must determine if the waste has to be treated before it can be land disposed. This is done by determining if the hazardous waste meets the treatment standards in §268.40, 268.45, or §268.49. This determination can be made concurrently with the hazardous waste determination required in §262.11 of this chapter, in either of two ways: testing the waste or using knowledge of the waste. If the generator tests the waste, testing would normally determine the total concentration of hazardous constituents, or the concentration of hazardous constituents in an extract of the waste obtained using test	Generation of hazardous waste for storage, treatment, or disposal – **Applicable**	40 C.F.R. § 268.7(a) ADEM Admin. Code r. 33-14-9-.01

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	method 1311 in ‘‘Test Methods of Evaluating Solid Waste, Physical/Chemical Methods,’’ EPA Publication SW–846, (incorporated by reference, see §260.11 of this chapter), depending on whether the treatment standard for the waste is expressed as a total concentration or concentration of hazardous constituent in the waste’s extract. (Alternatively, the generator must send the waste to a RCRA-permitted hazardous waste treatment facility, where the waste treatment facility must comply with the requirements of §264.13 of this chapter and paragraph (b) of this section.)		
Waste Storage — Primary Wastes (e.g., contaminated sediments and soil samples) and Secondary Wastes (e.g., wastewaters and contaminated equipment/PPE)			
Temporary on–site accumulation of hazardous waste in containers	A large quantity generator may accumulate hazardous waste on site without a permit or interim status, and without complying with the requirements of parts 124, 264 through 267, and 270 of this chapter, or the notification requirements of section 3010 of RCRA for treatment, storage, and disposal facilities, provided that all of the following conditions for exemption are met:	Accumulation of RCRA hazardous waste on site as defined in 40 C.F.R. § 260.10 **– Applicable**	40 C.F.R. § 262.17(a) ADEM Admin. Code r. 335-14-3-.01(7)
Condition of containers	If a container holding hazardous waste is not in good condition, or if it begins to leak, the large quantity generator must immediately transfer the hazardous waste from this container to a container that is in good condition, or immediately manage the waste in some other way that complies with the conditions for exemption of this section.	Accumulation of RCRA hazardous waste in containers on site as defined in 40 C.F.R. § 260.10 **– Applicable**	40 C.F.R. § 262.17(a)(1)(ii) ADEM Admin. Code r. 335-14-3-.01(7)(a)(1)(ii)
Compatibility of waste with container	Must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be accumulated, so that the ability of the container to contain the waste is not impaired.		40 C.F.R. § 262.17(a)(1)(iii) ADEM Admin. Code r. 335-14-3-.01(7)(a)(1)(iii)
Management of containers	(A) A container holding hazardous waste must always be closed during accumulation, except when it is necessary to add or remove waste. (B) A container holding hazardous waste must not be opened, handled, or accumulated in a manner that may rupture the container or cause it to leak.		40 C.F.R. § 262.17(a)(1)(iv) ADEM Admin. Code r. 335-14-3-.01(7)(a)(1)(iv)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Labeling and marking of containers	A large quantity generator must mark or label its containers with the following: (a) The words "Hazardous Waste"; (b) An indication of the hazards of the contents (examples include, but are not limited to, the applicable hazardous waste characteristic(s) (*i.e.,* ignitable, corrosive, reactive, toxic); hazard communication consistent with the Department of Transportation requirements at 49 C.F.R. part 172 subpart E (labeling) or subpart F (placarding); a hazard statement or pictogram consistent with the Occupational Safety and Health Administration Hazard Communication Standard at 29 C.F.R. § 1910.1200; or a chemical hazard label consistent with the National Fire Protection Association code 704); and (c) The date upon which each period of accumulation begins clearly visible for inspection on each container.	Accumulation of RCRA hazardous waste on site as defined in 40 C.F.R. §260.10 **– Applicable**	40 C.F.R. § 262.17(a)(5)(i) ADEM Admin. Code r. 335-14-3-.01(7)(a)(5)(i)(a)-(c)
	A large quantity generator must mark or label its containers with the following: (d) All appropriate EPA hazardous waste numbers associated with the hazardous waste as specified in 335-14-2-.03 and 335-14-2-.04.	Accumulation of RCRA hazardous waste on site as defined in 40 C.F.R. §260.10 **– Applicable**	ADEM Admin. Code r. 335-14-3-.01(7)(a)(5)(i)(d)
Use and management of hazardous waste in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers **– Applicable**	40 C.F.R. § 265.171 ADEM Admin. Code r. 335-14-5-.09(2)
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 C.F.R. § 265.172 ADEM Admin. Code r. 335-14-5-.09(3)
	Keep containers closed during storage, except to add/remove waste. Open, handle and store containers in a manner that will not cause containers to rupture or leak.	Storage of RCRA hazardous waste in containers**– Applicable**	40 C.F.R. § 265.173 ADEM Admin. Code r. 335-14-5-.09(4)(a)&(b)
	Containers having capacity greater than 30 gallons must not be stacked over two containers high		ADEM Admin. Code r. 335-14-5-.09(4)(c)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 C.F.R. 264.175(b)(1)-(5).	Storage of RCRA hazardous waste in containers *with free liquids* **– Applicable**	40 C.F.R. § 264.175(a) ADEM Admin. Code r. 335-14-5-.09(6)(a)
	Area must be sloped or otherwise designed and operated to drain liquid resulting from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA hazardous waste in containers that *do not contain free liquids* (other than F020, F021, F022, F023, F026 and F027) **– Applicable**	40 C.F.R. § 264.175(c)(1) and (2) ADEM Admin. Code r. 335-14-5-.09(6)(c)(1) and (2)
Closure of hazardous waste container storage with containment system	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with40 C.F.R. 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit *with a containment system* **– Applicable**	40 C.F.R. § 264.178 ADEM Admin. Code r. 335-14-5-.09(9)(a)
Exemption from RCRA Subpart CC Air Emission Standards for containers	The requirements of this subpart do not apply to the following waste management units at the facility: (5) A waste management unit that is used solely for on-site treatment or storage of hazardous waste that is placed in the unit as a result of implementing remedial activities required under the corrective action authorities of RCRA sections 3004(u), 3004(v), or 3008(h); CERCLA authorities; or similar Federal or State authorities.	Storage of RCRA hazardous waste in containers **– Applicable**	40 CFR § 1080(b)(5) *Applicability*
Waste Disposal — Primary Wastes (e.g., contaminated sediments and soil samples) and Secondary Wastes (e.g., decon wastewaters and contaminated equipment/PPE)			
Disposal of RCRA hazardous waste in	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 C.F.R. 268.40 before land disposal.	Land disposal, as defined in 40 C.F.R. 268.2, of	40 C.F.R. § 268.40(a) ADEM Admin. Code r. 33-14-9-.04

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
an off-site land-based unit		restricted RCRA waste – **Applicable**	
	All underlying hazardous constituents [as defined in 40 C.F.R. 268.2(i)] must meet the Universal Treatment Standards, found in 40 C.F.R. 268.48 Table UTS prior to land disposal	Land disposal of restricted RCRA characteristic wastes (D001 –D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **Applicable**	40 C.F.R. § 268.40(e) ADEM Admin. Code r. 33-14-9-.04
Disposal of RCRA – *hazardous waste soil* in an off-site land–based unit	Must be treated according to the alternative treatment standards of 40 C.F.R. 268.49(c) or Must be treated according to the UTSs specified in 40 C.F.R. 268.48 applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 C.F.R. 268.2, of restricted hazardous soils – **Applicable**	40 C.F.R. § 268.49(b) ADEM Admin. Code r. 33-14-9-.04(9)
Treatment of RCRA *hazardous waste soil*	Prior to land disposal, all "constituents subject to treatment" as defined in 40 C.F.R. § 268.49(d) must be treated as follows: • **For non–metals** (except carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90 percent reduction in total constituent concentrations, except as provided in 40 C.F.R. § 268.49(c)(1)(C) • **For metals** and carbon disulfide, cyclohexanone, and methanol, treatment must achieve a 90 percent reduction in total constituent concentrations as measured in leachate from the treated media (tested according to TCLP) or 90 percent reduction in total constituent concentrations (when a metal removal technology is used), except as provided in 40 C.F.R. § 268.49(c)(1)(C) • When treatment of any constituent subject to treatment to a 90 percent reduction standard would result in a concentration less than 10 times the Universal Treatment Standard for that constituent, treatment to achieve constituent concentrations less than 10 times the universal treatment standard is not required. Universal Treatment Standards are identified in 40 C.F.R. §	Treatment of restricted hazardous waste soils – **Applicable**	40 C.F.R. § 268.49(c)(1)(A)-(C)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	268.48 Table UTS.		
	In addition to the treatment requirement required by paragraph (c)(1) of this section, prior to land disposal, soils must be treated to eliminate these characteristics.	Soils that exhibit the characteristic of ignitability, corrosivity or reactivity intended for land disposal – **Applicable**	40 C.F.R. § 268.49(c)(2)
	Provides methods on how to demonstrate compliance with the alternative treatment standards for contaminated soils that will be land disposed.	On-site treatment of restricted hazardous waste soils following alternative soil treatment of 40 C.F.R. 268.49(c) – **TBC**	*Guidance on Demonstrating Compliance with the LDR Alternative Soil Treatment Standards* [EPA 530 –R –02 –003, July 2002]
Constituents subject to treatment	When applying the soil treatment standards in paragraph (c) of this section, constituents subject to treatment are any constituents listed in § 268.48 Table UTS-Universal Treatment Standards that are reasonably expected to be present in any given volume of contaminated soil, except fluoride, selenium, sulfides, vanadium, zinc, and that are *present at concentrations greater than 10 times the universal treatment standard*. PCBs are not constituents subject to treatment in any given volume of soil that exhibits the toxicity characteristic solely because of presence of metals.	Treatment of restricted hazardous waste soils – **Applicable**	40 C.F.R. § 268.49(d)
Disposal of RCRA characteristic wastewaters in an NPDES permitted WWTU	Are not prohibited, if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. pursuant to a permit issued under 402 the CWA (i.e., NPDES permitted), unless the wastes are subject to a specified method of treatment other than DEACT in 40 C.F.R. 268.40, or are D003 reactive cyanide.	Land disposal of RCRA restricted hazardous wastewaters that hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 C.F.R. 268 – **Applicable**	40 C.F.R. § 268.1(c)(4)(i) ADEM Admin. Code r. 335-14-9-.01
Transport and conveyance of collected RCRA wastewater to WWTU located on the facility	Any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to an on–site NPDES–permitted wastewater treatment facility are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment unit (as defined in 40 C.F.R. 260.10) subject to regulation under § 402 or § 307(b) of the CWA (i.e., NPDES–	40 C.F.R. §264.1(g)(6)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
		permitted) that manages hazardous wastewaters – **Applicable**	
Disposal of RCRA characteristic wastewaters in a POTW	Are not prohibited, if the wastes are treated for purposes of the pretreatment requirements of Section 307 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 C.F.R. 268.40, or are D003 reactive cyanide.	Land disposal of hazardous wastewaters that hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 C.F.R. 268 – **Applicable**	40 C.F.R. §268.1(c)(4)(ii) ADEM Admin. Code r. 335-14-9-.01
Liquids in landfills prohibition	The placement of bulk or noncontainerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents have been added) in any landfill is prohibited. Prior to disposal in a hazardous waste landfill, liquids must meet additional requirements as specified in 335-14-5-.14 and 335-14-6-.14	Land disposal, as defined in 40 C.F.R. 268.2, of restricted hazardous soils – **Applicable**	ADEM Admin. Code r. 335-14-3-.04(5)
Discharge of Wastewater (e.g., from equipment decontamination and de-watering of sediments/soils) into Surface Water[2]			
Protection of surface water	The quality of any waters receiving sewage, industrial wastes or other wastes, regardless of their use, shall be such as will not cause the best usage of any other waters to be adversely affected by such sewage, industrial wastes or other wastes.	Point source discharge of pollutants to surface waters – **Applicable**	ADEM Admin. Code r. 335-6-10-.05
Protection of surface water	The following minimum conditions are applicable to all State waters, at all places and at all times, regardless of their uses: a. State waters shall be free from substances attributable to sewage, industrial wastes or other wastes that will settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use. b. State waters shall be free from floating debris, oil, scum, and other floating materials attributable to sewage, industrial wastes or other wastes in amounts sufficient to be unsightly or interfere directly or indirectly with any classified water use.	Point source discharge of pollutants to surface waters – **Applicable**	ADEM Admin. Code r. 335-6-10-.06(a)-(c)

[2] *NOTE*: A responsible party is not required to obtain a discharge permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean the responsible party. Limitations that otherwise would be included in a permit will be identified in a CERCLA ROD or post-ROD document approved by EPA and ADEM.

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	c. State waters shall be free from substances attributable to sewage, industrial wastes or other wastes in concentrations or combinations which are toxic or harmful to human, animal or aquatic life to the extent commensurate with the designated usage of such waters.		
Toxic Pollutant Criteria Applicable to State Waters	The U.S. EPA has listed the chemical constituents given in Table 1 of ADEM Admin. Code r. 335-6-10 as toxic pollutants pursuant to Section 307(a)(1) of the Federal Water Pollution Control Act (FWPCA). Concentrations of these toxic pollutants in State waters shall not exceed the criteria indicated in Table 1 to the extent commensurate with the designated usage of such waters.	Point source discharge of *toxic pollutants* to surface waters – **Applicable**	ADEM Admin. Code r. 335-6-10-.07
General duty to mitigate for discharge of wastewater treatment unit	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Point source discharge of pollutants to surface waters – **Applicable**	40 C.F.R. §122.41(d)
Operation and maintenance of treatment unit	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters – **Applicable**	40 C.F.R. §122.41(e)
Technology-based effluent limits (TBELs) for wastewater discharge	To the extent that EPA promulgated effluent limitations are inapplicable, shall develop on a case-by-case Best Professional Judgment (BPJ) basis under § 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in 40 *CFR* §125.3(d) and shall consider: • The appropriate technology for this category or class of point sources, based upon all available information; and • Any unique factors relating to the discharger.	Discharge of pollutants to surface waters from other than a POTW – **Applicable**	40 C.F.R. §125.3(c)(2)
	Technology-based treatment requirements are applied prior to or at the point of discharge.		40 C.F.R. § 125.3(e)
	Technology-based treatment requirements cannot be satisfied through the use of “non-treatment” techniques such as flow augmentation and in-stream mechanical aerators.		40 C.F.R. § 125.3(f)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
Water quality standards and State requirements	Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.	Discharge that causes or has the reasonable potential to cause, or contributes to an excursion above any State water quality standard, including State narrative criteria for water quality – **Applicable**	40 C.F.R. § 122.44(d)(1)(i)
Establishing water quality-based effluent limits using a calculated numeric water quality criterion	Permitting authority must establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such criterion may be derived using an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data … and current EPA criteria documents.	Determination of effluent limits where a State has not established a water quality criterion for a specific pollutant – **Applicable**	40 C.F.R. §122.44(d)(1)(vi)(A)
Water quality-based effluent limits for wastewater discharge	When developing water quality based effluent limits under this paragraph the permitting authority shall ensure that: (A) The level of water quality to be achieved by limits on point source(s) established under this paragraph is derived from, and complies with all applicable water quality standards; and (B) Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR §130.7.	Point source discharge of pollutants to surface waters **– Applicable**	40 C.F.R. §122.44(d)(1)(vii)
	Attain or maintain a specified water quality through water quality related effluent limits established under section 302 of CWA.		40 C.F.R. §122.44(d)(2)
Minimum monitoring requirements for discharges from on-site CERCLA wastewater treatment unit	In addition to § 122.48, and to assure compliance with permit limitations, the following monitoring requirements shall be followed: (i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit; (ii) The volume of effluent discharged from each outfall; (iii) Other measurements as appropriate including pollutants in internal waste streams under § 122.45(i); pollutants in intake water for net limitations under § 122.45(f); frequency, rate of	Point source discharge of pollutants as defined in 40 CFR 122.2 into surface water – **Applicable**	40 C.F.R. § 122.44(i)(1) *Monitoring requirements*

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	discharge, etc., for non-continuous discharges under § 122.45(e); pollutants subject to notification requirements under§ 122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 CFR part 503; or as determined to be necessary on a case-by-case basis pursuant to section 405(d)(4) of the CWA.		
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under § 122.44(k)		40 C.F.R. § 122.45(a)
Continuous wastewater discharge	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: Maximum daily and average monthly discharge limitations for all discharges.	Continuous discharge of pollutants to surface waters – A**pplicable**	40 C.F.R. § 122.45(d)(1) ADEM Admin. Code r. 335-6-6-.15(4)(a)
Non-continuous wastewater discharge	Discharges which are not continuous, as defined in rule 335-6-6-.02, shall be particularly described and limited, considering the following factors, as appropriate: • Frequency (for example, a batch discharge shall not occur more than once every three weeks); • Total mass (for example, not to exceed 100 kilograms of zinc and 200 kilograms of chromium per batch discharge); • Maximum rate of discharge of pollutants during the discharge (for example, not to exceed two kilograms of zinc per minute or not to exceed a specified discharge rate); and • Prohibition or limitation of specified pollutants by mass, concentration, or other appropriate measure (for example, shall not contain at any time more than 0.1 milligrams per liter zinc or more than 250 grams of zinc in any discharge).	Non-continuous discharge of pollutants to surface waters – **Applicable**	ADEM Admin. Code r. 335-6-6-.15(5)(a)-(d)
Internal waste streams	Limitations on internal waste streams may be imposed: 1) When permit limitations or standards imposed at the point of discharge are impractical or infeasible; 2) Prior to mixing with other waste streams or cooling water streams; 3) When the wastes at the final point of discharge are so diluted that monitoring would be impracticable;	Mixing wastewater into another waste stream prior discharge into surface waters – **Applicable**	ADEM Admin. Code r. 335-6-6-.15(8)(a)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	4) When interferences among pollutants at the point of discharge would make detection or analysis infeasible.		
	When monitoring of internal waste streams is required, the monitoring requirements of subparagraph 335-6-6-.14(3)(i) shall be applicable.		ADEM Admin. Code r. 335-6-6-.15(8)(b)
Transportation of Wastes			
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 C.F.R. §§ 171–180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **Applicable**	49 C.F.R. § 171.1(c)
Pre-Transportation of hazardous waste *off–site*	Must comply with the generator standards of Part 262 including 40 C.F.R. §§ 262.20–23 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding,	Preparation and initiation of shipment of hazardous waste off–site – **Applicable**	40 C.F.R. § 262.10(h);
	A generator who transports, or offers for transportation, hazardous waste for off-site treatment, storage, or disposal, or a treatment, storage, and disposal facility who offers for transportation a rejected hazardous waste load, must prepare a Manifest (OMB control number 2050-0039) on EPA Form 8700-22, and, if necessary, EPA Form 8700-22A, according to the instructions in 335-14-3-Appendix I.		ADEM Admin. Code r. 335-14-3-.02(1)(a)
Packaging	Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must package the waste in accordance with the applicable United States Department of Transportation regulations on packaging under 49 CFR Parts 173, 178, and 179. Failure to properly package the waste in accordance with the applicable United States Department of Transportation regulations is a violation of 335-14-3-.03(1).		ADEM Admin. Code r. 335-14-3-.03(1)
Labeling	Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must label each package in accordance with the applicable United States Department of Transportation regulations on hazardous materials under 49 CFR		ADEM Admin. Code r. 335-14-3-.03(2)

Table 5: Action-Specific ARARs and TBCs for Olin OU-2 Amended Remedy

Action	Requirements	Prerequisite	Citation
	Part 172. Failure to properly label the waste in accordance with the applicable United States Department of Transportation regulations is a violation of 335-14-3-.03(2).		
Marking	Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must mark each package of hazardous waste in accordance with the applicable United States Department of Transportation regulations on hazardous materials under 49 CFR Part 172;		ADEM Admin. Code r. 335-14-3-.03(3)
Transportation of hazardous waste *on–site*	The generator manifesting requirements of 40 C.F.R. 262.20–262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 C.F.R. 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right–of–way.	Transportation of hazardous wastes on a public or private right–of–way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right–of–way – **Applicable**	40 C.F.R. § 262.20(f)
Transportation of samples (*i.e.* soil, sediments and wastewaters)	Are not subject to any requirements of 40 C.F.R. Parts 261 through 268 or 270 when: • the sample is being transported to a laboratory for the purpose of testing; or • the sample is being transported back to the sample collector after testing. • the sample is being stored by sample collector before transport to a lab for testing	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **Applicable**	40 C.F.R. § 261.4(d)(1)(i)–(iii)
	In order to qualify for the exemption in paragraphs (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must: • Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements. • Assure that the information provided in (1) thru (5) of this section accompanies the sample. • Package the sample so that it does not leak, spill, or vaporize from its packaging.		40 C.F.R. § 261.4(d)(2)(i)(A) and (B)

ADEM = Alabama Department of Environmental Management
ADPH = Alabama Department of Public Health
ARAR = Applicable or Relevant and Appropriate Requirement [Ref. 40 C.F.R. § 300.5 Definitions of 'Applicable requirements' and 'Relevant and appropriate requirements']
AWPCA = Alabama Water Pollution Control Act
C.F.R. = *Code of Federal Regulations*
CWA = Clean Water Act
DOI = U.S. Department of the Interior
DOT = U.S. Department of Transportation
PPE = personal protection equipment
> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
TBC = To Be Considered [Ref. 40 C.F.R. § 300.405(g)(3) "The 'to be considered' (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies."]
U.S.C. = U.S. Code
WWTU = waste water treatment unit

Table 6: Summary of Estimated Costs for Wastewater Ditch Remedial Alternatives

	WWD-2	WWD-3A	WWD-3B	WWD-4
Task Description	**Engineered Cap**	**Mechanical Excavation/ Consolidation in Basin/ Off-Site Haz Disposal**	**Mechanical Excavation / Off-Site Disposal**	**In Situ Solidification/ Stabilization and Protective Cover**
Capital Costs				
Contractor Submittals	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Preconstruction Works	$ 120,000	$ 120,000	$ 120,000	$ 120,000
Mob., Survey, & Site Prep.	$ 899,000	$ 1,019,000	$ 565,000	$ 466,000
Construction Works	$ 5,445,000	$ 18,726,000	$ 21,477,000	$ 7,506,000
Sub-Total: Capital Costs	**$ 6,474,000**	**$ 19,875,000**	**$ 22,172,000**	**$ 8,102,000**
Post-Construction Sampling	$ 197,000	$ 368,000	$ 368,000	$ 279,000
Annual O&M Costs	$ 6,371,000	$ 129,000	$ 129,000	$ 6,371,000
Long-Term Monitoring Costs	$ 769,000	$ 281,000	$ 281,000	$ 714,000
Sub-Total: Annual / Monitoring Costs	**$ 7,337,000**	**$ 780,000**	**$ 780,000**	**$ 7,360,000**
Present Value Discount @ 7%	$ (5,829,000)	$ (111,000)	$ (111,000)	$ (5,802,000)
Sub-Total: Annual Costs (Present Value)	**$ 1,508,000**	**$ 668,000**	**$ 668,000**	**$ 1,558,000**
Sub-Total (Present Value)	**$ 7,982,000**	**$ 20,543,000**	**$ 22,839,000**	**$ 9,660,000**
Contingency	$ 800,000	$ 5,136,000	$ 5,710,000	$ 970,000
Sub-Total (Present Value) including Contingency)	**$ 8,782,000**	**$ 25,679,000**	**$ 28,549,000**	**$ 10,630,000**
Project Management @ 5%	$ 440,000	$ 1,284,000	$ 1,427,000	$ 530,000
Construction Management @ 6%	$ 530,000	$ 1,541,000	$ 1,713,000	$ 640,000
Engineering & Design @ 6%	$ 530,000	$ 1,541,000	$ 1,713,000	$ 640,000
Total (Present Value)	**$ 10,280,000**	**$ 30,044,000**	**$ 33,403,000**	**$ 12,440,000**

Note: Costs presented in the 2023 Focused Feasibility Study for Alternatives WWD-3A and WWD-3B were adjusted downward to reflect a smaller fraction of soils being disposed at a hazardous waste landfill.

Table 7: Summary of Estimated Costs for Floodplains Remedial Alternatives

	FP-2	FP-3A	FP-3B
Task Description	**Engineered Cap**	**Full Excavation/ Consolidation in Basin**	**Full Excavation/ Off-Site Disposal**
Capital Costs			
Contractor Submittals	$ 10,000	$ 10,000	$ 10,000
Preconstruction Works	$ 120,000	$ 120,000	$ 120,000
Mob., Survey & Site Prep.	$ 4,120,000	$ 3,510,000	$ 2,702,000
Construction Works	$ 14,933,000	$ 44,682,000	$ 62,710,000
Sub-Total: Capital Costs	**$ 19,183,000**	**$ 48,322,000**	**$ 65,542,000**
Post Construction Sampling	$ 25,000	$ 618,000	$ 571,000
Annual O&M Costs	$ 6,371,000	$ 259,000	$ 259,000
Long-Term Monitoring Costs	$ 524,000	$ 402,000	$ 347,000
Sub-Total: O&M / Monitoring Costs	**$ 6,920,000**	**$ 1,279,000**	**$ 1,177,000**
Present Value Discount @ 7%	$ (5,638,000)	$ (192,000)	$ (188,000)
Sub-Total: Present Value Annual Costs	**$ 1,282,000**	**$ 1,087,000**	**$ 989,000**
Sub-Total (Present Value)	**$ 20,465,000**	**$ 49,409,000**	**$ 66,531,000**
Contingency (varies by RA Method*)	$ 2,047,000	$ 12,352,000	$ 16,633,000
Sub-Total (Present Value incl. Contingency)	**$ 22,512,000**	**$ 61,761,000**	**$ 83,164,000**
Project Management @ 5%	$ 1,126,000	$ 3,088,000	$ 4,158,000
Construction Management @ 6%	$ 1,351,000	$ 3,706,000	$ 4,990,000
Engineering & Design @ 6%	$ 1,351,000	$ 3,706,000	$ 4,990,000
Total (Present Value)	**$ 26,340,000**	**$ 72,261,000**	**$ 97,302,000**

Note: The cost presented in the 2023 Focused Feasibility Study for Alternative FP-2 was adjusted slightly upward to reflect the use of activated carbon as an amendment in the cap for a small portion of the floodplain.

Table 8: Summary of the Amended Selected Remedy

2014 ROD Selected Remedy for OU-2 Basin and Round Pond			
OU-2 Area	**Segment**	**Selected Remedy**	**Estimated Cost**
Olin Basin and Round Pond	Olin Basin and Round Pond	Engineered Cap with Amendment - 2014 ROD (Selected Remedy)	$33.3 Million (updated from 2014 estimate)
2024 Selected Remedy for OU-2 Wastewater Ditch and Floodplains			
OU-2 Area	**Segment**	**Preferred Alternative**	**Estimated Cost**
WWD	Upper and Upper Central (DU10 – DU26)	ISS with Cover - 2023 FFS, Alternative WWD-4	$12.4 Million
Floodplains	Northeast Floodplain	Engineered Cap with Amendment - 2023 FFS, Alternative FP-2	$26.3 Million
	East Floodplain		
	Northwest Floodplain		
	North Floodplain		
	South and Southwest Floodplains (including Lower WWD DU1 – 9)		
Total for OU-2 Selected Remedy - WWD-4 and FP-2			**$72 Million**
Total for OU-2 If Contingency Remedy WWD 3B Needed and FP-2:			**$93 Million**

Table 9: Detailed Cost Breakdown for Wastewater Ditch Selected Remedy

No.	Description	Quantity	Unit	Unit Price	Price
1	Contractor Submittals	1	LS	$ 10,000	$ 10,000
2	Engineering, Construction Planning & Procurement	1	LS	$ 120,000	$ 120,000
3	Mobilization/Demobilization	1	LS	$ 158,200	$ 158,200
4	Pre-Construction Surveying				
	Land Survey	1	LS	$ 15,000	$ 15,000
	Condition Survey	1	LS	$ 20,000	$ 20,000
	Bathymetry and Topography	1	LS	$ 55,000	$ 55,000
	Ecological Surveys	1	LS	$ 15,000	$ 15,000
5	Erosion and Sedimentation Controls & BMPs	10	AC	$ 2,623	$ 26,225
6	Clear & Grub				
	Clear Underbrush	10	AC	$ 4,401	$ 44,013
	Mulch & Spread	10	AC	$ 3,543	$ 35,431
7	Grading & Temporary Access				
	Temporary Access Routes	10	AC	$ 5,865	$ 58,651
	Interim Work Platforms	3.3	AC	$ 15,926	$ 52,556
	Permanent Drainage Features	3.3	AC	$ 4,751	$ 15,678
8	Dewatering				
	Coffer Dam	4	LS	$ 44,437	$ 177,748
	Dewatering & Bypass S&I	1	LS	$ 49,409	$ 49,409
	Dewatering & Bypass Operation	5	Mn	$ 10,700	$ 53,500
	Dewatering Decommission / Demobilization	1	LS	$ 10,000	$ 10,000
9	Contractor Survey Control & Staking	1	LS	$ 10,000	$ 10,000
10	Protective & Reinstatement Works				
	Protect O/H Caustic Pipeline	1	LS	$ 20,000	$ 20,000
	Weir Structure Remove & Replace	1	LS	$ 105,000	$ 105,000
11	In-Situ Stabilization				
	Benchscale / Pilot Testing	1	LS	$ 250,000	$ 250,000
	In-Situ Stabilization c/w Admixture	27,200	CY	$ 50	$ 1,367,695
	Confirmatory Sampling	54	CY	$ 1,000	$ 54,000
	In-Situ Stabilization c/w Admixture - 30% Remix	8,160	CY	$ 50	$ 410,309
	Bank Cuts / Slope Stabilization	6,500	CY	$ 7	$ 42,721
12	Final Grading				
	Bulk Materials (6 inches)	3,500	CY	$ 35	$ 122,500
	Grade Control - Tributaries	3	LS	$ 25,137	$ 75,411
	Geocomposite Liner	210,000	SF	$ 4	$ 840,000
	Liner Protect & Armor - Sand, Stone, Riprap	210,000	SF	$ 10	$ 2,143,728
	Final Grading	3,500	CY	$ 15	$ 52,728
13	Site Restoration				
	Additional Armoring	500	CY	$ 150	$ 75,000
	Vegetation Restoration	10	AC	$ 6,000	$ 60,000
14	Contractor Indirects & Reserves	22	%	-	$ 1,546,115
15	Contractor Quality Control / Testing	1	LS	$ 10,000	$ 10,000
	Total Capital Cost				**$ 8,101,618**

Table 9: Detailed Cost Breakdown for Wastewater Ditch Selected Remedy

Annual Operation and Maintenance Costs for Wastewater Ditch						
No.		Description	Quantity	Unit	Unit Cost	Price
1	Inspections		12	Mn	$ 500	$ 6,000
2	Maintenance Allowance		1	LS	$ 50,000	$ 50,000
3	Annual O&M Report		1	LS	$ 2,500	$ 2,500
4	Technical Support During O&M		10%	%	% of Cost	$ 5,850
	Total Annual O&M Cost					**$ 64,350**

Long-term Monitoring Cost for Wastewater Ditch						
No.		Description	Quantity	Unit	Unit Cost	Price
1	Site Inspection		2	LS	$ 6,020	$ 12,040
3	Sediment and Soil Sampling		15	LS	$ 3,250	$ 48,750
3	Topographic/ Bathymetric Survey		1	LS	$ 55,000	$ 55,000
4	Five-year Review Report		1	LS	$ 50,000	$ 50,000
	Total Long-term Monitoring Cost at 5-year Intervals					**$ 165,790**

Summary of Present Worth Analysis for Wastewater Ditch						
Year	Capital Cost	Monitoring Cost	Annual O&M Cost	Total Cost	Discount Factor	Present Worth
0	$8,101,618			$8,101,618	1.000	$8,101,618
1			$64,350	$64,350	0.935	$60,167
2			$64,350	$64,350	0.873	$56,178
3			$64,350	$64,350	0.816	$52,510
4			$64,350	$64,350	0.763	$49,099
5		$165,790	$64,350	$230,140	0.713	$164,090
6			$64,350	$64,350	0.666	$42,857
7			$64,350	$64,350	0.623	$40,090
8			$64,350	$64,350	0.582	$37,452
9			$64,350	$64,350	0.544	$35,006
10		$165,790	$64,350	$230,140	0.508	$116,911
	Sub-total for Years 1 - 10					$8,755,978
	Sub-total for Years 11 through 100					$3,684,022
	Total Present Worth Cost					**$12,440,000**

Notes:

LS	Lump Sum	AC	Acre
Mn	Month	CY	Cubic yard

1 Discount rate for present worth analysis = 7%

2 Present worth cost for the first 10 years presented for illustrative purposes.

Table 10: Detailed Cost Breakdown for Floodplain Selected Remedy

No.	Description	Quantity	Unit	Unit Price	Amount
1	Contractor Submittals	1	LS	$ 10,000	$ 10,000
2	Engineering, Construction Planning, Procurement	1	LS	$ 120,000	$ 120,000
3	Mobilization/Demobilization	1	LS	$ 393,200	$ 393,200
4	Pre-Construction Surveying				
	Land Survey	1	LS	$ 45,000	$ 45,000
	Condition Survey	1	LS	$ 20,000	$ 20,000
	Bathymetry and Topography	1	LS	$ 100,000	$ 100,000
	Ecological Surveys	1	LS	$ 45,000	$ 45,000
5	Erosion and Sedimentation Controls & BMPs	64	AC	$ 2,623	$ 167,842
6	Clear & Grub				
	Clear Underbrush	64	AC	$ 4,401	$ 281,680
	Mulch & Spread	64	AC	$ 3,543	$ 226,760
7	Grading & Temporary Access				
	Temporary Access Routes	64	AC	$ 5,865	$ 375,363
	Bridging of Soft Sediments	418176	SF	$ 6	$ 2,323,127
	Stormwater Retention Swale	2000	LF	$ 116	$ 231,802
8	Contractor Survey Control & Staking	3	YR	$ 10,000	$ 30,000
9	Maintain Water Management Features	3	YR	$ 20,000	$ 60,000
10	Subgrade Preparation	12000	CY	$ 15	$ 181,584
11	Engineered Cap				
	Supply and Haul Bulk Materials (12 inches)	103000	CY	$ 35	$ 3,605,000
	Activated Carbon Amendment	3350	CY	$ 66	$ 221,100
	Engineered Cap - Material placement	103000	CY	$ 7	$ 750,180
12	Site Restoration				
	Erosion Marker Layer / Geogrid	64	AC	$ 11,676	$ 747,288
	Liner Protect & Armor - Sand, Stone, Riprap	226512	SF	$ 10	$ 2,312,287
	Supply and Haul 6" Sand Habitat Layer	52434	CY	$ 35	$ 1,835,190
	Hydraulically Place Habitat Layer	52434	CY	$ 15	$ 790,180
	Vegetation/Wetland Restoration	64	AC	$ 10,000	$ 640,000
13	Contractor Indirects & Reserves	22	%	-	$ 3,660,131
14	Contractor Quality Control / Testing	1	LS	$ 10,000	$ 10,000
	Total Capital Cost				**$ 19,182,714**

Table 10: Detailed Cost Breakdown for Floodplain Selected Remedy

Annual Operation and Maintenance Costs for Floodplains						
No.		Description	Quantity	Unit	Unit Cost	Price
1	Inspections		12	Mn	$ 500	$ 6,000
2	Maintenance Allowance		1	LS	$ 50,000	$ 50,000
3	Annual O&M Report		1	LS	$ 2,500	$ 2,500
4	Technical Support During O&M		10%	%	% of Cost	$ 5,850
	Total Annual O&M Cost					**$ 64,350**

Long-term Monitoring Cost for Floodplains						
No.		Description	Quantity	Unit	Unit Cost	Price
1	Site Inspection		2	LS	$ 12,403	$ 24,806
3	Sediment and Soil Sampling		15	LS	$ 3,250	$ 48,750
3	Topographic/ Bathymetric Survey		1	LS	$ 55,000	$ 55,000
4	Five-year Review Report		1	LS	$ 25,000	$ 25,000
	Total Long-term Monitoring Cost at 5-year Intervals					**$ 153,556**

Summary of Present Worth Analysis for Floodplains						
Year	Capital Cost	Monitoring Cost	Annual O&M Cost	Total Cost	Discount Factor	Present Worth
0	$19,182,714			$19,182,714	1.000	$19,182,714
1			$64,350	$64,350	0.935	$60,167
2			$64,350	$64,350	0.873	$56,178
3			$64,350	$64,350	0.816	$52,510
4			$64,350	$64,350	0.763	$49,099
5		$153,556	$64,350	$217,906	0.713	$155,367
6			$64,350	$64,350	0.666	$42,857
7			$64,350	$64,350	0.623	$40,090
8			$64,350	$64,350	0.582	$37,452
9			$64,350	$64,350	0.544	$35,006
10		$153,556	$64,350	$217,906	0.508	$110,696
	Sub-total for Years 1 - 10					$19,822,136
	Sub-total for Years 11 through 100					$6,517,864
	Total Present Worth Cost					**$26,340,000**

Notes:

LS	Lump Sum	SF	Square Foot
Mn	Month	YR	Year
AC	Acre	CY	Cubic Yard
1			
2			

APPENDIX I RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

1.0 INTRODUCTION

Overview and Background

This responsiveness summary provides a summary of the public's comments submitted to the U.S. Environmental Protection Agency (EPA) regarding the January 2024 Proposed Plan for Olin Corp. (McIntosh Plant) Site Operable Unit 2 (Site) and EPA's responses to those comments. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 Code of Federal Regulation (CFR) § 300.430(f)(3)(F) requires a responsiveness summary. All comments summarized in this document have been considered in EPA's final decision for the selection of the remedy for the Site.

Summary of Community Participation

The January 2024 Proposed Plan, which identified the EPA's preferred remedy and the basis for that preference, including supporting analyses and information, was made available to the public online at www.epa.gov/superfund/olin-corporation-mcintosh on January 10, 2024. The *Washington County News* published notice of availability of the above-referenced documents and the announcements of a public meeting date January 12, 2024.

EPA presented the history of Operable Unit 2 (OU-2), summarized the work done to investigate the Site, described EPA's Preferred Remedy and the rationale behind the selection, and published the comment period schedule in a January 23, 2024, public meeting at McIntosh High School. The Administrative Record provides a copy of the transcript from the public meeting.

Because of public interest, a second public availability session was also held at McIntosh High School on February 20, 2024. To accommodate the additional availability session, the public comment period was extended two weeks. The initial 30-day comment period began January 15, 2024, and ended February 14, 2024. The time extension changed the end date to February 28, 2024. The *Washington County News* published a notice of the availability session and extension of the public comment period February 16, 2024.

EPA received comments and responded to questions from area residents and other attendees during the public meeting and availability sessions. The Administrative Record file for the Amendment to the OU-2 Record of Decision contains written comments that the EPA received during the public comment period, the public meeting transcript, and presentation materials the EPA displayed during public meetings. The Administrative Record file may be reviewed at the McIntosh Public Library, 83 Olin Road, McIntosh, Alabama, or online at https://www.epa.gov/superfund/olin-corp-mcintosh.

In recent years, residents have expressed concerns regarding air quality near the Olin Chlor Akali plant. Trust of Olin Corporation seems very low among members of the nearby community, where 92 percent (%) of the population within 1 mile of the facility are people of color. EPA contacted the MOWA Band of Choctaw in December 2023 about the Olin Corp. Superfund Site and again in March of 2024 about the Proposed Plan.

In August of 2022, EPA was contacted by a University of Alabama professor, who has been engaged with the community, about concerns centered mostly on air emissions. EPA facilitated communications between the professor, Alabama Department of Environmental Management (ADEM), and the Agency for Toxic Substances and Disease Registry (ATSDR) in efforts to address the community's concerns. The professor and community members were contacted directly about the Proposed Plan Public Meeting in January 2024. The professor attended and videoed the meeting to document the meeting and responses. In February 2024, after the availability session, the EPA team was given a tour of the areas where the community believes flood water from the Olin property is leaving the Olin property and entering the surrounding neighborhoods. Findings from this tour and any follow-up actions needed will be provided at a later date.

Overview of Comments Received

EPA received written and oral comments on EPA's preferred alternative for OU-2 from community members. WSP USA, Inc. (WSP), on behalf of Olin Corporation and BASF Corporation, provided a letter during the comment period. Section 2.0 of this Responsiveness Summary details a written response to each significant comment category. Section 3.0 of this Responsiveness Summary presents a copy of the letter provided by WSP..

A total of 26 comments were received and are grouped into the following six categories:

- Seven comments on potential contamination of nearby, off-site private property
- Two comments related to public health and safety before and during remedial action
- One comment on the duration of remedial action implementation
- Twelve comments in reference to the development of preferred alternatives
- Three comments in reference to public comments provided at previous public meetings
- One comment in reference to job opportunities related to ongoing cleanup activities

2.0 PUBLIC COMMENTS AND RESPONSES

Comment 1. Potential contamination of off-site private property:

Seven individuals provided comments about the potential risks associated with possible contamination on nearby, off-site private property. Their primary concerns revolve around the adequacy of delineating the extent of off-site contamination and whether that delineation had factored into ongoing flooding risks. Additionally, there were apprehensions expressed regarding the safety of eating deer and fish, as well as gardening, on these properties. One individual specifically highlighted concern about whether soil samples had been collected in an old property located between Industrial Road and River Road, recalling past site operations at the location possibly related to disposal activities.

EPA Response:

The human health risk assessment described in the 2014 Record of Decision (ROD) evaluated the risks associated with the Site. This assessment evaluated known exposure pathways for the chemicals of concern (COCs) and concluded that unacceptable off-site risks were not present. EPA has not seen an increase in the COCs in response to storms or flooding and does not believe that OU-2 is affecting off-site properties. Historical sampling of residential wells and soils on off-site properties near the Site did not indicate COCs above maximum contaminant levels (MCLs) or soil screening levels. EPA will continue to engage with the community to address their concerns about OU-2 and the potential for off-site migration of COCs.

Regarding consumption of deer, EPA found that the estimated health risks for DDTR (i.e., Total dichlorodiphenyl choroethanes (Sum of p,p'-DDT; o,p'-DDT; p,p'- DDE; o,p'-DDE; p,p'-DDD and o,p'-DDD), mercury, and hexachlorobenzene (HCB) are not of concern for both cancer and noncancer risks. As far as the question relates to the selected remedies in the 2014 ROD and this Amended Record of Decision (AROD), once the remedies are implemented, it is expected that contaminated soils and sediments will be isolated, preventing any uptake of contamination into wildlife (e.g., fish, birds, deer).

The main exposure route to people from OU-2 is through ingestion of contaminated fish in the Tombigbee River near the Site. Based on the site-specific human health risk assessment, the only unacceptable health risks were from recreational fishing in the Olin Basin in the future, because of the mercury levels in fish tissue. The risk assessment conservatively assumed that fisherpersons will catch and eat more fish from the Olin Basin in the future than they do currently.

Alabama Department of Public Health issues fish advisories for the State and those advisories can be found on the following website: www.alabamapublichealth.gov/tox/fish-advisories.html

As of 2022, the following fish advisories are applicable to the Site. The location of the fish advisories is located near McIntosh landing, River Mile 60.0 (Washington County):

Waterbody	Location	Species of Fish	Advisory
Tombigbee River	Vicinity of McIntosh landing, River Mile 60.0 (Washington County)	Channel catfish	1 meal/month (mercury)
		Black crappie	2 meals/month (mercury)
		Largemouth Bass	Do Not Eat Any (mercury)

According to Alabama Department of Public Health, a portion size of a fish meal (for an adult) is 6 ounces of cooked fish or 8 ounces of raw fish.

Comment 2. Public health and safety before and during remediation:

One individual expressed concern about the current air quality and sought clarification on any necessary precautions the public should take during the implementation of the remedy.

EPA Response

The human health risk assessment described in the 2014 ROD evaluated the risks associated with the Site. This assessment evaluated known exposure pathways for the COCs and concluded that unacceptable health risks from contaminants in air on- and off-site were not present. Furthermore, it was determined that current and future offsite land use is expected to remain unchanged. The Clean Air Act (CAA), administered by ADEM, regulates potential releases from active plant processes such as chlorine. Public concerns expressed regarding air emissions have been referred to ADEM and ATSDR.

During remedial action for OU-2 that involves land-disturbing activities, precautions will be undertaken to prevent fugitive dust emissions as required by CAA regulations that are identified as applicable or relevant and appropriate requirements (ARARs). During dry and arid conditions, affected soil areas may be wetted to suppress dust formation in the ambient air that could be transported off the facility.

Comment 3. Duration of remedial action implementation:

One individual asked about the time frame for remedial action implementation.

EPA Response

The estimated construction start is late 2026 or early 2027. It is expected that cleanup of the wastewater ditch (WWD) will take about a year (weather dependent) following completion of the Remedial Design (RD) which is currently underway. Cleanup of the floodplains may take up to three years after the RD is complete. Flooding occurs over several months a year and limits certain types of construction from taking place.

Comment 4. Development of preferred alternatives:

The settling defendants (SDs) provided the following comments on the development of the preferred alternative.

Comment 4a. General comment on selected remedies:

The SDs noted their support for EPA's selected remedies that were set forth in the Proposed Plan subject to detailed comments on the remedy cost estimates and development of preferred alternatives, which are addressed in Comment #s 5 and 6.

EPA Response

The SDs' support for the "selected remedies" (actually preferred "remedies" at this point in the remedy selection process) is acknowledged.

Comment 4b. Groundwater:

The SDs noted that the Proposed Plan had incorrectly identified groundwater as a media of concern for OU-2, based on the following statement from the Proposed Plan "…mercury and HCB exceedances in the WWD soils and sediments indicate that there may be contamination below the maximum sampling depth that extends into the groundwater. Thus, there may also be COC transport from the deeper WWD soils and sediments to groundwater."

The SDs noted that neither the *Revised Groundwater Investigation Report Operable Unit 2, McIntosh,* groundwater was not identified as a media of concern in either the *Revised Groundwater Investigation Report Operable Unit 2, McIntosh, Alabama* (MACTEC 2010) or the 2014 ROD and that more recent data are consistent with these reports. They noted that the analysis in the FFS Appendix E, indicates that the COCs in the soil/sediment are not mobile in groundwater (Appendix E, WSP 2023).

The SDs also expressed concerns that the potentiometric surfaces shown in each panel of Figure 4 of the Proposed Plan were different from the water surface elevations presented in the FFS (Figure 8, Section 1.2.3.2, WSP 2023).

EPA Response

The comment acknowledges that "groundwater levels may be intermittently elevated, resulting in temporary contact between the soils/sediments in the Upper and Upper Central wastewater ditch and groundwater" and cites Appendix E in the 2023 FFS that "COCs in the soil/sediment are not mobile in groundwater." However, the work documented in Appendix E was not performed with data from the WWD. Rather, Appendix E focused on simulating the maximum flow path length for COCs at concentrations above surface water quality criteria between the contaminated sediments in the south floodplain and the Tombigbee River. Conditions in the south floodplain area are significantly different from the WWD; therefore, the conclusions drawn in 2023 FFS Appendix E are not readily translatable to the WWD. For example, concentrations of mercury and HCB in the WWD sediments were higher (up to 2,000 milligrams per kilogram [mg/kg] for Hg and up to 1,000 mg/kg for HCB) than the south floodplain (up to 84 mg/kg for Hg and up to 140 mg/kg for HCB).

EPA also disagrees that it is incorrect to suggest that cleanup level (CUL) exceedances in the wastewater ditch soils/sediments may impact groundwater. It is likely that groundwater is not impacted at upgradient portions of the Upper Ditch, but it has not been shown conclusively that this is the case for other parts of the wastewater ditch. Adjacent monitoring well PL10D has exceeded the applicable standard for mercury in groundwater and has remained elevated. In addition, no data such as boring logs and actual water table elevations were presented in the

FFS to identify where the groundwater table is actually located, and the vertical extent of contamination has not been fully delineated. Note 3 on Figure 8 (Wastewater Ditch Profile and Sections) of the FFS states that "subsurface geologic delineations and seasonal groundwater levels are generalized based on data from nearby investigations and wells"; hence, some of the positions held in the comment are not supported by WWD-specific data. EPA will provide further determinations relating to groundwater during the RD, based in part on data to be collected as part of the data gaps investigation.

Figure 4 of the Proposed Plan was developed using information provided to EPA in the database, in boring logs, and in reports.

Comment 4c. Remedial Action Objective and Cleanup Levels for Mercury:

The SDs expressed that it was their opinion that the Proposed Plan was "incorrect with respect to the actions being taken to address the potential risks posed by mercury contamination in OU-2." The SDs noted that the remedial actions being taken at OU-2 are to meet CULs expressed as total mercury and that there are no remedial action objectives (RAOs) nor CULs for methylmercury. They requested that EPA be clear when noting that the remedial actions being taken are to meet CULs, which include total mercury, not methylmercury.

EPA Response

The EPA disagrees with the SDs' comment. The Proposed Plan is clear that RAOs (Proposed Plan, page 8) and CULs (Proposed Plan, **Table 1**) were derived for mercury only, but that mercury acts as a surrogate for methylmercury, which presents significant human and ecological risks at OU-2 (Proposed Plan, page 8, paragraph 1 and paragraph 2, respectively).

As noted in the FFS, while methylmercury does not have a numeric CUL, "risk to ecological and human receptors from methylmercury will be addressed through the remediation of soil and sediment with mercury concentrations above the CUL". As noted by the SDs in their comment, the 2014 ROD is also clear that while remedial goals (RGs) and subsequently derived RAOs and CULs were established only for total mercury, the intention is to reduce the total mercury and to control the transformation processes that produces methylmercury:

> "Though the risk assessment evaluated both total mercury and methylmercury separately, RGs were established only for total mercury (inorganic + methyl). **Reducing total mercury and controlling the transformation processes that produce methylmercury are the keys to reducing methylmercury concentrations in OU-2.**"

Comment 4d. Use of terms "habitat replacement/enhancement" instead of restoration:

The SDs noted in two comments that the Proposed Plan used the term "habitat replacement/enhancement" in both the third paragraph of Page 1 and the first paragraph of Page 2 when describing the WWD-4 and FP-2 alternatives, respectively. EPA-approved FFS used the term "restoration" instead. They request that the term "restoration" be used when

describing the remedy to be consistent with the EPA-approved FFS and state that the restoration details will be addressed during the RD.

EPA Response

The phrase "habitat restoration" will be used in the AROD when describing the remedial alternatives similar to the nomenclature used in the EPA-approved November 2023 revised FFS. The EPA decided to use the phrase "habitat replacement/enhancement" in the 2024 Proposed Plan because it represents the type of restoration that likely will be implemented to satisfy identified location-specific ARARs related to activities in floodplains and wetlands. In addition, EPA was concerned that parties might misunderstand the term "restoration" because there is a definition for "restoration or rehabilitation" in the natural resource damage assessment regulations at 43 CFR § 11.13. Despite this reasonable rationale, EPA has decided to revert to the phrase "habitat restoration" in the remedial alternatives (and selected remedies) presented in this AROD because it may be understood to encompass a wider range of restorative actions that could be undertaken. In the context of wetlands mitigation, restoration is one of the available options for satisfying the requirement for compensatory mitigation under the Clean Water Act (CWA) Section 404(b) guidelines regulations.

Adverse impacts to aquatic resources such as wetlands caused by OU-2 remedial activities are subject to compensatory mitigation under the CWA Section 404(b) guidelines regulations that are identified as location-specific ARARs in the AROD. That mitigation could include restoration and replacement/enhancement of the existing wetland resources located at the site. In-kind mitigation projects should result in resource structure and functional capacity that are comparable to reference aquatic resources. In other words, in-kind mitigation should not consist of replacing a degraded resource with a degraded compensation resource. An in-kind compensatory mitigation project should result in high-quality aquatic resources. Thus, a mitigation project that was for the same class of wetlands as the impacted resource, but with a greater species diversity and habitat quality, would be considered appropriate in-kind mitigation. See preamble to the EPA's *Compensatory Mitigation for Loss of Aquatic Resources* Final Rule at 73 Fed. Reg. 19622 (April 10, 2008). EPA's determination as to what type of mitigation EPA will require will be influenced throughout the remedy implementation, including in the RD and Remedial Action Work Plan. EPA recognizes that compensatory mitigation is not fully considered until after all appropriate and practicable steps have been taken to first avoid and then minimize the adverse impacts to the aquatic ecosystem pursuant to the CWA Section 404(b) guidelines. In addition to the wetlands mitigation, restoration of disturbed floodplains will be required to ensure that the natural and beneficial values served by floodplains are maintained.

Comment 4e. Post-construction confirmation sampling:

The SDs noted that for Alternative FP-2, it is unclear why additional sampling post-remedial action would be needed (aside from any necessary long-term monitoring to assess remedy effectiveness), because sufficient sampling should be performed before remedial action as part of RD activities to define the extent of the cap layer. As such, post-construction sampling (i.e., confirmation sampling) would not be needed for EPA's Preferred Alternative and should not be stated or implied.

EPA Response

EPA agrees that post-construction sampling to verify attainment of CULs should not be necessary following implementation of Alternative FP-2. However, post-construction monitoring and inspections of the capped areas will be required and maintenance must be performed, as necessary, to any degraded areas.

Comment 4f. Amendments in engineered cap:

The SDs requested that the Proposed Plan should state that the need for an amendment in the engineered cap will be determined, through the analysis and evaluations conducted during the RD, where data from various media will be evaluated. They noted that the text as presented in **Tables 6 and 7** implied that an amended cap would be constructed throughout all the segments of the floodplain, which may not be necessary.

EPA Response

EPA acknowledges that the information gathered from the Treatability Study and further detailed analyses that will be performed during the RD, will be helpful in determining what, if any, amendment is needed and where it is necessary. The preferred remedy for certain parts of the FP was selected on the assumption that an amendment might be needed to ensure the remedy is sufficiently robust for current and future possible conditions as well as meet identified RAOs. se of an amendment in floodplain areas with the highest COC concentrations provides protection against even higher COC concentrations at depth. However, during its review of the RD, EPA will identify areas where an amendment is and is not needed to sequester COCs.

Comment 4g. Development of performance criteria for Preferred Alternative:

The SDs requested that the Proposed Plan state that the performance criteria will be developed in the RD and remove reference to the specific criteria in the Proposed Plan. They noted that criteria regarding strength, permeability, and leachability used to determine the success of the in situ stabilization (ISS) with protective cover remedy (WWD-4) should be developed as part of the upcoming ISS treatability study and further refined in the RD, before being incorporated into an amendment to the 2014 ROD.

EPA Response

The Proposed Plan provided these criteria to avoid ambiguity for the goals of the RD with respect to ISS. The criteria were based on guidance and standard practice. However, EPA agrees that the ISS bench-scale treatability study (mix trial) will identify specific criteria to determine effectiveness of ISS for the WWD, including those identified by EPA in the AROD, which could be modified or refined if approved by EPA.

Comment 4h. Removal Contingency:

The SDs asked that the amendment to the 2014 ROD acknowledge the conservatism built into dual remedy (ISS and a protective cover). The SDs argued that the complete removal contingency for the wastewater ditch that was included in the Preferred Alternative (WWD-4) in the Proposed Plan is unnecessary. They noted that FFS documented that a robust cap alone

would effectively contain the material (WSP 2023) and that removal is suggested only in limited circumstances where ISS combined with a protective cover is not feasible.

EPA Response

EPA agrees that ISS along with the protective cover (if successfully implemented) would effectively contain the contaminated sediments/soil and mitigate unacceptable exposures to receptors. Language in the ROD already recognizes that WWD-4 would meet threshold criteria and have long-term effectiveness and permanence. The nature and extent of contamination associated with the WWD are not fully defined and a data gaps investigation and bench-scale mix trial study have been required as of the writing of the AROD. Until the additional investigation/bench-scale treatability study is completed, EPA needs to account for the possibility that ISS may not be successful and allow for an alternative plan for the WWD. If the ISS bench-scale mix trial study demonstrates that performance criteria are not met and COCs could leach into subsurface soil and groundwater, then EPA selection of the identified contingency remedy or some other alternative that achieves RAOs would be required.

Comment 4i. Tree/vegetation removal:

The SDs suggested that the Proposed Plan and amendment to the 2014 ROD remain neutral with respect to the extent of tree/vegetation removal until an evaluation can be developed during future RD activities. The goal should be to minimize, to the extent practicable, the amount of trees/vegetation that are removed to what is necessary, to successfully construct and maintain the long-term effectiveness of the remedy.

EPA Response

The preferred remedy for certain parts of the floodplain was selected on the reasonable assumption that select tree removal would allow for a more uniform/intact engineered cap that improves long-term viability of the remedy and minimizes maintenance. The FFS also contemplated removal of some vegetation, and SDs have proposed tree surveys to support this approach. As requested in the comment, EPA will defer its decision on the extent of required tree/vegetation removal to the RD phase of the project and take all relevant information into account. EPA agrees that the goal should be to minimize, to the extent practicable, the amount of trees/vegetation removal to successfully construct the remedy, and maintain the long-term effectiveness of the remedy while considering the beneficial functions within the wetlands and the floodplain.

Comment 4j. Remedy cost estimates:

The SDs made two comments on the cost estimates provided in the Proposed Plan regarding differences between the cost estimates provided in the 2014 ROD and 2023 FFS. First, the SDs noted that the costs for the Olin Basin and Round Pond remedy, which were previously selected and summarized in the 2014 ROD, differ from the costs of these remedies provided in the Proposed Plan (Tables 2, 5, and 7) and that the need for this increase was unclear. Second, the SDs noted that the costs for the remedial alternatives, which were previously summarized in the 2023 FFS (WSP 2023) differ from the costs of these remedies provided in the Proposed Plan (Tables 3, 4, and 7).

EPA Response

The 2014 ROD provided a range for the estimated cost of the remedy selected for OU-2 to reflect that different reactive materials may be used to reduce the potential for contaminants to migrate through the cap. The 2014 ROD also stated that "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" and that "changes in cost for the selected remedy may be documented in the RD, an Explanation of Significant Differences, or an Amendment to the ROD depending upon NCP requirements for the change in question." Accordingly, the costs were updated in the Proposed Plan as a precursor to updating the AROD to reflect updated information, including an escalation from the 2014 cost. The EPA documented the updated costs in a January 2024 Technical Memorandum, which can be found in the Administrative Record.

The WWD excavation costs were refined to reflect more realistic assumptions by being less conservative regarding disposal of lesser contaminated soils. A little more than 1% was added to the cost for remediating the floodplain to cover potential use of an amendment that was not accounted for in the FFS and left blank in the FFS cost tables. These adjustments were made recognizing that the impact on FFS cost was negligible since they could be 30% lower to 50% higher, according to EPA guidance. TheEPA documented the adjusted costs in an EPA Preface, Comment #6 to the November 2023 FFS. The Administrative Record includes the November 2023 FFS.

Overall, it is EPA's intention to present a realistic bracket of potential costs for the Site, to follow its own process, and be transparent to the public.

Comment 5. Comments on public comments provided at public meetings:

The SDs provided three comments in response to public comments on risk exposure, impacts to private properties, and EPA's proposed remedy that were provided by the public at the January 23, 2024, public meeting and February 20, 2024, availability session for the Proposed Plan.

EPA Response

As part of an impartial process, EPA responds to public comments based on information in the Administrative Record file and the agency's own rationale and explanation. Consistent with the NCP on community input, EPA's position is to accept all public comments (preferably in writing), be transparent, and address public concerns wherever appropriate in consideration of modifying the proposed remedy, if warranted. EPA has reviewed the SDs comments and included any relevant information that EPA believes is helpful in responding to these other public comments.

Comment 6. Potential job opportunity:

One individual asked about potential job opportunities related to remedial action implementation.

EPA Response

EPA does not directly facilitate employment opportunities in the context of conducting cleanup of OU-2. Interested parties are encouraged to explore relevant opportunities with SDs and through private contractors hired by the performing parties or other entities involved in cleanup

efforts. EPA will ask that the performing parties make any employment opportunities as widely known to the community as possible.

3.0 SETTLING DEFENDANTS COMMENT LETTER

February 28, 2024 Project No. GL20417001.003

Ms. Beth Walden
Remedial Project Manager
US Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, GA 30303-8909

RE: COMMENTS ON USEPA'S JANUARY 10, 2024 PROPOSED PLAN
OLIN CORPORATION (MCINTOSH) SUPERFUND SITE OPERABLE UNIT 2 (OU-2)
MCINTOSH, WASHINGTON COUNTY, ALABAMA

Dear Ms. Walden,

WSP USA, Inc. (WSP), on behalf of the Settling Defendants (SDs), Olin Corporation (Olin) and BASF Corporation (BASF), has reviewed the United States EPA's (USEPA's) January 10, 2024 Proposed Plan for the Olin Corporation (McIntosh) Superfund Site Operable Unit 2 (OU-2). The purpose of USEPA's Plan is to propose an amendment of the remedy selected in the 2014 Record of Decision (ROD) for OU-2 to include remedies for select portions of the OU-2 wastewater ditch and floodplains. These wastewater ditch and floodplain remedies were selected by USEPA after a thorough and lengthy Focused Feasibility Study (FFS) conducted by USEPA and the SDs, during which several remedial alternatives were developed and evaluated by USEPA according to the process prescribed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The SDs support the Proposed Plan, subject to the specific comments that are attached.

We appreciate USEPA's consideration of these comments as it works through this public comment review period and ROD amendment process.

Sincerely,

WSP USA Inc.

Carol D. Northern, PG
Project Coordinator

Eric Pastor, PE
Alternate Project Coordinator

JA/MS/sf/kld

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Comments on USEPA's January 10, 2024 Proposed Plan for the Olin Corp. McIntosh Site OU-2 Wastewater Ditch and Floodplains

General Comment

As noted in the cover letter, the SDs support USEPA's selected remedies set forth in the Proposed Plan – namely In-Situ Stabilization with a Protective Cover for the Olin OU-2 Wastewater Ditch and an Engineered Cap for the OU-2 Floodplain. These remedies were based on a scientific and technical evaluation of multiple remedial alternatives as per the criteria in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The evaluation, contained in the Focused Feasibility Study (FFS), found that the selected remedies will be protective of human health and the environment and meet all state and federal applicable or relevant and appropriate requirements. In comparison with other alternatives, the selected remedies were found to best achieve the established remedial action objectives (RAOs) for the wastewater ditch and the floodplain.

Based on the results of the evaluation in the FFS, the SDs support the remedies selected by USEPA for the Olin OU-2 wastewater ditch and floodplain as specifically set forth in the January 10, 2024 Proposed Plan, subject to the following detailed comments on the Proposed Plan provided below.

Specific Comments

1. **Page 1, 3rd Paragraph: Refer to "restoration" instead of "habitat replacement/enhancement".** The text states that "*…WWD-4…includes in-situ stabilization (ISS), with a protective cover, institutional and engineering controls, and* ***habitat replacement/enhancement***" (emphasis added). The USEPA-approved FFS defined the alternative as "*WWD-4…includes in-situ stabilization (ISS), with a protective cover, institutional and engineering controls, and* ***restoration****"* (WSP 2023a, emphasis added). The Wastewater Ditch is used by Olin to convey treated industrial wastewater and stormwater. The appropriate restoration approach for the wastewater ditch should be determined during future Remedial Design (RD) activities. It is premature to specify whether this area should be restored, replaced, or enhanced. Please reference "restoration" when describing the remedy to be consistent with the USEPA-approved FFS and state that the restoration details will be addressed during the RD.

2. **Page 2, 1st Paragraph: Refer to "restoration" instead of "habitat replacement/enhancement".** The text states that "*…FP-2…includes installation of an engineered cap, institutional and engineering controls, and* ***habitat replacement/enhancement.****"* (emphasis added). The USEPA-approved FFS defined the alternative as "*…FP-2…includes installation of an engineered cap, institutional and engineering controls, and* ***restoration.****"* (WSP 2023a, emphasis added). The appropriate restoration approach for the floodplain should be determined during future RD activities. It is premature to specify whether this area should be restored, replaced, or enhanced. Please reference "restoration" when describing the remedy to be consistent with the USEPA-approved FFS and state that the restoration details will be addressed during the RD.

3. **Page 6, Figure 4: Groundwater is not a media of concern for Olin OU-2.** The potentiometric surfaces shown in each panel of Figure 4 differ from water surface elevations presented in Figure 8 of the USEPA-approved FFS (WSP 2023a). It is unclear what information USEPA used to generate these potentiometric surfaces and the results are inconsistent with the analysis that was provided in the USEPA-approved FFS in Section 1.2.3.2. It is recommended that the USEPA and SDs' project teams utilize a consistent dataset going forward.

Regardless, the average potentiometric surfaces presented on Figure 4 appear to be the basis for USEPA's statement that "*…mercury and HCB exceedances in the WWD soils and sediments indicate that there may be contamination below the maximum sampling depth that extends into the groundwater. Thus, there may also be COC transport from the deeper WWD soils and sediments to groundwater.*" As discussed in Section 1.2.3.2 of the FFS (WSP 2023a), soils/sediments in the Upper and Upper Central wastewater ditch with Contaminant of Concern (COC) concentrations above the 2014 Record of Decision (ROD) Cleanup Levels (CULs) are not in constant contact with groundwater. While groundwater levels may be intermittently elevated, resulting in temporary contact between the soils/sediments in the Upper and Upper Central wastewater ditch and groundwater, the analysis presented in Appendix E of the FFS (WSP 2023a) indicates that the COCs in the soil/sediment are not mobile in groundwater. This is due to a combination of factors, including the relatively high site-specific adsorption coefficients (K_d) that were developed from the results of the on-going Treatability Study.

Based on the information presented in the USEPA-approved FFS (WSP 2023a), which served as the basis for the Preferred Alternative presented in USEPA's Proposed Plan, it is incorrect to suggest that CUL exceedances in the wastewater ditch soils/sediments may impact groundwater. Instead, the assessment and conclusions presented in the USEPA-approved FFS (WSP 2023a) should be correctly summarized. As noted previously to USEPA, the *Revised Groundwater Investigation Report Operable Unit 2, McIntosh, Alabama* (MACTEC 2010) stated that at the time of previous OU-2 groundwater investigations, the COCs had been present in soil and sediment in OU-2 for more than 50 years yet, at that time, groundwater within OU-2 was not a medium of concern. The methods used and conclusions developed were supported by empirical data and approved by USEPA. That information was evaluated by USEPA in developing the 2014 ROD (USEPA 2014), which did not identify groundwater as a medium of concern for OU-2. More recent data are consistent with USEPA's 2014 conclusion. The information contained in the USEPA-approved FFS (WSP 2023a) is supported by data that have been collected appropriately and submitted to and approved by USEPA. These data strongly support the conclusion that the soils/sediments in the wastewater ditch do not present an unacceptable risk to groundwater.

4. **Page 7, Figure 5 Caption: Post-construction confirmation sampling not necessary for USEPA's Preferred Alternative for the floodplains.** The text states that "*Additional sampling will be needed as part of the remedial design to define footprint boundaries and* ***following remedial action to confirm that soils exceeding CULs have been addressed, depending on which alternative is selected***." (emphasis added). Only a single alternative has been put forward as USEPA's Preferred Alternative for the Floodplains (FP-2). For this alternative, it is unclear why additional sampling post-remedial action would be needed (aside from any necessary long-term monitoring to assess remedy effectiveness), as sufficient sampling should be performed prior to remedial action as part of RD activities to define the extent of the cap layer. As such, post-construction sampling (i.e., confirmation sampling) would not be needed for USEPA's Preferred Alternative and should not be stated or implied.

5. **Page 8, 1st Paragraph and 2nd Paragraph: There is no Remedial Action Objective nor Cleanup Level for methylmercury.** The text in the Proposed Plan is incorrect with respect to the actions being taken to address the potential risks posed by mercury contamination in OU-2. While methylmercury was evaluated in both the human health and ecological risk assessments, no RAO nor CUL was explicitly established for methylmercury. Instead, a CUL was established for total mercury and was established such that it was inclusive of the potential risk posed by the small portion (<1%) of methylmercury that may be present in the sediment and surface water at OU-2. As noted in Section 2.12.2 of the 2014 ROD:

> *"Mercury is generally considered a toxic substance with the degree of toxicity dependent upon the form of mercury and concentration. Mercury was historically discharged to the Basin in the form of mercuric salts, not as elemental mercury. Mercury likely exists in the sediment and surface water as mercury (2+) and to a lesser degree as methylated mercury. Methylmercury comprised approximately 0.00736 to 0.136 percent of the total mercury species based on 2009 data,* ***The maximum methylmercury percentage observed in all data collected from 2008 to 2010 was 0.29%,*** *which was observed during the drought year of 2008."* (USEPA 2014, emphasis added)

Similar ratios of methylmercury-to-total mercury were also documented in the more recent Pre-Design Investigation (PDI) that was conducted at OU-2.

Moreover, Section 2.7.1.1 (regarding the Human Health Risk Assessment) and Section 2.7.2.5 (regarding the Ecological Risk Assessment) of the 2014 ROD state, respectively:

> *"****Clean-up goals*** *for sediment and fish tissue for protection of human health* ***are expressed in terms of total mercury*** *(methylmercury + inorganic mercury).*" (USEPA 2014, emphasis added)

> *"[Remediation Goals] are intended to correspond to minimal and acceptable levels of effects on the ecological assessment endpoints. In general, they correspond to small effects on individual organisms that would be expected to cause minimal effects on populations and communities.* ***Though the risk assessment evaluated both total mercury and methylmercury separately, RGs were established*** **only for total mercury (inorganic + methyl).**" (USEPA 2014, emphasis added)

As has been documented numerous times by the SDs, the remedial actions being taken at OU-2 are to meet CULs expressed as total mercury. Based on the previous human health and ecological risk assessments, which formed the basis for the RAOs and CULs outlined in the 2014 ROD, remediating the soils/sediments at OU-2 with total mercury concentrations above the CULs will address any potential risk posed by methylmercury (USEPA 2014). While methylmercury was identified as a primary COC in the 2014 ROD, USEPA should be clear in noting that the remedial actions being taken are to meet CULs for total mercury (as well as CULs for hexachlorobenzene [HCB] and the collective of dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyldichloroethane [DDD] referred to as DDTR).

6. **Page 10, Table 2 vs. Page 14, Table 5 and Page 18, Table 7: The updates to the Basin and Round Pond remedy costs were not consistent with USEPA guidance, prior USEPA-approved documents, or with each other.** The text in Table 2 indicates that no change is being made to the Basin and Round Pond remedy selected and summarized in the 2014 ROD (USEPA 2014). However, Table 5 indicates that the cost estimate from the 2014 ROD has been "updated" to $32.3 Million while Table 7 indicates $33.3 Million (in both cases, an increase of more than 50% over the high-end of the cost range, $13.4 Million to $22 Million, presented in the 2014 ROD). The need for this increase is unclear, as the remedy selected in the 2014 ROD (Alternative 2A – In-Situ Capping; USEPA 2014) was not detailed in nor the focus of the USEPA-approved FFS (WSP 2023a), nor is this portion of the OU-2 remedy the focus of USEPA's Proposed Plan (which focuses on presenting USEPA's Preferred Alternative for the Wastewater Ditch and Floodplains).

   Additional concerns associated with USEPA's revised cost estimate include the following:

   a. USEPA should report the full range of costs accurately from those presented in the 2014 ROD (USEPA 2014) and not simply state the highest cost (see Comment Table 1).

b. USEPA notes that the accuracy of the revised estimate is -50% to +100%, which is not consistent with the level of accuracy for detailed cost estimates per USEPA's *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (USEPA 2000).
c. The revised cost estimate assumes a carbon amendment over 72.5 acres (without specifying the assumed dosage). This assumption, as well as the statements made in USEPA's Proposed Plan, are inconsistent with the 2014 ROD (USEPA 2014). For example, Page 142 of the 2014 ROD states that reactive material may be used to reduce the potential for contamination to migrate through the cap (USEPA 2014). Consistent with this statement, costs for a cap were provided as a range in the 2014 ROD, which included alternatives that encompassed no amendment to dual amendments. The remedial alternatives with an amendment were based on the assumption that only a portion of the Basin and Round Pond footprint would require an amendment (see Comment Table 1).

Comment Table 1. Amendment costs presented in 2014 ROD (USEPA 2014).

Amendment	Total Cost as Capital and O&M ($ Million)	Present Worth ($ Million)
Soil (No Amendment)	13.4	12.9
Bentonite*	16.9	16.4
Polishing Amendment (Activated Carbon)*	18.9	18.4
Polishing Amendment and Bentonite*	22.5	22

*Amendment in 15 acres of the 76-acre Basin.

For the reasons noted above, the updated cost estimate for the Basin and Round Pond remedy (which were not considered in the development of the USEPA-approved FFS [WSP 2023a]) should be removed.

7. **Page 14, Tables 3 and 4, and Page 18, Table 7: Concerns regarding the detailed cost estimates in the FFS should have been conveyed to the SDs, prior to USEPA's approval, to allow the SDs the opportunity to address those concerns.** The preface that USEPA appended to the FFS (WSP 2023a) indicates that "revisions" were made to the cost estimates detailed in the FFS. Those updated values are also presented in Tables 3 and 4 and summarized in Table 7 of the Proposed Plan. The cost estimates presented in the USEPA-approved FFS were supported by detailed references for unit prices and assumptions related to the assumed scope of work. USEPA's comments dated September 11, 2023 on the Draft FFS (June 30, 2023) did not include questions or comments related to the costing assumptions for dewatering or the quantities for soil/sediment disposal associated with Alternatives WWD-3A or WWD-3B. Rather than modifying those costs unilaterally as part of USEPA's approval of the FFS, it would have been more appropriate for USEPA to have provided comments regarding the cost estimate so that additional discussion could have occurred and the feedback appropriately considered by the SDs in preparing the detailed cost estimates presented in the FFS. By unilaterally revising the cost estimates, USEPA denied the respondents the opportunity to revise the cost estimates appropriately.

   Likewise, the cost estimates presented by USEPA should mirror the range of costs that were developed in detail and presented in the USEPA-approved FFS (WSP 2023a). Based on the information that was available and reviewed in developing the FFS, two reasonable "bookend" cost scenarios were developed—a lower-end cost estimate that assumed no amendment was needed and a higher-end cost estimate that assumed an amendment was needed in only a portion of the floodplain. Rather than creating a "new" costing assumption,

USEPA should simply present the detailed estimates that were developed and explained in the USEPA-approved FFS (WSP 2023a).

8. **Page 15, Table 6 and Page 18, Table 7: The need for and extent of any amendment in the engineered cap is currently unknown.** The need for any amendments for the engineered cap will be determined through the analysis and evaluations conducted during the RD. As presented in Tables 6 and 7, the text implies that an amended cap would be constructed throughout all of the segments of the floodplain, which may not be necessary. The selected remedy should be neutral, at this time, and not presume any particular outcome of the on-going treatability studies and RD activities that will determine whether and to what extent an amendment may be needed in any specific area of the floodplain. As noted by USEPA, the information gathered during the on-going Treatability Study and further detailed analyses that will be performed during the RD should define what, if any, amendment is needed and where it is necessary. Please state that the need for an amendment will be addressed during the RD where data from various media will be evaluated.

9. **Page 16, 3rd Paragraph: Detailed performance criteria for USEPA's Preferred Alternative for the Wastewater Ditch should be developed as part of the upcoming Treatability Study.** Specific performance criteria regarding strength, permeability, and leachability used to determine the success of the In-situ Stabilization (ISS) with Protective Cover remedy (WWD-4) should be developed as part of the upcoming ISS Treatability Study and further refined in the RD, before being incorporated into an Amendment to the 2014 ROD. As noted in Section 8.3 of USEPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents* (USEPA 1999):

> *"The use of contingency remedies should be considered carefully. Treatability studies and/or field investigations necessary to evaluate a technology's applicability to the site* ***should be completed during the RI/FS****. More detailed testing necessary to establish design parameters and performance requirements may be performed during remedial design."* (USEPA 1999, emphasis added)

Please state that the design criteria will be developed in remedial design and remove references to specific criteria.

10. **Page 16, 7th Paragraph and Page 18, Table 7: A full-removal contingency remedy is not necessary at this time.** USEPA has selected ISS with Protective Cover remedy (WWD-4) as the Preferred Alternative, while indicating that a contingent remedial alternative of full removal may be needed, pending the results of the ISS Treatability Study that is under development. A full removal contingency for the entirety of the wastewater ditch is not necessary because a robust cap alone (including erosion controls and maintenance) would effectively isolate and contain the material in the wastewater ditch (as supported in the USEPA-approved FFS [WSP 2023a]). Removal should be considered as a contingency only in limited circumstances and in isolated areas where ISS combined with a protective cover is not practicable. The conservatism already built into a dual remedy (i.e., ISS **and** a protective cover) needs to be acknowledged in the Amendment to the 2014 ROD, with the contingency for full removal in the wastewater ditch deleted.

11. **Page 17, 1st Paragraph and 2nd Paragraph: The need for and extent of tree/vegetation removal should be determined during the RD.** An evaluation of the nature and extent of tree removal should be developed during future RD activities so that an approach can be developed that minimizes, to the extent practicable, the amount of trees/vegetation that are removed to what is necessary to successfully construct and maintain the

long-term effectiveness of the remedy. Until that evaluation is performed, the Proposed Plan and Amendment to the 2014 ROD should remain neutral with respect to the extent of tree/vegetation removal.

Comments Related to the January 23, 2024 Public Meeting and February 20, 2024 Open House

The following comments are in response to public comments provided at the January 23, 2024 public meeting and the February 20, 2024 open house for the Proposed Plan.

1. **Public comments regarding risk exposure**. The human health risk assessment approved by USEPA and summarized in the 2014 ROD concluded that there is no current unacceptable risk to human health off-Site (USEPA 2014). USEPA approved the risk assessment, and it was part of the Administrative Record for remedial decision-making for the OU-2 and the Proposed Plan. USEPA did not select clean-up goals for any off-site media. The remedy will be implemented to continue to ensure that no future risk is realized. The 2014 ROD states that exposures to floodplain soils were not associated with unacceptable risks or hazards (USEPA 2014) to human health. Carcinogenic risk for all current and future exposure scenarios fell within the acceptable risk range.

2. **Public comments regarding USEPA's proposed remedy.** USEPA considered a substantial volume of data and detailed evaluation to formulate the remedies for the wastewater ditch and floodplains as described in the Proposed Plan. The Proposed Plan outlining USEPA's Preferred Alternative reflects the best alternative taking into consideration both the Threshold and Balancing Criteria in the NCP. A significant PDI was conducted to define current conditions and to predict future conditions (WSP 2022a and 2022b). More than 800 soil and sediment samples and approximately 150 water samples were collected and analyzed for the OU-2 COCs (among many other parameters), which resulted in more than 6,000 individual analyses. These activities were carried out to further refine the conceptual site model developed during the Remedial Investigation and support the remedial alternatives evaluation. A Preliminary PDI Evaluation Report (WSP 2023b) was developed with these evaluations, and that information was used to inform a robust FFS that evaluated pertinent remedial alternatives (WSP 2023a). The FFS was written in accordance with USEPA guidance and was approved by the USEPA. USEPA then used the data and evaluations presented in the FFS to propose protective and effective Preferred Alternatives for the wastewater ditch and floodplains.

   The FFS and USEPA's evaluation of the same included reviews of 1) overall protection of human health and the environment, 2) compliance with Applicable Relevant and Appropriate Requirements, 3) long-term effectiveness and permanence, 4) reduction of toxicity, mobility, or volume through treatment, 5) short-term effectiveness, 6) implementability, and 7) cost. In presenting its Preferred Alternatives, the USEPA is indicating its decision as to which of the alternatives that were evaluated best satisfied the criteria established in the NCP. Of note, USEPA evaluated, but did not select, alternatives for both the floodplain (FP-3A and FP-3B) and wastewater ditch (WWD-3A and WWD-3B) that involved the excavation and disposal of the soils/sediments with COC concentrations above the CULs. Rather than explaining why USEPA selected the Preferred Alternatives it did and the legal requirements USEPA is required to follow in the decision making process, USEPA's representative stated in response to verbal comments from two community members at the public meeting that USEPA has revised remedies in the past based on public comment, and if the public wants a revised remedy, then "they should tell us that." This may have left the impression that the community has the "final say" on remedy selection. Selection of remedies other than USEPA's Preferred Alternatives would be arbitrary, given the detailed evaluation spanning more than a year that USEPA used to reach its conclusions supporting its Preferred Alternatives.

EPA's proposed remedy is the only alternative that treats the material in place and reduces the potential for transport of residuals. In addition to reducing residual risk, the proposed remedy avoids the transport of impacted materials through the community and along State roads, which would pose not only risk of public exposure where none exists currently, but also cause a significant increase in large truck traffic and resulting substantial carbon footprint. For example, based on the estimated quantities presented in the USEPA-approved FFS (WSP 2023a), excavating and disposing of the soils/sediments from the wastewater ditch off-site would require nearly 1,360 vehicle roundtrips (assuming a 20 cubic yard dump truck), whereas for the floodplains more than 12,100 vehicle roundtrips would be needed (and likely more).

3. **Public comments related to impacts to private properties by migration of potentially impacted water from the Site under flood conditions.** There is no evidence that flooding of nearby residences that may occur as a result of natural conditions are affected by the Site. Current and historical photographs as well as observation of the Tombigbee River at flood stage confirms that water from OU-2 does not flow onto properties adjacent to the Site. This was also confirmed by USEPA at the February 20, 2024 open house, wherein USEPA presented an aerial figure/map depicting the drainage basins around OU-2, none of which drain onto properties adjacent to the Site.

REFERENCES

MACTEC, 2010. *Revised Groundwater Investigation Report Operable Unit 2, McIntosh, Alabama*. January.

USEPA, 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents.* July.

USEPA, 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. July.

USEPA, 2014. *Record of Decision. Olin McIntosh Site, Operable Unit 2 (OU-2), McIntosh, Washington County, Alabama.* April.

USEPA, 2024. *U.S. Environmental Protection Agency Proposed Plan. Olin Corp. (McIntosh Plant) Site, Operable Unit 2, Washington County, Alabama.* January 10.

WSP USA Inc., 2022a. *Pre-Design Investigation Work Plan – Olin Corp (McIntosh Plant) Superfund Site Operable Unit 2.* June 30, 2022.

WSP USA Inc., 2022b. *Pre-Design Investigation Work Plan Addendum No. 1 – Olin Corp (McIntosh Plant) Superfund Site Operable Unit 2.* March 24, 2022.

WSP USA Inc., 2023a. *Olin (McIntosh) OU-2 Focused Feasibility Study – Wastewater Ditch and Floodplains.* November.

WSP USA Inc., 2023b. *Olin (McIntosh) OU-2 Preliminary Pre-Design Investigation Evaluation Report.* March.

APPENDIX II STATE CONCURRENCE LETTER

LANCE R. LEFLEUR
DIRECTOR

KAY IVEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov

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April 30, 2024

TRANSMITTED ELECTRONICALLY

Ms. Beth Walden
Remedial Project Manager
U.S. EPA – Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8960

Re: ADEM Review and Concurrence - Amended Record of Decision
Olin Corporation, Operable Unit 2
1638 Industrial Road
McIntosh, AL 36553
USEPA I.D. Number 008 188 708

Dear Ms. Walden:

The Department has completed the review of the U.S. Environmental Protection Agency's (EPA) request for concurrence on the draft Amended Record of Decision (AROD) dated April 15, 2024, for the Olin Corporation Superfund Site, Operable Unit 2 (OU-2). The Department concurs with the AROD, which selects remedial actions for the increased footprint of OU-2 by incorporating the facility's wastewater ditch and the floodplains surrounding the Olin Basin and Round Pond.

If questions should arise concerning this matter, please contact Ben King of the Engineering Services Section at (334) 394-4330.

Sincerely,

Sonja B. Favors, Chief
Industrial Hazardous Waste Branch
Land Division

cc/via email: ADEM: Austin Pierce, Robert Stanley

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Appendix C

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF ALABAMA
SOUTHERN DIVISION

UNITED STATES OF AMERICA,

Plaintiff,

v.

Civil Action No.:
1:20-cv-00602-KD-MU

OLIN CORPORATION and
BASF CORPORATION,

Defendants.
_____/

NOTICE OF FILING SETTLEMENT AGREEMENT WITH RESPECT TO DEFENDANTS' MOTION FOR JUDICIAL REVIEW OF ADMINISTRATIVE DECISION WITH RESPECT TO CONSENT DECREE ENTERED JANUARY 28, 2021

Defendants Olin Corporation and BASF Corporation (jointly "Settling Defendants" or "SDs"), through their undersigned counsel, hereby give notice of the filing of the Settlement Agreement attached hereto as Exhibit 1 which resolves SDs' Motion For Judicial Review of Administrative Decision With Respect to Consent Decree Entered January 28, 2021 filed March 27, 2023 (ECF No. 11) ("Motion").

Respectfully submitted,

/s/ W. Larkin Radney, IV
One of the Attorneys for Settling Defendants
Olin Corporation and BASF Corporation

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CERTIFICATE OF SERVICE

I certify that on March 28, 2024, a copy of the foregoing was filed electronically with the Clerk of Court using the CM/ECF system. Notice of this filing will be sent to all counsel of record registered to receive electronic service by operation of the Court's electronic filing system.

/s/ W. Larkin Radney, IV
Of Counsel

EXHIBIT 1 TO NOTICE OF FILING SETTLEMENT AGREEMENT

SETTLEMENT AGREEMENT

This Settlement Agreement ("Settlement Agreement") is entered into with an effective date of March 28, 2024 by and among The United States of America ("United States"), Olin Corporation ("Olin") and BASF Corporation ("BASF"). Each party may be referred to as a "Party" and all parties collectively as "Parties."

Recitals

United States and SDs entered into that certain consent decree entitled "Remedial Design/Remedial Action Consent Decree for Operable Unit Two of the Olin Corp. (McIntosh Plant) Superfund Site" which was entered by the United States District Court for the Southern District of Alabama ("Court"), Case No. 1:20-cv-00602 ("Case") on January 29, 2021 at ECF No. 6 ("Consent Decree" or "CD");

In 2022, SDs initiated dispute resolution under the CD and on March 9, 2023 the United States Environmental Protection Agency issued an administrative decision with respect to the dispute resolution instituted by SDs ("Administrative Decision");

On March 27, 2023, SDs filed their motion to reopen the Case and for judicial review of the Administrative Decision (ECF No. 11) ("Motion for Judicial Review") to which United States filed its response (ECF No. 13) and SDs filed their reply (ECF No. 14);

The Parties have now resolved their differences with respect to the issues raised in the dispute resolution and SDs' Motion for Judicial Review.

NOW THEREFORE, in consideration of the agreements contained herein, the receipt and sufficiency of which are acknowledged, the Parties agree as follows:

Agreement

The Recitals set forth above are true and correct and are incorporated herein by reference.

1. Chemistry Data. SDs shall be conclusively deemed to have met their obligations under the CD with respect to delivery of laboratory chemistry data derived from the Work by delivering Validated Chemistry Data 75 days after the end of the calendar month the sample was taken ("EOM") and delivering the sample locations corresponding to such Validated Chemistry Data as current EPAR4 EDDs within 30 days EOM. SDs will continue to have their laboratories send copies of their laboratory data packages and laboratory EDDs to EPA at the same time it is sent to SDs. As used in this settlement agreement "current" refers to formats in effect on the effective date of this settlement agreement. Nothing in this settlement shall be read to alter Section 9.3 of the Statement of Work which provides:

> "For any regulation or guidance referenced in the CD or SOW, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Work only after SDs receive notification from EPA of the modification, amendment, or replacement."

2. Non-Chemistry Data. SDs shall be conclusively deemed to have met their obligations under the CD with respect to delivery of non-chemistry data derived from the Work by delivering the following non-chemistry data on the schedule and in the formats described below:

a. Real-time Data:
    i. Water Levels (automated instruments post continuously via EQuIS Live and Golder Connect, with periodic corrections, as necessary, delivered in MS Excel format)
    ii. Meteorological Data (automated instruments post continuously via EQuIS Live and Golder Connect, with periodic corrections, as necessary, delivered in MS Excel format)
b. 30 Days EOM
    i. Sample Location current EPAR4 EDDs
c. 75 days EOM
    i. LIDAR – Digital Elevation Model (DEM)
    ii. ERI – transect data (MS Excel) and GIS map package
    iii. Sidescan Sonar – GeoTIFF
    iv. Bathymetry Surveys – GIS Map Package (DEM and contours)
    v. Wetland Delineation Survey – GIS Map Package (physical survey information) and MS Excel (other details)
    vi. Aquatic/Terrestrial/Habitat Surveys –MS Excel or PDF
    vii. Seepage Monitoring (hourly summary data) – MS Excel Spreadsheet and current EPAR4 EDD
    viii. Geotechnical Data (non-chemical lab) – Applicable current EPAR4 EDDs (e.g., lithological, Atterberg, grain size distribution)
    ix. All other data for which no EQuIS format currently exists as of the date of this Settlement Agreement will be provided in the format SDs use in their data evaluation and analysis. These data follow and will be provided in the specified formats:
        1. Seepage Monitoring (detailed data; additional information beyond that provided per par.2.c.vii) – MS Excel
        2. Soil Boring Logs – PDF (monitoring well screen intervals can be submitted in an EQuIS-compatible EDD; however, the boring logs will be provided in PDF)
        3. Water Levels (corrected values as noted in par. 2.a.i) - MS Excel
        4. VHG Data – MS Excel
        5. PWP Measurements – MS Excel
        6. Geophysical Logs – PDF
        7. CPT Logs – PDF
        8. Geotechnical Field Tests (plate load tests, vane shear tests, SPI, sediment catch pan) – provide in the format SDs use in their data evaluation and analysis (MS Excel, PDF, image, video or MS Word file.

For geospatial data submittals (2c. i., ii., iii., iv., and v.), the SDs will provide the data in accordance with the current EPA R4 GIS delivery requirements. For all non-chemical data, including geospatial data, the SDs will also provide the data in the Final Deliverable required under the RD Schedule (as may be modified by subsequent written agreement of the parties) necessary to support the interpretation of the Final Deliverable. Without limiting the generality of paragraphs 1 and 2, paragraphs 1 and 2 define the format and delivery time frames to EPA of the specified data types, and do not define sample turnaround times (TAT).

3. New Data Types. For all new data types (i.e., data types for which there is no data delivery format and due date specified in paragraphs 1 or 2; for example, that are generated by test methods not previously employed by SDs in the RD), SDs will coordinate with the EPA for a mutually agreed upon data delivery format and due date for each such item. Because the results of these new test methods will generate a new data type not specified in paragraphs 1 or 2, in accordance with the first sentence of this paragraph 3, SDs will coordinate with the EPA during the work plan development for a mutually agreed upon data delivery format and due date.

4. Expedited Data Decisions.

   a. With respect to "field or sampling decisions" (as described in the Final Decision), which must necessarily be based upon near real-time or Unvalidated Data (whether chemistry or non-chemistry laboratory data) in order to efficiently manage the fieldwork, including without limitation the work performed during the RD or during RA construction activities, SDs will provide EPA copies of the data together with other unchecked field/study measurements or documentation in the form(s) used by the SDs to support such decisions. In these situations, the data delivery format and reporting timeframes outlined in paragraphs 1 and 2, would still apply with respect to the provision of the Validated Chemistry Data (paragraph 1) and final data for non-chemistry data (paragraph 2) and will be handled in accordance with paragraph 3 with respect to new data types.

   b. The Parties acknowledge and agree that during the RD/RA activities, it will be necessary to make field, sampling, construction, and/or study-specific decisions (e.g., Treatability Studies to evaluate the performance of capping amendments and In Situ Stabilization [ISS] mix trials to test a series of mixes, such as involving one or more reagents, at various doses to assess stabilized mass strength/permeability) on an expedited basis. The details for providing such information as defined in paragraph 4a will be included in appropriate EPA-approved documents, but any such approved document will not amend the reporting timeframes outlined in paragraphs 1 and 2 or otherwise as agreed under paragraph 3 with respect to new data types.

By way of example and not limitation, in the event that the SDs perform surface water quality monitoring during the RD/RA activities, water quality samples that produce laboratory chemistry data would be delivered to EPA in accordance with paragraph 1. However, in order to make field decisions based upon such data (for example, to take corrective actions such as adjustment of best management practices during construction, as appropriate), the SDs may need to provide information, as defined in paragraph 4a, to support the decision-making process. In this case, EPA would receive this information in accordance with the provisions of paragraph 1 as a matter of course. The SDs will also provide this information in accordance with the provisions of this paragraph 4 to aid the field decisions making process (specifically, copies of the data together with other unchecked field measurements or documentation in the form(s) used by the SDs to support such field or sampling decisions).

5. Tolling of Data Delivery Schedule. If SDs or their contractors have not received data from their laboratories or other subcontractors (e.g., divers, drillers, surveyors, and field personnel) within 45 days

after the EOM, SDs will notify the EPA of such delay in writing, which notification shall toll the running of the submission deadline for the delayed data. Such notification shall be accompanied by an estimated date by which the data will be provided based upon information provided by such laboratory or subcontractor, which notification shall be updated with any subsequently obtained information from the relevant laboratory or subcontractor. With respect to chemistry data, delays may affect only a portion of a sample data group that SDs have submitted for analysis (for example, delays may affect only a specific analyte, analytical method, or set of samples). It is standard laboratory practice to delay delivery of the data for a sample data group until all sample analyses in that sample data group are complete. The SDs will direct their chemical analytical laboratories that, in the event of a delay that affects only a portion of a sample data group, to the extent practicable based on each laboratories' capabilities, that the laboratory "split" the affected laboratory data package, such that the laboratory delivers to EPA and SDs the data that can be analyzed and delivered as soon as it is ready according to the provisions of par. 1, and to move the sample analyses that are delayed into a separate analytical data package for analyses as soon as possible (i.e., the "delayed data package"). Thereafter, upon receiving the delayed data package, SDs shall promptly notify the EPA, and the deadline for submission of that data shall begin running again from the date that SDs or their contractors received the data. The EPA reserves the right to request documentation establishing the basis for laboratory's or other subcontractor's delay in submitting data and may deny a deadline extension for good cause, provided, however, EPA may not unreasonably withhold or deny a request for extension, and before denying such request must first provide SDs with a written justification for the denial and an opportunity to provide additional explanation or documentation, to which SDs must respond within 5 business days (the "Cure Period"). The deadline shall remain tolled during the Cure Period. If SDs fail to timely submit such explanation or documentation, the deadline for submission of the delayed data shall begin running again as of the expiration of the Cure Period or the date that EPA provides SDs with written notice that it has determined that such additional explanation or documentation was insufficient, whichever last occurs. If SDs disagree with EPA regarding whether or not good cause has been shown regarding the basis for the requested extension, and thereafter invoke informal dispute resolution in accordance with the terms of the CD, then "informal negotiations" between the parties, as contemplated by par. 47 of the CD, shall be convened and the deadline shall remain tolled during the pendency of any dispute resolution pursuant to the CD.

6. eCOC Tracking Process. SDs will continue to provide the EPA with SDs' monthly sample status tracking sheet (the "eCOC") which tracks the status of SDs' sampling activities. As the remedy progresses, the nature of sampling activities may change. The eCOC needs to remain sufficiently dynamic to adjust to such changes, but will not be revised to include information of a type or nature not currently provided in the eCOC (examples of the type and nature of information currently included are the date of sample collected, type of analysis performed on such sample, and the status of each sample analysis).

7. Transition Period. In order to effectuate a smooth transition from current data delivery schedule: (a) if the Settlement Agreement is effective on or before the 15th day of a month, the data delivery dates and formats set forth in paragraph 1 and 2 apply to data collected in the preceding month and thereafter; and (b) if the Settlement Agreement is effective after the 15th day of a month, the data delivery dates and formats set forth in paragraph 1 and 2 apply to data collected the then current month and thereafter. For example, if the Settlement Agreement is effective September 8, 2023, the data

delivery dates and formats set forth in paragraph 1 and 2 apply to data collected from August 1, 2023, and thereafter. If the Settlement Agreement is effective September 18, 2023, the data delivery dates and formats set forth in paragraph 1 and 2 apply to data collected from September 1, 2023, and thereafter.

8. Attached hereto as Exhibit "A" is the Data Management Plan ("DMP") agreed to by the Parties which replaces and supersedes any prior DMP. This Settlement Agreement amends the DMP, and to the extent that the terms and conditions of this Settlement Agreement and the DMP conflict, this Settlement Agreement controls.

9. Penalties. To the extent that SDs' data submission prior to the execution of this Settlement Agreement have not been in accordance with this Settlement Agreement, the United States will not pursue any potential stipulated penalties for any matter that has occurred prior to the execution of this Settlement Agreement.

10. Abbreviations. Certain terms are defined and abbreviated in this Settlement Agreement and attached DMP. In addition to those defined and abbreviated terms, attached as Exhibit B is a list of definitions for other abbreviated and/or defined terms.

11. Complete Agreement. This settlement represents a complete settlement of all issues raised by the SDs in their Motion for Judicial Review filed March 27, 2023 in Case No. 1:20-cv-00602-KD-MU in the United States District Court for the Southern District of Alabama.

BASF Corporation

/s/ Linda Mirsky Brenneman
LINDA MIRSKY BRENNEMAN
Associate General Counsel
BASF Corporation
100 Park Avenue
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Date: 03/28/2024

Olin Corporation

/s/ Lisa A. Funderburg
Vice President, Chief EHS Counsel
Olin Corporation
190 Carondelet Plaza, Suite 1530
Clayton, MO 63105

Date: 03/28/2024

The United States:

/s/ Caroline Freeman _____ Date: 03/27/2024
CAROLINE FREEMAN
United States Environmental Protection Agency
Region 4
Superfund Division Director
61 Forsyth Street
Atlanta, GA 30303

/s/ Ellen Mahan _____ Date: 3/27/2024
ELLEN M. MAHAN
United States Department of Justice
Environmental Enforcement Section
Deputy Section Chief
150 M Street, NE
Washington, DC 20530

EXHIBIT A TO SETTLEMENT AGREEMENT

Olin OU2 Data Management Plan, Rev. 2
January, 2024

Task/Data Type	Data Submittal Format [1]	Data Delivery Schedule [2,3]
Chemistry Data		
Sample Locations	EPAR4 EDD	30 Days EOM
Lab EDDs	Laboratory Data Package / Laboratory EDD	Simultaneous to EPA & SDs [4]
Validated Chemistry Data	EPAR4 EDD	75 Days EOM
Non-Chemistry Data		
Real Time Data (Automated Instruments)		
Water Levels (Automated)	EQuIS Live and Golder Connect Dashboards	Data Available Continuously and Downloadable
Meteorological Data (Automated)	EQuIS Live and Golder Connect Dashboards	Data Available Continuously and Downloadable
Non-Real Time Data		
Sample Locations	EPAR4 EDD	30 Days EOM
LiDAR	Digital Elevation Model (DEM)	75 Days EOM
Electrical Resistivity Imaging (ERI)	Transect Data (MS Excel) and GIS Map Package	75 Days EOM
Sidescan Sonar	GeoTIFF	75 Days EOM
Bathymetry Surveys	GIS Map Package (DEM and Contours)	75 Days EOM
Wetland Delineation Survey	GIS Map Package (Physical Survey Information) and MS Excel (Other Details)	75 Days EOM
Aquatic/ Terrestrial/ Habitat Surveys	MS Excel or PDF	75 Days EOM
Seepage Monitoring (Hourly Summary Data)	EPAR4 EDD and MS Excel	75 Days EOM
Geotechnical Data (Non-chemical Lab)	Applicable Components of EPAR4 EDD (e.g., Lithological, Atterberg, Grain Size Distribution)	75 Days EOM
Other Data Types		
Seepage Monitoring (Detailed Data, other than Hourly Summary Data)	MS Excel	75 Days EOM
Soil Boring Logs	PDF	75 Days EOM
Monitoring Wells (MWs) Screen Intervals	EPAR4 EDD	75 days EOM
Correction of Automated Water Level Measurements (Corrected via Manual Water Level Measurements)	MS Excel	75 Days EOM
Vertical Hydraulic Gradient (VHG)	MS Excel	75 Days EOM
Porewater Pressure (PWP) Measurements	MS Excel	75 Days EOM
Geophysical Logs	PDF	75 Days EOM
Cone Pentrometer Test (CPT) Logs	PDF	75 Days EOM
Geotechnical Field Tests (e.g., Plate Load Tests, Vane Shear Tests, Sub-bottom Profile Imaging, Sediment Catch Pan)	MS Excel, PDF, Image, Video, or MS Word File	75 Days EOM
Other		
Sample Tracking Table (a.k.a. eCOC)	MS Excel	10 Days EOM
Report Figures	GIS Map Package	Per Deliverable Submittal Schedule (With each submission including Initial Submission and Subsequent Revisions, if needed)

Notes:

1) EQuIS and GIS deliverables as defined by USEPA Region 4 Environmental Data Submission Standard Operating Procedure (SEMDPROC-009-R0, January 9, 2020) or current update. All other data for which no EQuIS format currently exists as of the date of the Settlement Agreement will be provided in the format the Settling Defendants (SDs) use in their data evaluation and analysis. For all new data types and additional studies for which there is no format specified, SDs will coordinate with the EPA for a mutually agreed upon format and due date.

2) Per the Consent Decree, in computing any period of time under this CD, where the last day would fall on a Saturday, Sunday, or Federal or State holiday, the period shall run until the close of business of the next working day.

3) Data delivery schedule will be tolled as described in the Settlement Agreement if SDs or their contractors have not received data from their laboratories or other subcontractors (e.g., divers, drillers, surveyors, and field personnel) within 45 days after the EOM.

4) The SDs' will request the TATs specified in the EPA-approved QAPP. If it is necessary to make field, sampling, construction and/or study-specific decisions on an expedited basis, SDs' may propose modificiations for EPA review and approval, or EPA may propose modificiations of those TATs during the development of task- or study-specific Work Plans.

Abbreviations
EDD - Electronic Data Deliverable
EOM - End of Month (as used herein, EOM means after the last day of the month in which data was collected)
GIS - Geographical Information System
PDF - Portable Document Format
MS Excel, MS Word - Microsoft Software

Appendix C to
Amendment to Remedial Design/Remedial Action Consent Decree
For Operable Unit Two of the Olin Corp. (McIntosh Plant) Superfund Site

EXHIBIT B TO SETTLEMENT AGREEMENT

Exhibit B

List of Definitions and/or Abbreviations

The following is a list of definitions of terms or abbreviated terms not otherwise defined in the Settlement Agreement

CPT – Cone Penetrometer Test

eCOC – Electronic Chain of Custody (a/k/a sample tracking table)

EDD – Electronic Data Deliverable

EOM – End of Month. After the last day of the month in which data was collected.

EPA – United States Environmental Protection Agency

EPAR4 EDDs – EPA Region 4 Electronic Data Deliverable

EQuIS Live – A module within the EQuIS database software produced by EarthSoft that manages real-time, series data from data loggers, sensors and other sources within and external to EQuIS

ERI – Electrical resistivity imaging

GeoTIFF – Public domain metadata standard enabling georeferencing information to be embedded within an image file

GIS – Geographical Information System

LIDAR – Light Detection and Ranging

PDF – Portable Document Format

PWP – Pore Water Pressure

MS Excel – Microsoft Spreadsheet Software

MS Word – Microsoft Word-processing Software

RA – Remedial Action as defined in the CD

RD - Remedial Design as defined in the CD

SOW – Statement of Work as defined in the CD

SPI – Sediment Profile Imaging

VHG – Vertical Hydraulic Gradient