Exhibit 1

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

UNITED STATES OF AMERICA, Plaintiff, v. THE SHERWIN-WILLIAMS COMPANY, Defendant.	)))))))))	SW/HC OU4 MODIFICATION TO CONSENT DECREE Civil Action No. 1:19-cv-01907-JHR-KMW

WHEREAS, prior to September 27, 2018, the United States of America ("United States") and The Sherwin-Williams Company ("Sherwin-Williams") (collectively, the "Parties") engaged in negotiations to resolve Sherwin-Williams' alleged liability under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA") regarding the Sherwin-Williams/Hilliards Creek Superfund Site ("SW/HC Site"), the United States Avenue Burn Superfund Site ("Burn Site"), and the Route 561 Dump Site ("Dump Site") in Gibbsboro and Voorhees, Camden County, New Jersey (collectively, the "Sites"), in a cooperative manner, without the transaction costs associated with protracted litigation;

WHEREAS, as a result of these negotiations, an agreement was reached and embodied in a consent decree (the "Remedial Design/Remedial Action Consent Decree" or "RD/RA Decree"), which resolved certain claims alleged by the United States against Sherwin-Williams under CERCLA;

WHEREAS, the RD/RA Decree required that Sherwin-Williams conduct certain remedial design and remedial actions at the Sites and pay certain response costs incurred by EPA;

WHEREAS, this Court entered the RD/RA Decree on April 16, 2019 (Docket # 5), and, under Section XXI of the RD/RA Decree, has retained jurisdiction over implementation and enforcement of the RD/RA Decree;

WHEREAS, Paragraph 14.a. of the RD/RA Decree provides that, after issuance by EPA of a Record of Decision ("ROD") for an additional Operable Unit ("OU") at the Sites, the parties may engage in a process to incorporate the remedial work for the additional OU into the RD/RA Decree;

WHEREAS, Paragraphs 14.a(3) and 95 of the RD/RA Decree allows the Decree to be amended to add a SOW modification to implement the ROD for an additional OU by written agreement of the Parties, effective upon approval by the Court after notice and opportunity for public comment;

WHEREAS, on August 4, 2020, the EPA issued a ROD for the Sherwin-Williams/Hilliards Creek Superfund Site Operable Unit 2 ("SW/HC OU2 ROD");

WHEREAS, following the issuance of the SW/HC OU2 ROD, the Parties agreed on a SOW modification for the implementation of the SW/HC OU2 ROD, which was attached to the SW/HC OU2 Modification to Consent Decree (the "first amendment to the RD/RA Decree") that was approved and signed by the Court on April 5, 2021 (Docket # 10);

WHEREAS, on September 28, 2021, the EPA issued a ROD for the Sherwin-Williams/Hilliards Creek Superfund Site Operable Unit 4 ("SW/HC OU4 ROD"), which addresses the remediation of waterbodies at the SW/HC Site;

WHEREAS, the Parties agreed on a SOW modification for the implementation of the SW/HC OU4 ROD (the attached "SW/HC OU4 SOW Modification");

WHEREAS, since the SW/HC OU4 ROD estimates the cost of the remedy under the SW/HC OU4 ROD to be $90,026,569, Sherwin-Williams will adjust the financial assurance amount required under Section IX of the RD/RA Decree to include enough funds to cover the cost of this work (in addition to already required work) within 30 days of the Court's entry of this CD modification;

WHEREAS, Sherwin-Williams and the United States have agreed to this Sherwin-Williams/Hilliards Creek Operable Unit 4 Consent Decree Modification ("SW/HC OU4 CD Modification") to add the SW/HC OU4 SOW Modification to the RD/RA Decree;

WHEREAS, under Paragraphs 14.a(3) and 95 of the RD/RA Decree, the Decree may be amended to add the SW/HC OU4 SOW Modification to implement the Sherwin-Williams/Hilliards Creek Site OU4 ROD, by written agreement of the Parties, effective upon approval by the Court after notice and opportunity for public comment;

WHEREAS, the Parties agree, and the Court by entering this SW/HC OU4 CD Modification of the RD/RA Decree finds, that the amendments to the RD/RA Decree set forth herein are fair, reasonable, and in the public interest;

NOW THEREFORE, it is hereby ORDERED, ADJUDGED, and DECREED that the RD/RA Decree in this matter is modified as follows:

1. This SW/HC OU4 CD Modification shall apply to, and be binding upon, the Parties as an amendment to the RD/RA Decree (the "second amendment to the RD/RA Decree").

2. This SW/HC OU4 CD Modification shall not be construed to alter, affect or amend the RD/RA Decree in any way other than provided herein.

3. It is the purpose of the Parties in entering into this SW/HC OU4 CD Modification to further the objectives of the Parties as provided in the RD/RA Decree.

4. Unless otherwise defined herein, terms used in this SW/HC OU4 CD Modification shall have the meaning given to those terms in the RD/RA Decree, CERCLA, and the regulations promulgated thereunder.

5. The attached SW/HC OU4 SOW Modification is hereby incorporated into the RD/RA Decree.

6. Sherwin-Williams shall increase the amount of financial assurance provided under Section IX of the RD/RA Decree within 30 days of entry of this CD Modification as follows: Sherwin-Williams shall secure financial assurance, initially in the amount of $90,026,569 ("Estimated Cost of the SW/HC OU4 Work"), for the benefit of EPA, for the SW/HC OU4 ROD Work, in accordance with Paragraphs 28 and 31 of the RD/RA Decree. This amount of financial assurance shall be in addition to the amount of financial assurance provided under Section IX of the RD/RA Decree for the Burn Site Work and the SW/HC OU2 Work, and the provisions of Section IX of the RD/RA Decree shall apply to financial assurance for the SW/HC OU4 Work as well as the Burn Site Work and SW/HC OU2 Work.

7. This CD Modification shall be lodged with the Court for at least 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent to this CD Modification if the comments regarding the CD Modification disclose facts or considerations that indicate that the CD Modification is inappropriate, improper, or inadequate. Sherwin-Williams consents to the entry of this CD Modification without further notice. Sherwin-Williams agrees not to oppose entry of this CD Modification or challenge any provision of this CD Modification unless the United States has notified Sherwin-Williams in writing that it no longer supports entry of this CD Modification. If for any reason the Court declines to approve

this CD Modification in the form presented, this CD modification is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

Dated and entered this _____day of _____, _____.

_____
UNITED STATES DISTRICT JUDGE

The Undersigned Party, the United States of America, on behalf of the U.S. Environmental Protection Agency, Enters into this SW/HC OU4 Modification to Consent Decree in the case of *United States of America v. The Sherwin-Williams Company,* Civil Action No. 1:19-cv-01907-JHR-KMW.

FOR THE UNITED STATES OF AMERICA

DEPARTMENT OF JUSTICE

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The Undersigned Party, The Sherwin-Williams Company, Enters into this SW/HC OU4 Modification to Consent Decree in the case of *United States of America v. The Sherwin-Williams Company,* Civil Action No. 1:19-cv-01907-JHR-KMW.

FOR THE SHERWIN-WILLIAMS COMPANY

Assistant Secretary

STATEMENT OF WORK
FOR THE

REMEDIAL DESIGN/REMEDIAL ACTION

SHERWIN-WILLIAMS/HILLIARDS CREEK SUPERFUND SITE

Sherwin-Williams/Hilliards Creek Superfund Site

Operable Unit 4 - Soils, Sediment and Surface Water ("Waterbodies OU")

Gibbsboro, Voorhees, and Lindenwold, Camden County, State of New Jersey

EPA Region 2

SW/HC OU4 SOW Modification under Paragraph 14(a) of Consent Decree in

United States v. The Sherwin-Williams Company, D.N.J. Civil Action No. 1:19-cv-01907

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Purpose of the SOW. This Statement of Work (SOW) sets forth the procedures and requirements for implementing the Sherwin-Williams/Hilliards Creek (SW/HC) Superfund Site Operable Unit 4 (OU4) Work.

In accordance with Paragraph 14.a of the Consent Decree (CD) in the United States v. The Sherwin-Williams Company, D.N.J. Civil Action No. 1:19-cv-01907, this SOW also states the amount of Financial Assurance that Settling Defendant (SD) must have in effect for the SW/HC OU4 Work within 30 days of approval by the Court of the CD modification to which it is attached. This Financial Assurance amount is $90,026,569, the Estimated Cost of the SW/HC OU4 Work.

1.2 Structure of the SOW.

- Section 2 (Community Involvement) sets forth EPA's and SD's responsibilities for community involvement.
- Section 3 (Remedial Design) sets forth the process for the completion of the Remedial Design (RD) for the SW/HC Site OU4 RD.
- Section 4 (Remedial Action) sets forth requirements regarding the completion of the SW/HC Site OU4 Remedial Action (RA), including primary deliverables related to completion of the SW/HC Site OU4 RA.
- Section 5 (Reporting) sets forth SD's reporting obligations.
- Section 6 (Deliverables) describes the content of the supporting deliverables and the general requirements regarding SD's 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 SW/HC Site OU4 RA.
- Section 8 (State Participation) addresses State participation.
- Section 9 (References) provides a list of references, including URLs.

1.3 The Scope of the Remedy includes the actions described in the Selected Remedy Section of the SW/HC Site OU4 Record of Decision (SW/HC Site OU4 ROD (a/k/a Waterbodies ROD)) signed on September 28, 2021. A copy of the Declaration Statement and Decision Summary of this ROD is attached hereto; the complete ROD, including appendices, can be found online at: https:// https://semspub.epa.gov/work/02/630398.pdf . The major components of the selected remedy for the soil include removal of contaminated soil above the Performance Standards, installation of engineering controls including vegetated soil covers in the flood plain areas adjacent to Hilliards Creek, restoration and revegetation of Hilliards Creek flood plain, implementing appropriate Institutional Controls, and monitoring of restoration activities. The major components of the selected remedy for the sediment include construction of a stream diversion system, removal of contaminated sediment above the Performance Standards within lakes and creeks, dewatering and processing

of excavated sediment, stream bank remediation followed by revegetation and restoration, and monitoring of restoration activities. The selected remedy also includes surface water monitoring at the Site.

1.4 The terms used in this SOW that are defined in CERCLA, in regulations promulgated under CERCLA, or in the 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 Sherwin-Williams/Hilliards Creek Superfund Site, United States Avenue Burn Site, and the Route 561 Dump Site (collectively called the "Sites"). Previously during the Remedial Investigation/Feasibility Study (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 SW/HC Site OU4 Work that are not already addressed or provided for in the existing CIP.

(b) If requested by EPA, SD shall participate in community involvement activities, including participation in (1) the preparation of information regarding the SW/HC Site OU4 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 SW/HC Site OU4 Work. SD's support of EPA's community involvement activities may include providing online access to initial submissions and updates of deliverables to any Community Advisory Groups, and other entities to provide them with a reasonable opportunity for review and comment. EPA may describe SD's responsibilities for community involvement activities in its CIP. All community involvement activities conducted by SD at EPA's request are subject to EPA's oversight. SD, upon EPA's request, shall provide the established public repositories (that are located in Gibbsboro and Voorhees, New Jersey) with copies of final EPA-approved SW/HC Site-related documents.

(c) **SD's CR Coordinator**. If requested by EPA, SD shall, within 15 days of EPA's request, designate and notify EPA of SD's Community Relations Coordinator (SD's CR Coordinator). SD may hire a contractor for this purpose. SD's notice must include the name, title, and qualifications of the SD's CR Coordinator. SD's CR Coordinator is responsible for providing support regarding EPA's community involvement activities, including coordinating with EPA's CR Coordinator regarding responses to the public's inquiries about the SW/HC Site.

3. REMEDIAL DESIGN

3.1 For the SW/HC Site OU4 RD Work Plan, SD shall submit a 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, including plans for remedial design of all components of the remedy, including excavation, transportation, disposal, engineering controls, stream diversion, dewatering and processing, stream bank remediation, restoration and revegetation, and monitoring;

(b) A description of the overall management strategy for performing the RD, including a proposal for phasing of design and construction. The description will include a proposal of how the OU4 RD activities will be phased and which phases may require a Preliminary (30%) RD. This proposal will also include a schedule for submitting Pre-Design Investigation Work Plans (PDI WPs), Preliminary (30%) RDs, Pre-Final (90%) RDs, and Final (100%) RDs;

This proposed schedule, for each phase, shall include all of the RDWP deliverables referred to in ¶¶ 7.2 (2) and (6) through (8), with proposed time periods: (a) between EPA approval of the PDI Evaluation Report and submission of the Preliminary (30%) RD where EPA requires a Preliminary (30%) RD, (b) between EPA approval of the PDI Evaluation Report and submission of the Pre-final (90%) RD where EPA does not require a Preliminary (30%) RD, (c) between EPA comments on the Preliminary (30%) RD and the submission of the Pre-final (90%) RD where EPA requires a Preliminary (30%) RD, and (d) between EPA comments on the Pre-final (90%) RD and the submission of the Final (100%) RD;

(c) A description of the proposed general approach to contracting, construction, operation, maintenance, and monitoring of the RA as necessary to implement the SW/HC Site OU4 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) Descriptions of any applicable permitting requirements and other regulatory requirements;

(h) Description of plans for obtaining access in connection with the SW/HC Site OU4 Work, such as property acquisition, property leases, and/or easements;

and

(i) The following supporting deliverables described in ¶ 6.7: Health and Safety Plan, and Emergency Response Plan.

3.2

(a) SD shall meet regularly with EPA to discuss design issues as necessary, as directed or determined by EPA.

(b) To the extent that design and construction of the SW/HC Site OU4 remedy is phased, the deliverables referenced in ¶¶ 3.3, 3.4, 3.5, 3.6, 4.1, and 4.5 (b-f) shall be submitted for each individual phase on its own timeline and an individual preconstruction conference in ¶ 4.2(a) shall be held for each phase.

3.3 **Pre-Design Investigation**. The purpose of the Pre-Design Investigation (PDI) is to address data gaps by conducting additional field investigations.

(a) **PDI Work Plan**. SD shall submit a PDI Work Plan (PDIWP) for each phase 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;

(3) A proposed schedule for start of the PDI and major events including sampling, provision of validated data, and submittal of the PDI Evaluation Report, and the proposed schedule shall include the proposed time period between receipt of validated PDI sampling results and submittal of the PDI Evaluation Report;

(4) The following supporting deliverables described in ¶ 6.7 (Supporting Deliverables): Field Sampling Plan, and Quality Assurance Project Plan; and

(b) Following the PDI, SD shall submit a PDI Evaluation Report for each SW/HC Site OU4 phase for EPA approval. 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;

(7) Photographs documenting the work conducted; and

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

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

Following EPA approval of the PDI Evaluation Report for any phase of the remedy for which the SD has not specified, and EPA has not required, the need for a Preliminary (30%) RD in the RDWP, EPA may authorize SD in writing to proceed directly to Pre-Final (90%) RD from PDI completion for that phase, without the need for a Preliminary (30%) RD, provided that SD addresses all components of the remedy for that phase and incorporates all the requirements of ¶ 3.4.(a) through (i) below for that phase either in the PDI Evaluation Report or in the Pre-Final (90%) RD.

3.4 Preliminary (30%) RD. SD shall submit for EPA's comment a Preliminary (30%) RD for each phase of SW/HC OU4 that involves soil or sediment remedy work and, except when authorized by EPA to proceed directly to Pre-Final (90%) RD as stated in Paragraph 3.3 above, each other phase of SW/HC OU4. The Preliminary RD must address all components of the remedy for that phase and 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, where applicable;

(d) A Site Wide Monitoring Plan as described in Paragraph 6.7(e);

(e) Preliminary Operation and Maintenance (O&M) Plan and O&M Manual, where applicable;

(f) 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 (August 2009), where applicable;

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

(h) Any proposed revisions to the RA Schedule that is set forth in ¶ 7.3 (RA Schedule); and

(i) Preliminary Institutional Controls Implementation and Assurance Plan (ICIAP), where applicable.

3.5 **Pre-Final (90%) RD**. SD shall submit the Pre-final (90%) RD for each phase for EPA's comment. The Pre-final RD will serve as the approved Final (100%) RD if EPA approves the Pre-final RD without comments. If a Preliminary (30%) RD for a phase has been submitted to EPA, the Pre-final (90%) RD must address EPA's comments on the Preliminary RD. The 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 MasterFormat 2012;

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

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

(d) Supporting deliverables required to accompany the 90% RD such as the RDWP and the following additional supporting deliverables described in ¶ 6.7 (Supporting Deliverables): Field Sampling Plan; Quality Assurance Project Plan; Site Wide 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 **Final (100%) RD**. SD shall submit the Final (100%) RD for EPA approval. The Final RD must address EPA's comments on the Pre-final (90%) RD and must include final versions of all Pre-final RD deliverables.

4. REMEDIAL ACTION

4.1 **RA Work Plan**. SD shall submit a RA Work Plan (RAWP), and supporting deliverables (Paragraph 6.7), for each phase of the RA, for EPA approval that includes:

(a) A proposed RA Construction Schedule in the Gantt chart format;

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

(c) Description of all applicable permit requirements and plans for satisfying substantive requirements of permits for on-site activity.

4.2 Meetings and Inspections

(a) **Preconstruction Conference**. SD 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) for the SW/HC Site OU4 RA. SD shall prepare minutes of the conference and shall distribute the minutes to all parties.

(b) **Periodic Meetings**. During the construction portion of the SW/HC OU4 RA ("SW/HC Site OU4 RA Construction"), SD shall meet weekly with EPA, and others as directed or determined by EPA, to discuss construction issues. SD shall distribute an agenda and list of attendees to all parties prior to each meeting. SD shall prepare minutes of the meetings and shall distribute the minutes to all parties.

(c) **Inspections**

(1) EPA or its representative shall conduct periodic inspections of or have an on-site presence during the SW/HC Site OU4 Work. At EPA's request, the Supervising Contractor, or other designee, shall accompany EPA, or its representative, during inspections.

(2) SD shall provide office space for EPA personnel to perform their oversight duties. The minimum office requirements are a private office with at least 150 square feet of floor space, an office desk with chair, a four-drawer file cabinet, and a telephone with a private line, reproduction, and personal computer equipment, wireless internet access, and sanitation facilities.

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

(4) If EPA concludes that the SW/HC Site OU4 RA Construction is deficient for a phase, EPA shall so notify SD. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require SD to submit a schedule for EPA approval. SD shall take all necessary steps to correct the deficiencies and/or bring the SW/HC Site OU4 RA Construction into compliance with the approved Final SW/HC Site OU4 RD, any approved design changes, and/or the approved RAWP pursuant to the EPA provided or approved schedule.

4.3 Emergency Response and Reporting

(a) **Emergency Response and Reporting**. If any event occurs during performance of the SW/HC Site OU4 Work that causes or threatens to cause a release of Waste Material on, at, or from the SW/HC Site and that either constitutes an emergency situation or that may present an immediate threat to public health or

welfare or the environment, SD 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 ¶ 4.3(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 SW/HC Site OU4 Work that SD is 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, SD shall immediately notify the authorized EPA officer orally.

(c) For SW/HC Site OU4, the "authorized EPA officer" for purposes of immediate oral notifications and consultations under ¶ 4.3(a) and ¶ 4.3(b) is the EPA Project Coordinator (Julie Nace), or the EPA Alternate Project Coordinator, Rich Puvogel (if the EPA Project Coordinator is unavailable), or the EPA National Response Center Hotline at (800) 424-8802 (if neither the EPA Project Coordinator nor the EPA Alternate Project Coordinator is available).

(d) For any event covered by ¶ 4.3(a) and ¶ 4.3(b), SD 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 ¶ 4.3 are in addition to the reporting required by CERCLA § 103 or EPCRA § 304.

4.4 Off-Site Shipments

(a) SD may ship hazardous substances, pollutants, and contaminants from the Site to an off-Site facility only if it complies with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. SD will be deemed to be in compliance with CERCLA § 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if SD obtains a prior written notification from EPA that the proposed receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).

(b) SD may ship Waste Material from the Site to an out-of-state waste management facility only if, prior to any shipment, it provides written 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. SD 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. SD shall provide the notice after the award of the contract for RA construction and before the Waste Material is shipped.

(c) SD may ship Investigation Derived Waste (IDW) from the Site to an off- Site facility only if it complies 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.

4.5 RA Construction Completion

(a) For purposes of this ¶ 4.5, "RA Construction" includes, for any RA phase that involves sediment removal, soil removal, and/or capping, the implementation of, as applicable, the removal of contaminated sediment and soil to meet Performance Standards, stream diversion, installation of engineering controls including vegetated soil covers, dewatering and processing of excavated sediment, placement of about one foot of sand in Hilliards Creek for stream flow stabilization after excavation, stream bank remediation, revegetation and restoration, backfilling of excavated areas with clean fill and revegetating, installing soil caps where residential soil cleanup levels have not been attained and implementing appropriate Institutional Controls.

(b) **Inspection of Constructed Remedy.** For any RA phase that involves sediment removal, soil removal, and/or capping, SD shall schedule a pre-final inspection upon completion of that phase. The pre-final inspection must be attended by SD and EPA and/or their representatives. SD shall note any deficiencies in the pre-final inspection report and submit the Pre-Final Inspection Report to EPA. After completion of the work identified in the Pre-Final Inspection Report, SD shall schedule a final inspection that must be attended by SD and EPA and/or their representatives.

(c) **RA Construction Completion Report.** For any RA phase that involves sediment removal, soil removal, and/or capping, following the final inspection, SD shall submit a "RA Construction Completion Report" requesting EPA's determination that RA Construction for that phase has been completed. The RA Construction Completion Report must: (1) include statements by a registered professional engineer and by SD's Project Coordinator that the RA Construction for that phase has been completed; (2) include as-built drawings signed and stamped by a registered professional engineer; (3) 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); (4) contain data to demonstrate that Performance Standards have been achieved; and

(5) be certified in accordance with ¶ 6.5 (Certification). This report shall include the information specified in ¶ 4.5(d) and (e) for each phase.

(d) **Post Excavation Data Tables & Associated Figures.** After the SW/HC Site OU4 RA Construction completion for each phase that involves excavation or dredging, SD shall submit a plan view drawing for the SW/HC Site OU4 areas or subareas using the base map survey for each property on separate pages labeled "Confirmation Sample Locations" that depicts the area of soil and/or sediment contamination that was removed, elevation depth of the excavated or dredged area, the sample locations (with sample identifiers) used to bound the area of contamination both vertically and horizontally, property lines and significant features of the property (shorelines, docks, etc.) to EPA. SD shall also submit a planview drawing for each property on separate pages using the base map survey labeled "Final Excavation Limits" that depicts the final excavation limits of the contaminated area, the coordinates that define the areal extent of excavation limits, the elevation depths of the excavation limits of the contaminated area and the same significant features as indicated in the "Confirmation Sample Locations" figure. SD shall also submit data summary tables for each property on separate pages, that lists the Chemical Abstracts Service number for the contaminant of concern, the name of the contaminants of concern, the corresponding Performance Standards specified in the SW/HC Site OU4 ROD for each contaminant of concern, sample identification number that corresponds to the survey coordinates and sample identification numbers on the drawings, the dates of sample collection, sample depth indicated as elevation and feet below ground surface, and the analytical values for contaminants of concern at each sample point used to bound the area of soil and/or sediment contamination.

(e) For those properties that require a deed notice, after the SW/HC Site OU4 RA Construction completion for each phase, SD shall submit a plan view drawing for the SW/HC Site OU4 areas or subareas, using the base map survey for each property on separate pages, that indicates surveyed property lines, the location of the Restricted Area(s) indicated by surveyed points (include survey point coordinates) used to establish lines delineating the Restricted Area on the property, the location of sample points that exceed soil standards with sample identification(s) located within the Restricted Area, location(s) of cross section(s) on the property that correspond to cross section figure(s). For deed notice properties, also provide cross section drawing(s) indicating the elevation of ground surface, engineering control elevation, and elevation of contamination limits, property boundaries, vertical scale, horizontal scale, identification of the property and identification of the cross section corresponding to the cross section on the plan view drawing. Also, for deed notice properties, include a Restricted Area Data Table that lists the Chemical Abstracts Service number for the contaminant of concern, the name of the contaminants of concern, the corresponding Performance Standards specified in the SW/HC Site OU4 ROD for each contaminant of concern, sample identification numbers that correspond to the sample locations on the plan view drawing and the elevation the sample was obtained and the numerical value of the sample that exceeded the soil standard.

(f) If EPA concludes that the SW/HC Site OU4 RA Construction is not Complete for a phase after receipt of the RA Construction Report for that phase, EPA shall so notify SD. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require SD to submit a schedule for EPA approval. SD shall perform all activities described in the notice in accordance with the schedule.

(g) If EPA concludes, based on the initial or any subsequent RA Construction Completion Report, that the RA Construction is complete for that phase, EPA shall so notify SD.

4.6 Certification of SW/HC Site OU4 RA Completion

(a) **RA Completion Inspection**. The SW/HC Site OU4 RA is "Complete" for purposes of this ¶ 4.6 when all phases of the SW/HC Site OU4 RA have been fully performed and the SW/HC Site OU4 ROD Performance Standards for all phases have been achieved. SD shall schedule an inspection for the purpose of obtaining EPA's Certification of SW/HC Site OU4 RA Completion. The inspection must be attended by SD and EPA and/or their representatives.

(b) **RA Report and Monitoring Report**. Following the inspection, SD shall submit the SW/HC Site OU4 RA Report and Monitoring Report to EPA requesting EPA's Certification of the SW/HC Site OU4 RA Completion. The report must: (1) include certifications by a registered professional engineer and by SD's Project Coordinator that the SW/HC Site OU4 RA is complete; (2) include as-built drawings signed and stamped by a registered professional engineer; (3) 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); (4) contain monitoring data to demonstrate that Performance Standards have been achieved; and (5) be certified in accordance with ¶ 6.5 (Certification). The RA Report may incorporate or cross-reference the RA Construction Completion Reports provided under ¶ 4.5, to the extent applicable. The report shall also include copies of all deed notices/easements recorded in accordance with the ICIAP.

(c) If EPA concludes that the SW/HC OU4 RA is not complete, EPA shall so notify SD. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require SD to submit a schedule for EPA approval. SD shall perform all activities described in the notice in accordance with the schedule.

(d) If EPA concludes, based on the initial or any subsequent RA Report and Monitoring Report requesting Certification of SW/HC OU4 RA Completion, that the SW/HC OU4 RA is complete, EPA shall so certify to SD. This certification will constitute the Certification of the SW/HC Site OU4 RA Completion for purposes of the SOW. Certification of the SW/HC Site OU4 RA Completion will not affect SD's remaining obligations under the CD.

4.7 **Periodic Review Support Plan (PRSP)**. SD shall submit the PRSP for EPA approval. The PRSP addresses the studies and investigations that SD shall conduct to support EPA's reviews of whether the SW/HC OU4 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"). SD 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 guidances.

4.8 **Certification of SW/HC Site OU4 Work Completion**

(a) **Work Completion Inspection**. SD shall schedule an inspection for the purpose of obtaining EPA's Certification of SW/HC Site OU4 Work Completion. The inspection must be attended by SD and EPA and/or their representatives.

(b) **Work Completion Report**. Following the inspection, SD shall submit a report to EPA requesting EPA's Certification of SW/HC Site OU4 Work Completion. The report must: (1) include certifications by a registered professional engineer and by SD's Project Coordinator that the SW/HC Site OU4 Work is complete; and (2) be certified in accordance with ¶ 6.5 (Certification). If the SW/HC Site OU4 RA Report and Monitoring Report submitted under ¶ 4.6 (b) or (c) includes all elements required under this ¶ 4.8(b), then the SW/HC Site OU4 RA Report and Monitoring Report suffices to satisfy all requirements under this ¶ 4.8(b).

(c) If EPA concludes that the SW/HC Site OU4 Work is not complete, EPA shall so notify SD. EPA's notice must include a description of the activities that SD must perform to complete the SW/HC Site OU4 Work. EPA's notice must include specifications and a schedule for such activities or must require SD to submit specifications and a schedule for EPA approval. SD 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 SW/HC Site OU4 Work Completion, that the SW/HC Site OU4 Work is complete, EPA shall so certify in writing to SD. Issuance of the Certification of SW/HC Site OU4 Work Completion does not affect the following continuing obligations: (1) activities under the Periodic Review Support Plan; (2) obligations under Sections VIII (Property Requirements), XIX (Retention of Records), and XVIII (Access to Information) of the CD; (3) Institutional Controls obligations as provided in the SW/HC Site ICIAP; (4) reimbursement of EPA's Future Response Costs under Section X (Payment of Response Costs) of the CD; and (5) Work or other obligations relating to other OUs at the Sites.

5. REPORTING

5.1 **Progress Reports**. Commencing 30 days following the lodging of the SW/HC OU4 Modification to Consent Decree and until EPA approves the SW/HC Site OU4 Construction Completion for the last phase completed, SD shall submit progress reports to EPA on a monthly basis on the 15th day of the following month, or as otherwise

requested by EPA. Post-construction completion reporting shall be in accordance with the Site Wide Monitoring Plan and the O&M Plan. The reports must cover all 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 SD;

(c) A description of all deliverables that SD submitted to EPA;

(d) A description of all activities relating to RA Construction that are scheduled for the next 45 days, as well as a brief description of activities relating to RD, IC, O&M, and/or monitoring planned to be conducted in the next 45 days;

(e) An updated RA Construction Schedule, together with information regarding percentage of completion, delays encountered or anticipated that may affect the future schedule for implementation of the SW/HC Site OU4 Work, and a description of efforts made to mitigate those delays or anticipated delays;

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

(g) A description of all activities undertaken in support of the CIP during the reporting period and those to be undertaken in the next 30 days.

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

6. DELIVERABLES

6.1 **Applicability**. SD shall submit deliverables for EPA approval or for EPA comment as specified in the SOW. 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.

6.2 **In Writing**. As provided in ¶ 92 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. SD shall submit all deliverables to EPA in electronic form and paper copies if requested. 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 and, if requested by EPA, in paper form. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5" by 11", SD shall also provide EPA with paper copies of such exhibits.

6.4 Technical Specifications

(a) Sampling and monitoring data should be submitted in standard EPA Region 2 Electronic Data Deliverable (EDD) format, which can be found at https://www.epa.gov/superfund/region-2-superfund-electronic-data-submission. Other delivery methods may be allowed if electronic direct submission presents a significant burden or as technology changes.

(b) Spatial data, including spatially-referenced data and geospatial data, should be submitted: (1) in the ESRI File Geodatabase format and (2) as unprojected geographic coordinates in decimal degree format using North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) as the datum. If applicable, submissions should include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data should be accompanied by metadata, and such metadata should be compliant with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor (EME), complies with these FGDC and EPA metadata requirements and is available at https://edg.epa.gov/EME/.

(c) Each file must include an attribute name for each site unit or sub-unit submitted. Consult https://www.epa.gov/geospatial/geospatial-policies-and-standards for any further available guidance on attribute identification and naming.

(d) Spatial data submitted by SD does not, and is not intended to, define the boundaries of the SW/HC Site.

6.5 Certification. All deliverables that require compliance with this ¶ 6.5 must be signed by the SD's Project Coordinator, or other responsible official of SD, 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 writing, 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 SW/HC Site OU4 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), SD shall, within 40 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 SD 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 enforceable under the CD; and (2) SD 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 SD of any liability for stipulated penalties under Section XIV (Stipulated Penalties) of the CD.

6.7 Supporting Deliverables. SD shall submit each of the following supporting deliverables for EPA approval, except as specifically provided. SD shall develop the deliverables in accordance with all applicable regulations, guidances, and policies (see Section 9 (References)). SD shall update each of these supporting deliverables as necessary or appropriate during the course of the SW/HC Site OU4 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 SW/HC Site OU4 Work. SD 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 SW/HC 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 and date(s) 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 ¶ 4.3(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 all necessary actions to ensure compliance with ¶ 4.3 of the SOW in the event of an occurrence during the performance of the SW/HC Site OU4 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 for each phase. 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 Field Sampling Plan (FSP) and addresses sample analysis and data handling regarding the SW/HC Site OU4 Work for each phase. The QAPP must include a detailed explanation of SD's quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance, and monitoring samples. SD shall develop the QAPP in accordance with EPA Directive CIO 2105.1 (Environmental Information Quality Policy, 2021), the most recent version of Quality Management Systems for Environmental Information and Technology Programs –

Requirements with Guidance for Use, ASQ/ANSI E-4 (Feb. 2014), EPA 2005, Uniform Federal Policy for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Data Collection and Use Program - Part 1: UFP-QAPP Manual, EPA-505-B-04-900A, and EPA 2012 Revision 1, Optimized UFP-QAPP Worksheets (March 2012). SD shall collect, produce, and evaluate all environmental information at the Site in accordance with the approved QAPP. The QAPP also must include procedures:

(1) To ensure that EPA and its authorized representative have reasonable access to laboratories used by SD in implementing the CD;

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

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

(5) For SD to provide EPA with notice at least 14 days prior to any sample collection activity;

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

(7) For EPA to take any additional samples that it deems necessary;

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

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

(e) **Site Wide Monitoring Plan**. The purpose of the Site Wide Monitoring Plan (SWMP) is to obtain baseline information regarding the extent of contamination in affected media at the SW/HC Site; to obtain information, through short- and long- term monitoring, about the movement of and changes in contamination throughout the SW/HC Site, before and during implementation of the RA for each phase; to obtain information regarding contamination levels to determine whether Performance Standards (including Remediation Goals) are achieved; and to obtain information to determine whether to perform additional actions, including further Site monitoring. The SWMP for each RA phase must include the following, unless determined inapplicable by EPA:

(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 SW/HC Site-related requirements;

(4) Description of verification sampling procedures;

(5) 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;

(6) Description of proposed 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);

(7) Provision for monitoring to verify dredge performance to ensure dredge elevations were achieved;

(8) Provision for chemical monitoring to ensure removal of sediment with contaminants of concern above the Performance Standards;

(9) Provision for post-remediation surface water and sediment sampling to determine achievement of sediment Performance Standards, and provision for post-remediation soil sampling to determine achievement of soil Performance Standards;

(10) Provision for monitoring of surface water to assess any changes in contaminant concentrations over time, including at least quarterly surface water monitoring unless and until EPA approves a change in frequency of monitoring;

(11) Provision for monitoring of stream banks, riparian zone, and wetlands for at least 5 years after remediation of sediment to assure successful restoration;

(12) Provision for monitoring of vegetated soil cover caps that are installed within the floodplain soils of Hilliards Creek; and

(13) Provision for monitoring of restoration and revegetation of Hilliards Creek floodplain to assure successful restoration.

(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 SW/HC Site OU4 RA construction will satisfy all 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 SW/HC Site OU4 RA construction has satisfied all plans, 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 SW/HC Site OU4 Performance Standards (including Remediation Goals) required to be met to achieve Completion of the RA;

(3) Describe the activities to be performed: (i) to provide confidence that SW/HC Site OU4 Performance Standards (including Remediation Goals) will be met; and (ii) to determine whether Performance Standards 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 ¶ 4.4 (Off-Site Shipments). The TODP must include:

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

(2) Identification of communities, including underserved communities referred to in Executive Order 14008, § 222(b) (Feb. 1, 2021), 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 and maintaining the RA. SD shall develop the O&M Plan for the SW/HC Site OU4 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 Performance Standards required to be met to implement the OU4 ROD;

(2) Description of activities to be performed: (i) to provide confidence that Performance Standards (including Remediation Goals) will be met; (ii) to

determine whether Performance Standards (including Remediation Goals) have been met; (iii) to inspect and maintain vegetated soil cover caps; (iv) to inspect the revegetation and restoration of the Hilliards Creek flood plain and conduct maintenance or other activities as necessary to ensure successful restoration; (v) to inspect stream banks, riparian zone, and wetlands and conduct maintenance or other activities as necessary to ensure successful restoration; and (vi) provide schedules for the activities to be performed;

(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, reports of inspection, maintenance, and restoration activities, 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 Performance Standards; (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 Performance Standards 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. SD 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 SW/HC Site. SD shall develop the ICIAP for the SW/HC Site OU4 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 plans for the development and recordation of Institutional Controls (deed notice) as referenced in the SW/HC OU4 ROD and/or as required under Section VIII of the CD. 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.

(3) Documentation of compliance with Paragraph 24 of the CD (Notice to Successors-in-Title) with respect to applicable properties at the SW/HC Site.

(4) Proposed schedules for submitting drafts of deed notices/easements to EPA for review and approval and for recordation of deed notices/easements.

7. SCHEDULES

7.1 Applicability and Revisions. All deliverables and tasks required under this SW/HC Site OU4 SOW must be submitted or completed by the deadlines or within the time durations listed in the SW/HC Site OU4 RD and RA Schedules, set forth below. SD may submit proposed revised SW/HC Site OU4 RD or RA Schedules for EPA approval. Upon EPA's approval, the revised SW/HC Site OU4 RD and/or RA Schedules supersede the SW/HC Site OU4 RD and/or RA Schedule, set forth below, and any previously-approved SW/HC Site OU4 RD and/or RA Schedule. To the extent that design and construction of the SW/HC Site OU4 remedy is phased, the deadlines or time durations listed in the SW/HC Site OU4 RD and RA Schedules, set forth below, or revised as approved by EPA, shall apply on an individual phase basis for the deliverables or tasks listed in RD Schedule 2 through 8 and RA Schedule 1 through 11 and 15.

7.2 SW/HC OU4 Site RD Schedule

	Description of Deliverable, Task	**¶ Ref.**	**Deadline**
1	RDWP (including HASP and ERP)	3.1	RD schedule to be provided 30 days after EPA's Authorization to Proceed; RDWP to be submitted 60 days after EPA's Authorization to Proceed.
2	PDIWP (including FSP and QAPP)	3.3(a)	In accordance with the schedule in the EPA approved RDWP.
3	Start PDI		In accordance with the schedule in the EPA approved PDIWP, for each phase.

4	Provide validated PDI sampling results		In accordance with the schedule in the EPA approved PDIWP, for each phase.
5	PDI Evaluation Report	3.3(b)	In accordance with the schedule in the EPA approved PDIWP, for each phase.
6	Preliminary (30%) RD (including SWMP)	3.4	In accordance with the schedule in the EPA approved RDWP for each individual phase for which EPA requires a Preliminary (30%) RD.
7	Pre-final (90%) RD (including FSP, QAPP, SWMP, CQA/QCP, TODP, O&M Plan, O&M Manual, and ICIAP)	3.5	(a) In accordance with the schedule in the EPA approved RDWP for each individual phase for which EPA requires a Preliminary (30%) RD; or (b) In accordance with the schedule in the EPA-approved RDWP for each individual phase for which EPA authorizes proceeding directly from the PDI approval to Pre-Final (90%) RD.
8	Final (100%) RD	3.6	In accordance with the schedule in the EPA-approved RDWP for each individual phase.

7.3 SW/HC Site OU4 RA Schedule

	Description of Deliverable / Task	**¶ Ref.**	**Deadline**
1	Award RA contract		45 days after EPA Notice of Authorization to Proceed with RA, for each phase.
2	RAWP	4.1	60 days after Award of RA Contract, for each phase.
3	Pre-Construction Conference	4.2(a)	15 days after Approval of RAWP, for each phase.
4	Start of Construction		60 days after Approval of RAWP, for each phase.
5	Completion of Construction	4.5	As per schedule in the approved RAWP, for each phase.
6	Pre-final Inspection of RA Construction	4.5 (b)	15 days after completion of construction, for each phase.
7	Pre-final Inspection Report of RA Construction	4.5(b)	30 days after completion of Pre-final Inspection, for each phase.
8	Final Inspection of RA Construction	4.5(b)	15 days after completion of work identified in Pre-final Inspection Report, for each phase.
9	RA Construction Completion Report	4.5(c)	60 days after Final Inspection of RA Construction, for each phase.
10	Develop and Record Deed Notices/ICs		As per schedules in the approved ICIAP, for each phase.
11	Implement Operation & Maintenance and Monitoring Requirements		As per schedules in the approved O&M Plan and Site Wide Monitoring Plan, for each phase.
12	RA Completion Inspection	4.6 (a)	15 days after all phases of the SW/HC OU4

			RA have been fully performed and the Performance Standards for all phases of the RA have been achieved.
13	RA Report and Monitoring Report	4.6 (b)	60 days after SW/HC OU4 RA Completion Inspection.
14	Work Completion Report	4.8(b)	60 days after SW/HC OU4 Work Completion Inspection.
15	Periodic Review Support Plan	4.7	Two years after Start of SW/HC OU4 RA Construction, for each phase, unless determined inapplicable by EPA .

8. STATE PARTICIPATION

8.1 **Copies**. SD 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 SD 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 RA Construction Completion Report under ¶ 4.5 (RA Construction Completion), any disapproval of, or Certification of SW/HC Site OU4 RA Completion under ¶ 4.6 (Certification of SW/HC Site OU4 RA Completion), and any disapproval of, or Certification of SW/HC Site OU4 Work Completion under ¶ 4.8 (Certification of SW/HC Site OU4 Work Completion).

9. REFERENCES

9.1 The following regulations and guidance documents, among others, apply to the SW/HC Site OU4 Work. Any item for which a specific URL is not provided below is available on one of the three 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/G90/001 (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, EPA/540-R-01-007 (June 2001).

(o) EPA 2005 Uniform Federal Policy for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Data Collection and Use Program - Part 1: UFP-QAPP Manual, EPA-505-B-04-900A.

(p) EPA 2012 Revision 1, Optimized UFP-QAPP Worksheets. (March 2012).

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

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

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

(t) EPA National Geospatial Data Policy, CIO Policy Transmittal 05-002 (Aug. 2005), https://www.epa.gov/geospatial/epa-national-geospatial-data-policy.

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

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

(w) Providing Communities with Opportunities for Independent Technical Assistance in Superfund Settlements, Interim (Sep. 2009).

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

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

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

(aa) Plan EJ 2014: Legal Tools, EPA Office of General Counsel (Dec. 2011), https://www.epa.gov/environmentaljustice/plan-ej-2014-legal-tools.

(bb) Construction Specifications Institute's MasterFormat, available from the Construction Specifications Institute, http://www.csinet.org/masterformat.

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

(dd) 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), https://semspub.epa.gov/work/HQ/175446.pdf.

(ee) 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), https://semspub.epa.gov/work/HQ/175449.pdf.

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

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

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

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

(jj) Quality Management Systems for Environmental Information and Technology Programs -- Requirements with Guidance for Use, ASQ/ANSI E-4 (February 2014), available at https://webstore.ansi.org/.

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

(ll) Advanced Monitoring Technologies and Approaches to Support Long-Term Stewardship (July 20, 2018), https://www.epa.gov/enforcement/use-advanced-monitoring-technologies-and-approaches-support-long-term-stewardship.

(mm) Superfund Community Involvement Handbook, OLEM 9230.0-51 (March 2020). More information on Superfund community involvement is available on the Agency's Superfund Community Involvement Tools and Resources web page at https://www.epa.gov/superfund/superfund-community-involvement-tools-and-resources.

(nn) EPA directive CIO 2105.1 (Environmental Information Quality Policy, 2021), https://www.epa.gov/sites/production/files/2021-04/documents/environmental_information_quality_policy.pdf.

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

Search Superfund Documents at https://www.epa.gov/superfund/search-superfund-documents

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 SW/HC Site OU4 Work only after SD receive notification from EPA of the modification, amendment, or replacement.

Attachment to

SW/HC OU4 SOW Modification –

Sherwin-Williams/Hilliards Creek Site
Operable Unit 4 Record of Decision
Declaration Statement and Decision Summary

RECORD OF DECISION

Sherwin-Williams/Hilliards Creek Site

Operable Unit 4

Gibbsboro, Voorhees and Lindenwold, New Jersey

U.S. Environmental Protection Agency
Region II
September 2021

DECLARATION STATEMENT

RECORD OF DECISION

SITE NAME AND LOCATION

Sherwin-Williams/Hilliards Creek (NJD980417976), Borough of Gibbsboro, Camden County, New Jersey.
Operable Unit 4 – Soil, Sediment and Surface Water

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedy to address contaminated soil and sediment at the Sherwin-Williams/Hilliards Creek Site (Site), in the Borough of Gibbsboro, Voorhees Township, and Lindenwold in Camden County, New Jersey. The Site is comprised of the Former Manufacturing Plant area (FMP), Hilliards Creek, portions of Silver Lake (Gibbsboro, New Jersey), and Kirkwood Lake (Voorhees, New Jersey). Operable Unit 4 (OU4) of the Site, also known as the Waterbodies OU, will address soil and sediment contamination present within Silver Lake, Bridgewood Lake, Kirkwood Lake, and portions of Hilliards Creek (middle and lower). The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, (CERCLA) and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record established for this Site.

The State of New Jersey Department of Environmental Protection (NJDEP) concurs, in part, with the selected remedy. NJDEP concurs with the selected alternative of soil and sediment removal including off-site disposal. However, the State of New Jersey will not concur with the capping and institutional control components of the selected soil alternative unless and until owners of property subject to restricted use requirements provide their consent to the placement of caps and deed notices on their property.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document addresses the soil and sediment contamination at the Site, which are contaminated primarily with lead and arsenic.

The major components of the selected remedy for the soil include the following:

- Excavation, transportation, and disposal of 42,000 cubic yards of contaminated soil;
- Installation of engineering controls including vegetated soil covers in the floodplain areas adjacent to Hilliards Creek;

- Restoration and revegetation of Hilliards Creek flood plain;
- Institutional controls, such as deed notices, to prevent exposure to residual soil that exceeds levels that allow for unrestricted use; and
- Monitoring of restoration activities.

The major components of the selected remedy for the sediment include the following:

- Construction of a stream diversion system to allow access to sediment;
- Excavation, transportation, and disposal of 128,000 cubic yards of contaminated sediment within lakes and creeks;
- Dewatering and processing of excavated sediment;
- Stream bank remediation followed by revegetation and restoration that includes engineering controls to stabilize stream banks as needed; and
- Monitoring of restoration activities.

The U. S. Environmental Protection Agency (EPA) expects that removal of contaminated sediment, combined with soil removal and capping, will result in a decrease of surface water contaminants. Surface water monitoring will be included as part of the remedial action to assess any changes in contaminant conditions over time. If monitoring indicates that contamination levels have not decreased to below standards, EPA may require an action in the future.

The total present worth cost for the combined soil and sediment Selected Alternative is $90,026,569.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1: Statutory Requirements

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective and utilizes permanent solutions and treatment technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment

The selected remedy does not meet the statutory preference for the use of remedies that involve treatment as a principal element because the contamination will be removed and disposed off-site. Neither the selected remedy nor any of the alternative remedies involved treatment due to technical infeasibility in implementing treatment methods for the contaminants of concern at this Site.

Part 3: Five-Year Review Requirements

Because the remedy will result in contaminants remaining in the soil on-site above levels that allow for unlimited use and unrestricted exposure, a statutory five-year review will be required.

RECORD OF DECISION DATA CERTIFICATION CHECKLIST

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

- Contaminants of concern and their respective concentrations may be found in the "Site Characteristics" section.
- Baseline risk represented by the contaminants of concern may be found in the "Summary of Site Risks" section.
- Cleanup levels established for contaminants of concern and the basis for these levels can be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions used in the baseline risk assessment and decision document can be found in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedial cost estimates are projected can be found in the "Description of Alternatives" section.
- Key factors that led to selecting the remedy may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Michael S. Regan

Michael S. Regan, Administrator

SEP 28 2021

Date

RECORD OF DOCUMENT

DECISION SUMMARY

Sherwin-Williams/Hilliards Creek Site
Gibbsboro, Voorhees and Lindenwold
New Jersey

U.S. Environmental Protection Agency
Region II
New York, New York
September 2021

TABLE OF CONTENTS

APPENDICES

SITE NAME, LOCATION AND DESCRIPTION

The Sherwin-Williams/Hilliards Creek Site (Site), see Figure 1, EPA ID # NJD980417976, is one of three sites which collectively make up what is commonly referred to as the "Sherwin-Williams Sites" (Sites). Located in areas of Gibbsboro, Voorhees, and Lindenwold, New Jersey, the Sherwin-Williams Sites are the *Sherwin-Williams/Hilliard's Creek Superfund Site* located in Gibbsboro, Voorhees and Lindenwold, the *Route 561 Dump Site* in Gibbsboro, and the *United States Avenue Burn Superfund Site* in Gibbsboro (Figure 2). The Sites include source areas from which contaminated soil and sediment have migrated, predominately through natural processes, to downgradient areas within Gibbsboro, Voorhees and Lindenwold.

Sherwin-Williams/Hilliards Creek Superfund Site: The Sherwin-Williams/Hilliards Creek Superfund Site includes the FMP, Hilliards Creek, a portion of Silver Lake and Kirkwood Lake. The FMP is approximately 20 acres in size and is comprised of commercial structures, undeveloped land, and the southern portion of Silver Lake. The FMP extends from the south shore of Silver Lake in Gibbsboro and straddles the headwaters of Hilliards Creek. Hilliards Creek is formed by the outflow from Silver Lake. The outflow enters a culvert beneath a parking lot at the FMP and resurfaces on the south side of Foster Avenue, Gibbsboro. From this point, Hilliards Creek flows in a southerly direction through the FMP and continues downgradient through residential and undeveloped areas. At approximately one mile from its origin, Hilliards Creek empties into Kirkwood Lake. Kirkwood Lake is approximately 25 acres, and is located in Voorhees and Lindenwold, with residential properties lining its northern shore.

Route 561 Dump Site: The Route 561 Dump Site (Dump Site) is located approximately 700 feet to the east of the FMP and is approximately 19 acres. It includes retail businesses, a portion of a residential area, wooded vacant lots and a small creek. A 2.9-acre fenced portion of the Dump Site is located at the base of an earthen dam that forms Clement Lake. The Dump Site includes portions of White Sand Branch, a small creek which originates at the Clement Lake dam and flows in a southwest direction for approximately 1,650 feet where it enters the fenced portion of the United States Avenue Burn Site (Burn Site).

United States Avenue Burn Site: The fenced portion of the Burn Site and its associated contamination is approximately 13 acres in size and encloses the remaining 400 feet of White Sand Branch. A 500-foot portion of a small creek, Honey Run, enters the Burn Site where it joins White Sand Branch before it passes beneath United States Avenue and enters Bridgewood Lake in Gibbsboro. The six-acre Bridgewood Lake empties through a culvert beneath West Clementon Road and forms a 400-foot long tributary that joins Hilliards Creek at a point approximately 1,000 feet downgradient from the FMP.

The EPA has been designated as the lead agency for cleanup of the Site, with the NJDEP functioning in a support role. Recent investigations at the Site have been performed by The Sherwin-Williams Company (Sherwin-Williams) under an Administrative Order on Consent (AOC) entered into in 1999, with EPA's oversight.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site History

The former paint and varnish manufacturing plant property in Gibbsboro, New Jersey, was developed in the early 1800s as a sawmill, and later as a grain mill. In 1851, John Lucas & Co., Inc. (Lucas), purchased the property and converted the grain mill into a paint and varnish manufacturing facility that produced oil-based paints, varnishes, and lacquers. Sherwin-Williams purchased Lucas in the early 1930s and expanded operations at the facility. Historic features at the FMP included wastewater lagoons, above-ground storage tanks, a railroad line and spur, drum storage areas, and numerous production and warehouse buildings. Industrial waste from the facility was burned and discarded in the Burn Site. Waste from the facility was also discarded in the Dump Site. The facility was closed in 1977 and was sold to a developer in 1981.

In 1978, after plant operations closed, NJDEP directed Sherwin-Williams to excavate and properly dispose of the waste material remaining in the lagoons. During the 1980s, NJDEP entered into several administrative orders with Sherwin-Williams to oversee the characterization of contaminated groundwater and a petroleum-like seep in the FMP.

During the 1990s, NJDEP discovered two additional source areas, the Dump Site and the Burn Site. Contamination in both areas is attributable to historic dumping activities associated with the FMP. In the mid-1990s, enforcement responsibilities for the Dump Site and the Burn Site were transferred from NJDEP to EPA.

Contamination from the FMP, Dump Site and Burn Site has migrated downgradient, mainly through natural processes, into Hilliards Creek, Bridgewood Lake, and Kirkwood Lake. A small portion of Silver Lake, upgradient but adjacent to the FMP, is also contaminated.

Pre-Remedial Investigation Activities at the Sherwin-Williams/Hilliards Creek Site

The investigations were conducted in several phases starting in the late 1990s. In 1998, EPA sampled the upper portions of Hilliards Creek and several residential properties. Contaminants (mainly lead and arsenic) were detected in these soil and sediment samples. EPA entered into two AOCs with Sherwin-Williams in 1999. Under the first AOC Sherwin-Williams conducted additional sampling of Hilliards Creek and Kirkwood Lake to further characterize the extent of contamination. This sampling, which concluded in 2003, included residential properties along Hilliards Creek and Kirkwood Lake. The second AOC, signed in September 1999, required Sherwin-Williams to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the Dump Site, the Burn Site and Sherwin-Williams/Hilliards Creek Site that included the area known today as the Waterbodies OU.

Bridgewood Lake: The earliest investigation of Bridgewood Lake occurred in 1995 and 1996 during a removal action investigation of the Burn Site. Sediment sampling indicated elevated levels of lead.

Hilliards Creek: In 1998, NJDEP collected sediment samples from an area known as the Wildlife Refuge and braided stream area. EPA also conducted sediment sampling within this

area in 1998. In addition, EPA also conducted an investigation of Hilliards Creek from Silver Lake to Hilliards Road in 1998. In 1999, EPA conducted a soil investigation along the banks and in the floodplain of Hilliards Creek.

Starting in 1999 and continuing through 2001, there was a four-phase investigation of Hilliards Creek conducted by Sherwin-Williams with EPA oversight. This investigation included soil and sediment transects across Hilliards Creek, soil samples from the southern bank, soil samples from a berm surrounding an artificial pond on a residential property, and soil samples from multiple residential properties along Kirkwood Lake.

Pursuant to the findings of this sampling, a removal action was taken at a number of locations for arsenic and lead. Installation of fencing occurred at the end of a walking path leading to the southern bank of Kirkwood Lake, across from Steven Drive, in the wetland area of Glenview Drive, on the south side of Hilliards Creek near North and West Roads, and the Wildlife Refuge and braided stream area.

Kirkwood Lake: An investigation of the soil, sediment and surface water was conducted by Sherwin-Williams for Kirkwood Lake with oversight from the EPA in 2002 and 2003. Soil shoreline samples and sediment samples from within Kirkwood Lake were obtained and analyzed in this investigation.

In 2002, under the direction of NJDEP, Sherwin-Williams conducted a study of fish tissue in Kirkwood Lake. This study consisted of interviews with local anglers, fish collection and fish tissue analysis.

In 2008, the Site was placed on the National Priorities List. Under EPA oversight, RI/FS activities began at the Site pursuant to the 1999 AOC, and those activities continue at present for portions of the Site for which EPA has not yet selected a remedy. EPA has been designated as the lead agency for cleanup of the Site, with the NJDEP functioning in a support role.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA released the Proposed Plan for this remedial action at the Site and supporting information such as the Waterbodies RI/FS Reports as well as other related documents to the public for comment on April 1, 2021. EPA made these documents available to the public in the administrative record file maintained at the Gibbsboro Borough Hall/Library in Gibbsboro, NJ; the M. Allan Vogelson Regional Branch Library-Voorhees in Voorhees, NJ; the EPA Region II Records Center located at 290 Broadway, New York, NY; and online at https://www.epa.gov/superfund/sherwin-williams. The notice of availability for these documents was published in the Courier-Post on April 1, 2021. A 30-day public comment period lasted from April 1 through May 3, 2021.

In addition, on April 12, 2021, EPA held a virtual public meeting to discuss the findings of the Waterbodies RI/FS and to present EPA's Proposed Plan to the community. At this meeting, EPA representatives answered questions about the remedial alternatives developed as part of the FS. EPA addresses comments it received at the public meeting and during the public comment period in the Responsiveness Summary, which can be found in Appendix V.

SCOPE AND ROLE OF OPERABLE UNIT

The Sherwin-Williams/Hilliards Creek Superfund Site has been divided into several OUs to remediate the contamination more efficiently. OU1 includes all the residential properties. OU2 includes the FMP and the upper portion of Hilliards Creek. OU3 includes the groundwater at the Site. OU4 includes the rest of Hilliards Creek, Silver Lake, Bridgewood Lake and Kirkwood Lake. This ROD addresses OU4 of the Sherwin-Williams/Hilliards Creek Superfund Site which consists of the soil, sediment, and surface water of Silver Lake, Bridgewood Lake, Kirkwood Lake, and Hilliards Creek, also known as the Waterbodies OU. Both the Burn Site and the Dump Site have separate OU2 and OU3 designations that include soil, sediment, and groundwater. The table below lists the Records of Decision for the Sites. Those OUs that have RODs are in various stages of design and construction.

Sherwin-Williams/Hilliards Creek Site

Operable Unit	Record of Decision
1 - Residential	2015
2 - Former Manufacturing Plant	2020
3 - Groundwater	Anticipated 2022
4 - Waterbodies	2021

United States Avenue Burn Site

Operable Unit	Record of Decision
1 - Residential	2015
2 - Soil and Sediment	2017
3 - Groundwater	TBD

Route 561 Dump Site

Operable Unit	Decision Document
1 - Residential	2015
2 - Soil and Sediment	2016
3 - Groundwater	TBD

SITE CHARACTERISTICS

Physical Setting

OU4 is part of the Sherwin-Williams/Hilliards Creek Site. It includes Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek (Figure 2). All the lakes have been created by the construction of dams along the Hilliards Creek system. OU4 has been divided into four study areas corresponding to a waterbody:

Silver Lake: Silver Lake is approximately fourteen (14) acres, is located at the northern boundary of the FMP and is the most upgradient waterbody at the Sites. It is surrounded by mixed use properties including commercial and light industry, parking lots and undeveloped areas. It can reach a depth of nine feet. Silver Lake outflows through an underground conveyance system from the FMP area via a culvert under Foster Avenue before discharging into Hilliards Creek.

Bridgewood Lake: Bridgewood Lake is approximately nine acres, is divided into two lobes, and reaches a maximum depth of five feet. The shoreline is undeveloped except for a private sports club on the southwestern corner. It receives the combined flow of White Sand Branch and Honey Run and discharges into Hilliards Creek.

Hilliards Creek: The reach of Hilliards Creek that is included in the Waterbodies OU begins south of the FMP and continues to Kirkwood Lake, a distance of 1.5 miles. A small upper portion of Hilliards Creek, adjacent to the FMP, is being addressed separately under OU2. Hilliards Creek is a shallow stream with depths ranging from less than one foot to three feet. Its width ranges from five feet to twenty feet. The wider areas are characterized by a series of braided, interconnected small streams. There are approximately 40 acres of NJDEP mapped wetlands within the Site boundary along the entire length of Hilliards Creek. The wetlands include high-quality, high-value forested habitat, medium-quality, medium-value emergent habitat and low-quality, low-value phragmites habitat, see Figure 3. The wetlands provide substantial benefits to the community and the environment.

Kirkwood Lake: Kirkwood Lake is approximately 25 acres. It is two-thirds of a mile long, up to 400 feet wide, and has a maximum depth of four feet. The north side of the lake is developed with residential properties along its shore. The south shore is undeveloped except for a rail yard. The lake discharges through the spillway of Kirkwood Lake dam into the Cooper River.

Summary of the Remedial Investigation

Remedial investigation sampling of soil, sediment, and surface water by Sherwin-Williams, under EPA oversight, began in 2005 and continued to 2008. Additional sampling was conducted in 2017 and 2018 for the Human Health Risk Assessment (HHRA) and Baseline Ecological Risk Assessment (BERA). The 2018 RI Report contains a comprehensive description of all pre-RI investigation activities. Investigations of Bridgewood Lake, Hilliards Creek and Kirkwood Lake were conducted by Sherwin-Williams under the direction of NJDEP and the EPA.

The results of sample analyses were screened to determine if the levels of contamination posed a potential harm to human health and/or the environment. This was done by comparing the measured values of contaminants to standards that are protective of human health or ecological receptors.

The soil sample analytical results were compared to NJDEP's Residential Direct Contact Soil Remediation Standards (RDCSRS) referred to hereafter as residential remediation goals, and the Non-residential Direct Contact Soil Remediation Standards (NRDCSRS), referred to hereafter as non-residential remediation goals, depending on the zoning and land use. The sediment sample analytical results were compared to the lowest effect levels for ecological receptors and surface water results were compared to the New Jersey Surface Water Quality Standards (NJSWQS) for

Fresh Water. In addition, a HHRA and a BERA were conducted to determine if levels of contaminants exceeded EPA's acceptable risk range. Explanations of the results of the human health and ecological risk assessments are provided in separate sections later in this document.

The results of the RI showed that lead and arsenic are the primary contaminants of concern (COCs) in all media tested throughout OU4. Other contaminants, such as chromium and cyanide, were also found and they were generally co-located with lead and arsenic.

Soil:

Soil samples were taken from over 4,700 sample locations from the ground surface to depths of approximately ten feet in the floodplain soils around Hilliards Creek and the southern shore of Kirkwood Lake.

Lead and arsenic are the main COCs and were found most frequently and at the greatest concentrations above the NJDEP RDCSRS. Other contaminants that were found in the soil above the standard include hexavalent chromium and other metals, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Based on the sampling results and a comparison of these results to the RDCSRS, lead and arsenic were identified as the main COCs in the soil.

The most highly contaminated soil was found closest to the banks of the stream and the levels decline within a relatively short distance from the stream bank. This is a low energy, depositional riverine system but, during storm events, there is more transport of sediments downgradient. The stream has higher flow rates and water levels are higher during the spring season due to higher rainfall. The highest concentrations of lead and arsenic can be found along Hilliards Creek in an area called the Wildlife Refuge.

Most of the contamination in soil is located in the upper six inches but can be found at depths to five feet. The concentration of lead in soils range from less than the NJDEP residential standard of 400 milligrams/kilogram (mg/kg) to levels exceeding 100,000 mg/kg in the Wildlife Refuge area. The concentration of arsenic in soil ranges from less than the NJDEP residential standard of 19 mg/kg to levels exceeding 3,000 mg/kg in the Wildlife Refuge area. These high levels are due to the release of contaminants associated with the FMP.

Sediment:

Sediment samples were taken from more than 2,200 locations in Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek.

Lead and arsenic were the most common contaminants found at the highest concentrations above the NJDEP lowest effect levels for ecological receptors, which are 31 mg/kg for lead and 6 mg/kg for arsenic. Contaminants in sediment that exceed the lowest effect level criteria generally require further evaluation. Other constituents found above this criterion were cadmium, chromium, copper, cyanide, mercury and zinc, PAHs, pesticides, and PCBs. These other constituents were found less frequently and are co-located with lead and arsenic.

Lead and arsenic exceedances were found in sediment throughout Bridgewood Lake, Kirkwood Lake, Hilliards Creek, and a portion of Silver Lake. The concentration of lead varies from below the lowest effect level for ecological receptors to 39,200 mg/kg. The arsenic levels varied from below the lowest effects level for ecological receptors to over 1,900 mg/kg. For both metals, the highest values were found within Hilliards Creek near the Wildlife Refuge area.

Surface Water:

Over 700 surface water samples were collected from Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek. Analyses of the surface water showed exceedances of the NJSWQS for Fresh Water for aluminum, iron, zinc, cyanide, arsenic, lead, and cadmium. As with the other media, lead and arsenic are the main COCs.

The concentrations of metals in surface water were compared to the NJSWQS for Fresh Water of 5.4 micrograms/Liter (µg/L) for lead and 150 µg/L for arsenic. The total lead and total arsenic values varied from below the NJSWQS for Fresh Water to over 3,990 µg/L for total lead and over 329 µg/L for total arsenic. The highest concentrations in surface water were found in Hilliards Creek near the Wildlife Refuge Area.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

OU4 is located within the municipalities of Gibbsboro, Voorhees and Lindenwold. Most of the land ownership is the Borough of Gibbsboro and Camden County. OU4 is comprised of lakes, a creek, and wetlands. These areas are zoned for multiple uses that include residential, industrial and office technical park usage; however, all areas currently contain ecological habitat. Future use is mainly recreational use through a series of planned trails and recreational use of the streams and lakes. Silver Lake is privately owned and is surrounded by a walking trail. Swimming and boating are prohibited by the lake owner. Bridgewood Lake is privately owned by a sports club and the adjacent cemetery. It is used for catch-and-release fishing and boating. The lake is primarily surrounded by undeveloped, wooded land used for passive recreation. Kirkwood Lake is presently used for recreational activities such as fishing and boating and may be used for swimming in the future. This lake is bordered by residential properties to the north, which were evaluated as part of OU1, and undeveloped land potentially used for passive recreation to the south. The Hilliards Creek corridor includes the creek itself and adjacent floodplain soils. Hilliards Creek ranges from 0.5-3 feet deep and may be used for recreational wading. The upland areas surrounding Hilliards Creek include walking trails as well.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline risk assessment was conducted to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land uses. The baseline risk assessment includes an HHRA and a BERA. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the risk assessments for the OU4.

Human Health Risk Assessment

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure scenario:

> *Hazard Identification* – uses the analytical data collected to identify the contaminants of potential concern at the Site for each medium, with consideration of several factors explained below;
>
> *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed;
>
> *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
>
> *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1 x 10^{-6} to 1 x 10^{-4} (also commonly expressed as: 1E-06 to 1E-04) or a noncancer Hazard Index (HI) greater than 1; contaminants at these concentrations are considered COCs and are typically those that will require remediation at the Site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, the contaminants of potential concern (COPCs) in each medium were identified based on such factors as toxicity, frequency of detection, fate, and transport of the contaminants in the environment, concentration, mobility, persistence, and bioaccumulation.

The HHRA characterized the risk to human health from exposure to soil, sediment, surface water, and fish tissue at the Site. COPCs were determined for each exposure area and medium by comparing the available analytical data to appropriate risked-based screening criteria. Analytical data collected to determine the nature and extent of contamination at the Site indicated the presence of metals, PAHs, PCBs, and pesticides in various media above screening criteria.

Only the COCs, or the chemicals requiring a response, are listed in Appendix II-B, Table 1. Lead was also identified as a COC; the relevant subset of information for lead is summarized in Table 7 of Appendix II-B. However, a full list of all COPCs identified in the HHRA is available in the administrative record for the Site.

Exposure Assessment

Consistent with Superfund policy and guidance, the HHRA is a baseline HHRA and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as the highest exposure that is reasonably expected to occur at a Site.

For purposes of the HHRA, the Waterbodies OU was divided into the following four exposure areas: Silver Lake, Bridgewood Lake, Kirkwood Lake, and Hilliards Creek. Exposure areas are geographic designations created for the risk assessment to define areas with similar anticipated current and future land use and/or similar levels of contamination. Silver Lake is surrounded by a walking trail. The soils associated with the walking trail were assessed separately as part of OU2. The lake is not currently used for recreation as swimming and boating are prohibited by the lake owner. Bridgewood Lake is privately owned by a sports club and used for catch-and-release fishing and boating. The lake is primarily surrounded by undeveloped, wooded land used for passive recreation. Kirkwood Lake is presently used for recreational activities such as fishing and boating and may be used for swimming in the future. This lake is bordered by residential properties to the north, which were evaluated as part of OU1, and undeveloped land potentially used for passive recreation to the south. The Hilliards Creek corridor includes the creek itself and adjacent floodplain soils. Hilliards Creek ranges from 0.5-3 feet deep and may be used for recreational wading. The upland areas surrounding Hilliards Creek include walking trails as well. Since this exposure area includes the creek and associated wetlands, future development is considered unlikely.

Considering the current and potential future land uses in each exposure area, the following exposure populations and pathways were evaluated under the current/future land use scenario:

- Recreator (adult, adolescent [6-16 years], and child [0-6 years]): incidental ingestion, dermal contact, and inhalation of particulates and volatiles released from surface soils (0-2 feet) surrounding Bridgewood Lake, the southern portion of Kirkwood Lake, and Hilliards Creek. Exposures to sediment and surface water via incidental ingestion and dermal contact within Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek were also evaluated for these receptors.

- Angler (adult, adolescent [6-16 years] and child [0-6 years]): ingestion of fish caught from Kirkwood Lake.

The future land use scenario included the following populations and exposure pathways:

- Swimmer (adult, adolescent [6-16 years] and child [0-6 years]): incidental ingestion and dermal contact with sediment and surface water while swimming in Silver Lake, Bridgewood Lake and Kirkwood Lake.

The fish ingestion pathway was evaluated for Kirkwood Lake only and is representative of potential risks within Silver Lake and Bridgewood Lake. Kirkwood Lake was determined to be the most appropriate indicator of risks related to fish consumption because it is downgradient of the three source areas (i.e., FMP, the Burn Site, and the Dump Site). Contaminants at these areas may have been conveyed to Kirkwood Lake via particle transport, and the lake may have served as a sediment trap. Kirkwood Lake also has higher average concentrations of PCBs compared to the other lakes, which are known to bioaccumulate in fish. In addition, people currently fish in Kirkwood Lake, while Bridgewood Lake is privately owned, stocked, and is catch-and-release only. Silver Lake is also privately owned and not currently used for fishing. During the RI, fish tissue samples were collected from a variety of species within Kirkwood Lake. These fish samples were comprised of two target feeding guilds: benthic omnivores and sport fish. The benthic omnivore feeding guild included brown bullhead (*Ameiurus nebulosus*), common carp (*Cyprinus carpio*), and channel catfish (*Ictalurus punctatus*) as the target species. The sport fish feeding guild included largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and sunfish (*Lepomis sp*.). Data from these fish species were combined into one dataset for the HHRA under the assumption that an angler would catch and consume a mix of species over time. A summary of all the exposure pathways considered in the HHRA can be found in Table 2 (Appendix II-B).

Typically, exposures are evaluated using a statistical estimate of the exposure point concentration (EPC), which is usually an upper-bound estimate of the average concentration (typically the 95% upper confidence limit (UCL)) for each contaminant, but in some cases may be the maximum detected concentration. For lead exposures, the arithmetic mean of all samples collected from the appropriate soil interval was used as the EPC. In addition, samples collected from each of the exposure areas were analyzed for total chromium, rather than hexavalent chromium. The potential presence of hexavalent chromium in soil, sediment, and fish tissue was evaluated using a relationship developed from soil data collected at the FMP (OU2) in 2016. Here, the average ratio of hexavalent chromium to total chromium in soils was 5%. In the absence of speciated data collected from the Waterbodies OU, two EPCs were used to evaluate risk for current/future recreators, swimmers and anglers exposed to soil, sediment and/or fish tissue. The first conservatively assumed that 100% of the chromium identified exists in the more toxic hexavalent form to represent the “worst-case” scenario. The second applied the hexavalent chromium soil ratio to the EPC for total chromium in soil, sediment and/or fish tissue, thus adjusting it to 5%. The results of applying this EPC range to Site receptors are discussed further under *Risk Characterization.*

A summary of the EPCs for COCs other than lead in each medium can be found in Appendix II-B, Table 1. Lead EPCs are summarized in Table 7. A comprehensive list of exposure point concentrations for all COPCs can be found in Appendix C (table 3 series) of the HHRA.

Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the

normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to Site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the Site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the HHRA were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA guidance. This information is presented in Appendix II-B Table 3 (Noncancer Toxicity Data Summary) and Table 4 (Cancer Toxicity Data Summary). Additional toxicity information for all COPCs is presented in the HHRA for the Site.

Risk Characterization

This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. Exposure from lead was evaluated using blood lead modeling and is discussed in more detail later in this section.

Noncarcinogenic Risks

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than or equal to 1) exists at which noncancer health effects are not expected to occur. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated soil) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1 indicates that the potential exists for noncarcinogenic health effects to occur as a result of Site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. A summary of the noncarcinogenic risks associated with these chemicals for each exposure pathway is contained in Table 5 of Appendix II-B.

It can be seen in Table 5 that the noncancer hazard estimates exceeded EPA's threshold value of 1 for the child recreator in Hilliards Creek, child swimmer in Kirkwood Lake, child swimmer in Bridgewood Lake and child angler in Kirkwood Lake with HIs ranging from 2 to 7. The majority of noncarcinogenic hazard for these populations was primarily attributable to arsenic in Hilliards Creek surface soil and Bridgewood Lake sediment. A slightly elevated HI of 3 was identified for the child angler consuming fish from Kirkwood Lake due to PCB Aroclors 1254 and 1260. Thallium also contributed to elevated hazard in Kirkwood Lake surface water. Thallium, however, was infrequently detected throughout all Site media. Concentrations detected within soil and sediment were also similar to or below background levels. Therefore, the presence of thallium can likely be ascribed to natural background conditions (see *Uncertainties*) and is not included on Table 5. Using the assumption that all of the chromium present consisted of 100% hexavalent chromium did not significantly change the HI for any receptor and was not associated with an HI greater than 1 for any exposure pathway at the Site.

Carcinogenic Risks

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen under the conditions described in the *Exposure Assessment*, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1 x 10^{-4}). An excess lifetime cancer risk of 1 x 10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the *Exposure Assessment*. Current Superfund guidance identify the range for determining whether a remedial action is necessary as an individual lifetime excess cancer risk of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk), with 10^{-6} being the point of departure.

As summarized in Table 6 of Appendix II-B, the estimated cancer risk for the current/future child recreator at Hilliards Creek slightly exceeded EPA's target risk range with a risk of 2 x 10^{-4} due to arsenic in surface soil. A future child swimmer in Silver Lake had an estimated cancer risk of 2 x 10^{-4} as well, primarily due to benzo(a)pyrene in surface water. This chemical, however, was found at the highest concentrations from off-site stormwater influent locations and is, therefore, not considered to be Site-related.

Adjusting the total chromium EPCs to 5% in each medium resulted in risks below or within the target risk range. The assumption that all chromium in soil and sediment exists in the hexavalent state increased risks slightly. Under this scenario, risks due to chromium were elevated above the target risk range for the child recreator in Hilliards Creek soil (1 x 10^{-3}) and sediment (2 x 10^{-4}). Chromium also increased the total risk for the child swimmer exposed to Bridgewood Lake sediment and Kirkwood Lake sediment to levels slightly above the target risk range (2 x 10^{-4} for each). Assuming 100% hexavalent chromium further increased cancer risks for the adult, adolescent, and child angler from estimates within the EPA target risk range to 3 x 10^{-4}, 4 x 10^{-4}, and 8 x 10^{-4}, respectively (see *Uncertainties*).

Risks Associated with Lead

Lead was detected in site media at elevated concentrations. Because there are no published quantitative toxicity values for lead it is not possible to evaluate risks from lead exposure using the same methodology as for the other COCs. However, since the toxicokinetics (the absorption, distribution, metabolism, an excretion of toxins in the body) of lead are well understood, lead is regulated based on blood lead concentrations. In lieu of evaluating risk using typical intake calculations and toxicity criteria, EPA developed models which are used to predict blood lead concentration and the probability of a child's blood lead concentration (BLL) exceeding 5 micrograms per deciliter (µg/dL) based on a given multimedia exposure scenario. EPA's risk reduction goal for lead-contaminated sites is to limit the probability of a typical child's (or that of a group of similarly exposed individuals') blood lead concentration exceeding 5 µg/dL to 5% or less. In the HHRA, lead risks for child receptors were evaluated using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model. The Adult Lead Methodology (ALM) model was used for all other adolescent and adult receptors.

As summarized in Table 7 of Appendix II-B, the predicted probabilities of a child's BLL exceeding 5 µg/dL surpassed EPA's risk reduction goal of 5% for a child swimmer at Silver Lake, Bridgewood Lake and Kirkwood Lake as well as a child recreator at Bridgewood Lake, Kirkwood Lake and Hilliards Creek. Based on the IEUBK results, the predicted probabilities at these exposure areas ranged from 8% to 99%. Results of the ALM model indicated that an adult

swimmer at Bridgewood and Kirkwood Lake and an adult recreator at Hilliards Creek also exceeded the risk reduction goal with predicted fetal BLL probabilities ranging from 11% to 38%. Furthermore, the evaluation of lead in fish consumed by Kirkwood Lake adult and child anglers also assumed exposure to soil and sediment using the weighted EPC of 510 mg/kg in the models. Soil exposure represented the greatest risks for the child receptor. The geometric mean blood lead level for the child angler is only 0.1 ug/dL higher when compared to a baseline scenario in which no fish from Kirkwood Lake are consumed. Thus, the risks associated with lead in fish are considered negligible and soil and sediment are considered the primary media of concern for lead exposure.

Human Health Risk Summary

Exposure to lead was found to exceed EPA's threshold criteria from surface soil and surface water from Bridgewood Lake and Kirkwood Lake, surface soil from Hilliards Creek, and sediment from each exposure area evaluated. Arsenic was associated with risk above EPA's threshold criteria in Bridgewood Lake sediment and Hilliards Creek floodplain soils. Based on these results, arsenic and lead were identified as the primary COCs, although the ingestion of PCBs in fish caught from Kirkwood Lake slightly exceeded the noncancer threshold as well.

The assumption that all chromium in soil and sediment exists in the hexavalent state increased risks to levels exceeding the EPA target risk range in Hilliards Creek floodplain soils and sediment, Bridgewood and Kirkwood Lake sediment and Kirkwood Lake fish. This assumption, however, likely overestimates risk as discussed under the *Uncertainties* section. In addition, the PAHs and thallium associated with elevated risk or hazard in surface water from Silver Lake and Kirkwood Lake, respectively, were attributed to anthropogenic or natural background sources.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the COCs, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the COCs at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near OU4 and is highly unlikely to underestimate actual risks related to OU4.

Assuming that all chromium exists in the hexavalent state likely overestimates risk. Since contamination from OU2 was likely distributed downgradient via surface water and sediment within Hilliards Creek, the hexavalent chromium content in downgradient soil, sediment and fish tissue is not likely to be higher than that in OU2 soils. The conditions along Hilliards Creek (e.g., high total organic carbon from decaying vegetation) favor a more reducing environment resulting in higher concentrations of the less toxic, trivalent chromium as well. Therefore, hexavalent chromium in soil, sediment, surface water, and fish tissue, if present at all, is likely to be far less than 100% of the total chromium concentration.

A noteworthy source of additional uncertainty in the HHRA deals with the large number of tentatively identified compounds (TICs) detected. Toxicity factors are needed to quantify risks and hazards from exposure to chemicals. Since toxicity values were not available for the majority of the detected TICs, risks and hazards could not be quantified for these compounds. The omission of these chemicals from the quantitative risk evaluation tends to underestimate total noncancer and cancer risks.

Due to limited data, a 95% UCL could not be calculated for several analytes in OU4 surface water (thallium, cobalt and antimony in Kirkwood Lake, thallium in Hilliards Creek and benzo(a)pyrene in Bridgewood Lake), sediment (benzo(j)fluoranthene in Silver Lake) and soil (thallium around Kirkwood Lake). Instead, the maximum detected concentration was used as the EPC. Using the maximum concentration as the EPC is a conservative (i.e., health protective) assumption, which is likely to overestimate risks from exposure to these media.

Thallium was identified as one of the COPCs that contributed to risk in soil, sediment, and surface water. However, thallium was infrequently detected (i.e., in approximately 13% of soil samples, 6% of sediment samples, and 10% of surface water samples) across all the four exposure areas. Thallium occurs naturally, and the soil EPCs for all exposure areas (0.44-0.85 mg/kg) were within the range of background soil values established for the Site (maximum of 1.2 mg/kg). The EPA residential soil Regional Screening Level (0.78 mg/kg) for thallium is also below the background soil level. The EPCs for thallium in sediment were below the maximum thallium concentration in Clement Lake sediment (4.9 mg/kg), which was used to establish background conditions as well. Thus, it is likely that much of the risk attributed to thallium corresponds to background conditions.

As previously discussed, data from the various fish species collected were combined into one dataset for the HHRA under the assumption that an angler would catch and consume a mix of species over time. It is important to note that risks may differ based on fish consumption preferences as the concentrations observed varied by species. The highest PCB concentrations

were found in the benthic omnivore species, specifically the common carp. Thus, risks may be higher for an angler who preferentially consumes these types of fish. Conversely, the PCB concentrations for sport fish were lower than those in the combined dataset; thus, the risks may be lower than those estimated in this HHRA for an angler who preferentially consumes sport fish.

More specific information concerning health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the HHRA report which can be found within the Administrative Record that can be accessed at the EPA website https://www.epa.gov/superfund/sherwin-williams.

Ecological Risk Assessment

Sediment, surface water, pore water, soil, and biota tissue samples (i.e., benthic invertebrates, fish, and soil invertebrates) were collected as part of the BERA. Sediment toxicity testing was also conducted at the Site. The areas of the Site evaluated include Hilliards Creek, Kirkwood Lake, Bridgewood Lake, and Silver Lake. Hilliards Creek was further divided into upper (UHC), middle (MHC), and lower (LHC) portions. The following receptor groups were evaluated in the BERA: benthic invertebrates, fish, aquatic and terrestrial plants, soil invertebrates and wildlife (birds, mammals, amphibians, and reptiles). Surrogate wildlife species that were selected to represent a variety of wildlife in the BERA included Mallard, Muskrat, Spotted Sandpiper, Lesser Scaup, Great Blue Heron, Bald Eagle, Mink, American Robin, Short-tailed Shrew, Northern Bobwhite, Meadow Vole, Raccoon, Red-tailed Hawk, and Red Fox. Potential risks posed by site-related contaminants were determined by calculating hazard quotients (HQs) for each chemical and wildlife receptor. A summary of the HQs calculated for the wildlife receptors for each waterbody is presented in Table 8 in the Appendix II-B.

The BERA concluded, based on a weight-of-evidence (WOE) analysis of multiple lines of evidence (LOEs), that the potential for unacceptable ecological risks from sediment in Hilliards Creek, Kirkwood Lake, and Bridgewood Lake were primarily associated with the COPCs arsenic, chromium, cyanide, and lead. The highest ecological risks were predicted for Hilliards Creek and were primarily associated with elevated concentrations of arsenic, chromium, cyanide, and lead in the upstream portions of MHC. Small aquatic and terrestrial invertivorous wildlife (i.e., represented by the Spotted Sandpiper, American Robin, and Short-tailed Shrew) were identified as the most sensitive receptors at Hilliards Creek. Concentrations of arsenic and lead in Kirkwood Lake and Bridgewood Lake surface sediments were found to be uniformly elevated, resulting in unacceptable risks to several receptors. Risks in Silver Lake were predicted to be the lowest, consistent with background risks, and driven by localized metal concentrations in the southernmost portion of the lake.

Finally, unacceptable risks were identified for terrestrial invertivores (American Robin and Short-tailed Shrew) that may be exposed south of Kirkwood Lake, primarily from exposure to lead in dietary items (earthworms). However, these risk estimates were deemed uncertain given the small sample size and the wide range of detected lead concentrations in earthworm tissues

(reflecting a wide range of lead soil-to-earthworm bioaccumulation factors (BAFs) in Kirkwood Lake as compared to the BAFs developed for Hilliards Creek).

Based on these results, the response action selected in the Record of Decision is necessary to protect the public health or welfare or the environment from actual or threatened releases of contaminants into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment. The RAOs for contaminated media provided below address the human health and ecological risks at OU4. No remedial action is proposed for surface water, therefore there are no remedial action objectives for surface water. Instead, surface water monitoring is included as part of each soil and sediment remedial alternative except for the no action alternative.

Soil

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure (via direct contact, ingestion, and uptake into the food chain) to contaminants in soil.

- Minimize migration of Site-related contaminants in the soil to sediment and surface water.

Sediment

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure (via direct contact, ingestion, and uptake into the food chain) to contaminants in sediment.

- Minimize migration of Site-related contaminants from the sediment to surface water and downgradient areas.

It is expected that removal of sediment, combined with soil removal and capping will result in a decrease of surface water contaminants to levels below NJSWQS. If monitoring indicates that surface water contamination levels have not decreased to below the NJSWQS, EPA may require an action in the future.

To achieve RAOs, EPA has selected soil and sediment RGs for the primary COCs, arsenic and lead. Chromium, PCBs, and other contaminants were found less frequently than and are co-located with lead and arsenic. They will be addressed by actions developed using the RGs for lead and arsenic; therefore, separate RGs were not identified. The RG for arsenic is based on the

New Jersey background level of 19 mg/kg. The RG for lead is based on the lower of the New Jersey human health direct contact (residential) standards or ecological risk-based goals.

The Waterbodies OU is comprised of lakes, a creek, and wetlands. These areas are zoned for multiple uses that include residential, industrial and office technical park usage; however, all areas currently contain ecological habitat. Therefore, RGs protective of both ecological and human receptors were considered to ensure that the cleanup is consistent across the OU.

The ecological RG for lead in soil is 213 mg/kg and is based on the most sensitive terrestrial wildlife receptor (Spotted Sandpiper) and applies to the top foot of soil at all properties, which is considered the biologically active zone. Below one foot, the human health RG of no concentration above 400 mg/kg, with an average at or below 200 mg/kg is applied. The approach for lead would achieve the risk reduction goal established for the Site, which is to limit the probability of a child's blood lead level exceeding 5 µg/dL to 5% or less.

The sediment RG for lead of 213 mg/kg is based on the dietary uptake of the Spotted Sandpiper. The use of this sediment value will result in the protection of avian species, which are the most sensitive receptor group, and is also considered protective of human receptors.

Achievement of RGs will be determined by post-remediation sampling. Attainment of sediment cleanup goals will be determined by use of post-remediation surface water and sediment sampling. Attainment of soil RGs will be determined by post-remediation soil sampling. The soil sampling methodology to determine attainment of cleanup goals is detailed in the Description of Alternatives below. In summary, the RGs for the Waterbodies are as follows:

Soil:

Arsenic:
- Residential RG: 19 mg/kg
- Ecological : 19 mg/kg

Lead:
- Residential RG: 400/200 mg/kg
- Ecological RG: 213 mg/kg

Sediment:

- Arsenic: 19 mg/kg
- Lead: 213 mg/kg

DESCRIPTION OF ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. §9621(b)(1) requires that a remedial action be protective of human health and the environment, be cost effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practical. In addition, Section 121(b)(1) of the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances. CERCLA Section 121(d), 42 U.S.C. §9621(d), specifies that a remedial action must require a level or standard of control of the hazardous substances, pollutants, and contaminants which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. §9621(d)(4).

Potential technologies applicable to soil and/or sediment remediation were identified and screened using effectiveness, implementability, and cost criteria, with emphasis on effectiveness. Those technologies that passed the initial screening were assembled into alternatives for soil and sediment.

For alternatives that incorporate removal of contaminated soil or sediment, the proposed depths of excavation are based on the soil boring data taken during the RI. These depths were used to estimate the quantity of soil to be removed and the associated costs. The actual depths and quantity of soil to be removed will be finalized during design and implementation of the selected remedy.

The time frames below for construction do not include the time it will take to negotiate with the potentially responsible party, design the selected remedy or procure necessary contracts. Five-year reviews would be conducted as a component of the alternatives that would leave contamination in place above levels that allow for unlimited use and unrestricted exposure.

For all soil and sediment alternatives requiring five-year reviews, the Present Worth Cost includes the periodic present worth cost of five-year reviews.

Common Element for Soil and Sediment Alternatives: Surface Water Monitoring

EPA expects that removal of sediment, combined with soil removal and/or capping, will result in a decrease of surface water contaminants to levels below the NJSWQS. Monitoring would be conducted on a quarterly basis to assess any changes in contaminant conditions over time. If monitoring indicates that contamination levels have not decreased to below the NJSWQS, EPA may require an action in the future.

Soil Alternatives:

Alternative 1 - No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated soil within OU4.

Alternative 2 – Targeted Soil Removal, Capping and Institutional Controls

Capital Cost:	*$28,757,660*
Annual O&M Cost:	*$354,200*
Present Worth Cost:	*$30,920,667*
Construction Time Frame:	*10 months*

This alternative would remove the highest concentrations of arsenic and lead (and other contaminants) in soils while preserving, to the extent possible, valuable wetlands and forested areas. Under this alternative, the average surface concentrations (0 - 2 feet) of arsenic and lead remaining in soil will meet the RGs in areas with valuable wetlands.

Based on the preliminary application of a Surface Weighted Average Concentration methodology, described below, approximately 42,000 cubic yards (cy) of soil would be excavated from the floodplain soils within Hilliards Creek for removal and to accommodate a cap where needed. The floodplain consists of sensitive wetlands and forested land. 42,000 cy would be removed from approximately 16 acres of wetlands and forested areas down to a depth of two feet. The area would be restored after excavation. This alternative would, to the extent practicable, preserve the forest in the high and medium quality wetland areas and provide a higher probability of restoring the current functions and values of these areas. To the extent possible during excavation, the existing high and medium-quality wetlands would be preserved, and low-quality wetlands would be targeted for removal. All areas would be restored with native species. The excavated soil would be transported to an appropriate disposal facility.

As part of this alternative, areas that have met the RGs through averaging would not require capping or deed notices. Capping with vegetative cover would be required for soils below two feet where contaminants remain at concentrations exceeding the RDCSRS. Institutional controls (deed notice) would be required for areas where the RDCSRS have not been attained. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure. Reviews would include monitoring for the success of the ecological restoration.

Soil Alternative 2 was developed as a remedial alternative for the Hilliards Creek floodplain that would minimize the number of acres of high quality habitat disturbed and preserve (as

determined by a Wetland Evaluation Technique, or WETII, Functions and Values Analysis), to the extent possible, the overstory trees that provide forested canopy for the wetlands. These actions are considered important in maximizing the potential for post-remediation restoration. Additionally, low quality habitat dominated by invasive Phragmites would be removed and restored to the extent possible with higher-quality habitat.

To calculate how to achieve these goals, a form of compliance averaging, called Surface Weighted Average Concentration, would be employed to determine the location and volume of soils to be removed in order to meet RGs. Surface Weighted Average Concentration methodology is based on dividing the remediation area into polygons based on wetland type and type of contamination. The size of each polygon is based on the range of the most sensitive ecological receptor. These polygons are assigned a weighted average based on samples taken within the polygon. Soils are removed in polygons with the highest concentration of contamination, and the lowest habitat value, until the remaining soils can meet the RGs on an average basis.

Alternative 3 – Excavation to Remediation Goals

Capital Cost:	*$59,445,435*
Annual O&M Cost:	*$478,720*
Present Worth Cost:	*$62,261,469*
Construction Time Frame:	*3 years*

This alternative would remove all soil exceeding the applicable RGs in ecological habitat areas with no preservation of wetlands or forested areas. Under this alternative, it would not be possible to preserve the forested areas because of the nature and extent of soil contamination. Clear cutting of all vegetation at distances ranging from approximately 50 to more than 200 feet from the stream bank would be required to excavate the soil. The excavation would extend to depths of 5 feet or more in some locations, with the greatest depths immediately adjacent to the stream channel.

Approximately 114,000 cubic yards of soil would be excavated. Approximately 23 acres of wetlands and forested areas would be completely cleared and impacted. The excavated soil would be transported to an appropriate disposal facility. The excavation area would be backfilled and revegetated with native species. No five-year reviews would be required. Reviews would be needed to monitor for the success of the ecological restoration.

Sediment Alternatives:

Alternative 1 – No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated sediment within the Waterbodies OU.

Alternative 2 – Partial Dredging, Capping and Natural Recovery

Capital Cost:	*$39,395,693*
Annual O&M Cost:	*$462,060*
Present Worth Cost:	*$40,261,013*
Construction Timeframe:	*2 years*

Under this Alternative, one foot of sediment would be dredged, or removed, in areas of Hilliards Creek, Silver Lake, Bridgewood Lake and Kirkwood Lake within OU4 that contain Site-related COCs exceeding the sediment RGs. In areas where contamination remains above RGs below one foot, a cap would be installed. The cap would be constructed of a layer of sand and stone. Natural sedimentation would then fill in above the cap and allow for restoration of habitat for the benthic community. Approximately 60,000 cubic yards of sediment would be removed under this alternative. Capping would require approximately 29,000 cubic yards of sand and 14,500 cubic yards of stone to be placed in Hilliards Creek, Bridgewood Lake, and Kirkwood Lake.

Sampling would take place to confirm that restoration was successful. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 3 –Full Dredging

Capital Cost:	*$57,760,606*
Annual O&M Cost:	*$150,600*
Present Worth Cost:	*$59,105,902*
Construction Timeframe:	*2.5 years*

This alternative consists of the dredging, or removal, of all sediment with Site-related contaminants exceeding RGs. No capping of sediments is expected since all sediment exceeding the RGs would be removed and transported to an approved off-site disposal facility. Capping would be considered if residual contamination extends to unexpected depths. Lake areas would not be backfilled, but one foot of sand would be placed within Hilliards Creek for stream flow stabilization during natural sedimentation and the area restored. Stream areas would need to be diverted during dredging activities. All sediment would be dewatered and processed prior to transport off-site.

It is estimated that 128,000 cubic yards of sediment would be removed under this alternative, resulting in removal of 100% of contaminated sediments. Approximately three feet of sediment would be removed from Hilliards Creek, and between two and five feet of sediment from Silver Lake, Bridgewood Lake and Kirkwood Lake.

Monitoring to verify dredge performance will include bathymetry to ensure dredge elevations were achieved and chemical monitoring to ensure removal of sediment with COC concentrations above the RG. Vegetation of stream banks, and in the riparian zone and wetlands, would be monitored for a period of five years to ensure successful restoration of vegetation in these areas. In addition, a minimum of five years of surface water monitoring would be conducted to ensure that the concentration of surface water contaminants is below NJSWQS levels. Five-Year Reviews would also be employed to assess the effectiveness of the remedy.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA Section 121, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 C.F.R. § 300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria. The first part of the comparative analysis discusses the nine evaluation criteria for the soil and the second part discusses the nine evaluation criteria for the sediment.

Threshold Criteria - The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.

Evaluation of Soil Alternatives

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated soil.

Alternative 2 would be protective of human health and ecological receptors by removing surface soil (0 – 2') to meet RGs. The areas to be excavated will be calculated by using averages for each wetland habitat (forested, emergent, and phragmites) created for lead, arsenic and chromium. Excavation based on the use of averaging is predicted to reduce contamination up to 96% depending on habitat area and specific contaminant. The excavation approach of Alternative 2, incorporating the Surface Weighted Average Concentration methodology, would meet the RGs and be protective of public health and the environment while preserving sensitive habitat and open space. The highest concentrations of contamination in surface soils would be removed and

those areas would be revegetated and stabilized. The average concentrations of lead and arsenic in surface soil throughout the remediation area would meet soil RGs. Engineering controls would be applied in the form of a cap that is comprised of vegetative covering, and institutional controls in the form of deed notices would be required for areas that have lead and arsenic contamination exceeding the RDCSRS below two feet in depth. The cap would consist of a demarcation layer, one foot of common fill, one foot of topsoil, and a fabric erosion control blanket. This would prevent the transport of contamination to surface water by contamination left below the surface.

Alternative 3 would also be protective of human health and ecological receptors by removing all surface soil to meet RGs based on ecological criteria in ecological habitat areas. In addition, all subsurface contamination, below two feet, exceeding RDCSRS would be removed.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA and NCP, 40 C.F.R. § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are 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, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are 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, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or provides a basis for invoking a waiver.

There are three types of ARARs, chemical-specific, location-specific, and action-specific. These are explained below.

Chemical-Specific: These ARARs include health- or risk-based numerical values or methodologies that establish the acceptable amount or concentration of a chemical in the environment. Where more than one requirement addressing a contaminant is determined to be an ARAR, the most stringent value should be used.

Location-Specific: These ARARs address activities based on geographical or land use concerns. Examples include standards and requirements for addressing wetlands, historic places, floodplains, or sensitive ecosystems and habitats.

Action-Specific: These ARARs address activities or the operation of certain technologies at a site. Examples include regulations concerning the design, construction, and operating characteristics of a treatment system or a landfill.

Location-specific ARARs include the Federal Fish and Wildlife Coordination Act and the New Jersey Freshwater Wetlands Protection Act and Clean Water Act. Location-specific ARARs affect some portions of the Site that are wildlife areas and/or designated wetland areas.

Action-specific ARARs are determined by the specific technology of each alternative. For this operable unit, all the active soil alternatives include excavation and off-site disposal. Action-specific ARARs include the Federal Resource Conservation and Recovery Act. Also included are the New Jersey Solid Waste Rules and certain portions of the Technical Requirement for Site Remediation.

A complete list of potential ARARs can be found in Appendix II-A.

Alternative 1, No Action, would not meet ARARs.

Alternatives 2 and 3 would be in compliance with chemical-specific ARARs by either removing contaminated surface and subsurface soil with lead and arsenic at concentrations exceeding the New Jersey RDCSRS (Alternative 3), or through a combination of excavation and capping and application of institutional controls (Alternative 2). Ecological RGs will also be used to determine the extent of excavation and capping.

Alternative 2 would also be consistent with To Be Considered (TBC) criterion in the NJDEP Ecological Evaluation Technical Guidance (2015). This guidance states that where remediation may do more harm than good, a risk management decision can be made. This alternative is designed to minimize damage to ecological habitat and provide the greatest potential for complete restoration of the functions and values of these habitats by achieving the ecological risk-based remedial goals through an excavation designed based on the use of averaging.

Action-specific ARARs would be met by Alternatives 2 and 3 during the construction phase by proper design and implementation of the action including disposal of excavated soil at the appropriate disposal facility. These alternatives would also meet location-specific ARARs, such as applicable provisions of the NJDEP Wetlands Protection Act Rules.

Primary Balancing Criteria - The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given Site-specific data and conditions.

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3. Long-Term Effectiveness and Permanence

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 1 would not provide long-term effectiveness or permanent protection to ecological or human receptors because the soil contaminants would remain uncontrolled.

Alternative 2 provides long-term effectiveness and permanence by removing approximately 96 percent of the contaminant mass and controlling direct contact exposure to human health and ecological receptors to residual levels of contamination that would remain in soil. This alternative removes the highest concentrations of lead and arsenic contamination based on an averaging methodology, and caps the remaining contamination at depth, thereby preventing humans and wildlife from coming into direct contact with the contamination. Also, by preserving valuable wetland habitat and maximizing the potential for successful restoration, Alternative 2 helps ensure the long-term viability of the wetlands. Restoration of the wetland floodplain areas takes into consideration more frequent and intense storms. Overstory trees, native plants and removal of invasive species is part of the restoration plan to create a more resilient wetland corridor.

Alternative 3 would provide a greater degree of long-term effectiveness and permanence than Alternative 2 when considering exposure to lead and arsenic in soil because Alternative 3 removes all of the contamination but would not provide the same flood resiliency since all vegetation would be removed.

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

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

All the active soil alternatives involve removal and/or capping of soil. There is no treatment of the contaminants in any of the alternatives and, therefore, no reduction in toxicity. Removal of the contaminated soil would decrease the volume of contaminants at the Site and capping would decrease accessibility and contaminant mobility. The excavated material would be transferred to a landfill without treatment and therefore the overall reduction of toxicity mobility or volume through treatment would not be achieved. However, treatment of contaminated soil may be required prior to disposal.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 does not present any short-term risks to Site workers, the community, or the environment because it does not include active remediation work.

Alternatives 2 and 3 would each have significant short-term impacts upon the community and the environment. Both would have negative short-term impacts to the ecological habitat that currently exists. Overall, the short-term impacts of Alternative 2, although significant, are less than those of Alternative 3, as less habitat will be disturbed.

Risks to site workers, the community and the environment include potential short-term exposure to contaminants during excavation of soil. Potential exposures and environmental impacts associated with dust and runoff would be minimized with proper installation and implementation of dust and erosion control measures and monitoring. Worker safety issues would be significant for both Alternative 2 and Alternative 3, but Alternative 3 would require more time at the Site therefore expose workers to risks for a longer period of time (three years) compared to Alternative 2 (10 months).

Alternatives in which the largest quantity of soil is removed would have the greatest area of impact, would require the longest period of time to complete, and would have the highest potential for short–term adverse effects. Alternative 2 would take 10 months to complete. Alternative 3 would take 3 years to complete and includes almost three times the amount of soil removal compared to Alternative 2. Short-term impacts would be greater for Alternative 3 because of this longer timeframe and greater quantities of soil.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 does not entail any construction, so it can be easily implemented.

Alternatives 2 and 3 have common implementability issues related to the removal of large amounts of soil, water management, installation of the caps (for Alternative 2), and restoration. These issues also include conducting large-scale construction activities in wetland areas and the need for specialized equipment, establishing routes to the soil removal areas, dewatering of the contaminated soil, the management of invasive species and protection of native species during restoration.

The increased volume of soil removal, and the need for large scale wetland restoration, associated with Alternative 3 increases the implementation difficulties compared to Alternative 2. Alternative 2 would also have implementability issues with targeted removal of soil, but they would be to a lesser extent than Alternative 3 due to reduced amount of soil removal and area of disturbance. Alternative 3 would remove more high value, sensitive wetland habitats creating implementability issues for restoration. These implementability issues are caused by the larger size and complexity of working in wetland and riparian areas. A substantial amount of water management will be required, and access to and from the removal areas will be limited.

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.

The total estimated present worth costs increase with the amount of material removed. The estimated costs, calculated using a 7% discount rate, are: $0 for Alternative 1; $30,920,667 for Alternative 2; and $62,261,469 for Alternative 3.

8. State Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected remedial measure.

The State of New Jersey concurs with the selected alternative of soil removal including off-site soil disposal. However, the state will not concur with the capping and institutional control component of the selected soil alternative unless and until property owners of property subject to restricted use requirements provide their consent to the placement of a cap and a deed notice on their property.

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial alternatives for soils that were proposed for OU4. Oral comments were recorded from attendees of the public meeting. The attached Responsiveness Summary addresses the comments received during the public comment period. The community (residents, business owners, nearby property owners) had varied positions, from support to reservations about EPA's Proposed Plan. EPA received written and oral comments from residents of Voorhees and Gibbsboro as well as elected officials. These issues raised by the commenters are discussed in EPA's comprehensive response to comments received during the public comment period in the Responsiveness Summary, Appendix V.

Evaluation of Sediment Alternatives

1. Overall Protection of Human Health and the Environment

Alternative 1 is not protective of human health or the environment because no action would be taken to address sediment contamination.

Alternative 2 would provide protection of human health and the environment by removing the sediment containing the highest concentrations of lead and arsenic and capping the areas of remaining sediment that contains arsenic and lead at concentrations greater than the RGs to prevent human and ecological exposure. Maintenance of the cap would be required to assure continued protection of human health and the environment over time.

Alternative 3 would provide protection of human health and ecological receptors by removing all sediment containing contaminants at concentrations greater than the RGs. Preventing exposure to sediment at concentrations greater than RGs would protect ecological receptors and prevent risks associated with fish ingestion.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Sediment RGs are a combination of background and Site-specific risk-based numbers. There are no chemical-specific Federal or State of New Jersey standards for the COCs in sediment.

Location-specific ARARs for the sediment are applicable because OU4 contains wetlands and wildlife areas. Location-specific ARARs include certain provisions of the Federal Fish and Wildlife Coordination Act and the New Jersey Freshwater Wetlands Protection Act and Clean Water Act.

Action-specific ARARs are determined by the specific technology of each alternative. In this case, all the active alternatives include dredging and off-site disposal. Action-specific ARARs include certain provisions of the Federal Resource Conservation and Recovery Act. Also included are the New Jersey Solid Waste Rules and certain portions of the Technical Requirements for Site Remediation.

A complete list of potential ARARs can be found in Appendix II-A.

Alternative 1 would not meet ARARs.

Alternatives 2 and 3 would comply with action and location-specific ARARs, including those that apply to remediation and filling in floodplains, work in wetland areas (NJDEP Wetlands Protection Act Rules), waste management (Resource Conservation Recovery Act Land Disposal Restrictions), and storm water management.

3. Long-Term Effectiveness and Permanence

Alternative 1 does not remove existing contamination and exposures and risks would remain. This alternative does not offer any long-term effectiveness or permanence.

Alternative 2 would provide long-term effectiveness and permanence by removing the most contaminated surface sediments in the OU and using capping to prevent exposure to the underlying contaminants. Maintenance dredging of the lakes may compromise the integrity of the sediment caps. Capped areas would need to be properly maintained to assure long-term protectiveness.

Alternative 3 would provide the highest degree of long-term permanence and effectiveness because all lead and arsenic at concentrations exceeding RGs, would be removed. No cap maintenance would be necessary because capping would not be a component of this alternative.

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

The primary COCs driving the risk associated with sediments are metals. All the active alternatives involve removal and/or capping of the sediment. Since removal and containment are

the technologies that would be used for the remediation of sediment, none of the alternatives provide reduction of toxicity, mobility, or volume through treatment; however, treatment of contaminated sediment may be required prior to disposal.

5. Short-Term Effectiveness

Alternative 1 does not present any short-term risks to the community, Site workers or the environment because this alternative does not include any active remediation work.

Alternatives 2 and 3 involve dredging and thus have potential for short-term adverse effects that include ecological damage to and loss of habitat, and construction within the community that adds noise, odor, and limits access to public areas. Potential risks posed to Site workers, the community, and the environment during implementation of Alternatives 2 and 3 could be due to wind-blown or surface water transport of contaminated sediments. Any potential impacts associated with dust and runoff would be minimized through proper installation and implementation of dust and erosion control measures. Contaminated sediments may become suspended in the water column during dredging activities. Sediment control mechanisms such as sediment curtains will be used to control sediment migration. The areas would be monitored throughout the construction. Adverse short-term impacts to the community include increased truck traffic, potential odors, and increased noise. The extent of the short-term impacts associated with Alternatives 2 and 3 would be similar since the remediation footprint for both alternatives is similar.

Alternative 2 would take two years to complete, as compared to 2.5 years for Alternative 3, so Alternative 3 would have a slightly higher potential for short–term adverse effects than Alternative 2.

6. Implementability

Alternative 1 would not include any activity, so no implementation is required.

Alternatives 2 and 3 require sediment removal and face similar implementability challenges. Such challenges include access through private property to the remediation areas, the need for barge or boat mounted dredging equipment, controlling sediment resuspension, transportation of dredged materials, controlling the flow of surface water and the influx of groundwater, and streambed stabilization and wetland restoration.

It is expected that the degree of implementability difficulty for Alternative 2 would be slightly greater than Alternative 3. Although the volume of sediment removed is less in Alternative 2 (60,000 cubic yards) compared to Alternative 3 (128,000 cubic yards), the aerial extent of sediment removal would be the same for each Alternative. The footprint of the equipment laydown and support areas and access roads required to conduct sediment removal would also be approximately the same under both alternatives. Implementability of Alternative 2 is slightly more difficult than Alternative 3 because it has the additional design and construction component of capping which involves the testing, procurement, shipment, distribution, and placement of approximately 43,500 cubic yards of cap material.

7. Cost

The total estimated present worth costs, calculated using a 7% discount rate, are: $0 for Alternative 1; $40,261,013 for Alternative 2; and $59,105,902 for Alternative 3.

8. State Acceptance

The state of New Jersey concurs with the selected alternative for sediment.

9. Community Acceptance

EPA solicited input from the community on the remedial alternatives for sediment that were proposed for the Waterbodies OU. Oral comments were recorded from attendees of the public meeting. EPA received written and oral comments from residents of Voorhees and Gibbsboro as well as elected officials. Comments from the community members indicated support of sediment Alternative 3. Comments received during the public comment period and EPA responses are in the attached Responsiveness Summary, Appendix V.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a Site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding as to whether the remedy must employ treatment as a principal element.

Although lead and arsenic, in soil and sediment, act as sources to surface water, these sources are not highly mobile and therefore are not considered principal threat wastes at this OU.

SELECTED REMEDY

Based upon consideration of the results of the Site investigations, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that Soil Alternative 2, Targeted Soil Removal, Capping and Institutional Controls is the appropriate remedy for the Site. For the sediment, the selected alternative is Alternative 3, Full Dredging. As discussed above, sediment and surface water will be monitored to determine the effectiveness of the implemented soil and sediment remedies. Together, these two elements comprise EPA's Selected Alternative. The remedy best satisfies the requirements of CERCLA Section 121 and the NCP's nine evaluation criteria for remedial alternatives, 40 C.F.R. § 300.430(e)(9). This remedy includes the following components for the soil and sediment.

Soil:
The Selected Soil Alternative 2 (Figure 4) involves excavation, capping, and off-site disposal of soil. The major components of the Selected Soil Alternative include:

- Excavation, transportation, and disposal of 42,000 cubic yards of contaminated soil;
- Installation of engineering controls including vegetated soil covers in the floodplain areas adjacent to Hilliards Creek;
- Restoration and revegetation of Hilliards Creek flood plain;
- Institutional controls, such as deed notices, to prevent exposure to residual soil that exceeds levels that allow for unrestricted use; and
- Monitoring of restoration activities.

This alternative would remove the soil containing the highest concentrations of arsenic and lead (and other contaminants co-located with the areas targeted for excavation) from the Hilliards Creek flood plain. To the extent possible during excavation, the existing high- and medium-quality wetlands would be preserved, and low-quality wetlands would be targeted for removal. All areas would be restored with native species. Under this alternative, surface and subsurface soil containing the highest concentrations of arsenic or lead at concentrations greater than the RGs would be removed to a depth of up to 2 feet. The areas to be excavated and the depth of excavation will be calculated by using averaging in the remedial design phase (Surface Weighted Average Concentration methodology). After excavation the average concentration of lead and arsenic in soil would meet soil RGs. This will reduce exposure to levels that are protective of human health and the environment and will also prevent the transport of soil contamination to surface water.

As part of the remedy, a cap consisting of a vegetated soil cover will be installed in those areas within the floodplain soils of Hilliards Creek where lead and arsenic remain in soil at concentrations greater than RDCSRS at depth, and an institutional control in the form of a deed notice will be required to ensure that future use of the affected property is restricted to avoid exposure to the elevated concentrations remaining at depth, and to provide for the maintenance and integrity of the cap. This remedial action will, to the extent practicable, preserve the forest canopy in the high- and medium-quality wetland areas, while removing the most highly contaminated soils.

Selected Soil Alternative 2 will provide an equivalent degree of protection as Soil Alternative 3, and has fewer implementability issues, and greater short-term effectiveness.

The Soil Alternative 2 is preferred over other alternatives because it is expected to achieve substantial and long-term risk reduction through off-site disposal, and is expected to preserve valuable wetlands, forests and open space while being protective of human health and the environment. The Selected Soil Alternative reduces the risk within a reasonable time frame, at a lower cost compared to other alternatives and is protective in the long-term.

The Selected Soil Alternative will achieve RGs that are protective for residential use in the surficial floodplain soils adjoining Hilliards Creek. Though the remedy will be protective, it will

not achieve levels that allow for unrestricted use at depth, and deed notices will be required. Five-year reviews will be conducted since contamination will remain above levels that allow for unlimited use and unrestricted exposure.

Sediment:

The Selected Sediment Alternative 3 (Figure 5 and Figure 6) includes full excavation of sediment bed and banks with contaminant levels greater than the RGs from Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek. The major components of the Selected Sediment Alternative include:

- Construction of a stream diversion system to allow access to sediment;
- Excavation, transportation, and disposal of 128,000 cubic yards of contaminated sediment within lakes and creeks;
- Dewatering and processing of excavated sediment;
- Stream bank remediation followed by revegetation and restoration that includes engineering controls to stabilize stream banks as needed; and
- Monitoring of restoration activities.

Approximately three feet of sediment would be removed from Hilliards Creek, and between two and five feet of sediment from Silver Lake, Bridgewood Lake and Kirkwood Lake. Following removal, monitoring to verify dredge performance will include bathymetry to ensure elevations were achieved and chemical monitoring to ensure removal of sediment with COC concentrations above the RG. Sediment chemistry will also be monitored prior to the five-year review(s) to address whether the remedy is functioning as intended until the Site is deleted from the NPL. After sediment and surface water monitoring verify that the remedial action objectives have been met, the stabilizing revegetation of stream banks, riparian zone, and wetlands, will be monitored for a period of five years to ensure successful restoration of these areas.

The Selected Sediment Alternative was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction with greater certainty, requires less long-term monitoring and maintenance, and has less implementability challenges than Alternative 2. The Selected Sediment Alternative includes dredging and off-site disposal of sediment at concentrations that exceed RGs, which will reduce contaminant levels in Hilliards Creek, Silver Lake, Bridgewood Lake and Kirkwood Lake. The Selected Sediment Alternative 3 reduces risk within a reasonable timeframe, is cost effective, and provides for long-term effectiveness of the remedy.

Surface water monitoring would be conducted during the implementation of the remedy, as well as post remedial construction to assess any changes in contaminant conditions. It is expected that removal of contaminated sediment, combined with the soil removal and capping performed as part of the Selected Soil Alternative, will result in a decrease of surface water contaminants to levels below NJSWQS. If monitoring indicates that surface water contamination levels have not decreased to below the NJSWQS, EPA may require an action in the future.

The Selected Alternatives provides the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA has determined that the Selected Alternatives will be protective of human health and the environment, will comply with ARARs, will be cost-effective and will utilize permanent solutions, to the extent practicable. The total present worth cost for the combined soil and sediment Selected Alternatives is $90,026,569. Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of a selected remedy.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA Section 121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to reduce the volume, toxicity or mobility of the hazardous substances, pollutants, or contaminants permanently and significantly at a Site. CERCLA Section 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4).

Protection of Human Health and the Environment

The selected soil remedy will be protective of human health and the environment by removing contaminated soil that poses a direct contact or ecological threat. The combination of soil removal and capping will prevent human and wildlife receptor exposure to contaminants. Where the soil is capped, institutional controls such as deed notices will be put in place to ensure that impacts to human health and the environment are minimized.

The selected sediment remedy will be protective by removing the contaminated sediment in Silver Lake, Bridgewood Lake, Kirkwood Lake and Hilliards Creek resulting in a reduction of contamination levels to below RGs.

In addition, removal of the contaminated soil and sediment is expected to result in contamination levels in the surface water decreasing to below the NJSWQS. Surface water will be monitored to ensure protectiveness.

Implementation of the selected remedy will not present unacceptable short-term risks or adverse cross-media impacts and will therefore be protective of human health and the environment.

Compliance with ARARs

EPA expects that the selected remedy for soil and sediment will comply with federal and New Jersey ARARs. A complete list of ARARs can be found in Appendix II-A.

Chemical-specific ARARs are only available for the soil because there are no chemical-specific Federal or State of New Jersey standards for the COCs in sediment. Sediment RGs are Site-specific, risk-based goals. The chemical-specific ARARs for lead and arsenic in the soil include the New Jersey Residential and Non-Residential Direct Contact Soil Remediation Standards.

Location-specific ARARs apply to some portions of the soil and sediment within OU4, such as the flood plain of Hilliards Creek which is a wildlife area. Location-specific ARARs include the Federal Fish and Wildlife Coordination Act and the New Jersey Freshwater Wetlands Protection Act and Clean Water Act.

The action-specific ARARs are the same for the soil and sediment because the soil and sediment remedy components both include excavation and off-site disposal. For the soil and sediment, action-specific ARARs include the Federal Resource Conservation and Recovery Act. Also included are the New Jersey Solid Waste Rules and certain portions of the Technical Requirement for Site Remediation.

Cost Effectiveness

EPA has determined that the selected remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430 (f)(1)(ii)(D)). EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of the selected remedy was determined to be proportional to costs and hence, the selected remedy represents a reasonable value for the money to be spent. The selected remedy is cost-effective as it has been determined to provide the greatest overall protectiveness for its present worth costs.

Utilization of Permanent Solutions and Alternative Treatment Technologies

EPA has determined that the selected remedy utilizes permanent solutions and treatment technologies to the maximum extent that is practicable. The majority of the contaminated soil will be removed. Where soil contaminants remain, a minimum of two feet of soil will be removed and the area will be capped with clean soil within the Hilliards Creek floodplain. In Hilliards Creek, Silver Lake, Bridgewood Lake and Kirkwood Lake, all contamination above the sediment RGs will be removed.

The selected remedy will provide adequate long-term control of risks to human health and the environment through eliminating and/or preventing exposure to the contaminated sediment and floodplain soils. The selected remedy is protective against short-term risks.

Preference for Treatment as a Principal Element

Treatment is not an element of the selected remedy because contaminated soil and sediment are being addressed through a combination of removal and capping.

Five-Year Review Requirements

The selected remedy for the soil involves capping where the RGs are not attained at depth. Therefore, contamination will likely be left in place at levels above those that allow for unlimited use and unrestricted exposure. A statutory five-year review will be conducted within five years of initiation of the remedial action for the Site to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Site was released for public comment on April 1, 2021. The Proposed Plan identified Soil Alternative 2 as the preferred alternative to address soil contamination, Sediment Alternative 3 to address sediment contamination, and monitoring of surface water. Upon review of all comments submitted, EPA determined that no significant changes to the selected remedy, as it was presented in the Proposed Plan, are warranted.

The Proposed Plan incorrectly provided present worth costs for sediment alternatives and total present worth costs of the combined sediment and soil selected alternatives. The present worth costs for Sediment Alternative 2 and Sediment Alternative 3 were incorrectly presented on page 20 of the Proposed Plan as $43,968,919 and $58,207,732 respectively. The correct present worth cost for Sediment Alternative 2 is $40,261,013 and for Sediment Alternative 3 is $59,105,902. The total present worth cost for both the soil and sediment selected alternatives was incorrectly presented on page 22 of the Proposed Plan as $90,974,604. The total present worth cost for both the soil and sediment selected alternatives is $90,026,569.