RECORD OF DECISION

FOR AN INTERIM REMEDY IN THE

UPPER 9 MILES OF THE

LOWER PASSAIC RIVER STUDY AREA

OU4 OF THE DIAMOND ALKALI SUPERFUND SITE

ESSEX, BERGEN AND PASSAIC COUNTIES, NEW JERSEY

U.S. Environmental Protection Agency

Region 2

September 2021

630399

DECLARATION FOR THE RECORD OF DECISION

FACILITY NAME AND LOCATION

Diamond Alkali Superfund Site
Operable Unit 4 – Lower Passaic River Study Area
Upper 9 Miles
Essex, Bergen and Passaic Counties, New Jersey

EPA Superfund Site Identification Number ~~NJD980529879~~ NJD980528996

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of an interim remedy (IR) for source control to address contamination in the Lower Passaic River Study Area (LPRSA), which is Operable Unit 4 (OU4) of the Diamond Alkali Superfund Site (the Site). The IR was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 U.S.C. §§ 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the IR. The Administrative Record Index (Appendix 3) identifies the items that comprise the Administrative Record upon which the selected IR is based.

The State of New Jersey was consulted on the IR in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f). The State of New Jersey concurs with EPA's selection of the IR alternative documented in this ROD (Appendix 4).

ASSESSMENT OF THE SITE

The response action selected in this 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 IR selected in this ROD is a source control IR in the upper 9 miles of the LPRSA. The objective of the IR for the upper 9 miles of the LPRSA is to remediate sediment source areas, focusing on 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) and total polychlorinated biphenyls (PCBs) as contaminants of concern (COCs). The IR will also address collocated contaminants in the areas of remediation. EPA determined that, for this IR, surface weighted average concentration (SWAC)-based goals will be used to determine if the sediment source areas have been remediated.

The major components of the selected IR include the following:

- A comprehensive pre-design investigation (PDI) will be implemented to assess baseline conditions, inform the IR design, and facilitate post-IR confirmatory sampling and response and recovery assessment.
- Areas where surface sediments (0 to 0.5 ft) have elevated concentrations of 2,3,7,8-TCDD and/or total PCBs between river mile (RM) 8.3 and RM 15 will be targeted through dredging and capping, achieving a post-IR 2,3,7,8-TCDD SWAC of 75 parts per trillion (ppt) and implementing a total PCB surface remedial action level (RAL) of 1 part per million (ppm).
- Areas between RM 8.3 and RM 15 that are vulnerable to erosion and have elevated subsurface concentrations of 2,3,7,8-TCDD and/or total PCBs will be dredged and capped.
- Dredging will be performed to the depth(s) necessary to construct a sediment cap that is designed to isolate underlying contamination, prevent contaminant migration, resist erosion, and will not diminish water depth or exacerbate flooding.
- Dredged material will be processed, stabilized, and then disposed of off-site.
- The specific composition and thickness of the cap will be determined in the IR design, and dredge depth and cap composition/thickness may vary in portions of the remediation footprint.
- Some areas may be dredged to native (uncontaminated) sediments based on a cost-effectiveness review. In these areas, there would be no need for an engineered cap and associated operation and maintenance (O&M). Dredging without capping in these areas could enhance the overall long-term effectiveness and permanence of the IR.
- The area above RM 15 will be assessed carefully during the IR design based on the PDI data to identify potential source areas.
- Appropriate and necessary institutional controls (ICs) will be implemented in conjunction with the IR.
- Monitoring and sampling will be performed to evaluate the IR during construction and to assess post-IR conditions.
- Adaptive management will be applied to evaluate IR performance, assess the response of the system to the IR and the long-term recovery of the system, and to inform selection of a final risk-based remedy in a final ROD.

The cost of the IR is $441 million.

DECLARATION OF STATUTORY DETERMINATIONS

This response action (1) is protective of human health and the environment in the short term and is intended to provide adequate protection until a final ROD for the LPRSA is signed and the final remedy implemented, (2) complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action, and (3) is cost-effective. Although the IR is not intended to address fully the statutory mandate for permanence it will provide remedy elements (e.g., the engineered cap) that are permanent and will not be incompatible with nor preclude a final remedy.

Through the IR, the mobility of the COCs removed from the upper 9 miles of the LPR will be effectively eliminated not through treatment, but by shipping the dredged sediments to disposal facilities. There would be no reduction in toxicity, mobility or volume of the COCs specifically through treatment. However, an amendment (e.g., Portland cement) will be added (as needed) to stabilize the removed material and meet transportation and disposal requirements. The addition of an amendment will reduce the mobility of contaminants contained within the sediments compared to unamended sediments. In addition, the engineered cap will effectively isolate the remaining sediments that are not removed, and a carbon amendment will be incorporated into the cap to prevent the migration of contamination through the cap. While the IR will not meet the statutory preference for utilizing treatment to the maximum extent practicable, a degree of treatment is a secondary benefit of ex situ amendment addition during sediment processing (for transportation and disposal requirements) and for the activated carbon component of the isolation cap.

Because the IR will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, five-year reviews will be required to ensure that the remedy is, or will be, protective of human health and the environment. The schedule for the five-year reviews for the Diamond Alkali Superfund Site was initially set by the on-site mobilization of contractors in 2000 to initiate the remedial action at OU1 of the Site (i.e., the 80-120 Lister Avenue facility); the submittal of each successive five-year review is triggered by signature of the prior five-year review. In addition, because the selected remedy is an IR, review of this remedy will be ongoing as EPA continues to develop final remedial alternatives for the LPRSA.

ROD DATA CERTIFICATION CHECKLIST

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 the LPRSA.

• COCs and their respective concentrations are in Section 5, “Summary of Site Characteristics.”

• Current and reasonably anticipated future use assumptions used in the baseline risk assessment and ROD are in Section 6, “Current and Potential Future Site and Resource Uses.”

• Baseline risks for human health and the environment represented by the COCs are in Section 7, “Summary of Site Risks.”

• Remedial Action Objectives, which provide a basis for determining if the IR has been conducted as described by this ROD, are in Section 8, “Remedial Action Objectives.”

• Estimated capital, O&M, and total present value costs (the applied discount rate and the number of years over which the IR cost estimates are projected) are in Section 10, "Comparative Analysis of Remedial Alternatives."

• Key factors that led to selecting the IR (i.e., how the selected IR provides the best balance of tradeoffs with respect to the balancing and modifying criteria and highlighting factors key to the selection) are also in Section 10, "Comparative Analysis of Remedial Alternatives."

AUTHORIZING SIGNATURE

Michael S. Regan, Administrator

SEP 2 8 2021

Date

DECISION SUMMARY
Upper 9 Miles of the
Lower Passaic River Study Area
Diamond Alkali Superfund Site – Operable Unit 4

Essex, Bergen, and Passaic Counties, New Jersey

U.S. Environmental Protection Agency
Region 2
September 2021

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1. SITE NAME, LOCATION AND DESCRIPTION

The Lower Passaic River Study Area (LPRSA) is Operable Unit (OU) 4 of the Diamond Alkali Superfund Site (the Site) and encompasses the entire Lower Passaic River (LPR) from Newark Bay at River Mile (RM) 0 to the Dundee Dam at approximately RM 17.7. The LPR and Newark Bay are part of the New York/New Jersey Harbor Estuary. The LPR specifically refers to the approximate 17-mile tidal portion of the river and its watershed, which includes the major tributaries of Saddle River, Third River, and Second River (Figure 1-1 in Appendix 1). Dundee Dam isolates the Upper Passaic River (UPR) from the tidal mixing that influences the LPR.

Notably, two RM systems have been developed for the LPRSA (Figure 1-2 in Appendix 1). A RM system was developed by the U.S. Army Corps of Engineers (USACE) that follows the navigation channel of the LPR. RM 0 in the USACE system is just offshore of Newark, New Jersey at Delancey Street, and RMs continue upriver to the Dundee Dam, which is located at RM 17.7 in this system. RM 8.3, which designates the upriver extent of OU2 and the downriver extent of the upper 9-mile reach of the LPRSA covered by this Record of Decision (ROD), is named in the USACE RM system. The second system, the Remedial Investigation (RI) RM system (which was developed by the U.S. Environmental Protection Agency [EPA] and used for the RI evaluations), follows the geographic centerline of the river. In the RI RM system, RM 0 is defined by an imaginary line between two marker lighthouses at the confluence of the LPR and Newark Bay: one in Essex County just offshore of Newark, and one in Hudson County just offshore of Kearny Point. RMs in the RI RM system then continue upriver to Dundee Dam (at RM 17.4 in the RI RM system). The two RM systems are about 0.2 to 0.3 mile apart. RM designations in this ROD are in the USACE system unless otherwise specified.

The LPR is in a highly developed urban area. The predominant adjacent land uses from the mouth of the LPR (RM 0) to RM 4 are industrial and commercial. Adjacent land use above RM 4 begins to also include residential and recreational uses. Hard shorelines, such as bulkheads and riprap, make up approximately 95 percent of the banks of the lower 8.3 miles of the LPR, with vegetation comprising the remainder of the banks. Moving upriver from RM 8.3, land use increasingly transitions to commercial and recreational, with pockets of residential use. The upper portions of the LPR generally feature steeper and hardened shorelines on the west bank with limited areas of riparian vegetation. A four-lane highway (Highway 21) runs parallel to the river along the western bank between RM 7 and RM 14. A strip of parkland runs along much of the eastern shoreline between RM 7 and RM 14, with six parks and recreation areas of note and four boathouses/crew facilities. The east bank tends to be less modified, consisting of more natural shoreline, residential areas, and parks. In the parks on the eastern shore, access to the riverbank is possible in some clearings and areas where vegetation growth is limited, and the riverbank is not too steep. Above RM 14, the river becomes narrower and shallower, and the adjacent uses become more residential. Pulaski Park is located on the western bank between RM 15.5 and 16. Much of the shoreline between RM 16 and Dundee Dam is vegetated with several points of public access to the water.

The lower 8.3 miles of the LPR comprises approximately 716 acres, while the upper 9 miles comprises approximately 344 acres. Mudflats (areas of fine-grained sediments exposed at lower tides) are present throughout the entire LPR and are typically composed of fine-grained sediments, and these fine-grained sediments generally have higher contaminant concentrations than coarser materials found elsewhere in the river. Fine-grained sediments also comprise the majority of the LPR surface sediments below RM 8.3.

The LPR's cross-sectional area declines steadily moving upstream from RM 0 to Dundee Dam, with a pronounced constriction at RM 8.3. At RM 8.3, there is a pronounced change in sediment texture within the riverbed. As stated above, the riverbed from RM 0 to RM 8.3 is dominated by fine-grained sediments, while coarser sediments (sand and gravel) with smaller areas or pockets of fine-grained sediments generally comprise the riverbed above RM 8.3. About 85 percent of the fine-grained sediment surface area (90 percent by volume) of the LPR is located below RM 8.3. As discussed in the March 3, 2016 ROD for the lower 8.3 miles of the LPRSA, which is OU2 of the Diamond Alkali Superfund Site, wider and thicker beds of contaminated sediments accumulated below RM 8.3 due to a combination of a wider cross section and a deeper historical navigation channel.

The primary continuing contaminant sources to the LPR are the internal sediment inventory (e.g., resuspended contaminated sediments within the LPR), tidal exchange with Newark Bay, and flows from above Dundee Dam. Combined Sewer Overflows (CSOs), overland flow, groundwater, and various other point and non-point sources also contribute contaminants to the LPR, but not at the same magnitude as the primary sources.

The inside bends of the LPR generally accumulate finer sediments, while the outside bends generally experience little or no sediment accumulation and (in some cases) experience erosion due to higher shear stresses. In the vicinity of structures such as bridge abutments and at tributary confluences, sediments tend to be coarse or absent owing to associated turbulence that prevents long-term accumulation of fine sediments (or any sediments). The contaminated fine-grained sediments already within the LPR are the most significant continuing contaminant source and will be addressed to a large degree by the planned bank-to-bank dredging and subsequent capping of RM 0 to RM 8.3, in accordance with the OU2 ROD. This dredging and capping of the lower 8.3 miles will substantially reduce the potential for recontamination of the rest of the LPR and is currently being designed by Occidental Chemical Corporation (OCC), working with its affiliated entity Glenn Springs Holdings (GSH), under EPA oversight. The interim remedy (IR) described in this ROD, which focuses on source control and targets removal of sediments with higher contaminant concentrations in the upper 9 miles of the LPR, is based on the RI/Feasibility Study (FS) prepared by a group of companies that owned or operated facilities from which hazardous substances were potentially discharged to the LPR, called the Cooperating Parties Group (CPG), under EPA oversight. Newark Bay is being addressed as OU3 of the Diamond Alkali Superfund Site and is currently in the RI/FS stage. The Newark Bay RI/FS is being conducted by OCC-GSH, also under EPA oversight.

Sediments in Dundee Lake and other UPR sediments are isolated from hydrodynamic impacts and sediment transport from the LPR by Dundee Dam. Sediments from above Dundee Dam are transported downriver into the LPR. The concentrations of the contaminants of concern (COCs) detected in recently deposited sediments collected from the UPR immediately above Dundee Dam and transported downriver into the LPR, are representative of current background conditions for the LPR.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Passaic River was one of the major centers of the American industrial revolution that started two centuries ago. Early manufacturing, particularly textile mills, developed in the area around Great Falls in the City of Paterson, which is 8 miles upriver of Dundee Dam. Dundee Dam, constructed along with a canal and locks in the mid-nineteenth century on top of an earlier dam, was originally conceived to provide waterpower to nearby businesses, supporting further industrialization along the banks of the river. By the end of the nineteenth century, a multitude of industrial operations, such as manufactured gas plants, paper manufacturing and recycling facilities, petroleum refineries, shipping facilities, tanneries, creosote wood preservers, metal recyclers, and manufacturers of materials such as rubber, rope, textiles, paints and dyes, pharmaceuticals, and chemicals, had located along the river's banks as cities such as Newark and Paterson grew.

Industrial operations and municipalities used the river for wastewater disposal. To date, more than 100 industrial facilities have been identified as potentially responsible for discharging contaminants into the river, including (but not limited to) dioxins and furans, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dichlorodiphenyltrichloroethane (DDT) and other pesticides, mercury, lead, and other metals.

Along with Dundee Dam, which physically isolates Dundee Lake and the UPR from LPR influences, another defining component of the development and urbanization of the LPR was the construction of a navigable channel for commercial vessels. Between 1884 and 1915, dredging projects authorized by Congress and constructed by USACE created a federally authorized navigation channel from RM 0 to RM 15.4 (at Wallington, New Jersey). Further deepening of the channel was authorized by Congress in 1930.[1] In 1932, the navigation channel was constructed to its maximum dredged depth—30 feet from RM 0 to RM 2.6, 20 feet from RM 2.6 to RM 4.6, 16 feet from RM 4.6 to RM 8.1, and 10 feet from RM 8.1 to RM 15.4. USACE performed dredging to maintain the channel through the 1950s above RM 1.9 and until 1983 below RM 1.9. The federal navigation channel above RM 1.7 was deauthorized by Congress in 2018, and the depth from RM 0.6 to RM 1.7 was reauthorized from 30 feet to 20 feet.[2]

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[1] Rivers and Harbors Act of 1930.

[2] America's Water Infrastructure Act of 2018.

2.1 Site History

The LPRSA is a part of the Diamond Alkali Superfund Site. EPA's response at the Site began at a former manufacturing facility located at 80-120 Lister Avenue in Newark, New Jersey, at RM 3.4, now known as OU1. Manufacturing of DDT and other products, including phenoxy herbicides, began at this facility in the 1940s. In the 1950s and 1960s, the facility was operated by the Diamond Alkali Company (later purchased by and merged into OCC). Between March 1951 and August 1969, the Diamond Alkali Company manufactured the chemical 2,4,5-trichlorophenol (2,4,5-TCP) and the herbicides 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), which are ingredients in the defoliant "Agent Orange." A byproduct of the manufacturing was 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD)—the most toxic form of dioxin. These substances have all been found in LPR sediments and in fish/crab tissue.

2.1.1 Preliminary Actions

Based on investigations by the New Jersey Department of Environmental Protection (NJDEP) and EPA, the Diamond Alkali Superfund Site was placed on the National Priorities List in 1984. After further investigations and several emergency response actions that addressed dioxin contamination found on nearby properties, EPA issued a ROD in 1987 to select an interim containment remedy for the Lister Avenue facility. The remedy consisted of demolishing a warehouse and other on-site structures, capping contaminated soils (including soils brought back to the facility from nearby properties), installing subsurface slurry walls on three sides and a sheet-pile flood wall along the river, and constructing a groundwater collection and treatment system to prevent exposure to contaminated soil (that originated at the facility and that was brought back to the facility from neighboring lots) and prevent further releases to the river.

Construction of the remedy at the 80-120 Lister Avenue facility was performed by OCC and the owner of the facility, Chemical Land Holdings, Inc., later known as Tierra Solutions, Inc. (Tierra), under EPA oversight. Construction was completed in 2001. Operation and maintenance (O&M) of the OU1 remedy continues to be performed by OCC under EPA oversight, and EPA performs periodic reviews of the remedy. The facility property is now owned by Mariana Properties, Inc., an affiliate of OCC.

2.1.2 Six-Mile Study

In 1994, OCC agreed to an administrative order on consent (AOC) with EPA to investigate a 6-mile stretch of the LPR (RM 1 to RM 7), with the work performed by Tierra on OCC's behalf. This investigation found COCs that originated from the Diamond Alkali facility, in particular 2,3,7,8-TCDD and pesticides, throughout the 6 miles, with the highest concentrations adjacent to the 80-120 Lister Avenue facility. This investigation also found many other COCs not clearly linked to Diamond Alkali's operations and indicated that contaminated sediments moved into and out of the 6-mile stretch, leading to the conclusion that a more comprehensive study was required. In 2002, EPA expanded the scope of the investigation to include the entire 17-mile LPR.

2.1.3 Newark Bay Study

In 2004, EPA and OCC signed an AOC in which OCC agreed to conduct a separate RI/FS of the Newark Bay Study Area (Newark Bay and portions of the Hackensack River, Arthur Kill, and Kill van Kull), under EPA oversight, to investigate the extent of dioxin contamination and collocated contaminants. This study of the Newark Bay Study Area, now known as OU3, is ongoing.

2.1.4 Tierra Removal

In June 2008, EPA, OCC, and Tierra signed an AOC for a non-time-critical removal action to remove 200,000 cubic yards (cy) of contaminated sediments from the river (from RM 3.0 to RM 3.8) adjacent to the 80-120 Lister Avenue facility. This source removal action is referred to as the "Tierra Removal." Sediments at depth adjacent to the facility were found to have the highest levels of 2,3,7,8-TCDD measured in the river. Dredging, dewatering, and transport off-site of the first 40,000 cy of sediments (known as Phase 1 of the Tierra Removal) was completed in 2012. The AOC contemplated that Phase 2 (160,000 cy) would undergo a separate engineering study and proposal that would be submitted to the public for review and comment. In 2015, Tierra, on behalf of OCC, collected additional samples in the Phase 2 area. The Phase 2 area is being incorporated into the final remedial action for the sediments of the lower 8.3 miles of the LPRSA, which is currently under design.

2.1.5 RM 10.9 Removal

In June 2012, EPA and the CPG signed an AOC for a time-critical removal action to address the risks posed by high concentrations of dioxins/furans, PCBs, and other contaminants found at the surface of a mudflat on the east bank of the river at RM 10.9 next to a recreational park in Lyndhurst, New Jersey. This action is referred to as the "RM 10.9 Removal." The action involved placing an engineered cap over contaminated sediments, thereby reducing exposure and preventing migration of the contamination to other parts of the river. To ensure that the action did not exacerbate flooding, a sufficient volume of surface sediments was first dredged from the area to make space for the cap. The CPG began work in 2013 and substantially completed it in 2014, with the exception of a relatively small area of contaminated sediments located above a utility pipeline that runs under the river. Approximately 16,000 cy of sediments were removed during the RM 10.9 Removal. The RM 10.9 Removal area is subject to a monitoring program under which the long-term performance of the engineered cap is evaluated. This area will be incorporated into the IR described in this ROD (as needed) to attain the objectives of the source removal action in the upper 9 miles of the LPRSA.

2.1.6 Lower 8.3 Miles of the LPRSA

Concurrent with these river studies and removal actions, EPA concluded that since the lower 8.3 miles of the river contain the bulk of the contaminated sediments, which in turn is the source of most of the risk associated with the LPR, addressing this portion of the river first would better support the overall protection of human health and the environment than would awaiting the outcome of the 17-mile LPRSA RI/FS to make a decision for the entire LPR. Because about 90 percent (by volume) of the fine-grained (and, therefore, more heavily contaminated) sediments are below RM 8.3, EPA undertook a targeted RI and Focused Feasibility Study (FFS) of the lower 8.3 miles. In March 2016, EPA selected a remedy for the sediments of the lower 8.3 miles, which includes the construction of an engineered cap bank-to-bank over the river bottom of the lower 8.3 miles of the LPRSA, dredging of the river bottom prior to placement of the cap so that the cap does not increase the potential for flooding and to allow for the continued commercial use of the federally authorized navigation channel, and implementation of institutional controls (ICs) designed to protect the engineered cap. In September 2016, EPA entered into an administrative settlement and order on consent with OCC to perform the remedial design for the lower 8.3; that work is ongoing.

2.1.7 17-Mile LPRSA

While working with OCC on the Lister Avenue facility and the first studies of the river, EPA also identified other potentially responsible parties (PRPs) for the LPRSA. A number of companies that owned or operated facilities from which hazardous substances were potentially discharged to the river formed the CPG. In 2004, EPA signed a settlement agreement with CPG members in which the settling parties agreed to pay for EPA to perform the 17-mile LPRSA RI/FS. The settlement agreement was amended in 2005 and 2007, adding more parties to reach a total of over 70 settling parties. From 2004 to 2007, EPA investigated contamination in sediments and water of the LPR, and investigated the major tributaries, CSOs, and stormwater outfalls (SWOs) to the river. In 2007, CPG members entered into a new AOC with EPA, in which the settling parties agreed to take over the performance of the 17-mile LPRSA RI/FS from EPA. Since 2007, the membership of the CPG has continued to change.

The CPG performed sampling for the LPRSA RI between 2008 and 2013. EPA approved the Baseline Human Health Risk Assessment (BHHRA) for the LPRSA in July 2017 and the Baseline Ecological Risk Assessment (BERA) in June 2019. The final RI Report was submitted by the CPG in July 2019 and has been conditionally approved by EPA pending approval of the bioaccumulation model. The bioaccumulation model is an appendix to the RI that is still under development; the appendix, containing a summary of the calibrated model, is expected to be completed in 2021, and the calibrated model will subsequently be carried through the peer review process. The remaining components of the LPRSA model suite (hydrodynamic model, sediment transport model, organic carbon model, and contaminant fate and transport model) were approved in June 2019.

In July 2017, the CPG proposed an adaptive management approach for evaluating an IR for the sediments of the upper 9 miles of the LPRSA. EPA Region 2, NJDEP and the CPG held a series of meetings, from July 2017 until October 2018, to discuss the proposal to evaluate an IR for source control in the upper 9-mile reach. In October 2018, EPA Region 2 directed the CPG to evaluate an IR approach for source control in the upper 9 miles of the LPRSA through an FS. The CPG submitted a draft final IR FS Report in December 2020, which was conditionally approved by EPA, pending any necessary revisions related to comments from the public after the public comment period on the IR Proposed Plan. The IR for the upper 9 miles targets sediment source areas of high 2,3,7,8-TCDD and/or total PCB concentrations, as well as any other contaminants collocated with high concentrations of 2,3,7,8-TCDD and/or total PCBs. The source areas tend to be composed of fine-grained sediments and are responsible for relatively higher degrees of exposure, the redistribution of contamination through erosion and redeposition, and an overall inhibition of system recovery.

Based on the IR FS, EPA prepared a Proposed Plan for the IR, which was released on April 14, 2021 for public comment. NJDEP concurred on the preferred alternative in the Proposed Plan. The IR will significantly lower contaminant concentrations in the upper 9 miles of the LPRSA. In turn, EPA expects the IR to reduce exposures and accelerate system recovery. Once the source sediments have been addressed through the IR, the river system will be monitored to assess response to the source removal action and recovery toward risk-based cleanup goals. When sufficient data have been collected to characterize the nature and extent of contamination and when further evaluations regarding the recovery of the river and risks to human health and the environment have been completed, EPA expects to issue a final ROD selecting a final remedy addressing any remaining risks in sediments within the upper 9 miles and in surface water throughout the LPRSA.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Diamond Alkali Superfund Site has generated a high level of public interest since it was first identified, beginning with EPA's actions in the 1980s to remove dioxins from the neighborhoods around the Lister Avenue facility. With the expansion of the scope of the project to encompass the entire 17-mile tidal portion of the LPR and Newark Bay, EPA's community outreach efforts have also expanded. A more detailed history of community involvement at the Site is provided in the *Lower Passaic River Restoration Project and Newark Bay Study Community Involvement Plan*, dated June 2006. To foster community involvement at the Site, beginning in 2004, EPA convened quarterly Project Delivery Team (PDT) meetings with stakeholders, including the Partner Agencies (NJDEP, the National Oceanic and Atmospheric Administration [NOAA], the U.S. Fish and Wildlife Service [FWS] and USACE), municipalities, PRPs, and other interested parties and members of the public. At the PDT meetings, EPA reported progress on various aspects of the LPRSA investigation and cleanup work that was underway, including the focused study of the lower 8.3 miles of the river.

In 2009, EPA facilitated the formation of a Community Advisory Group (CAG), composed of stakeholders with a broad range of interests. Between 2009 and 2011, both PDT and CAG meetings occurred. In 2011, PDT meetings were phased out, replaced by CAG meetings. Representatives of EPA, NJDEP, and the other partner agencies routinely attend CAG meetings, which are open to the public and generally held every other month. Any stakeholder may be invited by the CAG to share Diamond Alkali Superfund Site/Passaic River-related information with the community. In 2014, at the CAG's request, EPA provided the CAG with a Technical Assistance Services for Communities (TASC) contractor to respond to the CAG's technical questions related to the lower 8.3-mile RI/FFS.

In 2004, EPA awarded a Technical Assistance Grant (TAG) to the Passaic River Coalition (PRC) to assist the community in the interpretation of technical documents generated by the study of the LPRSA. The PRC was the TAG recipient until 2013. In 2013, the New York/New Jersey Baykeeper applied for and was awarded the TAG and continues to be the TAG recipient. The TAG advisor also provides technical assistance to the CAG.

The LPR runs through several cities and towns—Passaic, Belleville, North Arlington, Lyndhurst, Rutherford, Clifton, Garfield, Nutley, Wallington, East Rutherford, Kearny, Harrison, East Newark, and Newark—all with different demographics and income levels represented. Among these are portions of Newark, including the "Ironbound" community, which is generally considered to be a community with environmental justice (EJ) concerns and is located near the site of the former Diamond Alkali facility. Overall, this community has experienced various negative environmental consequences from multiple industrial and commercial operations, giving rise to EJ concerns. According to an EJ Screen analysis of the local communities along the upper 9 miles of the Lower Passaic River, 35 percent of the population is considered low income as compared to 24 percent of the population in the State of New Jersey.

EPA's early outreach efforts included alerting the public about New Jersey's prohibitions and advisories on fish and crab consumption for the tidal Passaic River and Newark Bay. Exposure to even low levels of contaminants through fish and crab consumption may have long-lasting health effects on people. The New Jersey prohibitions on fish and crab consumption are based on levels of mercury, PCBs, and dioxins/furans in fish and crab. These contaminants can be especially harmful to women of childbearing age, pregnant women, and nursing mothers. Children are also at risk of developmental and neurological problems if exposed to these chemicals. The NJDEP and New Jersey Department of Health have issued consumption advisories (available on the agencies' websites) to guide anglers and other members of the public if fish and crab are harvested from within New Jersey State waters.

In early 2018, EPA approached the CAG about the concept of an IR in the upper 9 miles of the LPRSA. At the February 8, 2018 CAG meeting, EPA presented the results of the LPRSA RI, the conceptual site model (CSM), and the general idea of an IR. At that time, the CAG was invited to submit comments and/or present at a meeting with EPA's Contaminated Sediments Technical Advisory Group (CSTAG) where EPA was presenting the IR concept to CSTAG. CSTAG is a technical advisory group that monitors the progress of and provides advice regarding large, complex, or controversial sediment sites being addressed by the Superfund program. In a February 21, 2018 letter to CSTAG, the CAG expressed support for an IR as long as it would not "undermine the long-term achievement of cleanup levels that are necessary to protect human health and the environment". In subsequent CAG meetings, EPA presented several topics related to the IR, including the concept of surface weighted average concentration (SWAC), which is a weighted average of sample data intended to estimate a mean contaminant concentration over a specified spatial area, as well as the anticipated range of remedial alternatives and remedial action objectives (RAOs).

In its early years, the CAG's primary focus was on the lower 8.3 miles of the LPRSA, and the members were primarily from the Newark area. In 2019, EPA reached out to communities along the upper 9 miles, which include Clifton, Garfield, Passaic, Wallington, Rutherford, East Rutherford, Nutley, Lyndhurst, North Arlington, and Belleville. On April 23, 2019, EPA held a meeting with public officials from these municipalities, as well as state and county officials, to discuss the IR approach. EPA also held public availability sessions in Clifton on July 25, 2019 and in East Rutherford on October 21, 2019. Following these meetings and information sessions, EPA received letters of support for the concept of an IR from Belleville, Clifton, Garfield, Lyndhurst, Nutley, and Rutherford.

The work at the Diamond Alkali Superfund Site has been extensively reviewed by EPA's CSTAG. While developing the IR for the upper 9 miles, EPA Region 2 consulted with the CSTAG, which also provided an opportunity for community participation. For the February 2018 CSTAG meeting where Region 2 presented the concept of an IR, stakeholder groups associated with the Site were invited to present (to the CSTAG) their views of how the Region had applied EPA's sediment management principles (Office of Solid Waste and Emergency Response [OSWER] Directive 9285.6-08) to this project. Presentations were made to the CSTAG by the CAG and CPG only. However, written comments were submitted by the CPG, NJDEP, and the CAG, as well as a joint comment from NOAA and FWS.

A second CSTAG meeting was held in November 2019, which included members of the EPA's National Remedy Review Board (NRRB) where once again an opportunity for community participation was provided. The November 2019 CSTAG/NRRB meeting was held to discuss the development of the IR FS. At this meeting, written submittals and presentations were made by CPG, NJDEP, and the CAG. At the conclusion of each meeting, the CSTAG submitted a letter of recommendations and the Region responded to each letter. The CSTAG recommendations and the Region's responses to the recommendations can be found in the Administrative Record (Administrative Record Index in Appendix 3).

The RI for the 17-mile LPRSA and the IR FS Report for the upper 9 miles of the LPRSA, and EPA's IR Proposed Plan for the upper 9-mile portion of the Site were released to the public for comment on April 14, 2021 via the website www.ourPassaic.org. A virtual public meeting to present the findings of the investigations of the upper 9 miles of the LPRSA, the IR alternatives considered, and the preferred alternative, and to receive public comments, was held on April 27, 2021. Closed captioning and a Spanish-speaking translator were made available for this virtual meeting. A transcript of the meeting is included as Attachment C of Appendix 5, the Responsiveness Summary. These documents were also made available to the public in the Administrative Record file maintained at the Newark Public Library, (5 Washington Street, Newark, New Jersey), the Elizabeth Public Library, (11 South Broad Street, Elizabeth, New Jersey), and in EPA Region 2 Records Center at 290 Broadway, New York City. A notice of availability of the Administrative Record was published in the Bergen Record and El Diario on April 14, 2021. EPA also developed fact sheets summarizing the IR Proposed Plan (translated into Spanish) to support its outreach to those communities. In addition, select documents from the Administrative Record were made accessible online at http://www.ourPassaic.org and http://www.epa.gov/superfund/diamond-alkali.

A public comment period for the IR Proposed Plan and supporting documents was originally scheduled from April 15, 2021 through May 14, 2021. EPA received a request to extend the public comment period to allow additional time for consideration of and comment on the Proposed Plan. In response to this request, EPA extended the public comment period to June 14, 2021, at which time the comment period closed. EPA accepted comments via mail and email, in addition to verbally at the April 27, 2021 public meeting. Responses to comments received by EPA at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (Appendix 5).

4. SCOPE AND ROLE OF OPERABLE UNIT

As discussed in EPA's December 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, EPA is employing three strategies to address the risks posed by the contamination at the Site (1) phased approach, (2) early actions, and (3) adaptive management.

4.1 Phased Approach and Early Actions

At complex sites, EPA often divides cleanup activities into different areas or OUs so that cleanup of environmental media or areas that have been characterized can occur while the nature and extent of contamination at the remainder of the site is still being investigated. Such a phased approach provides for site contamination to be addressed in a more expeditious manner, generally prioritizing response actions to accelerate risk reduction and to provide additional technical site information on which to base long-term risk management decisions. This includes implementing removal actions to address imminent threats to human health while also pursuing a long-term cleanup strategy.

The Diamond Alkali Superfund Site, which includes the LPR, has been divided by EPA into four OUs (Figure 4-1 in Attachment 1):

> **Operable Unit 1 (OU1)** includes the 80-120 Lister Avenue facility and is addressed by the 1987 ROD. This is an interim containment remedy, which consists of capping, a

subsurface slurry wall and flood wall, and a groundwater collection and treatment system, completed in 2001. The interim containment remedy prevents exposure to contaminated soil (including soil that originated at the facility and that was brought back to the facility from neighboring lots) and prevents further releases to the river and groundwater. OCC performs O&M of the OU1 remedy and continues to monitor the performance of the remedy to ensure the protectiveness of the actions taken to date. Based upon facility monitoring data, this OU is no longer an ongoing source of contamination to the Passaic River. Pursuant to CERCLA's requirements for remedy review, EPA has been evaluating the protectiveness of this interim containment remedy at least every five years since it was complete. Beginning in 2015, EPA evaluated the performance of the interim containment remedy and the availability of technologies that may be appropriate to address the on-site contamination over the long term. A final remedy for OU1 will be selected in the future. A five-year review was completed in December 2020, which determined that the interim containment remedy is functioning as designed and remains protective of public health and the environment.

Operable Unit 2 (OU2) includes the lower 8.3 miles of the LPRSA. In March 2016, EPA issued a ROD for an estimated $1.38-billion cleanup plan to address the lower 8.3 miles. The plan includes installing an engineered cap bank-to-bank to isolate the contaminated sediments. Before installing the cap, sediments will be dredged so that the cap does not increase the potential for flooding and to allow for the continued commercial use of the federally authorized navigation channel. The contaminated sediments will be transported off-site to permitted disposal facilities. OU2 is currently in the remedial design phase of the project, which includes assessing specifically how the ROD will be implemented.

Operable Unit 3 (OU3) includes the Newark Bay Study Area, which is currently in the RI/FS phase. The risk assessments and data collection portion of the RI are complete.

Operable Unit 4 (OU4) includes the 17-mile LPRSA. The RI sampling was conducted for the full 17 miles from 2008 to 2013. The BHHRA was approved in July 2017 and the BERA was approved in June 2019. The final RI Report was submitted by the CPG in July 2019 and has been conditionally approved by EPA pending approval of the calibrated bioaccumulation model. The bioaccumulation model, which will be an appendix to the RI, is still under development. In July 2017, the CPG proposed moving away from the original schedule for a final OU4 ROD, and instead evaluating alternatives for an IR for source control for the upper 9 miles of the LPRSA. The IR will incorporate an adaptive management strategy into the Site cleanup that will inform the final remedy for the LPRSA. In October 2018, EPA Region 2 directed the CPG to prepare an IR FS evaluating an IR approach for source control. The IR FS was conditionally approved in December 2020, and the Proposed Plan was released in April 2021.

In addition to these implemented and planned remedial activities, the Diamond Alkali Superfund Site is being addressed by a series of other early response actions (called "removal actions" under CERCLA) that address highly contaminated areas of the river, namely, the Tierra Removal and the RM 10.9 Removal discussed previously in Section 2.1.

4.2 Basis for an Interim Remedy for the Upper 9 Miles

In selecting a final remedy for the sediments of the lower 8.3 miles of the LPRSA in 2016, EPA determined that it would be consistent with any remedy selected for the remainder of the Diamond Alkali Superfund Site, including the upper 9 miles of the LPRSA and Newark Bay Study Area. Based on the RI data, the highest concentrations of COCs tend to be found in areas that are predominantly composed of fine-grained sediments, which, for the LPRSA, are principally in the lower 8.3 miles. Approximately 90 percent (by volume) of the fine-grained sediments in the LPR are located in the lower 8.3 miles. These findings, coupled with the tidal nature of the water body, led EPA to conclude any remedy for the 17-mile LPRSA should begin with the lower 8.3 miles and include bank-to-bank remediation in the lower 8.3 miles.

During and following the remedy selection process for the lower 8.3 miles, EPA continued to evaluate the 17-mile RI data, including assessing the 9 miles from RM 8.3 to Dundee Dam. The data indicated that, in the upper 9 miles, fine-grained sediments are not present bank-to-bank but are interspersed with areas of coarse-grained, less-contaminated sediments. When approached with the concept of an IR for the upper 9 miles, EPA determined that an IR would be beneficial to expedite the overall process of remediating the LPRSA. An IR for the upper 9 miles that includes the cleanup of areas with elevated concentrations of contaminants will result in significantly reduced contaminant SWACs. EPA expects that this will result in expedited recovery of the river. If work on the upper 9 miles takes place at the same time as the cleanup of the lower 8.3 miles, as is anticipated, the infrastructure constructed for the lower 8.3 miles (such as a dewatering facility or storage areas) may be used for the upper 9 miles IR, and the disruption to the river ecology and the many communities along the river would be minimized. An IR for the upper 9 miles does not alter the previously selected cleanup for the lower 8.3 miles of the river.

4.3 Adaptive Management

Given the complexity and uncertainty involved with remediating sediment sites, especially at such a large scale, EPA supports the use of an adaptive management approach to address these sites. As discussed in the EPA guidance *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (December 2005): "Project managers are encouraged to use an adaptive management approach, especially at complex sediment sites to provide additional certainty of information to support decisions. In general, this means testing of hypotheses and conclusions and reevaluating site assumptions as new information is gathered. This is an important component of updating the CSM. For example, an adaptive management approach might include gathering and evaluating multiple data sets or pilot testing to determine the effectiveness of various remedial technologies at a site. The extent to which adaptation is cost-effective is, of course, a site-specific decision." EPA's phased approach has allowed the CSM to be updated and adjusted during the investigation of the LPRSA.

The remedial action for the upper 9 miles will be adaptively managed under a multistep process of remediation (the IR), assessment and monitoring, and additional remediation, if needed. The first step will be the design and implementation of the source control IR for the upper 9 miles. The IR will be followed by a period of response and recovery assessment monitoring to evaluate the response of the LPRSA system to the IR and to track the longer-term recovery of sediments, the water column, and biota, so that EPA can evaluate whether and when the conditions that give rise to unacceptable risk to human health and the environment have been addressed. Based on the evaluation of post-IR confirmation sampling, EPA will assess the need for any further action under the IR to fulfill the intent of the IR (i.e., source removal). In addition, risk-based preliminary remediation goals (PRGs) will be developed for COCs during/in parallel with the IR design and will be used by EPA to assess progress towards the PRGs as part of evaluating longer-term system recovery following the IR. Based on the evaluation of longer-term post-IR monitoring data, EPA will assess the need for additional action(s) to achieve final cleanup. EPA will evaluate remedial alternatives in a proposed plan and will issue a final ROD that includes final risk-based remediation goals (RGs) and specifies any additional actions beyond the IR, if any, that are needed to attain the RGs and address remaining unacceptable risks associated with the LPRSA, in both sediments and surface water. An Adaptive Management Implementation Approach was prepared during the IR FS and is included as Appendix D of the IR FS. EPA expects the Adaptive Management Implementation Approach to be revised and expanded into a more comprehensive adaptive management plan as project planning, design, and implementation progress.

5. SUMMARY OF SITE CHARACTERISTICS

5.1 Summary of Sampling Results and Other Investigations

The 17-mile RI and upper 9-mile IR FS Reports evaluated contamination in the LPRSA and Newark Bay using data from field investigations that were conducted from the 1990s through 2013 by federal and state agencies, PRPs (such as the CPG and OCC) under EPA oversight, and academic institutions. The investigations that support this ROD include bathymetric, geophysical, and geotechnical surveys; river flow and sediment transport studies; sediment erosion studies; sediment sampling for contaminants; water quality studies; fish and crab tissue sampling; habitat surveys; a dredging pilot study; and sampling at CSOs and SWOs. In addition to other information collected prior to 2005, the 17-mile RI and upper 9-mile IR FS incorporated the following data from 2005 and after:

- 2005 sediment bed erosion tests (Sedflume and Gust Microcosm)
- 2005–2007 high-resolution sediment coring program
- 2005 small-volume water column sampling program
- 2006 low-resolution sediment coring program

- 2007–2008 beryllium-7-bearing sediment collection program
- 2007 through 2012 single- and multi-beam bathymetric surveys
- 2008 tributary, CSO, and SWO sampling program
- 2008 low-resolution sediment coring program
- 2009–2010 benthic and surface sediment sampling program
- 2009–2010 physical water column monitoring program
- 2009–2010 fish community and tissue collection surveys
- 2010 high-flow water column suspended solids sampling
- 2010 habitat identification survey
- 2010 summer/fall avian community survey
- 2011–2013 small-volume chemical water column monitoring program
- 2011–2013 high-volume chemical water column monitoring program
- 2011 caged bivalve study
- 2011–2012 RM 10.9 characterization sampling
- 2012 background benthic sediment sampling
- 2012 background fish tissue survey
- 2012 low-resolution supplemental sediment sampling program
- 2013 low-resolution supplemental sediment sampling program 2

More detail related to individual investigation events can be found in the RI Report and other documents in the Administrative Record file (Administrative Record Index in Attachment 3).

In addition, a current conditions monitoring program (CCMP) was performed for the upper 9 miles of the LPRSA, pursuant to the 17-mile RI/FS AOC. The CCMP, which began in 2019, included bathymetric surveying and surface water and biota sampling that will also be relevant to the IR. Also, prior to the IR design, an extensive pre-design investigation (PDI) will be implemented during which a spatially extensive sediment sampling program will be performed to refine understanding of pre-IR contaminant distribution, inform the design including the final IR footprint, and provide baseline data for comparison to post-IR data.

5.2 Contaminants in the Upper 9 Miles

The IR targets two contaminants in the upper 9 miles of the LPRSA—2,3,7,8-TCDD and total PCBs. These two contaminants contribute significantly to the risk in the upper 9 miles. The objective of the IR is not risk-based, but the source control IR is expected to significantly reduce the risk associated with the targeted contaminants. The other COCs in the upper 9 miles, as identified by the risk assessments performed for the LPRSA, are total DDx,[3] other dioxins/furans, dieldrin, copper, lead, mercury (including methyl mercury), and PAHs.

[3] DDT is a common name that refers to an industrially produced, chlorinated pesticide, dichlorodiphenyltrichloroethane. DDT breaks down in the environment to form dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE). The term total DDx used in this document refers to the sum of DDT, DDD, and DDE (2,4' and 4,4' isomers) concentrations.

Contaminants other than 2,3,7,8-TCDD and total PCBs will be addressed during the IR to the extent they are collocated with areas targeted for remediation based on concentrations of 2,3,7,8-TCDD and total PCBs, or will be addressed in the final remedy, as needed. Detailed concentrations in surface sediments and at depth for 2,3,7,8-TCDD and total PCBs are shown in Tables 5-1 and 5-2, respectively, in Appendix 2. The COCs that are the focus of the IR are described below.

2,3,7,8-TCDD. Dioxins and furans are by-products of chemical manufacturing, combustion (either in natural or industrial settings), metal processing, and paper manufacturing. The dioxin congener[4] 2,3,7,8-TCDD is the most toxic form of dioxin. The 2,3,7,8-TCDD and other dioxin congeners were by-products of manufacturing processes at the former Diamond Alkali facility and elsewhere. The herbicides manufactured at the former Diamond Alkali facility included "Agent Orange," a defoliant manufactured for military purposes and shipped in drums with an orange stripe. Dioxins/furans persist in the environment for a long time and bioaccumulate in fish and crab. Dioxins/furans are classified as a probable human carcinogen. Toxic effects in humans include reproductive problems, problems in fetal development or early childhood, immune system damage, and cancer. In birds and mammals, effects include developmental and reproductive problems, hemorrhaging, and immune system problems.

PCBs. PCBs are man-made chemicals that were banned in the late 1970s. PCBs refers to a group of 209 congeners. Some of the congeners are referred to as dioxin-like PCBs because they have chemical structures, physicochemical properties, and toxic responses similar to 2,3,7,8-TCDD. Some commercial PCB mixtures are known in the United States by an industrial trade name, Aroclor. Because they do not burn easily and are good insulating materials, PCBs were used widely as coolants and oils, and in the manufacture of paints, caulking, and building materials. PCBs persist in the environment for a long time and bioaccumulate in fish and crab. PCBs are classified as probable human carcinogens. Children exposed to PCBs may develop learning and behavioral problems later in life. PCBs are known to impact the immune system and may cause cancer in people who have been exposed to them for a long time. In birds and mammals, PCBs can cause adverse effects such as anemia and injuries to the liver, stomach, and thyroid gland. PCBs can also cause immune system problems in animals, as well as behavioral alterations and impaired reproduction.

5.3 Sediment Conceptual Site Model

The LPR and Newark Bay are part of the New York/New Jersey Harbor Estuary. The LPR refers to the approximate 17-mile tidal portion of the river (i.e., RM 0 at Newark Bay to Dundee Dam) and its watershed, which includes the major tributaries of Saddle River, Third

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[4] The "dioxins and furans" referred to in this ROD describe 75 individual polychlorinated dibenzo-*p*-dioxins and 135 polychlorinated dibenzofurans that are considered related compounds, or "congeners." TCDD refers to a group of dioxin congeners with four chlorine atoms, and 2,3,7,8-TCDD is a congener with a specific arrangement of those chlorine atoms in its molecular structure.

River, and Second River (Figure 1-1 in Appendix 1). Dundee Dam isolates the UPR from the tidal mixing that influences the LPR.

The 17-mile LPR exhibits characteristics typical of a highly urbanized estuarine system. Its large urban watershed includes many industrial facilities that have been sources of dioxins, PAHs, PCBs, pesticides, and metals.

The lower 8.3 miles of the LPR comprise approximately 716 acres, while the upper 9 miles comprise approximately 344 acres. Fine-grained sediments in the LPR generally have higher contaminant concentrations than coarser materials. Fine-grained sediments comprise the majority of the LPR surface sediments below RM 8.3, while fine-grained sediments are generally more interspersed with coarser sediments in the upper 9 miles. Between RM 15 and Dundee Dam, the river bottom is generally composed of coarse sediments. Mudflats are present throughout the entire LPR and are typically composed of fine-grained sediments.

The LPR's cross-sectional area declines steadily, moving upstream from RM 0 to Dundee Dam, with a pronounced constriction at RM 8.3 (Figure 5-1 in Appendix 1). At that location, there is also a pronounced change in sediment texture within the riverbed. As previously stated, the riverbed from RM 0 to RM 8.3 is dominated by fine-grained sediments, while coarser sediments (sand and gravel) with smaller areas or pockets of fine-grained sediments generally comprise the riverbed above RM 8.3 (Figure 5-2 in Appendix 1). About 85 percent of the fine-grained sediment surface area (90 percent by volume) of the LPR is located below RM 8.3. As discussed in the lower 8.3-mile ROD, wider and thicker beds of contaminated sediments accumulated below RM 8.3 rather than above it owing to a combination of a wider cross section and a deeper historical navigation channel. Figures 5-3 and 5-4 in Appendix 1 show the concentrations of 2,3,7,8-TCDD and total PCBs as a function of grain size and relative position in the LPRSA, demonstrating both the differences in grain size between the lower 8.3 miles and upper 9 miles and the general occurrence of higher levels of contamination in association with finer-grained sediments.

Hydrodynamics of the LPR is governed by the freshwater discharge, tides (approximate 5-foot diurnal tidal range at the mouth of the Passaic River), estuarine circulation, and changes in mean water level caused by storm surges in the Atlantic Ocean. From Dundee Dam to approximately RM 14, the LPR behaves like a freshwater river influenced by tides. Between approximately RM 14 and approximately RM 8.3, the LPR behaves more like a fluvial estuary with a mix of freshwater and brackish waters. Downstream of approximately RM 8.3, the LPR behaves like an upper estuary with a mixture of fresh water and saltwater and a strong influence of estuarine circulation where denser saline waters (the leading edge of which is the "salt front") tend to flow in the upstream direction (on net) beneath fresher water flowing in the seaward direction, producing a two-layer flow pattern. This net upstream flow helps provide a mechanism for water and solids originating from the lower portions of the LPR to move upstream.

The interface between the fresh and saline waters (the salt front) typically resides within the lower 10 miles of the LPR and moves several miles during each tidal cycle. The exact location depends on freshwater inflows, tides, and the definition of the salt front. The LPRSA studies (OU2 and OU4) have used two definitions for salt front, either 0.5 or 2 practical salinity units (psu). As noted in the lower 8.3-mile ROD, during low-flow conditions, the salt front, when defined as 2 psu, and the region of maximum turbidity known as the estuarine turbidity maximum (ETM), can reach as far upstream as approximately RM 12. The salt front, when defined as 0.5 psu consistent with the technical definition used by the U.S. Geological Survey and the definition used by the Delaware River Basin Commission, can extend upstream beyond RM 14 under extreme low-flow conditions such as extreme droughts. The salt front can move into Newark Bay under high-flow conditions.

The extent of upstream transport in the system extends beyond the salt front. Measurements collected at the most upstream physical water column monitoring station (RM 13.8) show semidiurnal depth-averaged current velocities in the upstream direction for most periods when the flow is less than 1,350 cubic feet per second (cfs). During the period of the LPR's maximum depth, when the historical navigation channel was maintained up to RM 15.4, the extent of upstream transport and the salt front location would likely have been shifted further upstream relative to current conditions.

Freshwater inflow and sediment import from Newark Bay due to estuarine circulation are the two major sources of solids to the LPR. There are four major freshwater discharge points to the LPR—the UPR at Dundee Dam (RM 17.7), Saddle River at RM 15.6, Third River at RM 11.3, and Second River at RM 8.4. Besides these major tributaries to the LPR, there are numerous smaller tributaries, SWOs, and CSOs that contribute freshwater flow to the LPR. Water from the UPR at Dundee Dam represents the majority of the freshwater flow entering the LPR. Inflows to the LPR are usually highest in March and lowest between July and October.

The LPR shows typical geomorphological features of a meandering river but has been influenced by navigational dredging and subsequent infilling after maintenance of the navigational channel stopped. The authorized navigational channel was constructed by the USACE from RM 0 to RM 15.4 and was maintained by the USACE until the 1950s in most of the lower 8.3 miles, although portions upstream of RM 8.3 were dredged between 1973 and 1976. The reach below RM 1.9 was last dredged in 1983. As noted in Section 2, in 2018, the federal navigation channel above RM 1.7 was deauthorized by an act of Congress.

The inside bends of the river generally accumulate finer sediments, while the outside bends generally experience little or no sediment accumulation and (in some cases) experience erosion due to higher sheer stresses. The LPR widens and deepens moving downstream towards Newark Bay and finer sediments become more common in the lower reaches, particularly downstream of RM 8.3. In the vicinity of structures such as bridge abutments and at tributary confluences, sediments tend to be coarse or absent owing to associated turbulence that prevents long-term accumulation of fine sediments (or any sediments).

The salt front typically coincides with the region of maximum turbidity known as the ETM. The ETM results from a combination of resuspension of bottom sediments by tidal current stresses and the convergence of bottom water transport around the upstream limit of estuarine circulation (at the salt front). Estuarine circulation is integral to the CSM as it increases sediment retention in the LPR and provides a mechanism for contaminant transport in the upstream direction within (and beyond) the salt wedge and in the downstream direction in fresher surface-layer waters.

Suspended sediment concentrations (SSCs) are also affected by fluctuations in flow velocities within tidal cycles and between tidal cycles. SSCs generally increase as velocity increases during both flood and ebb tides and generally decrease as sediments are deposited during slack water. The geometry and density gradients in the LPR (under normal flow conditions) result in higher resuspension rates and SSCs during flood tides compared to ebb tides (referred to as tidal asymmetry). The easily erodible fine-grained sediments that make up SSCs during tidal cycles is termed a “fluff layer” and consists of unconsolidated sediments that overlie a less erodible sediment bed. SSCs also vary between tidal cycles depending on the spring-neap tidal cycle and freshwater flow over Dundee Dam.

The estuarine circulation, tidal asymmetry, and freshwater flow affect sediment transport over time scales longer than tidal cycles. During low river flow conditions (low energy, generally at or below 750 cfs), tidal asymmetry and estuarine circulation are dominant, leading to import of sediments from Newark Bay, net upstream transport associated with the salt wedge, and trapping of sediments within the LPR. In moderate river flow conditions (moderate energy, generally between 750 and 5,000 cfs), sediment transport is more impacted by river-induced advection, and sediments accumulated in the ETM and in unconsolidated surface sediments are generally flushed downstream and into Newark Bay. During high river flow conditions (high energy, generally at or above 5,000 cfs), the riverbed may experience scour and the system as a whole exports sediments and erodes beyond the easily erodible unconsolidated surface sediments.

Multiple bathymetric surveys have been conducted in the LPR since 2004, including following high-flow events such as Hurricane Irene in August 2011, allowing for a conceptual understanding of how the LPR sediment bed changes with various flow events. Flow over Dundee Dam reached 24,700 cfs following Hurricane Irene. As a point of comparison, the annual average flow at Dundee Dam is approximately 1,200 cfs. The 2004 survey used a single-beam echosounder, which allowed the survey transects to extend into the shallow areas along the shoreline and up to Dundee Dam. Beginning in 2007, more detailed data were obtained with multibeam echosounders in the reach downstream of approximately RM 14.3; limited single-beam surveying was also performed for shallow areas. The water-depth constraint on the use of the multibeam echosounders allows for a detailed characterization of approximately 75 percent of the 224 acres between RM 8.3 and RM 14.3, with the remaining 120 acres upstream of RM 14.3 characterized by only the 2004 single-beam survey data.

Bathymetry data indicate that erosion occurs most frequently on the scale of 6 inches or less, which is within the level of uncertainty in survey differences. However, bathymetry data do show that erosion of 6 inches to 1 foot does occur over limited areas, and in very limited cases, erosion of more than 1 foot (and rarely exceeding 1.5 feet) has been observed. The higher energy events that cause more significant erosion tend to naturally armor the sediment bed against further erosion beyond that depth by removing fine-grained sediments and leaving behind a coarser, and more erosion resistant, fraction.

Contaminant concentrations in the LPR are largely driven by variations in sediment type and depositional/erosional history. The two contaminants found in fine-grained sediments throughout the LPRSA that have been shown to contribute significantly to unacceptable risk based on risk assessments and that are the focus of the sediment source control IR are 2,3,7,8-TCDD and total PCBs. Other COCs found in the LPRSA—not contributing to human health and/or ecological risk to the same degree as 2,3,7,8-TCDD and total PCBs—include total DDx, other dioxins/furans, dieldrin, PAHs, and metals (including mercury). Contaminants are generally found in greatest concentrations in fine-grained sediments. For example, the RM 10.9 mudflat was found to contain surface sediment 2,3,7,8-TCDD levels exceeding 50,000 parts per trillion (ppt) and total PCB levels exceeding 33.9 parts per million (ppm) in some instances, prior to the RM 10.9 Removal. Variations in spatial patterns for PCBs, total DDx, and mercury suggest these contaminants may also be impacted by other sources, including from the UPR, Newark Bay, tributaries, and/or watershed sources.

Contrary to the distribution of the COCs, comparable amounts of both high-molecular weight (HMW) PAHs and low-molecular weight (LMW) PAHs are found in fine-grained and coarse-grained sediments. Sources of PAHs upstream of Dundee Dam may be contributing to concentrations of PAHs observed in the LPR. Downstream sources may also explain why PAH concentrations do not decline as much as 2,3,7,8-TCDD concentrations moving from the LPR into Newark Bay.

Continuing contaminant sources to recently deposited sediments of the LPR are the internal sediment inventory (e.g., resuspended contaminated sediments within the LPR), tidal exchange with Newark Bay, flows from above Dundee Dam, CSOs and SWOs, overland flow, groundwater, and various other point and non-point sources. The contaminated fine-grained sediments already within the LPR are the most significant continuing contaminant source and will be addressed to a large degree by the bank-to-bank capping of RM 0 to RM 8.3 pursuant to the lower 8.3-mile ROD. In comparison, UPR and Newark Bay contributions of contaminants are relatively small, and all other sources are minor. The IR focusing on source control (the subject of this ROD) targets sediments with elevated contaminant concentrations in the upper 9 miles of the LPRSA.

Dundee Lake and other UPR sediments are isolated from hydrodynamic impacts and sediment transport from the LPR by Dundee Dam. The concentrations of the contaminants detected in recently deposited sediments collected from the UPR immediately above Dundee Dam are representative of current background conditions for the LPR.

EPA investigated potential sources of contaminants to the LPR, including atmospheric deposition, groundwater, industrial point sources, the UPR, Newark Bay, major tributaries, CSOs, and SWOs. Based on analyses discussed in the lower 8.3-mile RI and FFS Reports, direct atmospheric deposition, groundwater discharge, and industrial point sources of contaminants are not significant contributors of contaminant mass in the recently deposited sediments or water column of the LPR. The UPR, Newark Bay, the three main tributaries, and CSOs and SWOs were sampled between 2005 and 2011. A mass balance of suspended sediments and contaminant loads was performed with the data as part of the analysis supporting the lower 8.3-mile ROD. The results indicate that the tributaries, CSOs, and SWOs are minor contributors of contamination to recently deposited sediments, since they are minor contributors of sediment particles compared to the UPR and Newark Bay, and the mass of contaminants delivered by those particles is low compared to the sediments of the LPR main stem. For 2,3,7,8-TCDD and total PCBs, concentrations on sediment particles from the tributaries, CSOs, and SWOs are clearly lower than those on LPR surface sediments.

As presented in the lower 8.3-mile ROD (Table 3 from the lower 8.3-mile ROD), resuspension of LPR sediments contributes over 90 percent of the 2,3,7,8-TCDD in recently deposited sediments of the LPR, followed by Newark Bay (approximately 5 percent) and the UPR (3 percent or less). Resuspension of LPR sediments contributes approximately 80 percent of the PCBs in recently deposited sediments, followed by the UPR (approximately 10 percent) and Newark Bay (less than 10 percent).

A detailed discussion of the LPRSA CSM is presented in the RI Report, and other documents in the OU4 Administrative Record, as well as the lower 8.3-mile ROD.

5.4 Sediments

Surface sediment 2,3,7,8-TCDD concentrations greater than 500 ppt have rarely been observed upstream of RM 12 and are confined mainly to fine-grained sediment regions that have been influenced by upstream transport from the LPR. The influence of upstream transport can extend beyond RM 14. Outside the fine-grained sediment deposits, 2,3,7,8-TCDD concentrations above RM 12 are mostly less than 100 ppt and concentrations above RM 14.6 are less than 1 ppt, reflecting the low concentrations at the upstream boundary at Dundee Dam and the coarse-grained nature of the sediments.

Moving downstream, fine-grained sediments and 2,3,7,8-TCDD concentrations greater than 500 ppt become more prevalent. Point bars (accumulations of sediments on the inner bend of a river), such as those that formed at RM 10.1 and RM 7.3, generally have higher 2,3,7,8-TCDD concentrations in the central area of the point bar and lower concentrations in nearshore and offshore portions. Sharp transitions to lower concentrations are typically observed moving across the point bar toward the edge of the deeper river channel. The RM 10.9 area is also characterized overall as a point bar deposit, which includes the mudflat area addressed through the RM 10.9 Removal. In the RM 10.9 point bar, concentrations greater than 1,000 ppt were observed where 1960s-era sediments existed at the surface. The channel in the vicinity of the RM 10.9 point bar is characterized by concentrations generally in the range of 10 to 100 ppt, consistent with the coarse-grained nature of the sediments. Concentrations are typically less than 500 ppt in the southerly portion of the RM 10.9 point bar, which is consistent with ongoing evolution characteristic of the downstream portion of a point bar. Similar patterns are also observed 0.5 to 1.5 feet below the surface.

The concentration patterns for total PCBs, total DDx, and mercury tend to mirror those of 2,3,7,8-TCDD in the region downstream of RM 14. As noted previously, patterns of HMW PAHs and LMW PAHs vary from those of the other contaminants, with no clear difference between concentrations in fine-grained and coarse-grained sediments. Upstream of RM 14, none of these contaminants show the dramatically lower concentrations evident for 2,3,7,8-TCDD because of the greater influence of sources from above Dundee Dam. Differences between concentration patterns of 2,3,7,8-TCDD and other COCs also exist near the mouth of the river owing to influences from sources in Newark Bay and beyond.

5.5 Biota

Biota tissue collected from the lower 8.3 miles of the LPR is addressed in the lower 8.3 ROD. This section concentrates on biota collection performed for the upper 9 miles of the LPRSA.

Biota tissue, including fish and crabs that are potentially consumed by humans and some wildlife receptors (e.g., blue crab, common carp, American eel, catfish, largemouth bass, and white perch), and forage-sized fish that are only consumed by wildlife receptors (various species of small sunfish) were collected and analyzed for COCs. The COC concentrations in biota tissue collected in 2009/2010 for the RI were used to determine risks from human consumption, and to determine whether the tissue COC concentrations could pose risk to the biota themselves (through comparisons to critical body residue thresholds), or to piscivorous wildlife receptors (birds, mammals, and/or fish).

While there is variability in contaminant levels in biota tissue, spatially (as well as within and between species), a general trend was observed based on the benthic invertebrate and fish tissue data collected from the LPR. Organic contaminants, including 2,3,7,8-TCDD, other dioxins/furans, total PCBs, total DDx, and dieldrin, are generally highest in large benthic omnivorous fish, with the highest concentrations found in carp. The close association of carp and other large benthic omnivorous fish with surface sediments influences their accumulation of organic contaminants. Organic contaminants accumulate in crabs, including 2,3,7,8-TCDD, other dioxins/furans, total PCBs, methyl mercury, and total DDx. Inorganic contaminants, including arsenic, cadmium, mercury, and selenium, also accumulate in crabs. Mercury concentrations in LPR fish tissue generally increase with increasing trophic level and are similar to those measured in fish collected above Dundee Dam.

6. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The New Jersey Surface Water Quality Standards (N.J.A.C. 7:9B) classify the LPR from its mouth to the Second River (RM 0 to RM 8.4) as saline-estuarine 3 (SE3), with designated uses that include secondary contact recreation (activities where the probability of water ingestion is minimal, including boating and fishing). The LPR from Second River to Dundee Dam (RM 8.4 to RM 17.7) is classified as freshwater 2 non-trout (FW2-NT) and saline-estuarine 2 (SE2). Designated uses for FW2-NT and SE2 include secondary contact recreation. Designated uses for FW2-NT also include primary contact recreation (activities that involve a significant ingestion potential, including wading, swimming, diving, and water skiing).

The federal Clean Water Act (CWA), as revised in 1972, set a national goal to restore and maintain the chemical, physical, and biological integrity of the nation's waters, with interim goals that all waters be fishable and swimmable where possible. Currently, the LPR is not fishable and swimmable owing to chemical contamination and other factors. New Jersey prohibits the consumption, and sale for consumption, of fish and crab from the entire LPR (RM 0 to RM 17.4) due to contamination by PCBs, 2,3,7,8-TCDD and mercury. Eating, selling, or taking (harvesting) blue crab from the Newark Bay Complex and tidal Passaic River is prohibited (N.J.A.C. 7:25-14.11). CERCLA does not supplant the CWA, which addresses pollutants in the water column through various mechanisms such as permitting programs and water quality monitoring. This ROD, issued under CERCLA to address contaminated sediments in the upper 9 miles of the LPR, will support the CWA goals by addressing a source of contamination to the water column.

As discussed in Section 2, a federally authorized navigation channel historically existed from RM 0 to RM 15.4 of the LPR. In 2018, Congress deauthorized the federal navigation channel above RM 1.7, and reauthorized it to a depth of 20 feet from RM 0.6 to RM 1.7. In accordance with Superfund guidance, reasonably anticipated future land and waterway uses in the upper 9 miles of the LPR were considered during the development of IR alternatives and IR alternative selection. Currently, adjacent land use in the upper 9 miles is approximately 35 percent residential and recreational and 30 percent industrial and commercial (primarily along the east bank). The remaining 35 percent includes roads and other transportation infrastructure adjacent to the river. Various parks and recreational spaces are adjacent to the river, including Riverside County Park, Rutherford Waterfront Park, Memorial Park, Sesselman Park, and Wallington Park, all on the east side of the river, and Pulaski Park on the western bank between RM 15.5 and RM 16. The west bank of the LPR is abutted by Route 21 across much of the upper 9 miles. Future land use in the upper 9 miles is expected to remain generally consistent with current uses. Throughout the LPR, particularly between RM 2 and RM 12, college, high school, and community rowing clubs use the river for recreation and competition. It is expected that recreational uses of the river will continue in the future.

7. SUMMARY OF SITE RISKS

Baseline human health and ecological risk assessments were conducted to evaluate the potential for current and future impacts of Site-related contaminants on receptors visiting, utilizing, or inhabiting the LPRSA. The risk assessments are analyses of the potential adverse effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these exposures under current and future uses. They identify the contaminants and exposure pathways that need to be addressed through remedial action and provide the basis for taking action. Sections 7.1 and 7.2 summarize the results of the BHHRA for the LPRSA and the BERA for the LPRSA, respectively. Under baseline conditions, the human health and ecological risks in the LPRSA are unacceptable. The BHHRA and BERA support the selected source control IR and the overall adaptive management approach for the LPRSA.

The BHHRA, entitled *Baseline Human Health Risk Assessment for the Lower Passaic River Study Area*, dated July 2017, and the BERA, entitled *Baseline Ecological Risk Assessment for the Lower Passaic River Study Area*, dated June 2019, are available in the Administrative Record (Administrative Record Index in Appendix 3).

7.1 Summary of the Human Health Risk Assessment

Consistent with Superfund policy and guidance, the BHHRA is a baseline risk assessment and therefore assumes no actions (remediation) to control or mitigate hazardous substance releases and no institutional controls, such as the fish consumption advisories and fishing restrictions that are currently in place, which are intended to control exposure to hazardous substances. Cancer risks and non-cancer hazard indices were calculated based on estimates of reasonable maximum exposure (RME) to individuals expected to occur under current and future conditions at the Site. EPA also estimated cancer risks and non-cancer hazard indices based on central tendency exposures (CTE), or average exposures, at the Site. A four-step process is utilized for assessing site-related human health risks, as follows:

Hazard Identification – uses the analytical data collected to identify the contaminants of potential concern (COPCs) at the site for each medium, with consideration of a number of 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 fish) 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 effect (response).

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 that exceed acceptable levels, defined by the

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as an excess lifetime cancer risk greater than 1×10^{-6} to 1×10^{-4} or a Hazard Index greater than 1.0; 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.

7.1.1 Hazard Identification

In this step, analytical data collected during the RI were used to identify COPCs in sediments, surface water, fish tissue, and crab tissue in the LPRSA. All RI data used in the BHHRA were validated in accordance with the approved Quality Assurance Project Plans (QAPPs) and were determined to be valid and acceptable for use in the risk assessment. The RI data provide a data set for the BHHRA, including:

- Accessible surface sediment samples from 180 nearshore and mudflat locations
- Near surface (shallow) surface water samples (144) from five stations in the river
- Fillet tissue samples (105) from nine species of fish (white perch, American eel, channel catfish, largemouth bass, white catfish, common carp, white sucker, smallmouth bass, and northern pike)
- Crab tissue samples (69), including muscle and hepatopancreas combined, muscle-only, and hepatopancreas-only tissue types

The screening process considered the concentration of the chemical and associated toxicity, carcinogen status, essential nutrient status, and the range and frequency of detection. The assessment identified a total of 62 chemicals as COPCs and these were retained for further evaluation in the BHHRA. The COPCs included dioxins/furans, PCBs, PAHs, total petroleum hydrocarbon ranges, methyl mercury, arsenic and other inorganics, various pesticides, and a limited number of semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs). Not all chemicals were identified as COPCs in every medium, and 14 were evaluated qualitatively in the uncertainty analysis. The screening process used to identify COPCs is designed to assure that chemicals not identified as COPCs are minor contributors to the overall risks and hazards from the LPRSA. A comprehensive list of all COPCs for the LPRSA can be found in Tables 3-8 through 3-11 of the July 2017 BHHRA report.

Dioxin/furan congeners were evaluated as TCDD toxicity equivalence (TEQ) based on individual congener toxicity equivalence factors (TEFs). Dioxin-like compounds (including 2,3,7,8-TCDD, other dioxin/furan congeners and dioxin-like PCBs) typically occur as mixtures in the environment. The toxicity of dioxin-like compounds can be assessed by considering their toxicity relative to 2,3,7,8-TCDD. A TEF is a measure of the relative potency of a compound to cause a particular toxic or biological effect relative to 2,3,7,8-TCDD. By convention, 2,3,7,8-TCDD is assigned a TEF of 1.0, and the TEFs for other compounds with dioxin-like effects range from 0.00003 to 1. The consensus TEF values published in 2005 by the World Health Organization and recommended by EPA in the 2010 guidance “Recommended Toxicity Equivalency Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-

Tetrachlorodibenzo-p-Dioxin-like Compounds" (EPA/100/R-10/005) are used in the risk evaluations. For a single dioxin-like compound, TCDD TEQ is the product of the concentration of the dioxin-like compound in the environment and its corresponding TEF; total TEQ for a mixture of dioxin-like compounds is the sum of the individual TCDD TEQs across those compounds. The TCDD TEQ provides a means for determining the toxicity of a mixture of dioxin-like compounds, in the absence of toxicity values for those compounds.

PCBs were evaluated using two separate approaches in the BHHRA. One approach evaluated total PCBs using the cancer and non-cancer toxicity values for total PCBs and Aroclor 1254, respectively. The other approach evaluated the sum of 12 dioxin-like PCB congeners (PCB TEQ) using the toxicity values for TCDD TEQ and evaluated the remaining non-dioxin-like congeners (PCB [non-DLC]) using the toxicity values for total PCBs and Aroclor 1254 (for cancer and non-cancer, respectively). Both approaches identified PCBs as COCs and resulted in very similar risk estimates. The PCB results presented herein represent the PCB TEQ/non-DLC approach, which was associated with slightly higher risk estimates.

COPCs identified at the conclusion of the BHHRA as posing the greatest risk are referred to as COCs and are the primary focus of the response action proposed in this ROD. The BHHRA identified TCDD TEQ and PCBs as COCs, primarily due to consumption of LPRSA fish and crabs.[5] The contribution of all other COPCs to total site cancer risks/non-cancer hazards was generally less than 4%. Among the dioxins/furans that are included in the TCDD TEQ, 2,3,7,8-TCDD contributes the majority of total TCDD TEQ (approximately 95%) for LPRSA fish and crab tissue, with the rest of the TCDD TEQ attributable to other dioxins/furans (approximately 5%).

7.1.2 Exposure Assessment

In this step, the different exposure scenarios and pathways (through which people might be exposed to the contaminants identified in the previous step) were evaluated. The goal of the exposure assessment is to estimate the magnitude, frequency, duration, and routes of current and future human exposure to COCs associated with the LPRSA. The receptor's exposure is estimated by identifying exposure scenarios that describe the potential pathways of exposure to COCs and the specific activities of individuals that may lead to contact with COCs at the LPRSA. The following receptors were evaluated for the LPRSA: anglers/crabbers, waders, swimmers, boaters, and workers. Workers were assumed to be adults and all other receptors were assumed to include two or more age groups (i.e., child, adolescent, adult). Potential exposure routes varied by receptor and included incidental ingestion of and dermal contact with sediments, incidental ingestion of and dermal contact with surface water, and ingestion of fish (mixed fish

[5] The BHHRA also identified TCDD-TEQ as a COC for direct exposure to accessible surface sediments in RM 6 to RM 9, and specifically the east bank of this river segment. Further analysis that included a quantitative analysis of the TCDD-TEQ data and associated risks and hazards indicates that no elevated direct contact hazard is associated with the sediments in the portion of the east bank RM 6 to RM 9 above RM 8.3.

diet) and blue crabs. Table 7-1 (Appendix 2) identifies all receptors and exposure pathways that were considered in the BHHRA and the rationale for selection or exclusion of each pathway.

COCs are associated with the consumption of LPRSA fish and crabs that have accumulated chemicals from the sediments and surface water. Recreational angler receptors evaluated in the BHHRA are defined as those individuals who consume self-caught fish and/or crabs from the LPRSA. Adults and adolescents (7 years to less than 19 years old) are expected to participate in angling and are expected to share self-caught fish and/or crabs with family members (i.e., children 1 year to less than 7 years old). Anglers can fish from bridges, boats, and a variety of locations along the shoreline, including bulkheads, highway and bridge abutments, boat launches and docks, mudflats, and park land.

The LPRSA BHHRA includes both site-specific data where possible (e.g., boating frequency and fish and crab consumption rates) and default exposure assumptions (e.g., body weight, dermal adherence, residence times) in the calculation of exposures.

The exposure point concentration (EPC) identifies the concentration of COCs in an environmental medium at the point of human contact (e.g., consumption of fish, crabs). Receptor- and chemical-specific exposure parameters are used in the BHHRA to estimate exposure doses to the potential receptors. Both RME and CTE exposure scenarios are evaluated. Tables 7-2a and 7-2b (Appendix 2) identify the COCs and their chemical-specific characteristics (e.g., range of concentrations, frequency of detection, EPCs, and associated statistical basis) in fish and crab tissue. The following subsections identify the exposure information used for fish and crab consumers. Exposure information for other receptors is provided in Section 4 of the July 2017 BHHRA.

7.1.2.1 EPCs for Fish and Crab

Based on the available data about fish species preferences and relative abundance, a mixed fish diet consisting of five species was evaluated in the BHHRA. The EPCs for the mixed fish diet are based on equal fractions (20 percent) of white perch, American eel, channel catfish, largemouth bass, and common carp. The EPCs for crab are based on the concentrations in the composite samples of edible crab tissue (i.e., muscle and hepatopancreas combined).

7.1.2.2 Angler Consumption Rates

Fish and crab ingestion rates for the BHHRA were developed from a detailed evaluation of LPRSA-pertinent angler and creel surveys and related literature, as documented in the EPA Region 2 Technical Memorandum, "Fish and Crab Consumption Rates for the LPRSA Human Health Risk Assessment" dated February 2012.

Two angler surveys were used to calculate the fish ingestion rate. The Burger (2002) data are from a survey conducted in the Newark Bay Complex. The Connelly et al. (1992) data are from the New York State-wide angler surveys. This analysis provided fish consumption rates for the adult angler of 34.6 g/day (or approximately 56 eight-ounce fish meals/year) for the RME scenario and 3.9 g/day (or 6.2 eight-ounce fish meals/year) for the CTE scenario. The fish ingestion rates for the adolescent and child were based on the assumption that the intake for the adolescent will be approximately two-thirds that of the adult and the intake rate for the child will be approximately one-third that of the adult.

Two studies were selected as data sources for crab ingestion (Burger 2002, Burger 1998) and the ingestion rate was adjusted based on the average weight of edible meat from crabs caught in the LPRSA. Based on the analysis, the crab ingestion rates for the adult angler were 21 g/day (or 34 eight-ounce crab meals/year) for the RME scenario and 3.0 g/day (or 4.9 eight-ounce crab meals/year) for the CTE scenario. Ingestion rates for the child and adolescent receptors were estimated assuming rates one-third and two-thirds those of the adult ingestion rates, respectively, as was assumed for fish ingestion.

7.1.2.3 Cooking Loss

A cooking loss factor accounts for the amount of chemical in tissue that is lost during the cooking process and thus not consumed. For the RME scenario, a cooking loss of 0 percent is used for all chemicals to account for the potential that individuals may consume cooking juices and pan drippings. The CTE scenarios included chemical-specific cooking loss factors, including 49 percent for dioxins/furans, 30 percent for PCBs, and 0 percent for mercury because cooking loss adjustments are not recommended for metals.

7.1.2.4 Other Exposure Assumptions

The Exposure Duration (ED) is the estimate of the total time (e.g., years) that a receptor engages in a particular activity that could result in exposure. Because of the differences in activity patterns and sensitivity to potential chemical exposures, various age groups were evaluated for the BHHRA receptors. The receptor- and age-group-specific EDs for fish and crab consumers are given below. Unless otherwise stated, the CTE duration is assumed to be one-half of the RME duration.

- Adult – from age 19 years through remainder of life. The RME ED for adult receptors is assumed to be 20 years, based on the standard default assumption of 26-year residential tenure at a single location minus 6 years as a non-adult. The CTE ED for adult receptors is 9 years, based on the 50th percentile for years living in current home.
- Adolescent – age 7 years to less than 19 years. The RME ED is 12 years based on the number of years in the age group.
- Child – age 1 year to less than 7 years. The RME ED is 6 years based on the number of years in the age group.

Receptor body weights are taken from EPA guidance and represent the averages for males and females in the applicable age ranges. A body weight of 80 kg is used for adults, 52 kg for the 7 years to less than 19-year-old adolescent, and 17 kg for the 1-year-old to less than 7-year-old child.

7.1.3 Toxicity

The toxicity assessment determines the types of adverse health effects associated with exposures to COCs and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Potential health effects include the risk of developing cancer over a lifetime from PCBs and TCDD. Other non-cancer health effects, such as changes in the normal functions of organs within the body, are also associated with exposures to PCBs and TCDD. Some of the 209 PCB congeners are considered to be structurally and mechanistically similar to dioxin and exert dioxin-like 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 non-cancer risks associated with exposures to individual chemicals were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and non-carcinogens, respectively.

- **Cancer**: Potential cancer effects are expressed as the probability that an individual will develop cancer over a lifetime based on the exposure assumptions described in Section 7.1.2. The cancer slope factor (CSF) is a plausible upper-bound estimate of carcinogenic potency used to calculate cancer risk from exposure to carcinogens, by relating estimates of lifetime average chemical intake to the incremental probability of an individual developing cancer over a lifetime.
- **Non-Cancer**: Non-cancer health effects were evaluated using reference doses (RfDs). An RfD is an estimate of a daily oral exposure for a given duration to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of adverse health effects over a lifetime. Chronic RfDs are specifically developed to be protective against long-term exposure to COCs.

Toxicity data for the BHHRA were selected according to OSWER Directive 9285.7-53, which recommends a hierarchy of human health toxicity values for use in risk assessments at Superfund Sites. The hierarchy is as follows: (1) EPA's Integrated Risk Information System (IRIS) database, (2) EPA's Provisional Peer-Reviewed Toxicity Values (PPRTVs), and (3) other sources identified as appropriate references for toxicity values consistent with EPA's directive on toxicity values.

Consistent with the toxicity hierarchy, the BHHRA used the current consensus toxicity values from IRIS in evaluating the cancer risk of PCBs (non-DLC) and the non-cancer health effects of TCDD TEQ and PCB (non-DLC). For cancer risks of TCDD TEQ and PCB TEQ, the BHHRA used toxicity information for dioxin (2,3,7,8-TCDD) provided in EPA's 1997 *Health Effects Assessment Summary Tables*. Cancer and non-cancer toxicity information for the COCs can be found in Tables 7-3 and 7-4 (Appendix 2), respectively. Additional toxicity information for all COPCs is presented in Tables 5-1 and 5-2 of the July 2017 BHHRA.

7.1.4 Risk Characterization

Risk characterization integrates exposure estimates with toxicity information to provide a quantitative estimate of the potential cancer risk and non-cancer hazard associated with the LPRSA.

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. Excess lifetime cancer risk (a unitless probability of an individual developing cancer) is calculated by multiplying the chronic daily intake averaged over 70 years (mg/kg-day) and the slope factor (per mg/kg-day). These cancer risks are probabilities that usually are expressed in scientific notation (such as 1×10^{-4}). For example, a 1×10^{-4} cancer risk means a "1 in 10,000 excess cancer risk," or 1 additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions described in the exposure assessment. The upper-bound excess lifetime cancer risks derived in the BHHRA are compared to the range of 10^{-4} to 10^{-6} (corresponding to a 1 in 10,000 to a 1 in 1-million excess cancer risk) established in the NCP (i.e., the "risk management range"). EPA's goal of protection for cancer risk is 10^{-6} and concentrations of COCs causing risks greater than 10^{-4} typically will require remedial action. For non-cancer health effects, a hazard index (HI) is calculated. The HI is determined by comparing expected contaminant intakes with the RfD for the specific route of exposure (e.g., oral). The ratio of the intake to the RfD for an individual chemical is the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the HQs for all compounds within a particular medium that impacts a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for non-carcinogenic 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 1.0, separate HI values are then calculated for those chemicals that are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for non-cancer 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. It is important to note that an HI exceeding 1.0 does not predict a specific disease. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than or equal to 1.0) exists below which non-cancer health effects are not expected to occur.

This section highlights risks greater than 1×10^{-4} and/or the goal of protection of an HI equal to 1.0. The main COCs are TCDD TEQ and PCBs. The pathways of exposure are ingestion of fish and crabs.

7.1.4.1. Fish Consumption

The potential cancer risks to the RME recreational angler on the LPRSA consuming a mixed species fish diet exceed the NCP risk range of 1×10^{-6} to 1×10^{-4}. The estimated cancer risks from consuming fish in the LPRSA to the RME individual are 3×10^{-3} (3 excess incidences of cancer in a population of 1,000) for the adult, 2×10^{-3} (2 in 1,000) for the adolescent, 1×10^{-3} (1 in 1,000) for the child (younger than age 7 years), and 4×10^{-3} (4 in 1,000) for the combined child/adult. The primary contributors to the fish consumption cancer risks are dioxins/furans (68 percent) and PCBs (30 percent).

The potential non-cancer hazards to all RME recreational angler populations on the LPRSA consuming a mixed species fish diet exceed the goal of protection of an HI equal to 1.0. The non-cancer health hazards are 124 for the adult, 127 for the adolescent, and 193 for the child consuming fish caught from the LPRSA. Potential non-cancer health effects associated with the RME HI above the goal of protection of 1 are: developmental and reproductive effects (2,3,7,8-TCDD TEQ and dioxin-like PCBs) and eye, nails, and immune effects (PCBs).

Tables 7-5a and 7-5b (Appendix 2) provide the calculated cancer risks for the RME and CTE individuals, respectively.

7.1.4.2 Crab Consumption

The potential cancer risks to the RME recreational angler on the LPRSA consuming crab (including muscle and hepatopancreas) exceed the NCP risk range. The estimated cancer risks to the RME individual are 9×10^{-4} (9 in 10,000) for the adult, 5×10^{-4} (5 in 10,000) for the adolescent, 4×10^{-4} (4 in 10,000) for the child, and 1×10^{-3} (1 in 1,000) for the child/adult consuming crab caught from the LPRSA. The primary contributors to the crab consumption cancer risks are dioxins/furans (77 percent) and PCBs (20 percent).

The potential non-cancer hazards to the RME recreational angler on the LPRSA consuming crab (including muscle and hepatopancreas) exceed the goal of protection of a HI equal to 1.0. The non-cancer HQ is 32 for the adult, 33 for the adolescent, and 50 for the child consuming crab caught from the LPRSA. Potential health effects associated with the RME HI above 1.0 are: developmental and reproductive effects (TCDD TEQ and dioxin-like PCBs) and eye, nails, and immune effects (PCBs). Tables 7-6a and 7-6b (Appendix 2) provide the calculated non-cancer hazards for the RME and CTE individuals, respectively.

7.1.5. Uncertainties in the Risk Assessment

Within the BHHRA, areas of uncertainty were identified in the assessment process. The key sources of uncertainty are identified below.

- **Hazard Identification** – A comprehensive list of chemicals was evaluated. It is likely that the primary chemicals of public health concern at the LPRSA have been captured in the data set used in the BHHRA.

  Several chemicals were detected in one or more media, but not evaluated in the BHHRA because of a lack of screening levels based on toxicity information. The lack of toxicity information for these chemicals results in a potential underestimate of cancer risks and non-cancer hazards. However, PCBs and 2,3,7,8-TCDD have been extensively studied for toxicity and exposure and the lack of toxicity information for the other chemicals are not anticipated to significantly underestimate the risks and hazards.

- **Exposure Assessment** – Uncertainty in the exposure assessment is due to an incomplete knowledge of exposure, such as the ingestion rates of contaminated fish and crabs in the LPRSA by receptors. This source of uncertainty was reduced by applying the most local diet information available (e.g., surveys conducted near the LPRSA) and contacting researchers directly to determine appropriate exposure parameters for fish and crab ingestion. Additional risks estimated in the uncertainty evaluation in the BHHRA still exceeded the NCP risk range when alternate assumptions were made (e.g., fish consumption rate of one-half-pound fish meal per month, single-species diets, alternate mixed fish diets).

  The potential exists that biota other than fish and crabs may be consumed, including turtles, ducks, and frogs. Some biota, such as ducks and turtles, are fattier than fish or crabs and therefore may carry heavier contaminant burdens. However, it is unlikely that site risks and hazards have been underestimated by not quantitatively evaluating consumption of LPRSA biota other than fish and crab, since the frequency of consumption is likely less than for fish and crab.

  The data used to calculate the EPCs are assumed to be representative of general area conditions. Samples of five species of fish and crab tissue were evaluated in the BHHRA, representing different feeding guilds, habitats, and angler preferences. Nevertheless, due to the large size of the LPRSA, spatial and temporal variability in the system, as well as sampling and analytical limitations, there is uncertainty in the EPCs used to estimate current conditions in environmental media. Key uncertainties associated with each medium were evaluated in the BHHRA. Fish and crab tissue EPCs used in the BHHRA are more likely to overestimate than underestimate risk, though the overall impact on risk estimates is expected to be minor.

- **Toxicity Assessment –** Toxicity values were not identified for several chemicals analyzed at the LPRSA and the cancer risk and non-cancer hazards may be underestimated based on the lack of this information. Based on the significant toxicity of PCBs and 2,3,7,8-TCDD, the effect is not expected to be significant.

  The cancer toxicity of 2,3,7,8-TCDD does not currently provide a cancer classification for this chemical and the Health Effects Assessment Summary Table (HEAST; EPA 1997) value was used in the assessment. As noted in the July 2017 BHHRA, use of other available cancer toxicity values for dioxins/furans would result in calculated cancer risks that are comparable to those in the BHHRA.

7.2 Summary of the Baseline Ecological Risk Assessment

The BERA evaluated the potential for adverse effects to ecological receptors from exposure to contaminants within the LPRSA. The BERA was conducted in accordance with EPA's 1997 *Ecological Risk Assessment Guidance for Superfund* (ERAGS) and its updates, which describes an eight-step process for performing ecological risk assessment:

Steps 1 and 2 make up the screening-level ecological risk assessment (SLERA):

- Step 1 – Screening-level problem formulation and ecological effects evaluation. Descriptions are developed for the environmental setting, site contaminants, ecological receptors, and exposure pathways.
- Step 2 – Preliminary exposure estimates and screening risk calculation, which compares maximum detected concentrations to screening benchmarks.
- SLERA arrives at one of three conclusions: (1) ecological threats are negligible, (2) further risk assessment is warranted, or (3) there is potential for adverse ecological effects, and a BERA incorporating more site-specific information is needed. For the LPRSA, the SLERA reached the third conclusion.

Steps 3 through Step 7 comprise the BERA, necessary only when the SLERA indicates that further ecological risk evaluation is warranted:

- Step 3 – Baseline problem formulation. This step includes toxicity evaluation, development of a preliminary ecological CSM and exposure pathways, and development of assessment endpoints.
- Step 4 – Study design and data quality objective development, which includes development of the work plan and sampling and analysis plans based upon results of the previous three steps.
- Step 5 – Verification of field sampling design outlined in Step 4.
- Step 6 – Site investigation and data analysis.
- Step 7 – Risk characterization, which includes more refined and detailed quantification of potential site risks and is a more realistic evaluation of risks than the SLERA.

Step 8 is risk management, which includes selection of a remedy in the ROD. Step 8, while ultimately part of the risk assessment process, is beyond the scope of the BERA and is carried out by EPA as the agency selecting the remedy.

7.2.1 SLERA Results

The SLERA was performed using the maximum detected concentrations of contaminants from site-specific sediment and surface water data, evaluated with respect to exceedances of screening-level toxicity benchmarks.

Contaminants of Potential Ecological Concern (COPECs) across all receptor groups included metals, PAHs, organochlorine pesticides, PCDDs/PCDFs, PCBs, SVOCs, VOCs, and cyanide. These COPECs and their exceedances of screening benchmarks are detailed in the BERA appendix of the RI Report. The SLERA concluded that a BERA was warranted to provide a more site-specific and detailed assessment of chemicals that pose potential risk to ecological receptor groups.

7.2.2 BERA Results

The BERA evaluated nine assessment endpoints that addressed the protection and viability of communities of ecological receptor groups. A BERA is designed to protect communities of ecological receptors, as opposed to individual animals, and will typically evaluate receptor communities of different trophic levels using surrogate species, e.g., a heron as a surrogate for all piscivorous (fish-eating) birds. The assessment endpoints were evaluated using site-specific data within a site-specific framework that followed the ecological CSM. The potential for ecological risk was assessed using empirical and modeled data from a number of chemical and biological sampling events and surveys. The assessment endpoints were as follows (Table 7-7 in Appendix 2):

- **Assessment Endpoint 1** – Protection of the zooplankton community that serves as a food base for juvenile fish (receptor group: zooplankton)
- **Assessment Endpoint 2** – Protection (survival, growth, and reproduction) of the benthic invertebrate community (receptor group: infaunal benthic invertebrates)
- **Assessment Endpoint 3** – Protection (survival, growth, and reproduction) of blue crab and crayfish communities (receptor group: decapod crustaceans)
- **Assessment Endpoint 4** – Protection (survival, growth, and reproduction) of the mollusk community (receptor group: bivalve mollusks)
- **Assessment Endpoint 5** – Protection (survival, growth, and reproduction) of omnivorous (plant- and tissue-eating), invertivorous (invertebrate-eating), and piscivorous fish communities (receptor groups: benthic omnivore – mummichog, banded killifish/darter, common carp; invertivore – white perch, channel catfish, brown bullhead, white catfish, white sucker; piscivore – American eel, largemouth bass, northern pike, smallmouth bass)
- **Assessment Endpoint 6** – Protection (survival, growth, and reproduction) of herbivorous, omnivorous, sediment-probing, and piscivorous bird communities (receptor groups: aquatic herbivore – mallard duck, sediment-probing – spotted sandpiper, migratory piscivore – heron/egret, resident piscivore – belted kingfisher)
- **Assessment Endpoint 7** – Protection (survival, growth, and reproduction) of the aquatic mammal community (receptor group: river otter)
- **Assessment Endpoint 8** – Protection of the aquatic plant community (receptor group: multiple species of aquatic plants)

- **Assessment Endpoint 9** – Protection (survival, growth, and reproduction) of amphibian and reptile communities (receptor group: early life-stage amphibians and multiple species of reptiles)

Measurement endpoints are quantitative expressions of observed or measured biological responses to contamination relevant to the selected assessment endpoint. The measurement endpoints for each assessment endpoint included comparisons to toxicity benchmarks. Higher trophic level organisms (fish, birds, and mammals) were also evaluated using food web models (FWMs). The FWMs were used to derive an estimate of the daily dose of site-related contaminants for each of the target receptors. The daily dose calculation included estimates of prey consumption, water ingestion, and incidental sediment ingestion in milligrams per kilogram of body weight per day (mg/kg bw/day):

$$\text{Dose} = \frac{\left[(FIR \times EPC_{prey}) + (SIR \times EPC_{sed})\right]}{BW} \times SUF$$

Where:

Dose = daily ingested dose (mg/kg bw/day)
FIR = food ingestion rate (kg wet weight (ww)/day)
EPC_{prey} = exposure point concentration (EPC) in prey tissue (mg/kg ww)
SIR = incidental sediment ingestion rate (kg dry weight [dw]/day)
EPC_{sed} = EPC in sediments (mg/kg dw)
BW = body weight (kg)
SUF = site use factor (unitless); proportion of time receptor spends foraging in the LPR

The body weights, ingestion rates, and SUFs were obtained from the literature for each species and are described in the BERA appendix of the RI Report. The exposure point concentration (EPC in prey for each species was calculated from the fraction of the prey type in the species' diet and the chemical exposure concentration in that prey type, as follows:

$$EPC_{prey} = (EPC_1 \times F_1) + (EPC_2 \times F_2) + (EPC_3 \times F_3)$$

Where:

EPC_{prey} = EPC in prey items (mg COPEC/kg food dw)
$EPC_{1,2,3}$ = EPC in each individual prey type (mg COPEC/kg tissue dw)
$F_{1,2,3}$ = fraction ingested of each individual prey type (kg fish/kg food)

The dietary fraction (DF) of each component in each species' diet was based on information from the available scientific literature. The DFs assumed for each species and the assumptions used to derive them are described in detail in the BERA appendix to the RI Report. The estimated daily dose was then compared to literature-based toxicity reference values (TRVs). The TRVs covered a range of potential impacts from no observable adverse effect level (NOAEL) to the lowest observable adverse effect level (LOAEL). The NOAEL is the highest tested concentration of a chemical that does not cause significant adverse impacts (e.g., mortality, reduced growth, or reduced fecundity) to the species tested. The LOAEL is the lowest tested concentration of the chemical that causes significant adverse impact. Because of the conservatism incorporated in the derivation of TRVs, a protective concentration of the chemical likely lies between the NOAEL and the LOAEL.

The TRVs utilized in the LPRSA BERA were first proposed by the CPG, and then reviewed and verified as having been appropriately derived from the given citation by EPA. In order to ensure that the TRVs utilized in the upper 9 miles (fresh water) were consistent with the lower 8.3 miles (estuarine), EPA required the CPG to utilize a set of TRVs that had been developed by a working group (including EPA, NJDEP, NOAA, FWS, and the CPG). Those TRVs included total LMW PAHs, total HMW PAHs, 2,3,7,8-TCDD, PCDD/PCDF TEQ, total TEQ, total PCBs, dieldrin, total DDx, mercury/methyl mercury, copper, and lead. The CPG also included a less conservative set of TRVs that they proposed and to which EPA agreed. Where two sets of TRVs were used, the risk evaluations were performed for each set.

The potential for unacceptable risk was assessed using empirical and modeled data collected from a variety of chemical and biological sampling events and surveys conducted as part of the LPRSA RI. A step-by-step process included an initial SLERA, which identified media specific COPECs. Site-specific exposure data and a range of effect-level thresholds were used to derive risk estimates (expressed as hazard quotients [HQs]) to identify the potential for unacceptable ecological risk under baseline conditions using multiple lines of evidence.

The HQ method was utilized to evaluate the probability of each COPEC posing ecological risk and divide the estimated daily dose by the TRV. If the resultant HQ is greater than 1.0, risk is implied. An HQ less than or equal to 1 suggests there is a high degree of confidence that risk is not significant. Higher HQs are not necessarily indicative of more severe effects, but rather an indication that there is a higher probability of risk.

COPECs with HQs greater than 1.0, based on LOAEL-based TRVs, were identified as preliminary ecological COCs. Ecological risk drivers were identified from the list of preliminary COCs based on a comparison to background concentrations as described in the BERA and the uncertainty of the assessment used in the BERA (Table 7-8 in Appendix 2). In addition to ecological risk drivers, other ecological COCs were identified using a weight-of-evidence approach to draw conclusions about the benthic invertebrate community using a sediment quality triad (SQT) approach. The SQT approach integrates sediment chemistry, laboratory sediment toxicity studies, and benthic community assessment information.

Unacceptable risk to ecological species based on exceedances of a range of LOAEL-based thresholds for various ecological receptor groups and lines of evidence was primarily driven by exposure to PCDD/PCDFs, total dioxins and dioxin-like compound TEQ, total PCBs, PCB TEQ, and total DDx; these were the ecological risk drivers identified in the 17-mile BERA. An evaluation limited to just the upper 9 miles of the LPRSA resulted in the same list of ecological risk drivers as in the BERA for the entire LPRSA. Based on this analysis, a remedial action to address unacceptable ecological risk in the upper 9 miles of the LPRSA is warranted.

7.3 Basis for Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The excess cancer risk and non-cancer health hazards associated with human ingestion of fish and crab, as well as the ecological risks associated with ecological exposures, are above acceptable levels under baseline conditions. The IR will address areas of the riverbed in the upper 9 miles of the LPRSA with elevated contaminant concentrations that act as ongoing sources to the water column, the sediment bed, and biota. Remediating these sources will immediately reduce SWACs, accelerate recovery of the water column and the areas of the sediment bed outside the remediated area, and reduce biota exposure to contaminants. After the IR is complete and a period of post-IR response and recovery monitoring, EPA will evaluate final remedial alternatives in a remedy selection process ending with a final ROD, consistent with an adaptive management approach. The final ROD will include risk-based RGs and will specify any additional actions beyond the IR needed to address any remaining unacceptable risks in upper 9-mile sediments and surface water throughout the LPRSA, consistent with CERCLA and the NCP. As such, the IR for the upper 9 miles will not be incompatible with nor preclude a final remedy.

8. REMEDIAL ACTION OBJECTIVES

The RAOs describe what the IR is intended to accomplish. Development of the RAOs considered the physical characteristics of the upper 9 miles and the nature and extent of contamination in this river reach. The IR RAOs are based on control of elevated concentrations of 2,3,7,8-TCDD and PCB contamination in sediments, which are the primary source of risks to human health and the environment. RAOs will be developed for the final remedy.

The following RAOs have been developed for the upper 9-mile source control IR:

- **RAO 1—Addressing Surficial Sediment Source Areas**
  Control the sediment sources of 2,3,7,8-TCDD and total PCBs by remediating surface sediment source areas containing elevated concentrations, thereby reducing the SWACs[6] of 2,3,7,8-TCDD and total PCBs from RM 8.3 to RM 15. Achieve a post-IR 2,3,7,8-TCDD

[6] The SWACs apply to the reach of the LPRSA from RM 8.3 to RM 15 and are calculated based on sediment data representing the surface interval 0 to 6 inches below the surface of the sediment bed. For the IR FS, SWACs were calculated using RI data and the conditional simulation approach presented in the final RI Report for the LPRSA (AQEA 2019, Appendix J). SWACs will be recalculated based on PDI sediment sampling data, and the recalculated SWACs will be used in the IR design to define the IR footprint. Post-IR SWACs will be calculated based on surface sediment sampling data for 2,3,7,8-TCDD and total PCBs collected following construction of the IR, including dredging and placement of capping or backfill material.

SWAC[7] from RM 8.3 to RM 15 of not more than 85 ppt, approximately an order of magnitude higher than the OU2 (i.e., the lower 8.3 miles of the LPRSA) 2,3,7,8-TCDD sediment RG of 8.3 ppt[8], and achieve a post-IR total PCB SWAC from RM 8.3 to RM 15 that is at or below the established total PCB background concentration of 0.46 ppm.

- **RAO 2—Addressing Subsurface Sediment Source Areas**
  Control subsurface sediments (sediments greater than 6 inches below the sediment bed) from becoming a source of 2,3,7,8-TCDD and total PCBs by remediating sediments between RM 8.3 and RM 15 that have a demonstrated potential for erosion to expose subsurface concentrations above the defined subsurface remedial action levels (RALs) established for 2,3,7,8-TCDD and total PCBs.

As described in Section 3, a SWAC is a weighted average of sample data intended to estimate a mean contaminant concentration over a specified spatial area. For the IR, this spatial area is the reach of the LPR from RM 8.3 to RM 15, in consideration of the limited fine-grained sediments and significantly lower level of contamination above RM 15. A RAL is the contaminant concentration above which action is taken. For the IR, sediments will be removed if surface concentrations of 2,3,7,8-TCDD and/or total PCBs exceed the surface-sediment RALs or if subsurface concentrations of 2,3,7,8-TCDD and/or total PCBs exceed the subsurface sediment RALs in an area with demonstrated potential for erosion. Given EPA's conclusion based on numerous bathymetric surveys performed in the LPR (see Section 5.3) that the maximum depth of erosion is generally not more than 18 inches, the subsurface RALs will be applied to the depth interval from 6 inches to 18 inches below the sediment bed. Wherever sediments are removed, sediment removal will be to a uniform depth (assumed to be 2.5 feet) to accommodate the placement of a cap. Removing sediments with concentrations that exceed the RALs will lead to a reduction in the RM 8.3 to RM 15 SWACs.

In developing the IR remediation footprint for the upper 9-mile IR, the RAO 1 footprint will be identified first, followed by the RAO 2 footprint. RAO 1 and RAO 2 areas will be combined to create the IR footprint to be remediated.

Existing data suggest the source areas to be targeted by the IR are located between RM 8.3 and RM 15. However, the PDI will generate data throughout the upper 9 miles of the LPRSA. If sediment data that support IR design and are collected between RM 15 and Dundee Dam identify surface concentrations in excess of a final surface RAL (as specified in the IR design for RM 8.3 to RM 15), these areas will be evaluated as part of the IR.

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[7] In evaluating the post-IR SWACs, the uncertainty in the SWAC calculations will be assessed. The post-IR sampling will be designed and performed to identify an acceptable envelope of uncertainty in the SWAC calculations to support a regulatory determination regarding whether RAO 1 has been achieved. A framework for this approach is provided in Appendix H of the IR FS Report.

[8] The 2,3,7,8-TCDD remediation goal (8.3 ppt) and total PCB background level (0.46 ppm) are documented in Appendix II, Tables 25 and 26, respectively, of the ROD for the lower 8.3 miles of the LPRSA (dated March 3, 2016).

EPA defines the source areas for the IR as sediments having elevated concentrations of 2,3,7,8-TCDD and/or total PCBs. These sediments have a low potential for recovery and act as a reservoir for potential migration of contamination to surface water and biota, thereby inhibiting overall abiotic and biotic recovery in the system. Source area sediments are those with 2,3,7,8-TCDD and/or total PCB concentrations greater than current water column particulate concentrations, which for 2,3,7,8-TCDD is a range of 200 to 400 ppt. Water column particulates influence system recovery through transport and deposition. Addressing source sediments will greatly reduce the 2,3,7,8-TCDD and total PCB SWACs (and reduce SWACs for other collocated contaminants that are coincidentally addressed by the remediation footprint). This in turn will reduce concentrations on suspended water column particulates, reduce concentrations in surface sediments where water column particulates are deposited, reduce sources to biota, and accelerate system recovery. In the IR design, source sediments will be defined based on the RALs; the RALs will be identified using the PDI data. This project-specific source definition aligns with the NCP and existing EPA guidance in terms of identifying sources that are "…a release of contaminants from direct and indirect continuing sources to the water body under investigation" (EPA 2005) and "…contaminants that act as a reservoir for ongoing migration and exposure" (EPA 1991). EPA expects that ecological exposure and tissue concentrations will be reduced over time in response to the IR, and that will result in a reduction in ecological and human health risk.

Achieving the SWAC for 2,3,7,8-TCDD of no greater than 85 ppt represents greater than 90-percent reduction compared to the current SWAC from RM 8.3 to RM 15. The 85 ppt level is approximately an order of magnitude higher than the OU2 sediment remediation goal for 2,3,7,8-TCDD of 8.3 ppt. EPA, in consultation with NJDEP, determined that the 85 ppt SWAC limit is an appropriate objective for a sediment source control IR for the upper 9 miles of the LPRSA that will be followed by longer-term monitoring and selection and implementation of a final remedy in an adaptive management approach. The final remedy will address remaining risk in sediments in the upper 9 miles and risk in surface water throughout the LPRSA. Final risk-based RGs will be determined in the final ROD for the LPRSA. The final ROD will be developed after the system response to the IR has been assessed and after a period of monitoring to evaluate longer-term system recovery following the source control action. EPA anticipates that this period of monitoring that will lead to a final remedy decision will last approximately 10 years.

9. SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, and use permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. CERCLA Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must require a level or standard of control of the hazardous substances, pollutants, and contaminants that 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).

Interim actions should protect human health and the environment from the threats they are addressing, be cost-effective, and be consistent with the final remedy. Five remedial alternatives were developed for the upper 9-mile IR. The remedial alternatives evaluated in the upper 9-mile IR FS report and presented in the proposed plan, except for the statutorily required No Action Alternative and Alternative 5, all protect human health and the environment from the threat addressed by the IR, comply with ARARs associated with the IR, and are cost-effective, thus satisfying the requirements of CERCLA. As discussed below, the active alternatives include the use of treatment technologies as part of dredged materials management.

The remedial alternatives evaluated for the upper 9-mile IR (except for the No Action Alternative) focus on source control. The common elements of the active alternatives are described below, followed by brief descriptions of each alternative. More detailed information regarding the alternatives is provided in the upper 9-mile IR FS Report.

9.1 Common Elements

Five remedial alternatives were evaluated in detail in the IR FS (described individually in Section 9.2), including the statutorily required No Action Alternative. In general, the active alternatives (i.e., alternatives other than No Action) are based on removing sediments and placing an engineered cap over remaining sediments to attain alternative-specific, post-removal SWAC targets. Certain common elements apply to any of the active alternatives, as described below.

9.1.1 Dredging and Sediment Management

Each active alternative evaluated includes sediment removal to the depths necessary to accommodate sediment capping. Dredge depths are anticipated to be 2 to 3 feet, including allowable overdredging. For the purpose of the IR FS (including cost estimating), EPA assumed a uniform removal depth of 2.5 feet (2-foot target dredge depth plus 0.5-foot overdredge allowance to account for typical dredge precision) for all alternatives using mechanical dredging with a conventional barge-mounted, clamshell dredge and/or environmental bucket. For areas of the river upstream of RM 13.9, it is assumed that land-based dredging will be necessary to accommodate fixed, low-clearance bridge constraints that preclude barge and tug operations. Contaminated sediments will be dredged to the depths necessary to construct a sediment cap without diminishing water depth or exacerbating flooding. Dredged sediments will be transported to a nearby commercial facility for processing. Following dewatering of the sediments and stabilization at the processing facility, sediments will be transported for off-site disposal at licensed disposal facilities determined based on the chemical constituents of the sediments and the acceptance criteria of the facilities. Water produced through dewatering will be contained, tested, treated, and disposed properly in accordance with testing results. The IR FS assumed transportation for various processes would be via barge, railcar, and/or truck. For the IR

FS (including cost estimating), EPA assumed disposal of dredged material at a landfill facility that is permitted to accept hazardous wastes under Subtitle C of the Resource Conservation and Recovery Act (RCRA). Precautions will be taken during transport to prevent the release of contamination; specific actions will be identified during design and implementation to reduce and minimize releases during transportation.

It is assumed that dredging will be feasible within the entirety of the IR footprint, and all possible efforts will be made to perform dredging throughout the IR footprint. If, during IR design, portions of the IR footprint are identified that have significant constraints (e.g., utility crossings, bridge abutments, or critical shoreline structures) limiting or precluding dredging and capping, thin-layer capping, and/or the in-situ placement of reactive amendments will be considered as alternate technologies for those areas.

Residual contaminated sediments remaining after remediation (residuals) can be categorized as undisturbed or generated (Patmont et al. 2018). Undisturbed residuals are contaminated sediments remaining at the post-dredging sediment surface that have been uncovered by dredging but not removed (USACE 2008b). Primary causes of undisturbed residuals include dredging limitations such as hardpan or structures, incomplete characterization or inappropriate dredge design elevation, inaccuracies in meeting target dredging elevations, and development of dredging plans that do not target complete removal due to engineering limitations or other factors (USACE 2008b). Generated residuals are contaminated sediments that are resuspended during dredging and subsequently redeposited. In addition to considering alternate technologies to address isolated issues of dredging feasibility, appropriate construction equipment and best management practices (BMPs) will be used during implementation to minimize the generation and transport of residuals. Mitigation of generated residuals will be managed in response to construction monitoring data.

While the IR approach is generally dredging to a uniform depth to accommodate an engineered cap, dredging without capping in specific portions of the remediation footprint will be evaluated. Dredging without capping is an approach that includes removal of sediments to a surface that does not require capping to isolate remaining sediments (i.e., to a surface that is demonstrably free of contamination). During the IR design, EPA expects to assess data using the following principles to determine if dredging without capping is appropriate:

- Will be considered within the dredge footprint developed to meet the sediment source control IR RAOs.
- Will be considered where native material (material that underlies contaminated sediments and is unimpacted) is visually observed in the sediment cores collected in the PDI.
- Will be considered where the costs associated with deeper dredging to reach native sediments and backfill placement (backfill would be placed where dredging without capping is performed; backfill would be accomplished by placing sand only and would not require long-

term performance monitoring) are not higher than the cost of dredging to the nominal dredge depth, capping, and long-term cap monitoring.[9]

- Will be evaluated where the depth to native material over an area of 0.25 or more contiguous acres yields the cost condition described in the bullet above, as determined using the depth to native material of at least two adjacent PDI cores.
- Would be implemented in a manner compatible with engineering, constructability, sediment stability, and safety constraints that may affect short-term effectiveness and implementability (e.g., dredging without capping would potentially not be possible in areas where sensitive infrastructure could be undermined by deeper dredging).

A cost comparison model will be developed prior to the PDI, so that the aforementioned principles can be applied, and so appropriate data can be collected to inform a detailed evaluation during the IR design of the potential application of dredging without capping. As part of the IR design, the cost comparison model will be updated using refined cost data (e.g., from remediation contractors and disposal facilities) and based on location-specific conditions that may vary for portions of the IR footprint area (e.g., dredging and capping costs associated with deeper and/or steeper portions of the river). The updated cost comparison model will be used to determine the cost comparison for discrete areas of remediation. Dredging without capping will be implemented for those discrete areas where dredging without capping would cost no more than dredging with capping.

9.1.2 Capping

Common sediment cap types include engineered granular caps, composite caps, and reactive caps. Typical cap configurations may include sand, armoring, geotextile, and reactive layers. The primary functions of a sediment cap are:

- Physical isolation of contaminated sediments from human and ecological receptors.
- Stabilization of contaminated sediments and prevention of resuspension and transport to other areas.
- Reduction of the flux of dissolved contaminants into the water column.

Each active alternative evaluated includes sediment capping following dredging. All capped areas will be pre-dredged to result in no net loss of water depth and/or increase in flooding potential once the cap is installed. It is assumed that cap material will be transported via barge and placed mechanically. For areas of the river upstream of RM 13.9, it is assumed that land-based cap material placement will be necessary, along with an alternate cap material delivery process, to accommodate fixed, low-clearance bridge constraints that preclude barge and tug operations upstream of RM 13.9.

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[9] Dredging without capping can provide an enhanced degree of long-term effectiveness and permanence in areas where it is technically feasible. Other factors may be considered during IR design in evaluating the feasibility of implementing dredging without capping.

Consistent with the RM 10.9 Removal design (2013 *River Mile 10.9 Removal Action Final Design Report*), a 1-foot isolation layer was evaluated over a 100-year time frame in the IR FS to determine the cap composition that would be effective at limiting migration of underlying sediment contaminants. An evaluation of potential armor size and thickness was performed with flows associated with a 100-year return period, consistent with EPA guidance.[10] For the purposes of the FS-level cap stability analysis, armor (i.e., stone material) was assumed to be placed across the cap footprint, to a thickness of 1 foot. Cap armor needs will be refined in the IR design. The IR FS assumed that in shoal areas, habitat reconstruction material similar to existing substrate will be placed as the top 1 foot of the cap. Further consideration and refinement of the ecological and recreational function of the cap will be considered during the IR design, at which time its specific composition will be determined. Cap type and thickness may vary depending upon location and armoring requirements. Bathymetric data, geomorphic evaluations, and hydrodynamic and sediment transport model results will be used to determine erosional areas that will require armored cap placement. Additional design considerations, such as the addition of reactive amendments to the cap and ensuring that an engineered cap would not exacerbate erosion adjacent to the cap, will be established during IR design. Data and lessons learned from cap construction, cap construction monitoring, and physical and chemical cap performance monitoring at the RM 10.9 Removal area will be relied on to inform the cap design during the IR design phase. Placement of caps on slopes greater than 3:1 will require additional geotechnical analyses and design considerations. For the IR FS, it was assumed that cap thicknesses would vary from approximately 2 feet (in low-energy areas) to approximately 2.5 feet (in areas subject to greater erosion potential). A 2.5-foot cap was assumed throughout the IR footprint for the purpose of the IR FS cost estimate.

In addition, the IR FS assumed that residuals management cover (RMC) will be placed outside of the dredge and cap footprint for each alternative, as a mechanism to mitigate potential impacts of dredge residuals that might redeposit on the sediment bed outside the remediation area. RMC will potentially also be placed immediately following dredging if capping were to be delayed. The IR FS assumed that RMC would be placed to an extent equivalent to 20 percent of the remediated area, but specific RMC needs will be evaluated during IR design.

9.1.3 Institutional Controls

ICs refer to non-engineering measures intended to ensure the protectiveness of a remedy by affecting human activities to prevent or reduce the potential for exposure to contaminated media and/or to protect the integrity of the remedy. ICs are used at Superfund Sites when contamination is first discovered, when cleanups are ongoing and when residual contamination remains on-site at a level that does not allow for unlimited use and unrestricted exposure after cleanup. ICs will likely be needed both during and following completion of the IR, as recovery of the system is monitored in comparison to PRGs and until RGs are achieved. EPA has yet to identify PRGs,

[10] https://semspub.epa.gov/work/HQ/174471.pdf

which will be developed during/in parallel with the IR design; RGs will be documented in a final ROD. Potentially applicable ICs for each of the IR alternatives for the upper 9 miles of the LPRSA can be grouped into the following categories:

Governmental controls – Governmental controls may be implemented to protect the integrity of the IR or a specific IR element by prohibiting activities that could disturb or otherwise compromise its performance (e.g., restrictions on dredging, piling placement or removal, or other construction activities). Under the Code of Federal Regulations (22 CFR Part 165) a regulated navigation area (RNA) may be established to regulate vessel navigation by the appropriate government agency within a defined boundary. Examples of RNA restrictions include limitations on anchoring, spudding, or grounding vessels in capped areas.

Proprietary controls – A proprietary control is a private contractual mechanism contained in the deed or other document transferring a property. On privately owned lands, restrictive covenants are sometimes utilized to help maintain the long-term integrity of capping or other containment actions and to help control exposure scenarios (e.g., residential versus recreational uses of land). Proprietary controls may be considered IR components such as capped areas within private or publicly owned, leased, or used in waterway lands (i.e., tidelands or riparian grant lands). Such proprietary controls are referred to as "land use restrictions."

Informational Devices – These tools provide information or notification often as recorded notice in property records or as advisories to local communities, tourists, recreational users, or other interested persons including:

- Deed notices – A deed notice could be prepared and recorded that describes restrictions on property to protect capped areas and could remain in effect until the federal or state government states in writing that a change in site condition(s) warrants its removal.

- Public advisories – Fish and crab consumption advisories are an IC subject to informed voluntary compliance by the public. There is currently a NJDEP fish and crab consumption advisory for the LPR (Dundee Dam to Newark Bay).[11] This advisory recommends restrictions on consumption of fish and shellfish. New Jersey prohibits the consumption, and sale for consumption, of fish and crab from the LPR due to contamination by PCBs, dioxin and mercury. Eating, selling or taking (harvesting) blue crab from the Newark Bay Complex and tidal Passaic River is prohibited (N.J.A.C. 7:25-14.11). It is assumed that the advisories and prohibitions will remain in effect during and following the IR. EPA would share monitoring data and consult with NJDEP about whether the prohibitions on fish and crab consumption can be lifted or adjusted to allow for increased consumption as contaminant levels decline.

[11] https://www.nj.gov/dep/dsr/Fish_Advisories_2019.pdf

- Signage – Signs could be used to warn recreational users and other potential users of risks and to provide information about pertinent advisories. Also, signs to warn vessel operators of critical remedy area boundaries (e.g., a sediment cap) could be installed to provide added protection and notify vessel operators of applicable RNA restrictions.

ICs required for the upper 9-mile IR will be evaluated during design, along with an overall plan for IC communication, enforcement, and monitoring.

9.1.4 Habitat Considerations

The impact on and recovery of ecological habitat areas is an important aspect of remedial alternatives that involve construction in intertidal mudflats and wetland areas. These areas are home to communities of fish, birds, invertebrate species, and vegetation. There is expected to be a short-term impact associated with active remedial alternatives during construction and following completion of construction as disturbed benthic and near-shore habitat areas recover. The IR design will include management of these areas to approximately restore the habitat that supports ecological value equal to current conditions and avoid net loss of habitat, in accordance with ARARs.

9.1.5 Monitoring and Sampling

For each alternative, monitoring and sampling associated with the IR and overall cleanup of the upper 9 miles of the LPRSA will consist of data collection with respect to current conditions, PDI, IR construction, post-IR confirmation, O&M, and long-term monitoring. Anticipated monitoring activities are summarized below:

- Under the current conditions sampling program performed pursuant to the 2007 RI/FS AOC, the CPG collects the following data that are also relevant to the IR:
  - Continuous monitoring of surface water quality using deployed sensors
  - Periodic sampling of surface water for physical and chemical parameters across varying river flow conditions
  - Comprehensive sampling of fish and crab tissue
  - Bathymetric surveying

- EPA anticipates the PDI sampling program will include, but not be limited to:
  - Sediment sampling on a spatially dense grid (approximately 2,000 locations) from RM 8.3 to Dundee Dam to evaluate surface and subsurface conditions (the density of the sampling grid may be less in areas of coarse sediments)
  - A second round of sediment sampling to refine the delineation of the IR footprint and reduce variability in the PDI dataset, which would be based on results from the first round of sampling
  - Bathymetric surveying
  - Debris identification surveying

– Supporting surveys (e.g., geotechnical, habitat, cultural, fish spawning)

EPA anticipates that the PDI sediment sampling will include coring to a nominal depth of 4 ft. Anticipated coring intervals are 0 to 0.5 ft, 0.5 to 1.5 ft, 1.5 to 2.5 ft, and 2.5 to 4 ft. Core depths may be extended and/or core intervals may be refined during the PDI to ensure achievement of the data use objectives: characterization of the surface sediment interval; characterization of subsurface sediments for (a) assessment of subsurface contaminant concentrations in erosional areas, (b) waste characterization of sediments within the dredge area, and (c) characterization of sediments below the dredge depth for cap design; and characterization of sediments that may be removed following the cost break-even evaluation for dredging without capping (Section 9.1.1).

- Construction monitoring is anticipated to include, but not be limited to, confirmatory bathymetric surveys, water quality monitoring, and some limited scope of sediment sampling. Construction monitoring is also anticipated to include sediment coring to physically verify the thickness and composition of cap layers as prescribed by the IR design. Performance metrics will be established during the IR design to ensure achievement of dredging and capping extents and other construction requirements. Water quality and sediment sampling will be used to understand and mitigate potential issues associated with dredging releases.

- Post-IR confirmation sampling will include a sufficient number of sediment samples to provide a statistically unbiased estimate of the post-IR SWACs and is anticipated to include not less than 400 sediment sample locations at which 3-point composite samples would be collected. The calculated post-IR SWACs will be statistically assessed to verify that the RAO 1 SWAC goals have been achieved. In the event that the RAO 1 SWAC goals have not been achieved based on the statistical assessment, the construction monitoring conducted during the IR will be evaluated with respect to compliance with the construction requirements specified by the IR design (i.e., water quality monitoring, bathymetric surveys, discharge monitoring, inspection surveys, sediment monitoring) and the overall distribution of concentrations in the post-IR dataset will be evaluated to determine if any sediment sources remain. A multiple lines of evidence framework will be applied in this case to determine if the IR should be considered construction complete or if additional source removal is necessary. The statistical testing methodology and multiple lines of evidence framework for evaluating IR completion are described in Appendix H of the IR FS Report.

- O&M monitoring of cap areas will be conducted following construction to ensure long-term effectiveness. Bathymetry surveys and chemical sampling will be performed to assess the stability and chemical isolation performance of the cap and any potential need for maintenance to ensure continued performance (e.g., replacement of eroded cap material and/or armor stone). For cost-estimating purposes, EPA assumes cap O&M monitoring will continue for 30 years after the end of IR construction, and also that some amount of cap material will need to be replaced during this 30-year period.

- Long-term monitoring will be performed following IR completion. For cost-estimating purposes, EPA assumes long-term monitoring will continue for 30 years after IR construction, which will include both system response and recovery assessment monitoring following the IR (anticipated to last for approximately 10 years, at which point EPA will select a final remedy) and the portion of additional long-term monitoring that occurs within the 30-year timeframe after a final remedy is selected. The final ROD will document the monitoring required for the final remedy.

The PDI will be planned and implemented prior to the IR design. Details of other various future monitoring components will be established in the IR design, and data and lessons learned from cap construction, cap construction monitoring, and/or physical and chemical cap performance monitoring at the RM 10.9 Removal area will be relied on to inform those details. Monitoring data collected during the CCMP, PDI, and long-term monitoring has included or will include comprehensive laboratory analysis of samples so that appropriate and informed decisions can be made related to site-related residual risks following the IR and selection of a protective final remedy through the CERCLA remedy selection process.

9.1.6 Five-Year Reviews

Five-year reviews will be required, as the IR will result in hazardous substances, pollutants, or contaminants remaining in sediments above levels that would allow for unlimited use and unrestricted exposure. The five-year reviews will be conducted to ensure that the remedy continues to function as intended and remains protective of public health and the environment. In addition, because the selected remedy is an IR, review of this remedy will be ongoing as EPA continues to develop final remedial alternatives for the LPRSA

9.2 REMEDIAL ALTERNATIVES

The following summaries of the IR alternatives are based on the assumptions and analyses in the IR FS Report, which rely on the available data for the upper 9 miles of the LPRSA collected during the RI and documented in the RI Report. Alternative 1 is the statutorily required No Action alternative. The 85 ppt target 2,3,7,8-TCDD SWAC alternative (Alternative 2) directly addresses the IR RAOs. The 75 ppt (Alternative 3) and 65 ppt (Alternative 4) target 2,3,7,8-TCDD SWAC alternatives also address the RAOs, but the lower SWAC targets for 2,3,7,8-TCDD allowed EPA to assess whether a lower SWAC target would accomplish meaningfully greater sediment source control or provide meaningfully greater acceleration of system recovery.

The post-IR SWAC goal for total PCBs is the established total PCB background concentration of 0.46 ppm, and the available data suggest that a total PCB RAL of 1 ppm will result in a SWAC at or below this concentration. Therefore, the 85 ppt, 75 ppt, and 65 ppt target 2,3,7,8-TCDD SWAC alternatives all incorporate a total PCB surface RAL of 1 ppm. However, 2,3,7,8-TCDD concentrations dictate the IR footprint in all the active alternatives, except Alternative 5. The 125 ppt target 2,3,7,8-TCDD SWAC alternative (Alternative 5) was also evaluated to allow comparison to a smaller IR footprint and better frame the comparison between the other active alternatives. To ensure a smaller footprint, the 1 ppm total PCB surface RAL was not applied for the 125 ppt target 2,3,7,8-TCDD SWAC alternative, since applying the 1 ppm total PCB surface RAL would result in a remediation footprint of a size more consistent with the other active alternatives.

In developing the alternative-specific footprints in the IR FS, RAO 1 was applied first to address sediments until the target 2,3,7,8-TCDD SWAC was attained. RAO 2 was then applied sequentially after attaining the target 2,3,7,8-TCDD SWAC, addressing additional areas characterized as erosional and with subsurface concentrations exceeding subsurface RALs. The effect of this is further lowering the resulting SWAC in relation to the target SWAC. Table 9-1 in Appendix 2 provides a summary of the SWACs, RALs, and technical specifications for all active alternatives evaluated.

9.2.1 Alternative 1: No Action

Present Value (PV) Capital Cost:	**$0**
PV Annual O&M Cost:	**$0**
Total PV Cost:	**$0**
Construction Time:	**0 years**
Time to Achieve RAOs:	**Not applicable (N/A)**

The Superfund program requires that the No Action alternative be considered as a baseline for comparison with the other alternatives. The No Action alternative would not include any remedial measures, although the Tierra Removal and RM 10.9 Removal are assumed to have been implemented. NJDEP's prohibitions on fish and crab consumption would remain in place.

9.2.2 Alternative 2: 2,3,7,8-TCDD SWAC of 85 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$392 million**
PV Annual O&M Cost[12]:	**$0.93 million**
Total PV Cost:	**$420 million**
Construction Time:	**4.3 years**
Time to Achieve RAOs:	**7.3 years**

Alternative 2 includes capping preceded by dredging between RM 8.3 and RM 15 in the remedial footprint delineated during the IR FS (the final IR footprint will be established during IR design based on the PDI). Alternative 2 targets source sediments with elevated concentrations of 2,3,7,8-TCDD and total PCBs, achieving a post-IR target 2,3,7,8-TCDD SWAC of 85 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1.

[12] PV total annual and periodic O&M costs averaged over the 30-year post-construction monitoring period to estimate the PV annual O&M cost.

The delineation of the remedial footprint in the IR FS to attain a 2,3,7,8-TCDD SWAC of 85 ppt results in a surface RAL for 2,3,7,8-TCDD of 260 ppt.[13] Alternative 2 also includes additional dredging and capping in areas with erosional potential and elevated subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with elevated subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (520 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs). The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 80 ppt and a total PCB SWAC of 0.29 ppm. Figure 9-1 (Appendix 1) shows the areas targeted under Alternative 2 (areas in red).

Alternative 2 includes the common engineering assumptions and considerations described in Section 9.1. This alternative includes processing of dredged material at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. This alternative also includes implementation of system response and recovery assessment monitoring and adaptive management following completion of the IR to assess progress towards PRGs[14] developed during/in parallel with the IR design and, ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 9-1 (Appendix 2), Alternative 2 would target approximately 363,000 cy of contaminated sediments across a total area of approximately 90 acres. For the IR FS, it was assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.3 years, considering the anticipated seasonal fish window (i.e., the annual period of time that dredging is not permitted due to fish spawning/migration), typical winter shutdown periods, and assumed production rates.

9.2.3 Alternative 3: 2,3,7,8-TCDD SWAC of 75 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$413 million**
PV Annual O&M Cost:	**$0.94 million**
Total PV Cost:	**$441 million**
Construction Time:	**4.6 years**
Time to Achieve RAOs:	**7.6 years**

[13] Final RALs for surface and subsurface sediments will be defined in the IR design. The application of a multiplier of 2 to the surface RALs to derive subsurface RALs is supported by an analysis of erosion potential and represents a site management decision agreed to by EPA and NJDEP for the purpose of the IR. This site management decision represents an uncertainty that could affect the rate and degree of natural recovery post-IR if subsurface sediments are exposed. The effect of this site management decision will be discerned through chemical and physical monitoring of the sediment bed post-IR. That information will be used in developing the final, risk-based remedy as part of the Site's adaptive management framework consistent with CERCLA and the NCP's nine criteria. During the IR design, the subsurface RAL multiplier will be evaluated based on more current bathymetry data and will not exceed 2.

[14] PRGs would be developed during/in parallel with the IR design; PRGs would not be used to evaluate the performance of the IR itself, but would be used to evaluate longer-term system recovery following the IR.

Alternative 3 includes capping preceded by dredging between RM 8.3 and RM 15 in the remedial footprint delineated during the IR FS (the final IR footprint will be established during IR design based on the PDI). Alternative 3 targets source sediments with elevated concentrations of 2,3,7,8-TCDD and total PCBs, achieving a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1. The delineation of the remedial footprint in the IR FS to attain a 2,3,7,8-TCDD SWAC of 75 ppt results in a surface RAL for 2,3,7,8-TCDD of 205 ppt. Alternative 3 also includes additional dredging and capping in areas with erosional potential and elevated subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with elevated subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (410 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs). The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 70 ppt and a total PCB SWAC of 0.27 ppm. Figure 9-1 (Appendix 1) shows the additional areas targeted under Alternative 3 (areas in green) compared with Alternative 2 (areas in red), which includes an additional 6 acres of footprint from RM 8.3 to RM 15, located mostly below RM 12.

Alternative 3 includes the common engineering assumptions and considerations described in Section 9.1. This alternative includes processing of dredged material at one or more nearby commercial processing facilities for off-site disposal at licensed disposal facilities. This alternative also includes system response and recovery assessment monitoring and adaptive management following completion of the IR to assess progress towards PRGs developed during/in parallel with the IR design and, ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 9-1 (Appendix 2), Alternative 3 would target approximately 387,000 cy of contaminated sediments across a total area of approximately 96 acres. For the IR FS, it was assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.6 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

9.2.4 Alternative 4: 2,3,7,8-TCDD SWAC of 65 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$440 million**
PV Annual O&M Cost:	**$0.95 million**
Total PV Cost:	**$468 million**
Construction Time:	**4.9 years**
Time to Achieve RAOs:	**7.9 years**

Alternative 4 includes capping preceded by dredging between RM 8.3 and RM 15 in the remedial footprint delineated during the IR FS (The final IR footprint will be established during IR design based on the PDI). Alternative 4 targets source sediments with elevated concentrations of 2,3,7,8-TCDD and total PCBs, achieving a post-IR target 2,3,7,8-TCDD SWAC of 65 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1. The delineation of the remedial footprint in the IR FS to attain a post-IR 2,3,7,8-TCDD SWAC of 65 ppt results in a surface RAL for 2,3,7,8-TCDD of 164 ppt. Alternative 4 also includes additional dredging and capping in areas with erosional potential and elevated subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with elevated subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (328 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs). The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 60 ppt and a total PCB SWAC of 0.24 ppm. Figure 9-1 (Appendix 1) shows the additional areas targeted under Alternative 4 (areas in blue) compared with Alternative 3 (areas in green) and Alternative 2 (areas in red), which includes an additional 8 acres of footprint from RM 8.3 to RM 15, located mostly below RM 13.

Alternative 4 includes the common engineering assumptions and considerations described in Section 9.1. This alternative includes processing of dredged material at one or more nearby commercial processing facilities for off-site disposal at licensed disposal facilities. This alternative also includes system response and recovery assessment monitoring and adaptive management following completion of the IR to assess progress towards PRGs developed during/in parallel with the IR design and, ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 9-1 (Appendix 2), Alternative 4 would target approximately 419,000 cy of contaminated sediments across a total area of approximately 104 acres. For the IR FS, it was assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.9 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

9.2.5 Alternative 5: 2,3,7,8-TCDD SWAC of 125 ppt

PV Capital Cost:	**$294 million**
PV Annual O&M Cost:	**$0.89 million**
Total PV Cost:	**$321 million**
Construction Time:	**3.2 years**
Time to Achieve RAOs:	**N/A**

Alternative 5 includes capping preceded by dredging between RM 8.3 and RM 15 in the remedial footprint delineated during the IR FS. Alternative 5 targets source sediments with elevated concentrations of 2,3,7,8-TCDD, achieving a post-IR target 2,3,7,8-TCDD SWAC of

125 ppt. For this alternative, PCBs are not specifically targeted to ensure a smaller IR footprint is achieved for comparison purposes (since applying the 1 ppm total PCB surface RAL would result in a remediation footprint of a size more consistent with the other active alternatives). Therefore, no total PCB RAL was applied in the IR FS for this alternative. The delineation of the remedial footprint to attain a post-IR 2,3,7,8-TCDD SWAC of 125 ppt in the IR FS results in a surface (0 to 0.5 ft) RAL for 2,3,7,8-TCDD of 346 ppt. Alternative 5 also includes additional dredging and capping in areas with erosional potential and elevated subsurface sediment concentrations (0.5 to1.5 ft) to address RAO 2. Areas with elevated subsurface concentrations were delineated in the IR FS by applying a subsurface RAL that is twice the surface RAL (692 ppt for 2,3,7,8-TCDD). Inclusion of these additional areas in the IR footprint results in a 2,3,7,8-TCDD SWAC of 121 ppt and a total PCB SWAC of 0.49 ppm.

Alternative 5 includes the common engineering assumptions and considerations described in Section 9.1. Dredged materials would be processed at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. Following completion of the IR, system response and recovery assessment monitoring and adaptive management would be implemented to assess progress towards PRGs developed during/in parallel with the IR design and, ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the remedial alternatives shown in Table 9-1 (Appendix 2), Alternative 5 would target approximately 250,000 cy of contaminated sediments across a total area of approximately 62 acres. For the IR FS, it was assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 3.2 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

This alternative, with a 125 ppt target 2,3,7,8-TCDD SWAC, would not achieve the 2,3,7,8-TCDD SWAC goal of not more than 85 ppt in RAO 1 and EPA did not consider it to be a candidate alternative. It was evaluated to allow comparison to a smaller IR footprint and better frame the comparison between the other active alternatives.

10. COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in Section 121 of CERCLA 42 U.S.C. § 9621, and conducts a detailed analysis of the viable remedial alternatives pursuant to Section 300.430(e)(9) of the NCP, 40 C.F.R. § 300.430(e)(9), EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER Directive 9355.3-01, and EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria at 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis focusing upon the relative performance of each alternative against those criteria. A summary of key metrics used in the Comparative Analysis is presented in Table 10-1 (Appendix 2). The cost for each alternative is also included in this table.

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

10.1 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.

While all the alternatives evaluated are for an interim action, not a final action, with the exception of Alterative 1 each of the alternatives would result in conditions that would contribute to a final remedy for the LPRSA that is protective of human health and the environment. Alternatives 2, 3, and 4 would provide overall protection of human health and the environment by remediating source sediments with elevated contaminant concentrations to achieve the RAOs and accelerate the recovery of sediments, water column, and fish and crab tissue contaminant concentrations. These alternatives would reach post-IR surface sediment SWACs for 2,3,7,8-TCDD of less than 85 ppt and for total PCBs of less than 0.46 ppm and would control subsurface sediments from becoming sources. Alternative 1, the No Action alternative, would not provide overall protection of human health and the environment. Alternative 5, while it has the ability to accelerate recovery and progress towards overall protection of human health and the environment, would not accelerate recovery to the same degree as Alternative 2, 3, or 4 and would not achieve the RAO 1 requirement to reach a post-IR surface sediment SWAC for 2,3,7,8-TCDD of not more than 85 ppt. The NJDEP fish and crab consumption advisories will help ensure that human health is protected in the short term.

Remediation of sediments within the IR footprint for Alternatives 2, 3, and 4 would be anticipated to achieve the following:

- Attainment of RAO 1, post-IR target SWACs of not more than 85 ppt for 2,3,7,8-TCDD and 0.46 ppm for total PCBs (subject to post-construction confirmation of IR completion in accordance with the IR remedy completion framework).
- Remediation of sediments with elevated concentrations of 2,3,7,8-TCDD and total PCBs, reducing the potential for these contaminated sediments to resuspend and become sources of contamination to the water column, to other areas of the sediment bed, and to biota.
- Reduction of 2,3,7,8-TCDD surface sediment SWAC of greater than 90 percent and reduction of total PCB surface sediment SWAC of greater than 80 percent.
- Accelerated recovery of surface sediment concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants following IR completion.

- Accelerated recovery of surface water concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants following IR completion.
- Reduction of fish and crab tissue concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants resulting from reduced concentrations in sediments and the water column.
- Reduced potential for human health exposure to 2,3,7,8-TCDD, total PCBs, and other contaminants resulting from sediment, water column, and fish and crab tissue concentration reductions.

10.2 Compliance with ARARs

Section 121 (d) of CERCLA and NCP §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).

<u>Applicable requirements</u> 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 identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

<u>Relevant and appropriate requirements</u> 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.

Any alternative considered by EPA must comply with all federal and state environmental standards, requirements, criteria, or limitations, unless they are waived under certain specific conditions. ARARs can be location-specific, action-specific, or chemical-specific. Tables 10-2 and 10-3 in Appendix 2 present the ARARs identified for this IR.

No active remediation is associated with Alternative 1 (No Action), so action- and location-specific ARARs do not apply. This alternative would not contribute significantly toward eventual achievement of federal and state surface water ARARs.

There are no chemical-specific ARARs for sediments. Alternatives 2, 3, 4, and 5 would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, the Rivers and Harbors Act, and the Wetland Act of 1970/Freshwater Wetlands Protection Act) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, the New Jersey Water Pollution Control Act, the Clean Air Act, and the Hazardous Materials Transportation Act). The active alternatives could require one or more ARAR waivers during construction to meet the threshold criterion of compliance with ARARs. Although waivers could be required, actions will be taken to limit water quality impacts during construction.

Alternatives 2, 3, 4, and 5 are anticipated to comply with the ARARs through appropriate engineering design and agency review processes. Confirmation of ARARs compliance is typically demonstrated during remedial design and through the remedial action work plan (e.g., environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and BMPs) as well as monitoring during the construction period.

A final remedy for surface water throughout the LPRSA (in addition to a final remedy for sediments in the upper 9 miles) will be established in the final ROD for the 17-mile LPRSA. While Alternatives 2, 3, 4, and 5 would be anticipated to improve water quality, ARARs for water quality may not be achieved following completion of any of the active IR alternatives. It is anticipated that the final ROD for the 17-mile LPRSA will evaluate achievement of surface water ARARs.

***Primary Balancing Criteria** – The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria involve the assessment of factors between response measures so that the best option will be chosen, given site-specific data and conditions.*

10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refer 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.

This criterion considers the residual risk remaining at the conclusion of remedial activities, and the adequacy and reliability of containment systems and ICs. Key parameters assessed for the comparative analysis of IR alternatives are source control and recovery potential; cap stability; and monitoring, maintenance, and ICs.

Alternatives 2, 3, and 4 achieve a high degree of performance for this criterion. All three alternatives would provide source control that would reduce concentrations in the water column and promote accelerated recovery in the unremediated areas of the sediment bed. Dredging and capping would reduce the surface SWAC from RM 8.3 to RM 15 by 91 to 94 percent for 2,3,7,8-TCDD and 81 to 84 percent for total PCBs for these three alternatives.

The surface RALs for 2,3,7,8-TCDD under Alternatives 2, 3, and 4 are (to varying degrees) within or below the range of concentrations (200 to 400 ppt) that EPA has identified for the IR to define source sediments that inhibit recovery (Figure 10-1 in Appendix 1). The 2,3,7,8-TCDD surface RAL of 164 ppt for Alternative 4 is less than the low end of this range, indicating this alternative may include areas in the active IR footprint that are currently subject to recovery on their own and not consistent with the definition of source sediments for the IR. The 2,3,7,8-TCDD surface RAL of 260 ppt for Alternative 2 is within the range of concentrations defined as source, while the 2,3,7,8-TCDD surface RAL of 205 ppt for Alternative 3 coincides with the low end of the range of concentrations defined as source. Thus, Alternative 3 provides the greatest certainty of meeting the IR source control objective, without including areas that are or may already be experiencing natural recovery.

The areas and volumes of sediment removal increase incrementally from Alternative 2 to Alternative 4 to meet the progressively lower 2,3,7,8-TCDD SWAC targets, without a commensurate degree of incremental 2,3,7,8-TCDD and PCB mass removal. While the overall remedial acreage and volume increases by more than 15 percent from Alternative 2 to Alternative 4, the increase in mass of 2,3,7,8-TCDD and PCBs removed from the top 0.5 ft of the sediment bed is much more modest, increasing by less than 2 and 4 percent, respectively.

The IR footprint and RALs are derived by addressing the highest sediment concentrations first followed by lower concentrations until the target SWAC is reached. Therefore, the highest concentrations on average are targeted by the alternative with the smallest footprint. Progressively lower concentrations are targeted as remedial area is added to achieve the lower SWACs of the alternatives with increasingly larger footprints (Figure 10-2 in Appendix 1). The average 2,3,7,8-TCDD concentration targeted in the IR footprint is 2,870 ppt for Alternative 2. It is 220 ppt in the 6 acres added for Alternative 3 (which is within the range of concentrations considered source sediments for the IR) and 170 ppt in the further 8 acres added for Alternative 4 (which is below the range of concentrations considered source sediments for the IR). The change in the distribution of post-IR concentrations relative to pre-IR concentrations is similar for Alternatives 2, 3, and 4 (i.e., the distribution of remaining concentrations is similarly skewed towards lower concentrations for each alternative).

Alternatives 2, 3, and 4 all target LPR sediments classified as fine-grained sediments. However, the additional areas of sediments targeted under Alternatives 3 and 4 (compared with Alternative 2) include sediments that are progressively coarser. Because the contamination in the LPR is closely associated with fine-grained sediments, the increasing volume of coarser sediments addressed by the alternatives with larger footprints, and particularly Alternative 4, may not represent source material.

Alternatives 2, 3, and 4 are expected to provide similar degrees of recovery potential based on numerical modeling of several recovery metrics, including average water column concentrations, total water column loads, gross and net erosion flux, and the average concentration on depositing fine sediments over the 10-year period following IR construction, and would result in similarly accelerated recovery of the sediments and water column. Reductions of erosion flux of contaminants from the sediment bed for each alternative would result in reduced concentrations on depositing fine sediments and downstream loads of 2,3,7,8-TCDD and PCBs. The projected recovery half-lives for 2,3,7,8-TCDD and PCBs (a representation of recovery trajectory) for Alternatives 2, 3, and 4 are similar, indicating they would yield similarly accelerated recovery.

The cap stability would be refined in design but is assumed to have a 1-foot isolation layer that could withstand flows associated with a 100-year return period, which is consistent with EPA guidance.

More detailed information related to the use of numerical modeling and the results of this modeling in the context of the comparative evaluation of IR alternatives under Long-Term Effectiveness and Permanence is provided in the IR FS Report.

10.4 Reduction of Toxicity, Mobility, or Volume of Contaminants via Treatment

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

This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and/or significantly reduce the toxicity, mobility, or volume of hazardous substances as their principal element.

For Alternative 1 (No Action), only natural recovery processes would potentially reduce contaminant concentrations in sediments and surface water. There would be no reduction of toxicity, mobility, or volume via treatment.

The active alternatives would use two treatment components to reduce the toxicity and/or mobility of contaminants: (1) solidification/stabilization during processing after removal, and (2) in situ sequestration via capping including a carbon amendment. The degree to which reductions would be achieved would be proportional to the contaminant mass removed and the area of the cap footprint. The mass fraction of 2,3,7,8-TCDD removed from the upper 0.5 ft of the sediment bed ranges from 92 to 94 percent of the total surface mass from RM 8.3 to RM 15 and from 80 to 85 percent of the total mass for the upper 2.5 ft of the sediment bed from RM 8.3 to RM 15 for the three alternatives (Alternatives 2, 3, and 4) that achieve the threshold criteria. The mass fraction of total PCBs removed from the upper 0.5 ft of the sediment bed ranges from

82 to 85 percent of the total surface mass from RM 8.3 to RM 15 and from 64 to 68 percent of the total mass for the upper 2.5 ft of the sediment bed from RM 8.3 to RM 15 for the three alternatives that achieve the threshold criteria. The area over which an erosion and chemical migration resistant cap that would reduce the mobility of contaminants would be placed to isolate remaining sediments would be 90 acres for Alternative 2, 96 acres for Alternative 3 (7 percent larger than Alternative 2), and 104 acres for Alternative 4 (8 percent larger than Alternative 3).

10.5 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.

This criterion addresses the effects of each alternative during construction and implementation until RAOs are met. It considers risks to the community as well as on-site workers and the environment, available mitigation measures, and the time frame for achieving the response objectives. Key parameters assessed for the comparative analysis of IR alternatives are time to achieve RAOs, worker risk and community impact, resuspension, and downstream and upstream transport.

Alternatives 2, 3, and 4 would achieve the RAOs in approximately 7.3, 7.6, and 7.9 years, respectively, following the start of construction, based on estimated respective construction durations of 4.3, 4.6, and 4.9 years and the IR completion assessment process taking approximately 3 years for any alternative. The IR completion assessment process will include implementation of sediment sampling, validation and analysis of results, potential additional sampling to address uncertainty in the data or the need for additional data for statistical interpretation, and the decision-making process following completion of data collection activities. The 3-year time frame for the IR completion assessment process represents a period of measurement, after which it can be stated the RAOs have been achieved. Despite this 3-year time frame, Alternatives 2, 3, and 4 would be designed and implemented to attain the RAOs at the completion of construction.

The estimated construction durations vary with the area and volume of the remedial footprints, with construction activities assumed to occur 24 hours per day, 6 days per week during the construction season. Appropriate health and safety plans and contingency plans would be in place during implementation of an IR to protect workers and the community. Impacts to communities from construction of the IR would potentially include temporary noise, light, odors, blocked views, traffic, and disruptions to commercial and recreational river users.

Alternative 2, which has the smallest IR footprint (of the alternatives that achieve the threshold criteria) and the shortest estimated construction duration, would have the fewest short-term impacts on and risks to workers, communities, and the ecosystem, in a relative comparison with the alternatives with larger footprints. These impacts are expected to arise in general proportion to the size of the remedial footprint of the remedial alternatives. The extent to which habitat and ecological disturbance may increase in proportion to the IR footprint is uncertain and would depend on final delineation of the IR footprint using the PDI data. The IR design will include management of ecologically sensitive areas to approximately restore the habitat that supports ecological value equal to current conditions and avoid net loss of habitat. Alternative 4, the alternative with the largest IR footprint (approximately 14 acres larger than Alternative 2) and longest estimated construction duration (approximately 0.6 years longer than Alternative 2), would have the greatest short-term impacts.

While Alternatives 2, 3, and 4 are all estimated to be complete within approximately 5 years, the larger the footprint, the greater the potential that work would extend into another construction season if delays are encountered, which would result in another season of worker risks and community impact.

Studies have shown that dredging can result in resuspension loss of 1 percent to 3 percent of the material removed. Resuspension of contaminants during construction would be expected to be generally similar for Alternatives 2, 3, and 4, based on model projections of annual average water column concentrations. During active construction, average annual water column concentrations for Alternatives 2, 3, and 4 are projected to be higher than the No Action alternative. For all of the alternatives, annual average water column concentrations at the completion of active construction would be expected to be generally lower than pre-construction concentrations.

At RM 15, there is little projected impact of IR implementation, and the average annual and cumulative net upstream water column load would be expected to be nearly the same for Alternatives 2, 3, and 4 as compared to No Action. At RM 8.3, the implementation of an IR is projected to increase the downstream loads of 2,3,7,8-TCDD and total PCBs in the water column during construction, compared to the No Action alternative, with similar increases for Alternatives 2, 3, and 4. At the conclusion of active construction, the water column loads for Alternatives 2, 3, and 4 at RM 8.3 would be expected to be at or near the projected load under No Action. The implementation of an IR is projected to have a small impact on the water column loads at RM 0, evidenced in the projections of total load, which are generally similarly minor for all alternatives over the construction period.

More detailed information related to the evaluation of resuspension and downstream and upstream transport and the results of these evaluations in the context of the comparative evaluation of IR alternatives under the short-term effectiveness criterion is provided in the IR FS Report.

10.6 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.

This criterion considers the technical and administrative feasibility of implementing each alternative, including availability of services and materials needed during construction.

There are no implementability issues for Alternative 1 (No Action), which does not involve any active remediation.

The technologies and methods to perform the active alternatives are well established. Necessary equipment, materials, facilities, and transportation capacity would be available for the active alternatives with sufficient lead times. The active alternatives would require BMPs during implementation to manage dredge residuals and potential recontamination. Construction of the IR would face implementability challenges in the upper 9 miles of the LPRSA owing to the urban environment. Specific challenges that could impact dredging and would need to be considered during IR design and implementation include utility crossings, existing shoreline structures, in-water bridge structures, and hard river bottom. For example, designing and implementing the IR where the footprint abuts hardened or engineered shoreline could require significant effort to avoid damaging engineered shoreline structures or to rebuild or replace failing structures, and/or result in lower production rates or unanticipated delays. Alternative 2 would abut an estimated 37,792 linear feet of hardened shoreline, compared with 39,551 and 41,454 linear feet that would be abutted by Alternatives 3 and 4, respectively. This is an increase of 5 percent (Alternative 3) and 10 percent (Alternative 4) in hardened shoreline compared to Alternative 2.

The transportation of materials up and down the LPR would also present implementability challenges owing to low clearance and/or narrow bridges, which could necessitate custom or specialized equipment, as well as transiting tugs and barges through the lower 8.3 miles during active remediation of that reach of the river. Implementation of the IR could require additional removal in and/or around the RM 10.9 Removal area, which could introduce additional implementability challenges associated with protecting the existing armored cap over that previously remediated area. The extent of remediation in and/or around the RM 10.9 area will be determined during the IR design when the IR footprint is finalized.

Among the active alternatives, the larger the remedial footprint, the greater challenges and constraints, because of the need to dredge in more areas and over a longer time frame. Although implementability challenges would be similar in type for all active alternatives, the degree of the challenges can be anticipated to increase in general proportion to the size of the remedial footprint. It is anticipated that any of the alternatives can be designed to address these challenges.

10.7 Cost

Includes estimated capital and long-term operation and maintenance (O&M) present value costs.

Cost estimates are summarized in Table 10-4 (Appendix 2). A discount rate of 7 percent was used in the PV calculations, consistent with EPA guidance.

Alternatives that achieve the RAOs (Alternatives 2, 3, and 4) are estimated to have a PV cost of $420 million, $441 million, and $468 million, respectively. There are no remedial response costs associated with Alternative 1. Costs that are assumed to be the same for the active alternatives include the PDI and IR design, long-term monitoring, and periodic sediment sampling (which includes remedy completion confirmation sampling). Other costs vary with area, volume, and construction duration. The cost estimates assume that long-term monitoring and maintenance will occur over a 30-year period following completion of construction, including both system response and system recovery assessment monitoring following the IR and additional long-term monitoring when a final remedy is selected under a final ROD.

Alternatives 2, 3, and 4 all achieve the RAOs for the IR, with an additional cost of $21 million and $48 million for Alternatives 3 and 4, respectively, compared with Alternative 2.

Modifying Criteria *– The final criteria 8 and 9, are known as "modifying criteria." Community and support agency acceptance are factors that are assessed by reviewing comments received during the public comment period, including new information made available after publication of the proposed plan that significantly changes basic features of the remedy with respect to scope, performance, or cost.*

10.8 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 response measure.

The State of New Jersey concurs with the selected remedy. A letter of concurrence is attached as Appendix 4.

10.9 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 what the community supports, opposes, and/or has reservations about.

Community acceptance of the selected IR for source control in the upper 9 miles of the LPRSA was evaluated based upon the comments received during the public comment period. The Proposed Plan for the IR indicated that Alternative 3 was EPA's preferred alternative. There was overwhelming support for the IR Proposed Plan for the upper 9 miles, including letters from the City of Clifton, Bergen County, the Township of Nutley, the City of Garfield, and the Borough of North Arlington. In addition, resolutions of support were submitted as public comments from Belleville, East Rutherford, Garfield, Lyndhurst, Rutherford, and Wallington. EPA also received letters of support from New Jersey Senator Paul Sarlo and New Jersey Assemblyman Clinton Calabrese. The letters and resolutions generally support the tenets of the IR for the upper 9 miles of the LPRSA and the expedited schedule that aligns with the remedy for the lower 8.3 miles of the LPRSA. The letters and resolutions advised EPA to keep in mind flooding impacts, shoreline erosion issues, EJ impacts, and careful assessment of the upper 2 miles (i.e., to ensure that the area from RM 15 to Dundee Dam is appropriately investigated during the PDI and action taken in that reach as necessary).

The CAG, which is composed of approximately 20 members representing local citizens and businesses, environmental and recreational groups, and municipalities and educators, supported the preferred alternative. Some environmental groups supported the preferred alternative, while others suggest consideration of alternate remediation technologies to implement the preferred alternative. A local boating and rowing club expressed concern over the impact on their ability to use the river during the construction. Individual residents of adjacent communities expressed concern over the scale of the IR, potential impacts to drinking water, potential traffic impacts, and the cost of the IR. Appendix 5, the Responsiveness Summary, addresses the comments received at the public meetings and written comments received during the public comment period.

11. PRINCIPAL THREAT WASTES

The identification of principal and low-level threats is made on a site-specific basis to help streamline and focus waste management options by categorizing the suitability of the waste for treatment or containment. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. No “threshold level” of toxicity/risk has been established to equate to “principal threat.” However, where toxicity and mobility of source material combine to pose a potential risk of 1×10^{-3} or greater, treatment alternatives should generally be evaluated. The NCP states that EPA expects to use treatment to address principal threats posed by a site whenever practicable.

The dioxin, PCB, and other contaminant concentrations in sediments throughout the LPRSA are present at levels contributing to significant risks (greater than 1×10^{-3}) for humans consuming fish and crab caught in the LPRSA. As previously stated, the IR is developed to remove and control sediments that have elevated contaminated concentrations and act as a reservoir for potential migration of contamination to the water column, other areas of the sediment bed, and biota. EPA considers the most highly contaminated sediments as principal threat wastes. However, engineering and sediment transport modeling work done as part of the IR FS determined that the source area sediments, despite their toxicity, under current conditions, may be reliably contained.

Additionally, EPA does not believe that treatment of all the sediments in the upper 9 miles of the LPRSA is practicable or cost effective given the high volume of sediments the number of contaminants that would need to be addressed and lack of applicable and mature in situ (i.e., in-place) treatment technologies. However, as discussed in this ROD, EPA has considered treatment as a component of dredged material management and capping. In addition, in the event that there are isolated limitations to the feasibility of dredging and capping, alternative technologies including the in situ placement of reactive (i.e., treatment) amendments would be considered for those areas.

12. SELECTED REMEDY

Based upon an evaluation of the results of previous site investigations, input from EPA's CSTAG and members of EPA's NRRB, the detailed analysis of the various remedial alternatives, and public comments, EPA has selected Alternative 3 (implementing sediment source control to achieve a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt for RM 8.3 to RM 15, incorporating a total PCB surface sediment RAL of 1 ppm) as the IR for the upper 9 miles of the LPRSA. This is the IR alternative offered as the preferred alternative by EPA in the IR Proposed Plan, which was released for public review and comment in accordance with CERCLA and the NCP.

Following are the key factors that led EPA to select this IR alternative:

- The IR is for sediment source control. Source sediments are those with elevated concentrations, defined generally as those with concentrations of 2,3,7,8-TCDD, in the range of 200 and 400 ppt and above. The 2,3,7,8-TCDD surface RAL, based on available data, is 260 ppt for Alternative 2, 205 ppt for Alternative 3, and 164 ppt for Alternative 4. The RAL for Alternative 3 aligns with the lower end of the range of concentrations representing source. The RAL for Alternative 2 is within but not at the lower end of this range, while the RAL for Alternative 4 is below the range and therefore would be expected to capture sediments that are not source sediments and are likely to be recovering. Alternative 3 therefore will most effectively address source sediments consistent with the intent and purpose of the IR (Figure 10-1 in Appendix 2).

- Based on available data, the average 2,3,7,8-TCDD concentration addressed by the footprint for Alternative 2 is 2,870 ppt, while the average concentration addressed in the additional 6 acres included for Alternative 3 is 220 ppt, and the average concentration addressed in the yet additional 8 acres included for Alternative 4 is 170 ppt. Given the average concentration in the additional footprint area for Alternative 3 is within the range of concentrations defined as source and the average concentration in the additional footprint area for Alternative 4 is below the range, this further demonstrates that Alternative 3 is most suitable to accomplish sediment source control per the intent and purpose of the IR while Alternative 4 would go beyond that intended source control, addressing areas that may be experiencing natural recovery (Figure 10-2 in Appendix 2).

- Contaminant concentrations generally correlate with sediment type in the LPR, with higher concentrations tending to be found in finer-grained sediments. Progressively larger IR footprints would capture progressively coarser sediments. Alternative 2 would capture sediments that are on average approximately 60- to 65-percent fine-grained, while the additional sediments captured by Alternative 3 (beyond Alternative 2) are on average approximately 40-percent fine-grained and the yet additional sediments captured by Alternative 4 (beyond Alternative 3) are on average approximately 35-percent fine-grained. Based on the distribution of 2,3,7,8-TCDD concentrations in sediment samples from the upper 9 miles of the LPRSA in comparison to the grain size of the samples, relatively high concentrations are associated with sediments that are on the order of 40- to 60-percent fine-grained (resulting from higher concentrations in the fine-grained fraction of those sediments) while the likelihood of high contaminant concentrations diminishes significantly when the sediments are only 35-percent fine-grained. This indicates that implementing Alternative 3 would address additional source material beyond that addressed by Alternative 2, even if the additional sediments captured by Alternative 3 are relatively coarser, whereas Alternative 4 would include yet coarser-grained sediments not likely to exhibit elevated contaminant concentrations indicative of source sediments. This shows that the additional footprint area for Alternative 3 includes more comprehensive control of source material while minimizing inclusion of non-source material.

- Alternative 3 will be cost effective in that it provides overall effectiveness (taking into account long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short–term effectiveness) proportional to its cost.

The major components of the selected IR include the following:

- A comprehensive PDI will be implemented to assess baseline conditions, inform the IR design, and facilitate post-IR response and recovery assessment.
- Surface sediments (0 to 0.5 ft) with elevated concentrations of 2,3,7,8-TCDD and/or total PCBs between RM 8.3 and RM 15 will be targeted through dredging and capping to address RAO 1, achieving a post-IR 2,3,7,8-TCDD SWAC of 75 ppt and implementing a total PCB surface RAL of 1 ppm.
- Areas between RM 8.3 and RM 15 that are vulnerable to erosion and have elevated subsurface concentrations of 2,3,7,8-TCDD and total PCBs will be dredged and capped to address RAO 2.
- Dredging will be performed to the depth(s) necessary to construct a sediment cap that is designed to isolate underlying contamination, prevent contaminant migration, and resist erosion, and will not diminish water depth or exacerbate flooding.
- Dredged material will be processed, stabilized, and then disposed of off-site.

- The specific composition and thickness of the cap will be determined in the IR design, and dredge depth and cap composition/thickness may vary in portions of the remediation footprint.
- Some areas may be dredged to native (uncontaminated) sediments based on a cost-effectiveness review. In these areas, there would be no need for an engineered cap and associated O&M. Dredging without capping in these areas could enhance the overall long-term effectiveness and permanence of the IR.
- The area above RM 15 will be assessed carefully during the IR design based on the PDI data and to identify potential source areas.
- Appropriate and necessary ICs will be implemented in conjunction with the IR.
- Monitoring and sampling will be performed to evaluate the IR during construction and to assess post-IR conditions.
- Adaptive management will be applied to evaluate IR performance, assess the response of the system to the IR and the long-term recovery of the system, and to inform selection of a final risk-based remedy in a final ROD.

12.1 Source Sediments Definition and Delineation

Source sediments are defined as sediments having elevated 2,3,7,8-TCDD concentrations in the range of 200 and 400 ppt and above. These sediments have a low potential for recovery, and act as a reservoir for potential migration of contamination to surface water and biota, thereby inhibiting overall recovery in the system. For purposes of the IR, EPA has defined sediments with low recovery potential as those with 2,3,7,8-TCDD and/or total PCB concentrations greater than those associated with current water column particulate concentrations. Water column particulates influence system recovery through transport and deposition. Addressing source sediments would greatly reduce the 2,3,7,8-TCDD and total PCB SWACs (and reduce SWACs for other collocated contaminants that are addressed by the IR footprint), which would in turn reduce concentrations of suspended water column particulates, reduce concentrations in surface sediments where water column particulates are deposited, reduce sources to biota, and accelerate system recovery.

The areas of source sediments to be addressed by the IR will be defined during the IR design based on the RALs identified to achieve the RAOs for the selected IR. These RALs will be identified using PDI data (Section 12.1.1) and through the footprint derivation process (Section 12.1.2). The footprint derivation process will establish the total area of source sediments to be addressed by the IR.

12.1.1 Current Conditions Monitoring Program and Pre-Design Investigation

Beginning in 2019, under the 2007 RI/FS AOC, a CCMP was performed in the upper 9 miles of the LPRSA which also provided data that will be relevant to the IR. The CCMP included bathymetric surveys,, physical and chemical water column monitoring at multiple stations in the upper 9 miles (and at times below the upper 9 miles when characterizing the area of the salt front), and contaminant monitoring in fish and crab tissue. These data will help establish pre-IR baseline conditions, facilitate post-IR evaluation of system response and recovery, and support refinement of models, to identify potential source areas used to predict system behavior. EPA anticipates that the CCMP data overall will be used in the IR design to support footprint development and construction and long-term monitoring approaches.

The PDI will be completed to support the IR design. The PDI is anticipated to include, but not be limited to:

- Sediment sampling on a spatially dense grid (approximately 2,000 locations) from RM 8.3 to Dundee Dam to evaluate surface and subsurface conditions (the spatial density of sampling may be less in areas of coarse sediments).
- A second round of sediment sampling to refine the delineation of the remedial footprint, better constrain data variability, and minimize the potential for targeting errors in the IR footprint, as needed.
- Sediment sampling is anticipated to include coring to a nominal depth of 4 ft. Anticipated coring intervals are 0 to 0.5 ft, 0.5 to 1.5 ft, 1.5 to 2.5 ft, and 2.5 to 4 ft. Core depths may be extended and/or core intervals may be refined during the PDI to ensure achievement of the data use objectives:
    - Characterization of the surface sediment interval.
    - Characterization of subsurface sediments for (a) assessment of subsurface contaminant concentrations in erosional areas, (b) waste characterization of sediments above the dredge depth, and (c) characterization of sediments below the dredge depth for cap design.
    - Characterization of sediments that may be removed following the cost break-even evaluation for dredging without capping.
- Additional bathymetry surveying.
- Debris identification surveying.
- Geotechnical evaluations.
- Supporting surveys (e.g., habitat, cultural, fish spawning).

The PDI sediment sampling program will be critical in establishing refined estimates of the pre-IR SWACs, developing the IR footprint (Section 12.1.2), and informing the statistical testing methodology to evaluate IR success (Section 12.3).

12.1.2 IR Footprint Development

Successful source control during the IR will require accurate mapping of 2,3,7,8-TCDD and total PCB concentrations in sediments, and accurate delineation of areas to be remediated.

As described in Section 12.1.1, sediments will first be sampled on a fixed grid nominally spaced at 80 feet on center from RM 8.3 to Dundee Dam (sampling density may be less above RM 15, where the sediment bed is coarser). Geostatistical interpolation will be conducted for the 0- to 6-

inch (surface) and 6- to 18-inch (subsurface) layers. A second round of PDI sampling will supplement the dataset and reduce the uncertainty of the footprint delineation. A second geostatistical interpolation will be performed with the combined data. This will be accomplished through conditional simulation.

The approach to conditional simulation, considering both total PCBs and 2,3,7,8-TCDD, will be determined after analysis of the first stage PDI data. In general, multiple conditional simulation maps (maps generated by artificially sampling from the underlying data distribution at a finer scale) will be generated and remedy footprints that yield surface sediment layer concentrations that meet the total PCB and 2,3,7,8-TCDD (RAO 1) SWAC goals will be established for each map along with targeting to meet RAO 2. These maps will be used to generate a map of the likelihood of being targeted for remediation. The second phase of sampling will be conducted where the likelihood of sediments being targeted falls in the range of 40 to 60 percent or where sharp concentration gradients are observed or predicted. After incorporating the data from the second phase of the PDI sampling, analyses of the surface sediment data will be refined to better understand spatial correlation and covariance, and the analyses will be extended to the subsurface data. These analyses will support determining an appropriate interpolation method to map both surface and subsurface sediment concentrations. Nominally, the subsurface mapping will use the data from the 6-inch to 18-inch layer, though adjustments may be incorporated if warranted based on assessments of depth of erosion from bathymetric differences and refined modeling. The preliminary delineation of the remedial footprint will be based on applying conditional simulation to these mappings.

The final delineation of the IR footprint will incorporate physical characteristics (i.e., geotechnical properties, side-scan sonar-based sediment type, bathymetry, and hydrodynamic conditions) to allow for consideration of elements that can impact where contamination may (or may not) exist based on the characteristics of the river. The geostatistical mappings will incorporate some of these features to honor patterns evident in the PDI data, but manual review, under EPA oversight, of those results to optimize the target areas and incorporate physical information will aid in developing a robust dredging prism.

To identify areas vulnerable to erosion, bank-to-bank bathymetric surveying will be conducted during the PDI and/or following a high flow (generally at or above 5,000 cfs) event, if such an event occurs and a survey can be safely performed, for comparison to the CCMP bathymetric survey and earlier surveys. Using bathymetric differencing, vulnerable areas will be defined and PDI data and geostatistical mapping (which will factor in side-scan sonar data) in those areas will be used to interpolate subsurface concentrations. The surface RAL for 2,3,7,8-TCDD will be determined specifically during the IR design through the footprint delineation process, as the lowest surface concentration that must be targeted to attain the 75 ppt post-IR SWAC.

For subsurface sediments, sediments in areas characterized as erosional and having concentrations in excess of the subsurface RALs will be remediated. Given the maximum depth of erosion is generally not more than 18 inches based on numerous bathymetric surveys performed in the LPR (see Section 5.3), the subsurface RALs will be applied to the depth interval from 6 inches to 18 inches below the sediment bed. In the IR FS, the subsurface RALs were established at twice the surface RALs, as a site management decision by EPA in consultation with NJDEP, supported by an analysis of erosion potential using available bathymetric data. . During IR design, the PDI data and newer bathymetry information will be used to establish erosional areas and verify the subsurface RAL multiplier using an analysis similar to the erosion potential analysis performed in the IR FS. The final footprint will be established by attaining RAO 1 first and then sequentially including additional area to attain RAO 2. The subsurface RAL multiplier will not exceed 2.

Combining areas addressed to attain RAO 2 with areas addressed to attain RAO 1, and based on existing data, EPA estimates that the IR will achieve a 2,3,7,8-TCDD SWAC of approximately 70 ppt (i.e., lower than the 75 ppt SWAC target because of sequentially addressing RAO 2 after RAO 1) and a total PCB SWAC of 0.27 ppm (compared to background of 0.46 ppm). Based on current estimates of SWACs from existing data, the IR will reduce the 2,3,7,8-TCDD SWAC in the upper 9 miles of the LPR by approximately 92 percent and the total PCB SWAC by approximately 82 percent. Based on existing data and the IR footprint derived in the IR FS, the IR will result in the removal of approximately 387,000 cy of contaminated sediments across approximately 96 acres.

With the development of the final IR footprint in the IR design using the PDI data, EPA anticipates that the actual post-IR 2,3,7,8-TCDD SWAC will be lower than the SWAC target of 75 ppt (70 ppt based on existing data, as described above); however, the degree to which the actual post-IR SWAC will be lower than the SWAC target will be determined in the IR design.

12.1.3 River Mile 15 to Dundee Dam

Current data suggest that the source areas to be targeted by the IR are located between RM 8.3 and RM 15. The river reach between RM 8.3 and RM 15 contains some proportion of fine-grained sediments, with which the LPRSA contaminants are associated, while the portion of the river above RM 15 tends to be overall coarser and shows a significantly lower level of contamination. However, if sediment data collected between RM 15 and Dundee Dam that support the IR design identify elevated surface concentrations in the reach of RM 15 to Dundee Dam (i.e., surface sediment concentrations in excess of the surface RAL determined for RM 8.3 to RM 15), EPA will evaluate these areas during IR design to determine whether they constitute a source that is inhibiting the recovery of the LPR. Exceedances above the RAL between RM 15 and Dundee Dam will be evaluated and any source areas identified will be remediated as part of the remedy.

12.2 Dredging and Capping

Sediments will be removed to the depths necessary to accommodate an engineered sediment cap in the remediation areas. Dredge depths are anticipated to be 2 to 3 ft, including allowable overdredging. For the purpose of the cost estimate, EPA assumes a removal depth of 2.5 ft

(2 ft nominal dredge depth plus 0.5 ft overdredge that accounts for typical dredge precision). Mechanical dredging with a conventional barge-mounted clamshell dredge and/or environmental bucket is assumed as the primary process option for the IR dredging. Other equipment (e.g., barge-mounted precision excavator) will be evaluated during IR design and implementation.

Land-based removal is assumed for the area above RM 13.9 to accommodate fixed, low-clearance bridge constraints that preclude barge and tug operations upstream of RM 13.9. It is assumed that dredging will be feasible within the entirety of the IR footprint. All possible effort to perform active dredging, where feasible, throughout the IR footprint will be undertaken. If, during IR design, portions of the IR footprint where significant constraints (e.g., utility crossings, bridge abutments, and critical shoreline structures) limit or preclude dredging and capping, EPA will consider alternate technologies (e.g., enhanced natural recovery and in situ sediment treatment) for those areas. Dredging methods will be further evaluated during IR design to support development of construction monitoring performance standards.

Following dredging, an engineered cap will be placed throughout the dredge area, restoring the sediment bed to pre-IR elevations to avoid any impact to flood storage within the river. In addition, the placement of RMC will occur outside of the dredge and cap footprint as a mechanism to mitigate potential impacts of dredge residuals that might redeposit on the sediment bed outside the remediation area. RMC will potentially also be placed immediately following dredging if capping were to be delayed.

Consistent with the RM 10.9 IR design, a 1 ft isolation layer was evaluated over a 100-year time frame to determine the cap composition that would be effective at limiting migration of underlying sediment contaminants. An evaluation of potential armor stone size and thickness was performed with flows associated with a 100-year return period, consistent with EPA guidance (USEPA 2005). In the IR FS armor is assumed to be placed throughout the cap footprint, to a thickness of 1 ft. Armoring needs will be refined in the IR design, and sediment capping will conform to current EPA guidance concerning climate change considerations and flood risk management consistent with the reinstatement of Executive Order 13690 which establishes a federal flood risk reduction standard intended to "improve the resilience of communities and Federal assets against the impacts of flooding". In shoal areas, habitat reconstruction material similar to existing substrate is assumed to be placed throughout the shoals, as the top 1 ft of the cap. Further consideration and refinement of the ecological and recreational function of the cap will be considered during the IR design, at which time its composition will be determined. Cap types and thickness could vary depending on location and armoring requirements. Bathymetric data, geomorphic evaluations, and hydrodynamic and sediment transport model results will be used to determine erosional areas that would require armored cap placement. Additional design considerations, such as the addition of in situ reactive amendments, will be established during the IR design. EPA anticipates that one important cap design consideration will be the potential for an engineered cap to exacerbate erosion in adjacent uncapped areas. Placement of caps on slopes greater than 3:1 will require additional geotechnical analyses and design to evaluate feasibility. For cost-estimating purpose, EPA assumes that cap thicknesses will vary from approximately 2 ft (in low-energy areas) to approximately 2.5 ft (in areas subject to greater erosion potential). A 2.5 ft cap is assumed throughout the IR footprint for the purpose of the ROD cost estimate.

Some areas may be dredged to native (uncontaminated) sediments based on a cost-effectiveness review. Under this approach, discrete areas might be dredged to a clean subsurface horizon, eliminating the need to place an engineered cap in those areas (along with associated O&M). In the areas where dredging without capping is applied, remedy resiliency and climate change concerns are addressed by not requiring a cap that would need to be monitored and maintained after storm events. The following steps will determine the areas where dredging without capping will be employed:

1. Before the PDI, a cost model will be developed and used to compare the cost of (a) dredging to the nominal dredge depth, with capping and long-term cap monitoring to (b) dredging to reach native sediments and backfill placement (which includes evaluating depths deeper than the nominal dredge depth). Unit costs will be refined, as possible and necessary, and used in the cost comparison model. So that the costs are sufficiently developed for this exercise, the cost drivers associated with dredging and capping will be reviewed and possibly refined prior to using them in the cost model. Also, the backup and/or references used to establish the unit costs in the cost model will be identified. It is expected that this model will identify the depth(s) at which the costs of the two dredging options would be the same. These depths will be used to refine the termination depth of the PDI borings in each area of the river, if greater than the nominal PDI boring depth; EPA anticipates that cores will need to extend 1 ft beyond the depth at which the costs of the two dredging options are equal.

2. PDI sampling will be conducted to the depths established, with the depth at which native material is encountered in each boring (up to the termination depth for the area in the river the boring is located) to be recorded. The depth of native material will be determined from visual observation of the sediment cores.

3. Preliminary dredge management units (DMUs) where two or more adjacent borings intersect native material will be identified.

4. As part of the IR design program, the cost comparison model will be updated using cost data from remediation contractors, disposal facilities, etc., and location-specific conditions that may vary among the DMUs. The updated model will be used by EPA to determine the cost comparison for each preliminary DMU. Dredging without capping will be selected for those DMUs where dredging without capping would cost no more than dredging and capping.

It is assumed that dredged material will be transported via barge. It is assumed that cap (or RMC or backfill) material will be transported via barge and placed with a mechanical bucket. Upstream of

RM 13.9, land-based cap material placement is assumed to accommodate fixed, low-clearance bridge constraints that preclude barge and tug operations. Specific materials transportation and removal/placement methods will be determined in the IR design.

EPA will continue to assess RM 10.9 construction and performance-monitoring data to inform the dredging and capping approach for the IR. The remediation contractor will identify means and methods to satisfy the performance requirements in the IR design documents, including selection of appropriate dredging/capping equipment and methods.

12.2.1 Dredged Material Management

It is assumed that dredged sediments will be transported via barge to a nearby commercial facility for processing. For example, there are three Clean Earth sediment processing facilities within a 3-mile radius of the mouth of the Passaic River (Kearney, Koppers, and Claremont). Facility capacity and accessibility evaluations will be required during the design to identify which location(s) are available and accessible. Alternative sediment processing options, including the possible use of the sediment processing facility that EPA anticipates will be constructed for the material dredged from the lower 8.3 miles, or another facility, may be evaluated during IR design.

Following dewatering of the sediments and stabilization at the processing facility, sediments will be transported via railcar and/or truck for off-site disposal. EPA assumes the sediments will be transported via rail from the sediment processing facility. Precautions will be taken during transport to prevent the release of contamination; specific actions will be identified during design and implementation.

Nonhazardous dredged material may be accepted for direct disposal in a RCRA Subtitle D facility (i.e., a facility that is permitted to accept only nonhazardous wastes and not hazardous wastes), contingent on the facility's permit, available space, and facility-specific acceptance criteria for material impacted by chlorinated dioxins and furans. Dredged material that is characterized as hazardous waste, if any, would require disposal in a RCRA Subtitle C facility following treatment, if necessary, to meet all regulatory requirements. EPA has previously determined that sediments from the LPR do not contain RCRA-listed hazardous waste (USEPA 2008c). However, during the Phase I removal action near the Lister Avenue site, sediments were encountered that had to be managed as characteristic hazardous waste, and an analysis of the Phase I removal data in the lower 8.3-mile ROD responsiveness summary estimated 5 percent of the sediments to be addressed by the selected remedy exceeded RCRA waste characterization criteria. If PCB concentrations indicate TSCA-regulated sediments are encountered during dredging, then TSCA regulations will be followed (currently available data from the upper 9 miles do not suggest TSCA-regulated sediments are likely to be encountered). Waste characterization sampling conducted preliminarily during the PDI, with final testing taking place prior to disposal and in accordance with receiving facility requirements, will be used to identify dredged material requiring management as a RCRA characteristic waste. For cost estimating, EPA assumes that all dredged material will be sent for direct disposal in a Subtitle C facility, given the uncertainty regarding acceptance of material from the LPR at a Subtitle D facility.

12.2.2 Best Management Practices During Dredging

Appropriate construction equipment and BMPs will be used during implementation to minimize sediment resuspension, residuals generation, and contaminant releases from dredging operations. The specific array of BMPs or engineering controls implemented during the IR could vary according to location-specific conditions. BMPs may include the following, although relevant BMPs will be evaluated in more detail during IR design:

- Implement construction monitoring, including chemical measurements (through surface water and limited sediment sampling), bathymetry surveys, and continuous turbidity measurements upstream and downstream of construction areas.
- Remove debris prior to dredging.
- Minimize residuals generation through operational controls, such as carefully controlling depth, location, and cutting action to maximize sediment capture and minimize dredge area sidewall sloughing and bottom impacts. Optimize dredge bucket fill efficiency to minimize both free-water capture and overfill fallback.
- Control speed of bucket through the water column to minimize loss of adhered sediments.
- Allow the sediment-filled bucket to drain before fully emerging above the water surface.
- Contain drippage during the overwater swing of a filled bucket (e.g., by placing an empty barge or apron under the swing path during offloading).
- Use an environmental or sealed bucket except where conditions require other equipment.
- Start dredging in upslope areas and move downslope to minimize sloughing.
- Plan multiple dredge cuts, limit initial cut depths to avoid sloughing of the cut bank, and plan initial cut(s) to limit resuspension.
- Use floating and/or absorbent booms to capture floating debris or sheens.
- Use conventional construction stormwater BMPs to control and reduce the silt burden in runoff from barges or rehandling areas.
- Deploy silt curtains or other suitable containment features (subject to suitable site conditions).
- Limit or suspend dredging during high flows following significant storm events.
- Sequence dredging to remove areas with the most elevated sediment contaminant concentration first to minimize recontamination.
- Placement of RMC outside the dredge/cap footprint to mitigate impacts of generated residuals that are transported beyond the dredge area .

It is assumed that 6 inches of RMC will be placed outside the dredge and cap footprint, over an area approximately equal to 20 percent of the dredge footprint. The actual area for application of RMC will be evaluated during the IR design and determined through construction quality assurance sampling during IR construction. RMC may also be placed within a dredge area if capping is delayed.

For cost-estimation purposes, the ROD assumes that capping will be performed in multiple lifts to minimize resuspension. The ROD also assumes cap material will be placed as soon as practicable following confirmation of dredge prisms to contain residuals and underlying contaminated sediments.

12.2.3 Institutional Controls

ICs will likely be needed both during and following completion of the IR, as recovery of the system is monitored in comparison to PRGs/RGs and until RGs are achieved. EPA has not yet determined PRGs or RGs. PRGs will be developed during/in parallel with the IR design to inform system recovery assessment following the IR, and until RGs are documented in the final ROD.

ICs may include a combination of governmental controls, proprietary controls, and informational devices. Possible ICs include the following:

- Governmental controls (i.e., monitoring and notification of waterway users)
    - Prohibitions on anchorage within the areas that are capped
    - Prohibitions on grounding of small vessels on the shoreline
    - Restrictions of vessel draft, horsepower, and speed
    - Restrictions on dredging, piling placement or removal, or other construction activities that may disturb sediments
- Proprietary controls (i.e., easements and restrictive covenants related to cap)
- Informational devices (i.e., deed notices, fish consumption advisories, and signage)

Specific ICs will be evaluated during the IR design process. EPA assumes that the existing NJDEP fish and crab consumption advisories for the LPR (Dundee Dam to Newark Bay), which prohibit consumption of fish and shellfish, and ban collection of blue crabs from the entire LPR, will remain in effect during and following the IR. Consistent with the lower 8.3-mile ROD, EPA will evaluate enhancing the advisories with additional community outreach to encourage greater awareness. Also consistent with the lower 8.3 ROD, EPA will share monitoring data and consult with NJDEP about whether the fish and crab consumption restrictions can be lifted or adjusted to allow for increased consumption as contaminant levels decline.

ICs will be established through an Institutional Controls Implementation and Assurance Plan (ICIAP), or equivalent, which will document the ICs and necessary implementation, monitoring, and enforcement activities along with associated responsibilities and termination criteria.

12.2.4 Monitoring

Monitoring elements associated with the IR will consist of baseline, construction, confirmatory, O&M, and long-term monitoring.

Building on the CCMP data (evaluating bathymetry, surface water, and biota), the PDI will establish pre-remediation baseline conditions for comparison purposes and support the IR design. These monitoring elements are previously described in Section 12.1.1.

EPA anticipates that construction monitoring will include confirmatory bathymetric surveys to verify dredge depths and cap placement thicknesses, water quality monitoring, and sediment sampling to evaluate the efficacy of residuals management measures (e.g., limited sediment sampling after a dredging season, targeting newly deposited sediments, for the objective of evaluating the efficacy of and potential improvements to BMPs). Cap construction verification is also anticipated to include sediment coring to verify cap layer(s) thickness(es) and composition as prescribed by the IR design, and to evaluate potential mixing of cap layers with underlying sediments during cap placement. This information will be used to directly confirm achievement of cap layer IR design specifications. It will also help inform any future cap monitoring efforts focused on assessing the cap's performance in chemically isolating underlying contaminants. Performance metrics will be established during the IR design to ensure achievement of dredging and capping extents and other performance standards. Data and lessons learned from dredging, cap construction, cap construction monitoring, and physical and chemical cap performance monitoring at the RM 10.9 Removal area will be relied on to inform the IR construction monitoring approach.

Post-IR confirmation sampling will include sufficient samples to provide a statistically unbiased estimate of the post-IR SWACs. EPA anticipates this will include not less than 400 and not more than 800 sediment sample locations at which three closely spaced samples will be collected and composited. A multiple lines of evidence IR completion assessment process will be performed to verify that RAO 1 has been achieved. This assessment process is described in Section 12.3.

O&M monitoring of IR remediation areas will be conducted following construction to ensure long-term effectiveness. Bathymetry surveys and chemical monitoring will be performed to assess the continued stability and chemical isolation performance of the cap and any potential need for maintenance to ensure continued performance (e.g., replacement of eroded cap material and/or armor stone). Chemical monitoring to evaluate contaminant isolation may consist of sediment coring and sample analysis and/or the use of passive samplers. Data and lessons learned from cap performance monitoring at the RM 10.9 Removal area will inform the IR cap O&M monitoring approach. For cost estimating, EPA assumes cap O&M monitoring will continue until 30 years after the end of construction.

EPA expects that long-term monitoring will span two phases. The first will be a system response and recovery assessment phase to evaluate effectiveness of the IR, which will follow completion of IR construction and will continue for an estimated period of approximately 10 years. These years of monitoring data will support EPA's remedy selection decision regarding the need for additional remediation, if any, which will be documented in the final ROD. The second phase of long-term monitoring will occur following selection of a final remedy and issuance of the final

ROD. The post-IR system response and recovery monitoring activities will include assessment of sediments, surface water, and biota tissue to evaluate trends in concentrations and assess progress towards risk-based goals. Specific long-term monitoring needs for the final remedy will be documented in the final ROD. Assessing progress towards risk-based goals will initially be based on PRGs developed during/in parallel with the IR design, and later will be based on comparison to final RGs documented in the final ROD. Ultimately, monitoring may continue longer than 30 years, but 30 years is currently assumed consistent with EPA guidance for cost estimating.

Plans for all monitoring phases will be prepared for EPA approval before (the PDI) or in conjunction with the IR design. Monitoring approaches may be modified based on observed conditions in the LPRSA, in accordance with adaptive management principles (Section 12.5).

12.2.5 Habitat Considerations

There are expected to be short-term impacts to habitat (specifically intertidal mudflats and wetland areas) associated with IR construction and following completion of construction, as these habitat areas are disturbed and recover. IR design will include management of these areas to approximately restore the habitat that supports ecological value equal to current conditions and avoid net loss of habitat, in accordance with ARARs.

12.2.6 Construction Constraints

Various construction constraints may influence the proposal and selection of equipment and production rates in IR design and implementation. The possible constraints on the IR include:

- Bridges with low or limited crossing access, especially above RM 13.9
- Navigational constraints of shallow water or strong currents
- Migratory fish window limitations
- Critical structure protection (including utility corridors)

The ROD assumes a migratory fish window (i.e., when there would be a restriction on dredging) of March 1 to June 1 annually. The ROD also assumes that there will be an annual shutdown for winter weather, potentially January 1 to March 1. Further evaluation of construction constraints, including specific seasonal restrictions and physical/infrastructure impediments, and potential strategies to mitigate the associated impact on construction will be completed during IR design.

12.2.7 Green and Sustainable Remediation

A green and sustainable remediation (GSR) evaluation of a range of metrics was performed to compare the environmental, social, and economic impacts of implementing an IR. In summary, the GSR impacts are proportional to remedy size; the smallest remedial footprint has the smallest impacts, and impacts increase with increasing size of remedial footprints. The primary contributors to greenhouse gas emissions and energy consumption are equipment use during dredging and capping remediation activities, sediment dewatering, and the transportation of equipment and materials on- and off-site. Potential injuries are most influenced by the project duration and worker travel/transportation via roads and flights.

While not a formal CERCLA evaluation criterion, the GSR evaluation provides a way to measure the sustainability of an IR, with a goal of protecting the environment and minimizing community impacts. The concept of "sustainability" is not one of the NCP's criteria, however EPA may consider "greener" activities when those can be incorporated into alternatives and evaluated under specific NCP criteria.

The environmental benefits of the selected IR may be enhanced by consideration of technologies and practices during the design of the IR that are sustainable in accordance with EPA Region 2's Clean and Green policy.

In addition, during oversight of the IR design, EPA will closely evaluate climate change issues and climate change resiliency to ensure that climate change impacts are considered and addressed to the extent practicable and feasible, in accordance with federal and state resiliency initiatives. During IR design, capping materials will be evaluated, such as armoring, to ensure that the remedy can withstand potentially increased storm intensity due to climate change impacts. In addition, long term monitoring will be implemented to assess and maintain cap stability.

12.2.8 Selected Remedy Technologies

All active alternatives, including the selected IR for the upper 9 miles of the LPRSA, were developed by evaluating general response actions and combining remediation technologies and process options (i.e., a specific tool, method, or approach within a technology category) that were retained after a screening evaluation performed in accordance with CERCLA and the NCP. Technologies/process options were retained if they were judged to be suitable for the site, suitable for the contaminants of interest, overall effective relative to IR objectives, implementable, and appropriately cost effective.

However, certain technologies/process options were identified in the IR FS as "retained for further evaluation during IR design." Specific technologies/process options were considered to be potentially effective and potentially implementable and may warrant further consideration during IR design, but were not incorporated directly into the IR alternatives, including the selected IR. These include enhanced natural recovery, in situ sediment treatment, ex situ sediment treatment (soil washing, thermal desorption, thermal destruction, incineration, vitrification), composite capping or reactive capping, specialty dredging, hydraulic dredging, hydraulic transport, confined aquatic disposal, off-site landfill disposal at a Subtitle D landfill, and beneficial reuse. During the IR design, alternate technologies will be considered if and as necessary to overcome identified design and implementation challenges for discrete portions of the IR footprint. EPA will document changes to the selected remedy consistent with the requirements of the NCP.

12.3 Remedy Completion

The IR will be deemed successful and complete if it achieves the RAO SWAC goals. Assessing achievement of SWAC goals will rely on interpreting post-IR sediment data, which will not yield a precise estimate of SWAC because of the expected variability of concentrations and the nature of statistical assessment of averages. PDI data will likely reduce uncertainties and a balance between SWAC precision and post-IR confirmation sampling sample size will be sought. This balance will be adequate when the rates of false negative (i.e., the IR is judged to be unsuccessful when the post-IR SWACs do in fact comply with the RAO SWAC goals) and false positive (i.e., the IR is judged to be successful when the post-IR SWACs do not in fact comply with the RAO SWAC goals) post-IR decisions are suitably controlled. For purposes of this ROD, EPA, in consultation with and NJDEP, has determined that acceptable rates of false negative and false positive decisions are 5 percent and 10 percent, respectively.

A statistical assessment of post-IR sediment concentrations will be the first line of evidence in determining IR completion. If statistical assessment demonstrates attainment of the RAO SWAC goals, EPA will judge the IR successful. If statistical assessment fails to demonstrate success in achieving the RAO SWAC goals, the IR could still be deemed complete if effective source sediments control is indicated by a weight of evidence approach using other lines of evidence (LOEs).

Before the post-IR sediment data are collected, three of the LOEs will have been fully evaluated:

1. The mapping of total PCB and 2,3,7,8-TCDD concentrations and areas vulnerable to erosion and the use of that mapping to delineate areas to be remediated.
2. The comprehensiveness of the IR design to address the identified sediment sources, including the sequential application of RAO 2 after RAO 1 to derive the IR footprint.
3. The degree to which IR implementation is judged acceptable through construction performance monitoring and a construction certification process that will evaluate IR implementation over smaller spatial scales (dredge management units).

If the statistical assessment indicates that the IR is not conclusively successful, a final LOE will be applied. This final LOE will assess whether sediment source areas remain (i.e., surface concentrations that are above a surface RAL). The absence of surface RAL exceedances would be strong evidence of IR completion. If there are surface sediment concentrations above the surface RAL, an evaluation of the overall IR implementation will occur, incorporating the aforementioned LOEs to identify and explain observed concentration patterns. If EPA concludes that the identified sediment sources are actionable and can be effectively remediated based on size, location, and bottom type, additional sediment removal/ capping of the identified areas will be performed, or an additional FS will be developed. Otherwise, if there are no such actionable sediment sources, EPA will deem the IR complete by weight of evidence. A weight of evidence assessment protocol was developed in the IR FS, and is included in as Appendix H to the IR FS document. During the IR design, the weight of evidence approach will be refined to select specific statistical testing parameters and to provide a more detailed basis for characterizing sediments as actionable following IR implementation and post-IR sediment sampling, as needed.

12.4 Summary of the Estimated Cost of the Selected IR

The estimated capital, long-term O&M and total present value costs, as well as construction time and time to achieve RAOs for the selected remedy are summarized below. The cost estimate details are presented in Table 12-1 (Appendix 2). The cost estimate assumes that long-term monitoring and maintenance will occur throughout a 30-year period following completion of construction, including both response and recovery assessment monitoring following the IR, though, as explained above, additional long-term monitoring may be specified when a final remedy is selected under a final ROD.

PV Capital Cost:	**$413 million**
PV Annual O&M Cost:	**$0.94 million**
Total PV Cost:	**$441 million**
Construction Time:	**4.6 years**
Time to Achieve RAOs:	**7.6 years**

Consistent with CERCLA, the cost estimate is expected to be within +50 percent to -30 percent of the actual cost for implementation of the IR. As expected for a project of this size and nature, the cost estimate has scope and bid uncertainties. Major scope uncertainties that were identified are:

- Remedy approach changes in the IR design
- Area of the final IR footprint needed to achieve RAOs (to be evaluated following the PDI)
- Dredging depth (including over dredge allowance) needed to accommodate final cap design
- Selection of dredged material transportation options and landfill type
- Extent of operations, maintenance, and monitoring (OMM) activities (e.g., sample collection, cap maintenance)
- Additional regulatory requirements

Bid uncertainties that were identified are:

- Unforeseen dredging challenges (e.g., hardpan, debris, utilities)
- Major delays due to external factors (e.g., bridge failure, extreme weather events)
- Changes in regulatory requirements during the project
- Market condition variations that affect pricing of goods and services

Dredged materials will be processed at one or more nearby commercial processing facilities for off-site disposal at licensed disposal facilities; an additional uncertainty is the location of the sediment processing facility. A sensitivity analysis was performed to assess the response to changes in key factors, or elements, of the costs estimate. First, varying discount rates showed the total net present value costs, discounted at a rate of 7 percent (the EPA default discount rate used for the cost estimate), are approximately 20 percent lower than the undiscounted costs. Total net present value costs discounted at a rate of 1.5 percent are approximately 17- to 19-percent higher than those discounted at 7 percent. Also, increasing the total contingency from 25 percent, assumed in the cost estimate, to 35 percent, increases total net present value costs by approximately 6 to 7 percent. Additionally, two construction elements were compared in the sensitivity analysis: (1) Dredging Method (mechanical versus hydraulic), and (2) Disposal Landfills (Subtitle C versus Subtitle D). A screening-level evaluation performed for Alternative 3 (the selected remedy in this ROD) in the IR FS shows that estimated hydraulic dredging costs are approximately 16-percent higher than mechanical dredging costs and for the landfill assessment, overall costs were 15- to 17-percent lower with sediments disposed at a Subtitle D landfill compared with disposal at a Subtitle C landfill.

12.5 Expected Outcomes of the Selected IR

The selected IR, which is for sediment source control in the upper 9 miles of the LPRSA, will be designed to attain the IR RAOs, and will achieve the following:

- Removal of sediments with elevated concentrations of 2,3,7,8-TCDD, PCBs, and other contaminants that are collocated in the IR footprint, that might resuspend and become sources to the water column, other areas of the sediment bed, and biota, and that overall act to inhibit system recovery and contribute to human health and ecological risk.
- Immediate and significant reduction in SWACs for 2,3,7,8-TCDD and total PCBs in the reach RM 8.3 to RM 15, where current data suggest the source sediments to be addressed by the IR are located.
    - A SWAC of 75 ppt (or less, depending on the amount of additional area included in the IR footprint to attain RAO 2) for 2,3,7,8-TCDD, which represents a 93-percent reduction from the current SWAC based on currently available data.
    - A SWAC of 0.27 ppm for total PCBs, which represents an 83-percent reduction from the current SWAC based on currently available data and is below the PCB background level.
- Attainment of the IR RAOs, including addressing areas that might be subject to erosion that could expose buried contaminated sediments.
- Placement of an engineered cap that is resistant to erosion and chemical migration, isolates underlying contaminated sediments from exposure by receptors, and does not exacerbate flooding issues in the river.
- Accelerated recovery of surface sediment concentrations of 2,3,7,8-TCDD and PCBs, and other contaminants.
- Accelerated recovery of surface water concentrations of 2,3,7,8-TCDD and PCBs, and other contaminants.

- Accelerated recovery of fish and crab tissue concentrations of 2,3,7,8-TCDD and PCBs, and other contaminants, resulting from reduced concentrations in the sediment bed and water column.
- Reduced potential for human and ecological exposure to 2,3,7,8-TCDD and PCBs, and other contaminants, resulting from sediments, surface water, and tissue concentration reductions.
- Reduced risk to human and ecological receptors.
- Acceleration of the timeline for significant action in the upper 9 miles of the LPRSA (implementing the IR for the upper 9 miles under an adaptive management framework will lead to significant remediation and risk reduction in this reach of the river several years faster than would be realized without the IR).
- Technical and schedule synchronization with the lower 8.3-mile remedy, limiting the period of time that construction occurs in the river, effectively managing relationships between the two actions (e.g., generation and movement of dredging residuals between the upper 9 miles and lower 8.3 miles), minimizing short-term impacts to adjacent communities, and achieving economies of scale.
- Reductions of EJ burdens to adjacent communities, and the potential for opportunities for economic advancement in the LPRSA region (e.g., through promoting the use of the Superfund Job Training Initiative to the parties performing the remedy).
- Implementation, monitoring, and enforcement of ICs to ensure protection of human receptors from site risks.
- Post-IR conditions that are readily measurable, including over the long-term, to evaluate contaminant reduction trends and facilitate selection of a final risk-based remedy.

12.6 Adaptive Management

Consistent with EPA guidance, adaptive management is a formal and systematic management approach centered on rigorous planning and understanding of site conditions and uncertainties. This technique leverages continuous reevaluation and prioritization of the management of site activities and decisions to account for new learning and evolving site conditions.

For complex, large-scale sediment remediation projects such as for the LPRSA, adaptive management can play a central role in several important ways:

- Further developing and refining the CSM and quantitative models of system behavior, including transport, bioaccumulation, and recovery processes
- Reducing uncertainty in remedial decision-making by learning from new information and data that become available through site characterization, design and implementation of remedial actions, and monitoring
- Testing and evaluating the response of the system to remedial actions
- Modifying key hypotheses on system behavior and/or associated response actions, when needed, to support final site cleanup

Consistent with the goals of the EPA Superfund program, the overall objective of adaptive management for the LPRSA is to ensure the attainment of risk-protective final RGs as expeditiously and cost-effectively as possible. To meet this objective, remediation of the upper 9 miles of the LPRSA will be adaptively managed under a multistep process. The first step will be the design and implementation of the source control IR documented in this ROD for the upper 9 miles, along with expanding the Adaptive Management Implementation Approach (Appendix D of the IR FS) into a more comprehensive adaptive management plan which over time will be developed to include the decision points on remedy adaptation, the preliminary remediation goals and eventually the RAOs and remediation goals for the final actions, and general timeframes for the interim and final actions. The adaptive management plan will be periodically reviewed and updated based on new site data or information, if warranted.

The IR will be followed by a period of response and recovery assessment monitoring to evaluate the response of the system to the source removal and track the longer-term recovery of sediments, the water column, and biota. This period of monitoring is anticipated to last for approximately 10 years, during which recovery of the system will be monitored in comparison to PRGs. Based on the results of the recovery assessment monitoring, EPA will issue a final ROD for the LPRSA that finalizes risk-based RGs and specifies any additional actions beyond the IR that are needed to address remaining risks and attain the RGs. The final ROD will be risk-based and will address sediments in the upper 9 miles of the river (the IR will lead to substantial reduction in contaminant concentrations in the upper 9 miles, and thereby reduction in risk, but some risk may remain following the IR) and surface water throughout the LPRSA (the IR documented in this ROD does not explicitly focus on surface water, and the remedy for the lower 8.3 miles of the LPRSA is an interim remedy for surface water).

The data that will be collected prior to, during, and following the IR will guide the planned multistep remedial action for the upper 9 miles. The outcome of the process will answer the critical overarching question: *what actions are required to promote and attain the overall protection of human health and the environment, initially for the upper 9 miles of the LPRSA and subsequently for the entire LPRSA*.

Activities to support adaptive management of the LPRSA are currently under way, with ongoing data collection to describe current conditions and inform decision-making throughout the program. Adaptive management activities will continue through the IR design phase, when initial PRGs and expected recovery trajectories are established, and through response and recovery assessment monitoring to assess system response and track progress with respect to PRGs, issuance of a final ROD, and, ultimately, confirmation of the attainment of final RGs. More information can be found in Appendix D of the IR FS.

The three elements identified in the Adaptive Management Implementation Approach function in parallel and overlapping fashion, relying on information from the several phases of monitoring activities to be performed before, during, and following the completion of the IR. The approach (and comprehensive adaptive management plan, as available) will be refined and expanded during the IR design phase and at the initiation of recovery assessment monitoring, at minimum, as data and information become available to add details to support evaluations and decision-making or when new guidance is issued. Figure 12-1 in Appendix 1 demonstrates the adaptive management framework. As shown on this figure and discussed elsewhere in this ROD, EPA anticipates that the IR will take approximately 4.6 years to construct, followed by up to 3 years to complete the IR confirmation process. Post-IR system response and recovery monitoring will occur simultaneously and are anticipated to last for approximately 10 years. During this time, PRGs may be refined and other adaptive responses implemented, at which point EPA will make a decision regarding the trends in system recovery and the need for further action to address remaining site risks. A final FS will be developed to evaluate final remedy alternatives, and a final ROD will be developed to memorialize final RGs and a final remedy.

13. STATUTORY DETERMINATIONS

The selection of an alternative for remedial action is accomplished through the evaluation of the criteria as specified in the NCP. EPA has determined that the selected IR alternative documented in this ROD meets the threshold criteria and provides the best balance of tradeoffs relative to the other alternatives with respect to the balancing and modifying criteria. The selected IR will satisfy the following statutory requirements of CERCLA Section 121: (1) be protective of human health and the environment, (2) comply with ARARs, (3) be cost effective, (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and (5) satisfy the statutory preference for treatment as a principal element to the extent practicable or explain why the preference will not be met. With respect to the two modifying criteria (state acceptance and community acceptance), NJDEP concurs with EPA's preferred alternative and community acceptance has been evaluated through the public comment period associated with the Proposed Plan.

This IR is protective of human health and the environment in the short term and is intended to provide adequate protection until a final ROD is signed, complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action, and is cost effective. Although the IR is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, it uses treatment via stabilization of dredged sediments during processing and disposal and the use of cap materials that prevent the migration of contaminants, and thus supports that statutory mandate and the statutory preference for treatment as a principal element to the extent practicable.

Because this is an IR ROD, assessment will be ongoing as EPA continues to monitor system response and recovery and develop final remedial alternatives for a risk-based remedy for the LPRSA.

13.1 Protection of Human Health and the Environment

As an interim remedy, the selected IR will provide adequate protection until a final ROD is signed. The selected IR is expected to be protective of human health and the environment from the threat it is addressing in the short term. PRGs will be developed during/in parallel with the IR design and used to assess recovery of the system after the IR, and EPA expects to evaluate final cleanup levels in the final remedy decision for the LPRSA.

The selected IR, with a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt, meets the threshold criteria of overall protection of human health and the environment and compliance with ARARs. This alternative effectively achieves sediment source control based on the definition of source sediments for the IR and will yield accelerated recovery of the LPR system that will be verified. The IR will be followed by a period of system response and system recovery assessment monitoring to evaluate the response of the system to the sediment source removal and track the recovery of sediments, the water column, and biota.

13.2 Compliance with ARARs

There are no chemical-specific ARARs for sediments. The selected IR will be designed and implemented to comply with all substantive location- and action-specific ARARs. The IR could require one or more ARAR waivers during construction to meet threshold criterion of compliance with ARARs. EPA expects the IR to comply with the ARARs through appropriate engineering design and agency review processes. Confirmation of ARARs compliance is typically demonstrated during remedial design and through the remedial action work plan (e.g., environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and BMPs) as well as monitoring during the construction period. A final risk-based remedy for sediments in the upper 9 miles and surface water throughout the LPR will be established in the final ROD for the 17-mile LPRSA. While EPA anticipates that the IR will improve water quality, ARARs for water quality may not be achieved following completion; however, no evaluation of the potential need for a technical impracticability waiver was performed as part of the IR FS or this ROD.

13.3 Cost-Effectiveness

A cost-effective remedy is one for which costs are proportional to its overall effectiveness (NCP at 40 CFR Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluation of the following: long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost, to determine cost-effectiveness. Costs for the selected IR were evaluated in detail. Capital and annual O&M costs were estimated and used to develop present worth costs. In the present worth costs, annual O&M costs were calculated for the life of the IR using a 7-percent discount rate and a 30-year interval. Based on the comparison of overall effectiveness to cost, the selected IR meets the statutory requirement that Superfund remedies be cost effective. The selected IR will attain the IR RAOs, including achieving a post-IR 2,3,7,8-TCDD SWAC of not more than 85 ppt and a post-IR total PCB SWAC equal to or less than background, at a cost of $441 million, which is $21 million more than Alternative 2, and $27 million less than Alternative 4.

13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected IR provides the best balance of tradeoffs among the alternatives considered with respect to the balancing criteria set forth in the NCP at 40 C.F.R. Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at the LPRSA. Of those alternatives that were judged to be protective of human health and the environment and to comply with ARARs, EPA has determined that the selected IR provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and State and community acceptance.

The selected IR will provide adequate long-term control of risks to human health and the environment by removing and/or preventing exposure to contaminated sediments and otherwise preventing movement of contaminated sediments. It is also protective with respect to short-term risks. Sediment dredging and capping are mature and proven technologies, along with the ancillary IR elements, and with proper design, construction, and O&M, a sediment cap is a permanently protective remedy solution. During IR design, certain alternative treatment technologies will be considered to the extent that construction limitations would prevent the implementation of the selected dredging and capping approach in isolated areas.

13.5 Preference for Treatment as a Principal Element

Although CERCLA §121(b) also expresses a preference for selection of remedial actions that use permanent solutions and treatment technologies to the maximum extent practicable, there are situations that may limit the use of treatment, including when treatment technologies are not technically feasible or when the extraordinary size or complexity of a site makes implementation of treatment technologies impracticable.

The IR includes removal, disposal, and containment to reduce contaminant toxicity and mobility. Contaminants will be treated ex situ by stabilization during sediment processing, and in situ by the organic carbon content of the cap. Dredged sediments will be solidified and stabilized via treatment with a reagent admixture (e.g., Portland cement), which will reduce toxicity and mobility before disposal. The reagent will solidify the sediments by reducing the water content to levels appropriate for transportation and disposal at a permitted landfill. Chemical stabilization by the reagent will further immobilize contaminants within the dredged sediments. Solidification and stabilization are considered irreversible, but this component of treatment does not address residuals that would remain in the LPR. Based on currently available data, an in-situ sediment volume of 387,000 cy will be dewatered and processed (solidified and stabilized) ex situ at a nearby commercial processing facility. Implementation of the IR will result in the removal of approximately 610 g of 2,3,7,8-TCDD (of the approximate total of 740 g in upper 2.5 ft of the sediment bed in RM 8.3 to RM 15) and approximately 840 kg of total PCBs (of the approximate total of 1,270 kg in the upper 2.5 ft of the sediment bed in RM 8.3 to RM 15), based on currently available data.

The conceptual sediment cap design for the IR includes 5-percent organic carbon content in the sand isolation layer, which will reduce the mobility of residual contaminants in the IR footprint (96 acres based on available data and evaluations in the IR FS). Organic carbon in the cap will inhibit potential contaminant movement through the cap and the cap will be designed to prevent cap breakthrough within 100 years of placement. Capping is considered to be permanent, and the remaining residuals within the dredge footprint will be covered. Remaining contamination is expected to be effectively sequestered by this treatment action.
In situ sediment treatment options have been retained for consideration in the IR design, and, if implemented, would address contaminants in areas where active dredging and capping are not possible (e.g., utility crossings, bridge abutments, and critical shoreline structures).

13.6 Five-Year Review Requirements

Because the selected IR will result in hazardous substances, pollutants, or contaminants remaining in sediments above levels that allow for unlimited use and unrestricted exposure, reviews will be conducted every five years after initiation of the IR to ensure that the IR is, or will be, protective of human health and the environment.

Because this is an IR ROD, review of this action will be ongoing as EPA continues to develop final remedial alternatives for the LPRSA.

14. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan identified the preferred alternative for the IR as Alternative 3: 2,3,7,8-TCDD SWAC of 75 ppt, total PCB RAL of 1 ppm. That alternative constitutes the selected remedy in this ROD. Responses have been prepared for the comments received during the public comment period from April 15, 2021 to June 14, 2021 and at the Proposed Plan public meeting on April 27, 2021. The comments and responses are provided in Appendix 5, Responsiveness Summary. Upon review of the comments, EPA has determined that no significant changes to the selected remedy, as it was presented in the Proposed Plan, are warranted.

APPENDICES

APPENDIX 1

FIGURES

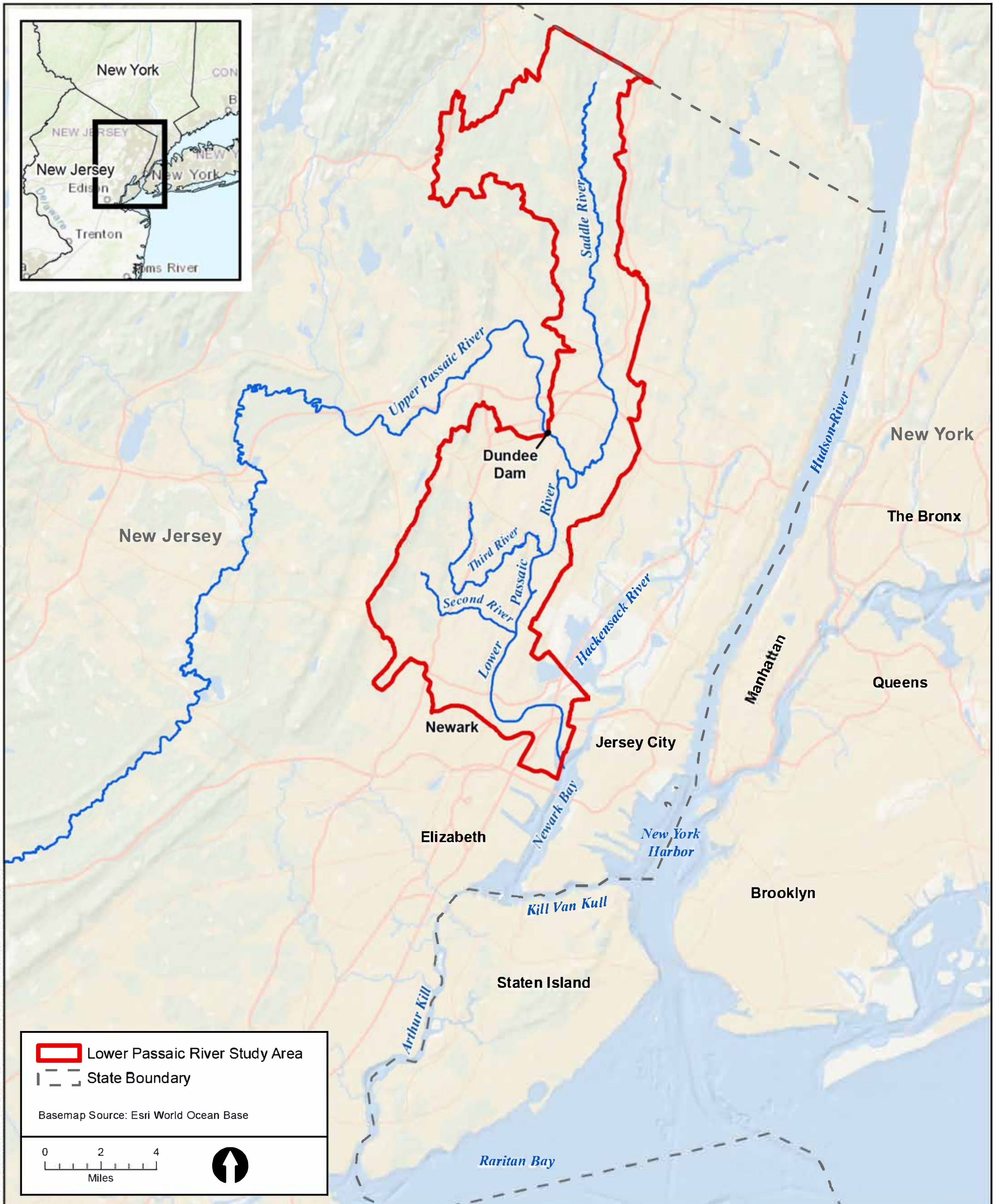

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Figure 1-1
Lower Passaic River Study Area
Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4

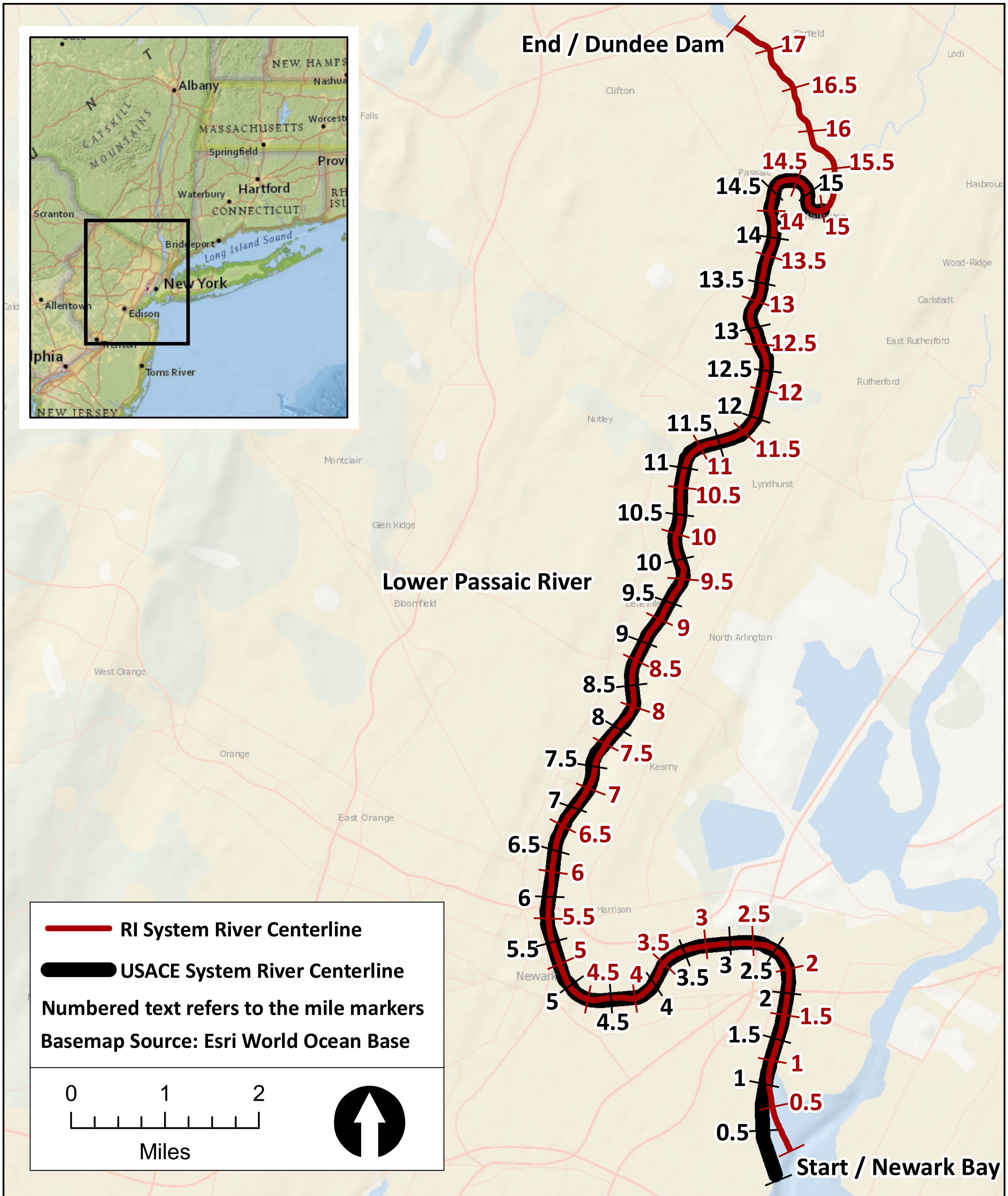


Figure 1-2
River Mile Systems
Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4

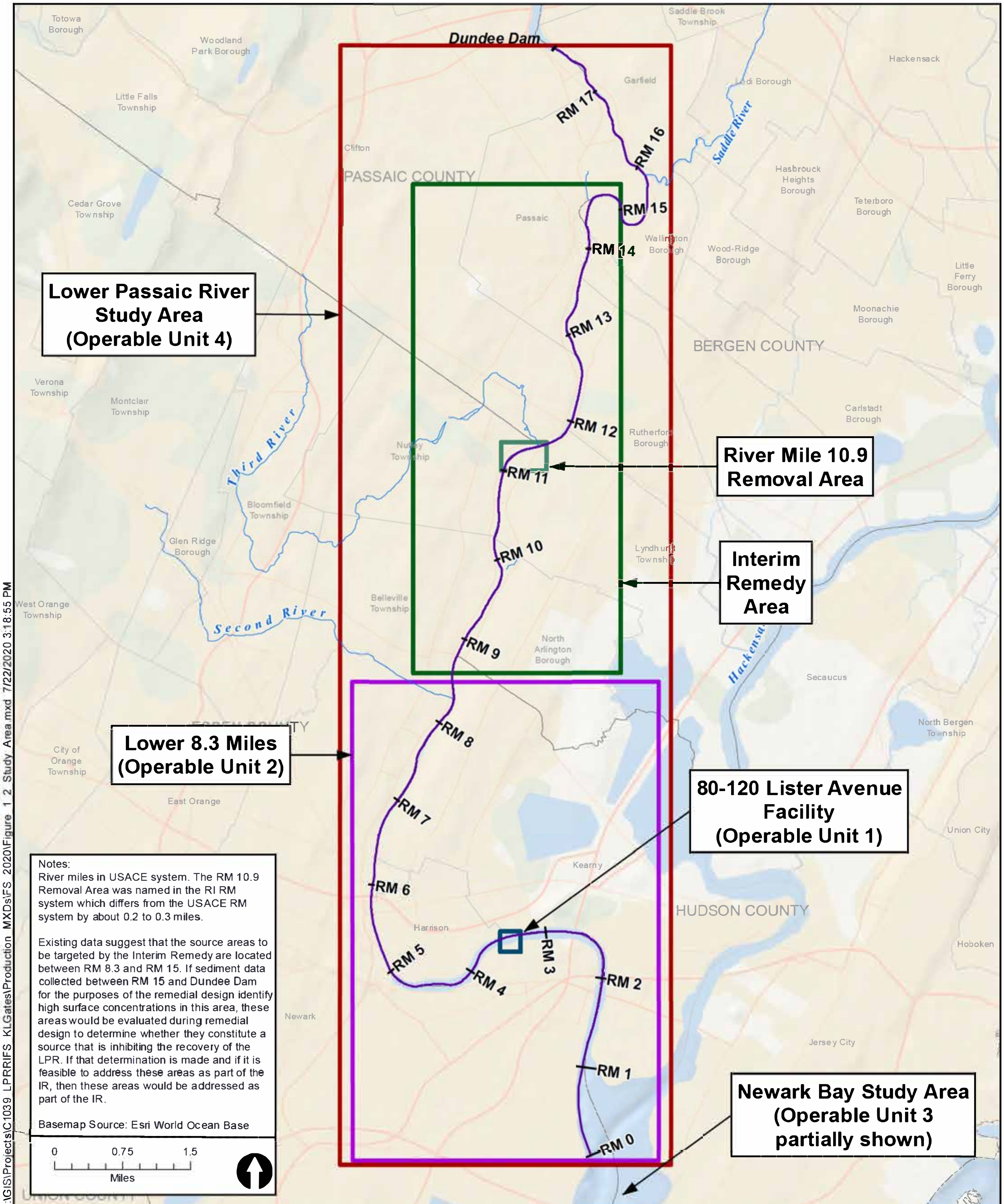
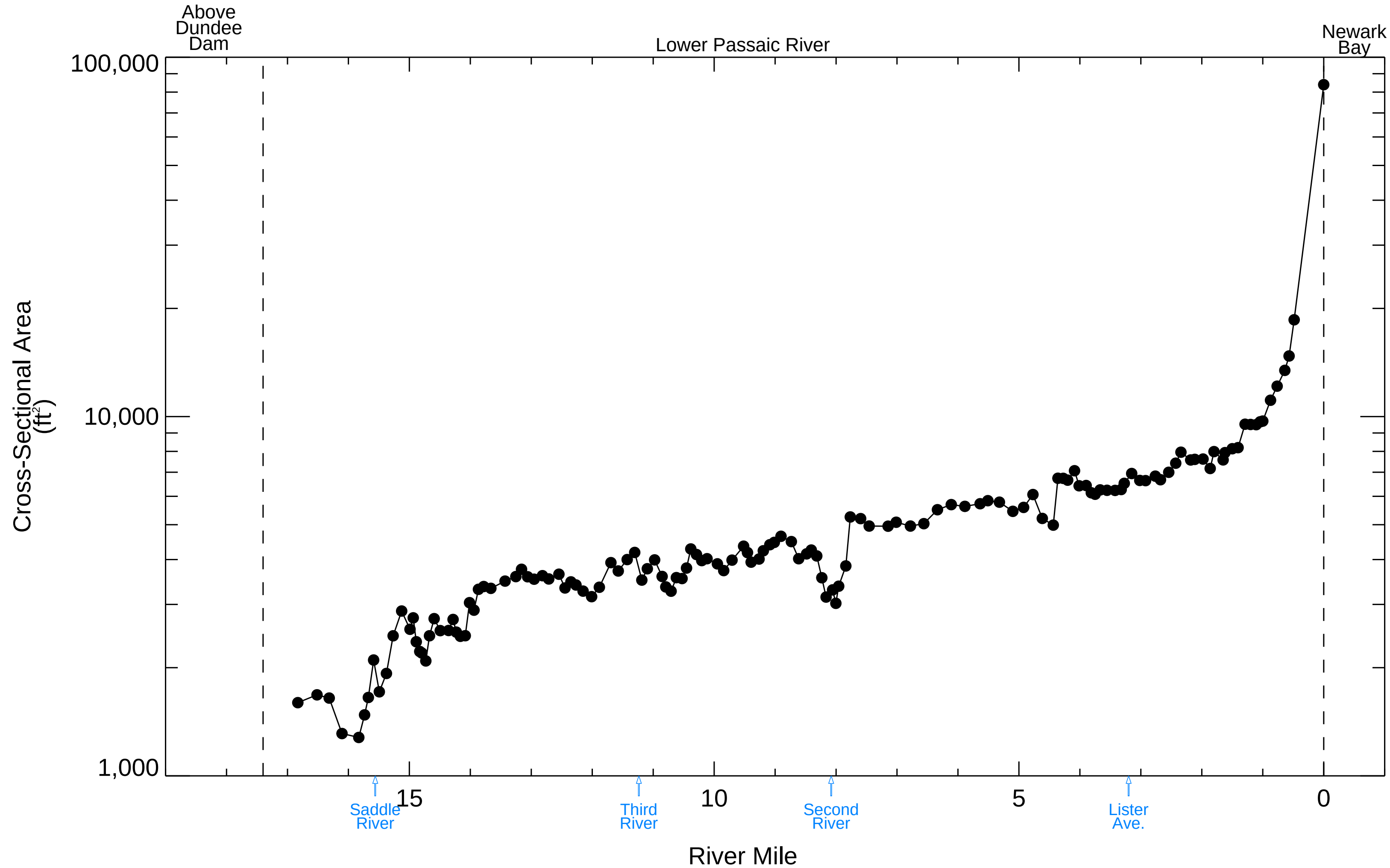


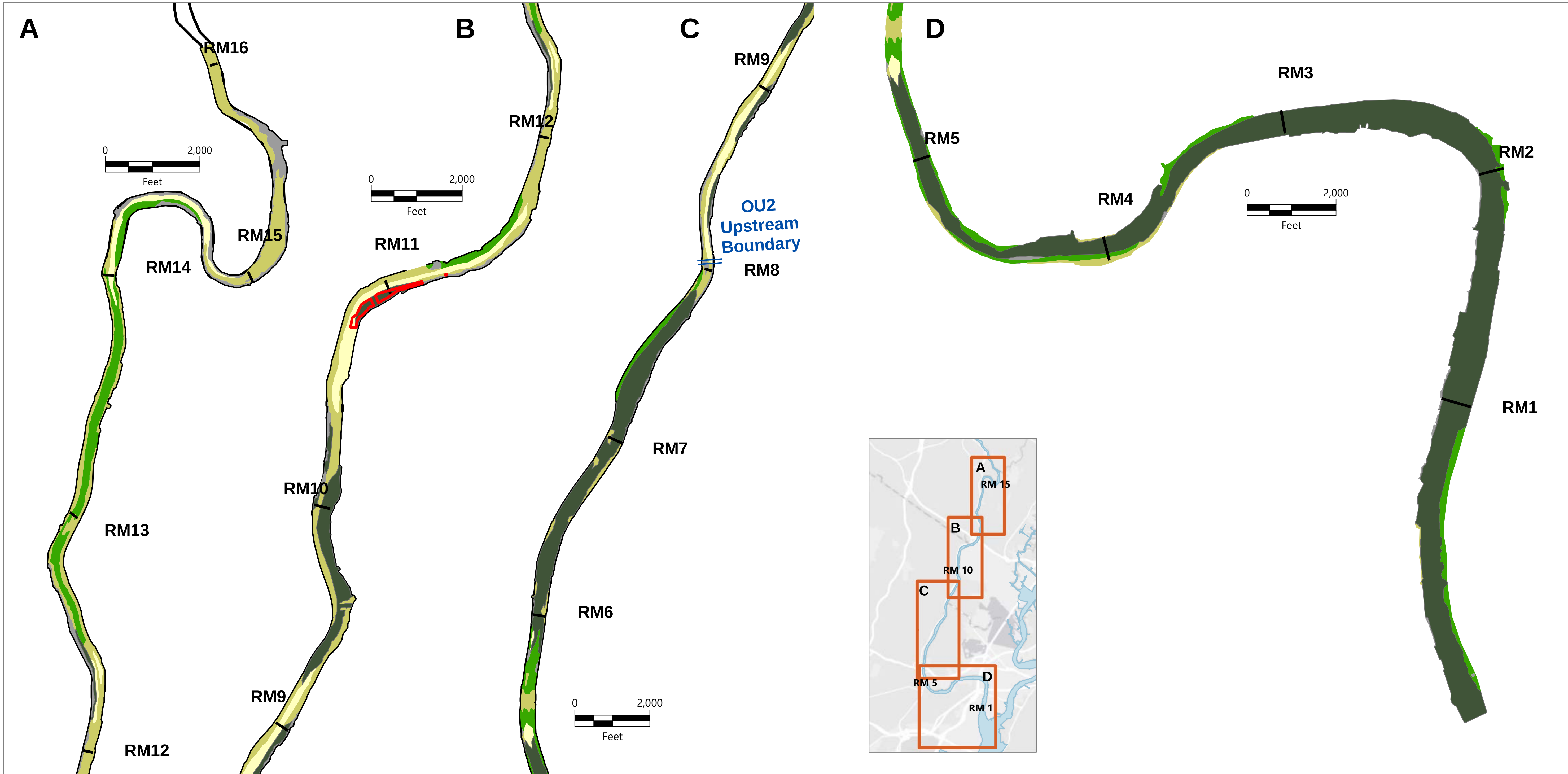
Figure 4-1
Operable Unit Layout
Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4



Cross-Sectional area calculated using model water depths on October 1, 2004. Above RM 0.5, cross-sectional area is calculated going across the river by model j.
At RM 0, cross-sectional area is calculated along the diagonal RM 0 line.

Figure 5-1

Cross-Sectional Area of the Lower Passaic River



LEGEND:

- TCRA remediated in 2013-2014
- River Mile
- Shoreline

SSS Sediment Types

- Rock and Coarse Gravel
- Gravel and Sand
- Sand
- Silt and Sand
- Silt

NOTES:
SSS - Side Scan Sonar
Cores located in the TCRA Area were subjected to remediation in 2013-2014

Figure 5-2
Grain Size by River Mile
Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4

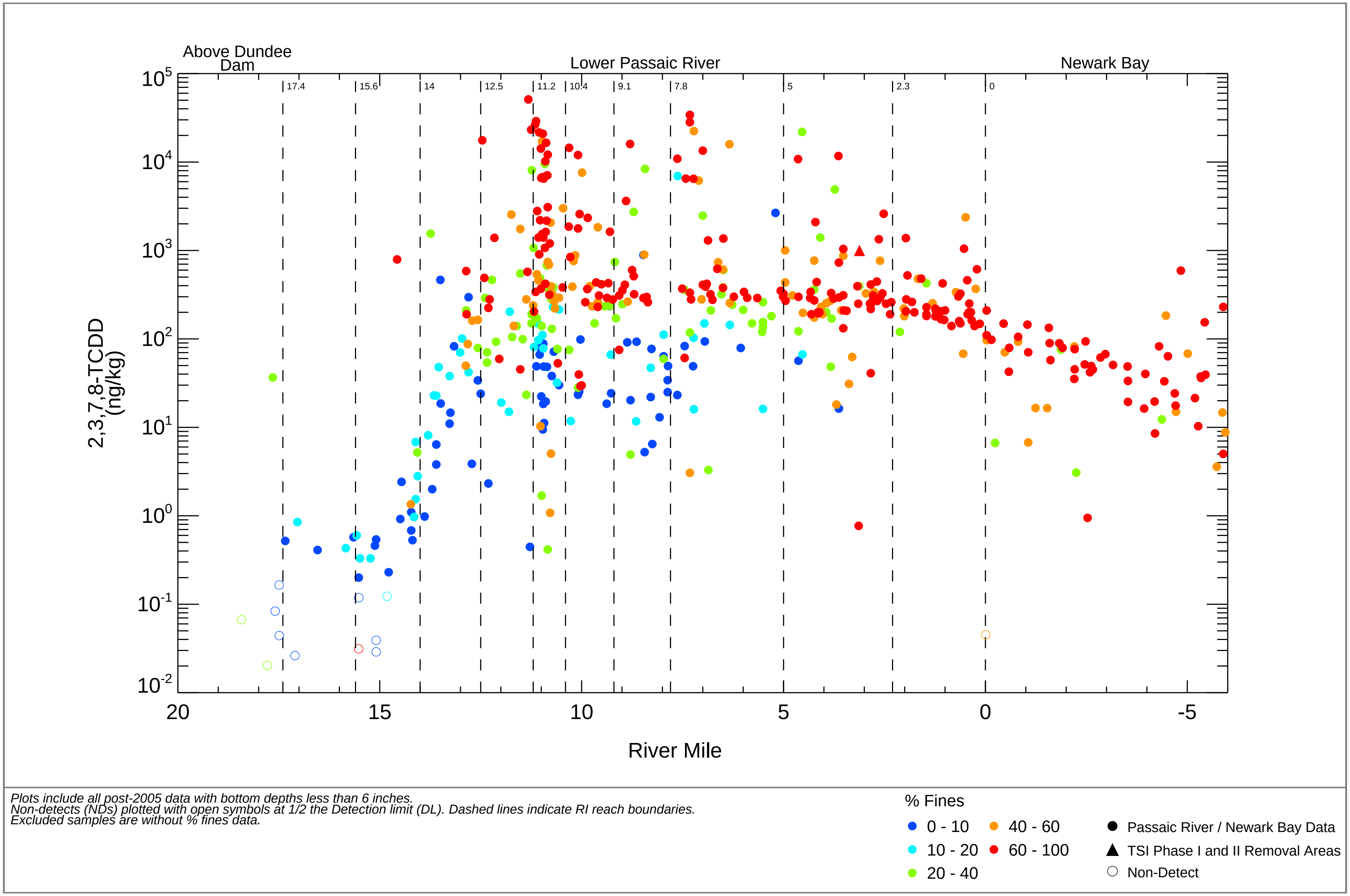
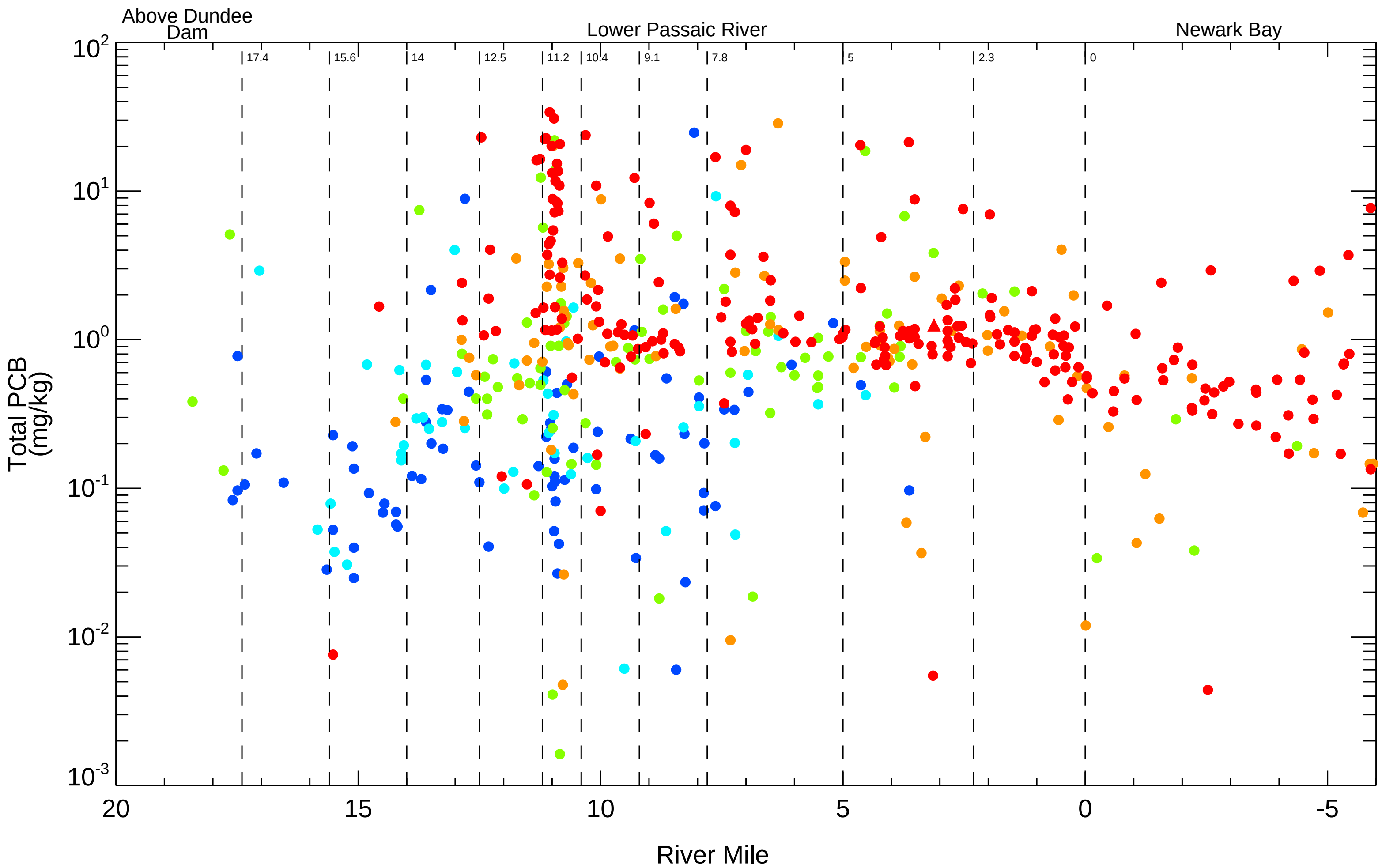


Figure 5-3

2,3,7,8-TCDD Concentrations in Surface Sediments of LPR and Newark Bay

Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4



Plots include all post-2005 data with bottom depths less than 6 inches.
Non-detects (NDs) plotted with open symbols at 1/2 the Detection limit (DL). Dashed lines indicate RI reach boundaries.
Excluded samples are without % fines data.

% Fines
- 0 - 10
- 10 - 20
- 20 - 40
- 40 - 60
- 60 - 100

- ● Passaic River / Newark Bay Data
- ▲ TSI Phase I and II Removal Areas
- ○ Non-Detect

Figure 5-4

Total PCB Concentrations in Surface Sediments of LPR and Newark Bay

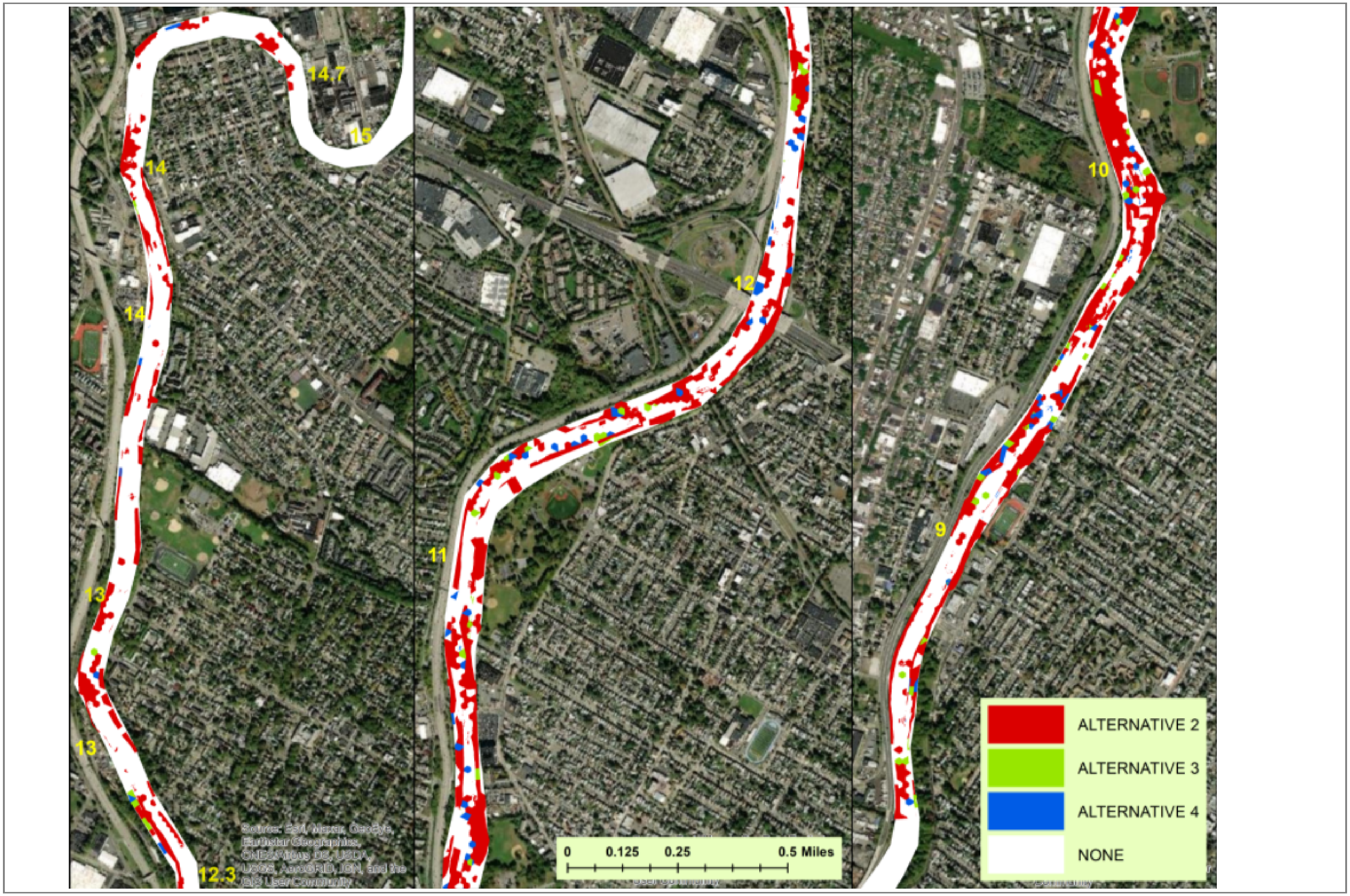


Figure 9-1

Comparison of Footprints: Alternatives 2, 3, and 4

Record of Decision

Lower Passaic River Study Area

Diamond Alkali OU4

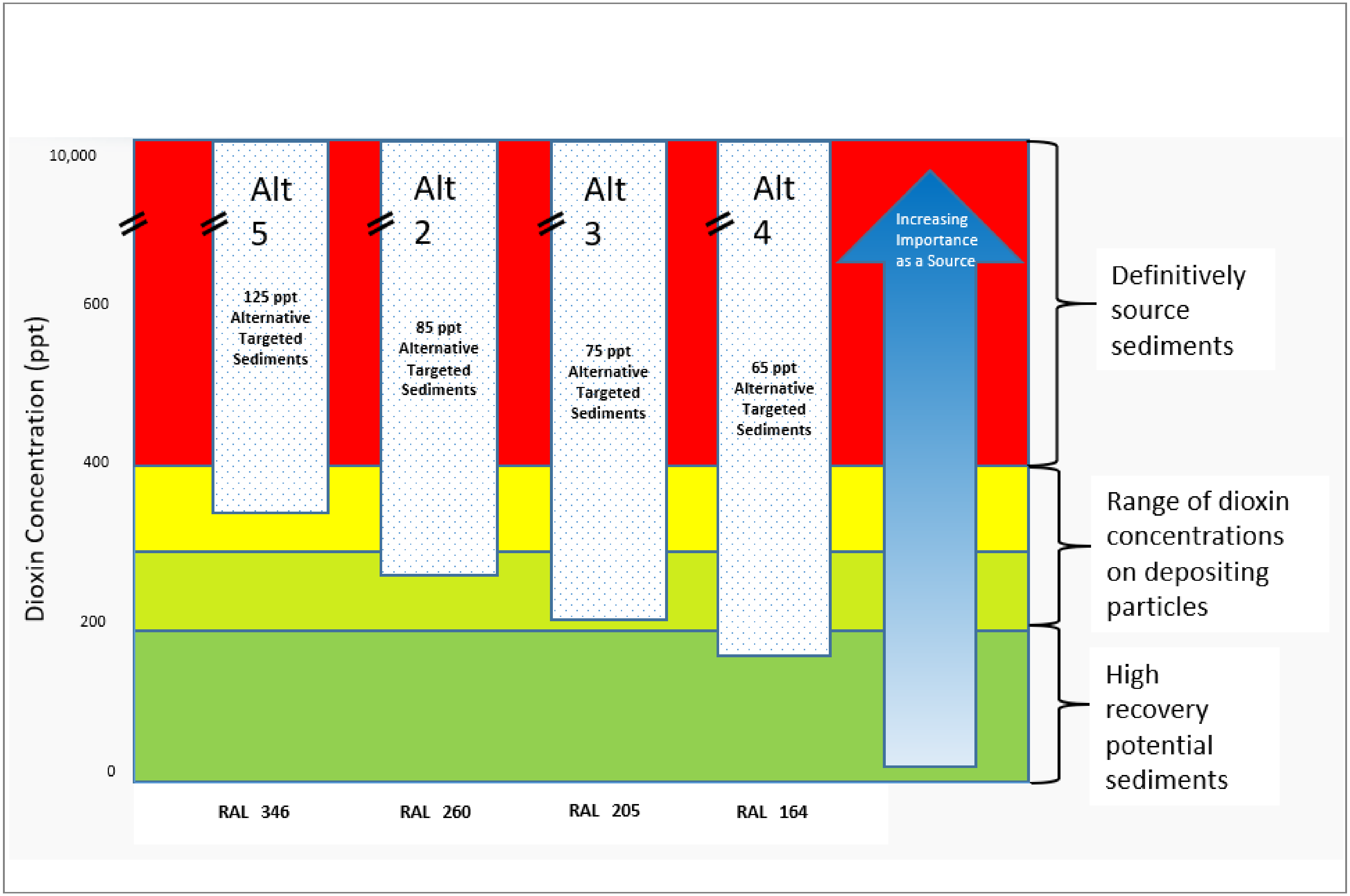


Figure 10-1

Comparison of Alternatives: Efficacy of Remedial Action Levels

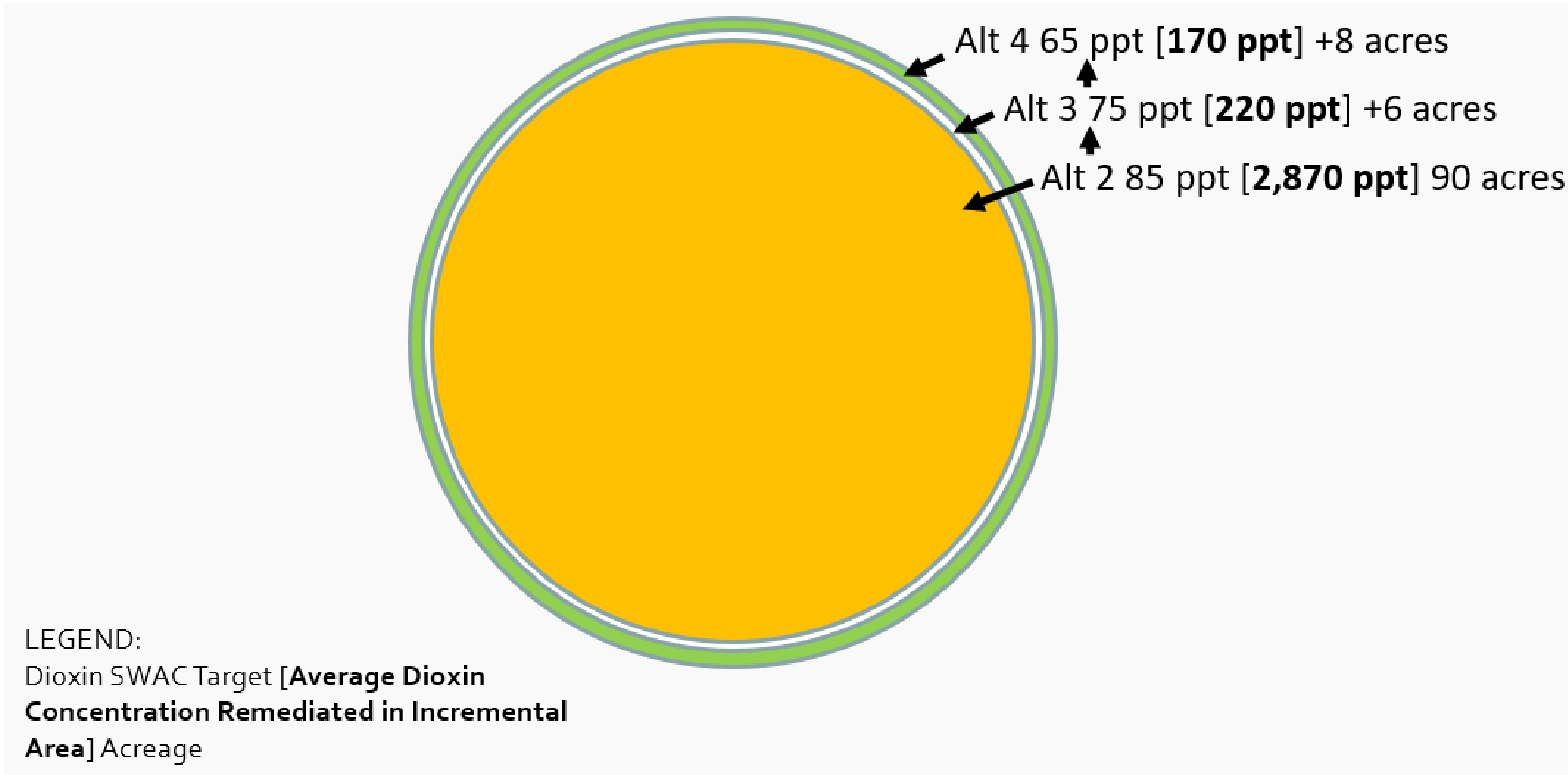
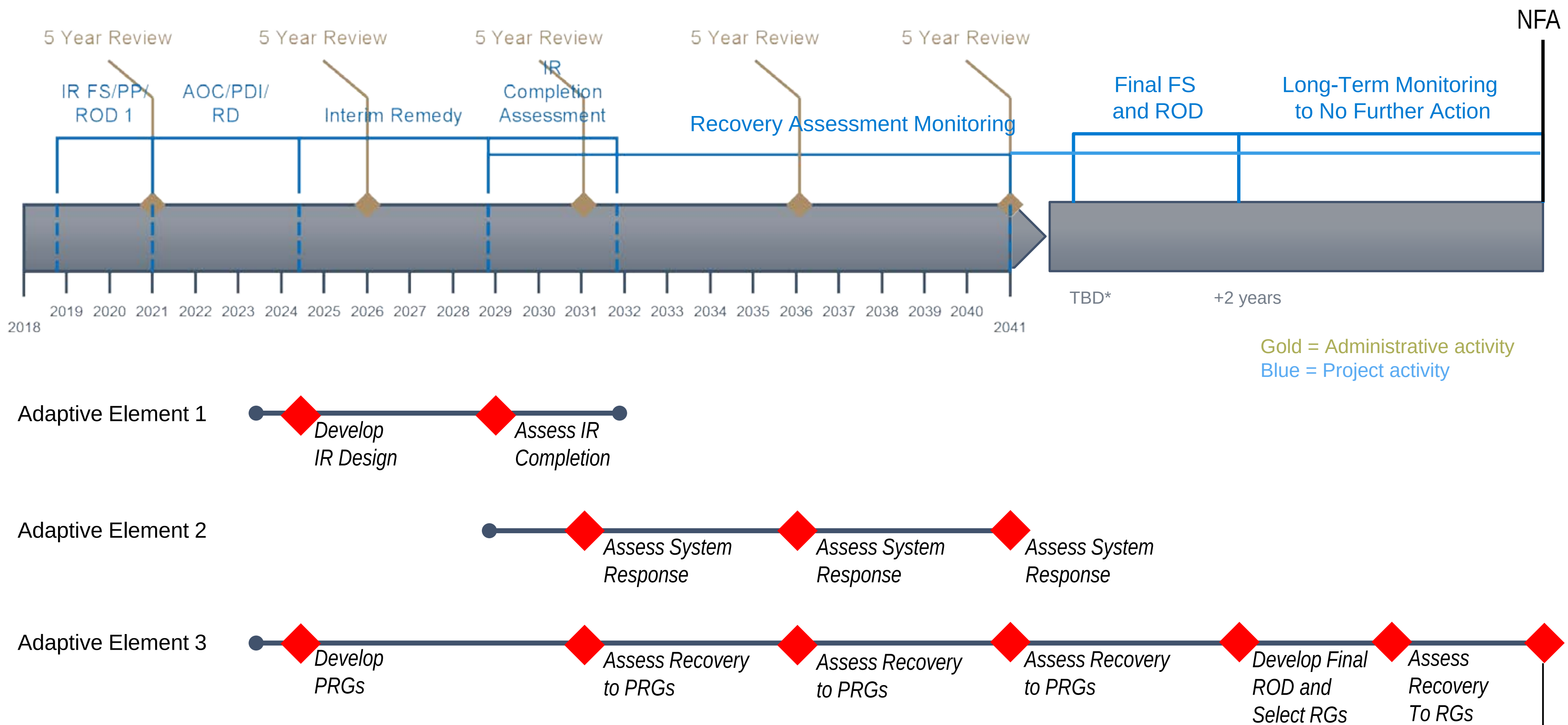


Figure 10-2
Comparison of Alternatives: Incremental Change in Targeted Concentrations



Notes:
- Assessment of adaptive elements may occur at times other than the 5-year review, if deemed beneficial to the program.
- PRGs may be refined if additional information is available that suggests uncertainty can be further constrained for particular PRG inputs and that refinement of PRGs is warranted.
- The time frame for a final FS and ROD would depend on decision time frames for Adaptive Element 3 and the need for possible follow-on actions.

◆ Decision Point. See Sections 3 through 5 and associated decision trees for potential response actions.

Figure 12-1
General Time Line for Adaptive Management
Record of Decision
Lower Passaic River Study Area
Diamond Alkali OU4

APPENDIX 2

TABLES

Table 5-1. Surface and Subsurface Sediment Concentrations (2,3,7,8-TCDD)

2,3,7,8-TCDD in Sediments (parts per trillion)					
Depth	*0.0 to 0.5 feet*	*0.5 to 1.5 feet*	*1.5 to 2.5 feet*	*2.5 to 3.5 feet*	*3.5 feet to End*
River Mile 8.3 - 15					
Minimum	0.4	0.01	0.01	0.02	0.04
Maximum	51,100	57,176	30,500	29,800	18,849
Mean	2,094	3,426	3,186	3,332	1,576
Median	260	402	272	315	107
River Mile 15 - Dundee Dam					
Minimum	0.03	0.03	0.04	0.03	0.02
Maximum	0.8	0.2	6.7	12	9
Mean	0.3	0.09	1.4	3	3
Median	0.3	0.07	0.07	0.2	0.2

Table 5-2. Surface and Subsurface Sediment Concentrations (PCBs)

Total PCBs in Sediments (parts per million)					
Depth	*0.0 to 0.5 feet*	*0.5 to 1.5 feet*	*1.5 to 2.5 feet*	*2.5 to 3.5 feet*	*3.5 feet to End*
River Mile 8.3 - 15					
Minimum	0.002	0.0001	0.000004	0.000003	0.000003
Maximum	34	35	34	34	22
Mean	3	4	5	5	3
Median	0.9	1.3	1.6	1.6	0.7
River Mile 15 - Dundee Dam					
Minimum	0.01	0.000002	0.000003	0.00001	0.000002
Maximum	2.9	0.6	0.3	0.5	0.6
Mean	0.3	0.2	0.1	0.2	0.2
Median	0.09	0.01	0.0004	0.1	0.03

Notes:
PCB = polychlorinated Biphenyl

Table 7-1. BHHRA Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Biota Tissue	Fish Tissue	Fish from 17-mile stretch of Passaic River	Angler	Child (1 to < 7 years old)	Ingestion	Quantitative	Site-related contaminants have been detected in fish. Studies have found that despite Fish Advisories, individuals do fish in the study area. Assumes receptor will consume fish caught from Passaic River and share it with family members.
					Adolescent (7 to < 19 years old)	Ingestion	Quantitative	
					Adult (> 18 years old)	Ingestion	Quantitative	
		Crab/shellfish Tissue	Crabs from 17- mile stretch of Passaic River	Angler	Child (1 to < 7 years old)	Ingestion	Quantitative	Site-related contaminants have been detected in crabs/shellfish. Studies have found that despite Fish Advisories, individuals do collect crabs from the study area. Assumes receptor will consume crabs/shellfish gathered from Passaic River and share them with family members.
					Adolescent (7 to <19 years old)	Ingestion	Quantitative	
					Adult (> 18 years old)	Ingestion	Quantitative	
		Turtles, ducks, etc.	Other species from 17-mile stretch of Passaic River	Angler	Child (1 to < 7 years old)	Ingestion	Qualitative	Limited data; ingestion of animals other than Passaic River fish/crabs likely to be minimal.
					Adolescent (7 to < 19 years old)	Ingestion	Qualitative	
					Adult (> 18 years old)	Ingestion	Qualitative	
		Fish/crab/other species	Fish/crab/other species	Transient Person	Multiple ages	Ingestion	Qualitative	Evidence of homeless camps has been observed in the study area. Limited exposure pattern data would make quantification highly uncertain. Potential risks relative to other receptors are discussed in the uncertainty section.
Current/ Future (continued)	Sediment	River Sediment, Mudflat Sediment (1)	17-mile stretch of Passaic River (3)	Angler	Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	Angler may contact sediment while fishing or crabbing from the river bank. Assumes that young children (1 to 6 years) would not typically accompany adult anglers due to safety concerns. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	

Table 7-1. BHHRA Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future (continued)	Sediment	River Sediment, Mudflat Sediment (1)	17-mile stretch of Passaic River (3)	Swimmer	Child (1 to < 7 years old)	Incidental Ingestion	Quantitative	Swimming is included in the designated uses of the freshwater portion of the river from the confluence with Second River to Dundee Dam (i.e., RM 8 to RM 17) (FW2-NT) (2). Swimming could also occur in other portions of the river. Swimmers may contact sediment while entering and leaving the river and while swimming. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (>18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Wader	Child (1 to < 7 years old)	Incidental Ingestion	Quantitative	Families visiting riverside parks may contact sediment along the river. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Boater	Older child (7 to < 14 years old)	Incidental Ingestion	Quantitative	Recreational boating is included in the designated uses of the Passaic River throughout the study area (FW2-NT, SE2, SE3) (2), and could include kayaking, canoeing, rowing/sculling. Eight high school sculling teams and two boating clubs use the river for rowing. Children (ages 7 to 13 years) may also participate in recreational boating. Docks are typically used, but boaters may occasionally contact sediment when a boat flips and wading is necessary. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Teen (14 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Worker	Adult (> 18 years old)	Incidental Ingestion	Quantitative	Workers may be tasked with collecting shoreline trash or other work that leads to contact with sediment along the river. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible. Contact with surface water is not typically expected to occur.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	

Table 7-1. BHHRA Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future (continued)	Sediment	River Sediment, Mudflat Sediment (1)	17-mile stretch of Passaic River (3)	Resident	Child (1 to < 7 years old)	Incidental Ingestion	Qualitative	Residential properties are located adjacent to the river, especially above RM 10. Residents may contact river sediment during activities near their homes. Potential risks are addressed qualitatively. The inhalation pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	
					Adult (> 18 years old)	Incidental Ingestion	Qualitative	
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	
				Transient Person	Multiple ages	Incidental Ingestion	Qualitative	Evidence of homeless camps has been observed in the study area. Limited exposure pattern data would make quantification highly uncertain. Potential risks relative to other receptors are discussed in the uncertainty section. The inhalation pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	
Current/ Future (continued)	Surface Water	Surface Water	17-mile stretch of Passaic River	Angler	Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	Anglers may contact surface water while fishing or crabbing from the river bank. Assumes that young children (1 to 6 years) would not typically accompany adult anglers due to safety concerns. Inhalation may occur if volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Swimmer	Child (1 to < 7 years old)	Incidental Ingestion	Quantitative	Swimming is included in the designated uses of the freshwater portion of the river from the confluence with Second River to Dundee Dam (i.e., RM 8 to RM 17) (FW2-NT) (2). Swimming could also occur in other portions of the river. Swimmers may contact surface water while swimming. Inhalation may occur if volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	

Table 7-1. BHHRA Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future (continued)	Surface Water	Surface Water	17-mile stretch of Passaic River	Wader	Child (1 to < 7 years old)	Incidental Ingestion	Quantitative	Families visiting riverside parks may contact surface water along the river. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adolescent (7 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Boater	Older child (7 to < 14 years old)	Incidental Ingestion	Quantitative	Recreational boating is included in the designated uses of the Passaic River throughout the study area (FW2-NT, SE2, SE3) (2), and could include kayaking, canoeing, rowing/sculling. Eight high school sculling teams and two boating clubs use the river for rowing. Children (ages 7 to 13 years) may also participate in recreational boating. Boaters may contact surface water while boating and occasionally when entering or leaving their crafts. Inhalation may occur if activities are in mudflat areas and volatiles are present, however, this pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Teen (14 to < 19 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
					Adult (> 18 years old)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
						Inhalation of Vapors	Quantitative	
				Resident	Child (1 to < 7 years old)	Incidental Ingestion	Qualitative	Residential properties are located adjacent to the river, especially above RM 10. Surface water from the river is not used as a domestic water supply. Residents may contact surface water during activities near their homes. Potential risks are addressed qualitatively. The inhalation pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	
					Adult (> 18 years old)	Incidental Ingestion	Qualitative	
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	
				Transient Person	Multiple ages	Incidental Ingestion	Qualitative	Evidence of homeless camps has been observed in the study area. Limited exposure pattern data would make quantification highly uncertain. Potential risks relative to other receptors are discussed in the uncertainty section. The inhalation pathway is not considered further in the BHHRA because the inhalation pathway risks are negligible.
						Dermal Contact	Qualitative	
						Inhalation of Vapors	Qualitative	

RM - River Mile.

(1) River sediment is defined as nearshore sediment under 2 feet of water or less at mean low water. Nearshore river and mudflat sediment are combined and treated as one media, referred to as accessible surface sediment, in the BHHRA.

(2) NJAC 7:9B Surface Water Quality Standards classification for the Passaic River: Second River to Dundee Dam (RM 8.4 to RM 17.17) is classified as freshwater 2 non-trout (FW2-NT) and saline-estuarine 2 (SE2). Designated use for FW2-NT and SE2 water includes secondary contact recreation (e.g., boating and fishing). Designated use for FW2-NT water also includes primary contact recreation: recreational activities that involve significant ingestion risks and includes, but is not limited to, wading, swimming, diving, surfing, and water skiing.

(3) Accessible sediments were evaluated on both a sitewide basis and an exposure area basis, where the Study Area was divided into six three-mile segments (RM 0-3, 3-6, 6-9, 9-12, 12-15, 15-17.4).

Table 7-2a. Summary of Chemicals of Concern and Medium Specific Exposure Point Concentrations (EPCs) for Risk Assessment - Fish

Exposure Medium	Chemical of Concern (a)	Minimum Concentration Detected	Maximum Concentration Detected	Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
White Perch - Fillet (skin on)								
	TCDD TEQ	0.00000378	0.000102	mg/kg	19:19	0.0000524	mg/kg	95% Students t: UCL
	PCB (non-DLC) (b)	0.136	1.39	mg/kg	19:19	0.672	mg/kg	95% Students t: UCL
	PCB TEQ (b)	0.000000401	0.0000144	mg/kg	19:19	0.00000805	mg/kg	(BCA) UCL
Largemouth & Small Mouth Bass - Fillet (skin on)								
	TCDD TEQ	0.00000796	0.000014	mg/kg	6:6	0.00000894	mg/kg	95% Students t: UCL
	PCB (non-DLC) (b)	4.47-02	0.396	mg/kg	6:6	0.3	mg/kg	95% Approximate Gamma UCL
	PCB TEQ (b)	0.000000108	0.0000113	mg/kg	6:6	0.0000102	mg/kg	95% Approximate Gamma UCL
American Eel - Fillet (skinless)								
	TCDD TEQ	0.000000507	0.0000415	mg/kg	32:32	0.0000171	mg/kg	95% Students t: UCL
	PCB (non-DLC) (b)	0.245	4.14	mg/kg	32:32	1.18	mg/kg	95% Approximate Gamma UCL
	PCB TEQ (b)	0.00000075	0.000014	mg/kg	32:32	0.00000585	mg/kg	95% Approximate Gamma UCL
Channel Catfish - Fillet (skinless)								
	TCDD TEQ	0.0000097	0.00007997	mg/kg	11:11	0.0000428	mg/kg	95% Approximate Gamma UCL
	PCB (non-DLC) (b)	0.179	1.17	mg/kg	11:11	0.662	mg/kg	95% Approximate Gamma UCL
	PCB TEQ (b)	0.0000019	0.00000865	mg/kg	11:11	0.00000865	mg/kg	95% Students t: UCL
Common Carp - Fillet (skin on)								
	TCDD TEQ	0.0000142	0.000756	mg/kg	12:12	0.000407	mg/kg	95% Students t: UCL
	PCB (non-DLC) (b)	0.778	14	mg/kg	12:12	6.68	mg/kg	95% Approximate Gamma UCL
	PCB TEQ (b)	0.0000104	0.000143	mg/kg	12:12	0.0000749	mg/kg	95% Approximate Gamma UCL
Mixed Fish Diet (c)								
	TCDD TEQ					0.000106	mg/kg	Calculated from the EPCs for each
	PCB (non-DLC) (b)					1.90	mg/kg	fish species assuming equal fractions
	PCB TEQ (b)					0.0000215	mg/kg	of the five species.

Notes:

(a) The BHHRA also identified methyl mercury as a potential COC for fish ingestion. However, methyl mercury represented only 1% or less of the noncancer hazard for fish ingestion and concentrations were comparable to concentrations in fish from above Dundee Dam. Therefore, methyl mercury is not a focus for the Interim Remedy.

(b) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]).

(c) The mixed fish diet is based on equal fractions (20 percent) of white perch, largemouth and smallmouth bass, American eel, channel catfish, and common carp. Risks for alternate diets (e.g., single species) were also evaluated in the uncertainty section of the BHHRA.

DLC - Dioxin-like congener.
mg/kg - Milligrams per Kilogram.
PCB - Polychlorinated Biphenyl.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-2b. Summary of Chemicals of Concern and Medium Specific Exposure Point Concentrations (EPCs) for Risk Assessment - Crab Tissue

Exposure Medium	Chemical of Concern	Minimum Concentration Detected	Maximum Concentration Detected	Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
Blue Crab - Muscle/Hepatopancreas								
	TCDD TEQ	0.00000449	0.000115	mg/kg	41:41	0.0000596	mg/kg	95% Student's-t UCL
	PCB (non-DLC) (a)	0.0602	0.689	mg/kg	41:41	0.311	mg/kg	95% Approximate Gamma UCL
	PCB TEQ (a)	0.00000051	0.0000171	mg/kg	41:41	0.0000115	mg/kg	95% Chebyshev (Mean, SD) UCL

(a) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]).

DLC - Dioxin-like congener.
mg/kg - Milligrams per Kilogram.
PCB - Polychlorinated Biphenyl.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-3. Cancer Toxicity Data Summary

Chemical of Concern	Oral Cancer Slope Factor	Slope Factor Units	Classification System Weight of Evidence	Source	Date
TCDD TEQ	1.5×10^5 (a)	$(mg/kg\text{-}day)^{-1}$	(b)	HEAST	7/31/1997
PCB (non-DLC) (c)	2.0×10^0 (d)	$(mg/kg\text{-}day)^{-1}$	B2 - Likely Human Carcinogen	IRIS	2/2017 (accessed IRIS)
PCB TEQ (c)	1.5×10^5 (a)	$(mg/kg\text{-}day)^{-1}$	B2 - Likely Human Carcinogen	HEAST	7/31/1997

Notes:
IRIS: Integrated Risk Information System (USEPA)
HEAST: Health Effects Assessment Summary Table
(a) The HEAST (USEPA 1997) cancer slope factor for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is used to evaluate carcinogenic effects of TCDD TEQ and the potentially dioxin-like PCBs (PCB TEQ).
(b) The cancer assessment for 2,3,7,8-TCDD is currently deferred, as indicated in the IRIS Program Multi-Year Agenda, December 2015 (USEPA 2015).
(c) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]).
(d) The cancer slope factor shown is for high risk and persistence PCBs/upper bound and was used in the BHHRA to estimate RME risks. IRIS also provides a cancer slope factor of 1.0E+00 $(mg/kg\text{-}day)^{-1}$ for high risk & persistence PCBs/central estimate that was used in the BHHRA to estimate CTE risks.

USEPA. 2015. IRIS Program Multi-Year Agenda. December. [https://www.epa.goc/iris/iris-agenda].
USEPA. 1997. Health Effects Assessment Summary Tables (HEAST). FY 1997 update. EPA 540-R-94-020. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington, DC.

CTE - central tendency exposure
DLC - Dioxin-like congener.
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
RME - reasonable maximum exposure.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-4. Non-Cancer Toxicity Data Summary

Chemical of Concern	Chronic Oral Reference Dose	Reference Dose Units	Primary Target Organ/System	Critical Endpoint	Combined Uncertainty / Modifying Factors	Source of RfD	Date of RfD
TCDD TEQ	7.0×10^{-10}	mg/kg-day	Reproductive, Developmental	Decreased sperm count and motility in men / increased TSH in neonates	30	IRIS	2/2017 (accessed IRIS)
PCB (non-DLC) (a)(b)	2.0×10^{-5}	mg/kg-day	Eye, nails, immune	Occular exudate, inflamed and prominent Meibomian glands, distorted growth of finger and toe nails, decreased antibody response to sheep erythrocytes	300	IRIS	2/2017 (accessed IRIS)
PCB TEQ (c)	7.0×10^{-10}	mg/kg-day	Reproductive, Developmental	Decreased sperm count and motility in men / increased TSH in neonates	30	IRIS	2/2017 (accessed IRIS)

(a) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar non-cancer hazards. Data presented here represent the approach with slightly higher hazards, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]).
(b) The non-cancer toxicity information for Aroclor 1254 was used to evaluate non-dioxin-like PCB congeners (PCB [non-DLC]).
(c) The non-cancer toxicity information for 2,3,7,8-TCDD was used to evaluate dioxin-like PCB congeners (PCB TEQ).

DLC - Dioxin-like congener.
IRIS: Integrated Risk Information System (USEPA)
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
RfD - Reference Dose.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-5a. Summary of Cancer Risks and Non-Cancer Hazards for RME Fish Ingestion

Receptor Age Group	Exposure Medium	Chemical of Concern (a)	Exposure Point Concentration		Cancer Risk (RME)					Non-Cancer Hazard (RME)				
					Intake Exposure Concentration		Cancer Slope Factor		Cancer Risk	Intake Exposure Concentration		Reference Dose		Hazard Quotient
			Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Angler - Child (1 to <7 years old)														
	RME Mixed Fish Diet (b)	TCDD TEQ	1.06×10^{-4}	mg/kg	6.15×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	9×10^{-4}	7.17×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	102
		PCB (non-DLC) (c)	1.90×10^{0}	mg/kg	1.10×10^{-4}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	2×10^{-4}	1.29×10^{-3}	mg/kg-day	2.0×10^{-5}	mg/kg-day	64
		PCB TEQ (c)	2.15×10^{-5}	mg/kg	1.25×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	2×10^{-4}	1.45×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	21
		Exposure Route Total (c)							1×10^{-3}					193
Total of Receptor Risks (Sitewide) Across All Media (c)									1×10^{-3}					193
Angler - Adolescent (7 to <19 years old)														
	RME Mixed Fish Diet (b)	TCDD TEQ	1.06×10^{-4}	mg/kg	8.07×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	1×10^{-3}	4.71×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	67
		PCB (non-DLC) (c)	1.90×10^{0}	mg/kg	1.45×10^{-4}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	3×10^{-4}	8.44×10^{-4}	mg/kg-day	2.0×10^{-5}	mg/kg-day	42
		PCB TEQ (c)	2.15×10^{-5}	mg/kg	1.64×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	2×10^{-4}	9.55×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	14
		Exposure Route Total (c)							2×10^{-3}					126
Total of Receptor Risks (Sitewide) Across All Media (c)									2×10^{-3}					127
Angler - Adult (>18 years old)														
	RME Mixed Fish Diet (b)	TCDD TEQ	1.06×10^{-4}	mg/kg	1.31×10^{-8}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	2×10^{-3}	4.58×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	66
		PCB (non-DLC) (c)	1.90×10^{0}	mg/kg	2.35×10^{-4}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	5×10^{-4}	8.22×10^{-4}	mg/kg-day	2.0×10^{-5}	mg/kg-day	41
		PCB TEQ (c)	2.15×10^{-5}	mg/kg	2.66×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	4×10^{-4}	9.30×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	13
		Exposure Route Total (c)							3×10^{-3}					123
Total of Receptor Risks (Sitewide) Across All Media (c)									3×10^{-3}					124
Angler - Combined Adult/Child														
	RME Mixed Fish Diet (b)	TCDD TEQ	1.06×10^{-4}	mg/kg	1.92×10^{-8}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	3×10^{-3}					
		PCB (non-DLC) (c)	1.90×10^{0}	mg/kg	3.45×10^{-4}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	7×10^{-4}					
		PCB TEQ (c)	2.15×10^{-5}	mg/kg	3.90×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	6×10^{-4}					
		Exposure Route Total (c)							4×10^{-3}					
Total of Receptor Risks (Sitewide) Across All Media (c)									4×10^{-3}					

(a) The BHHRA also identified methyl mercury as a potential COC for fish ingestion, with a maximum hazard quotient of 2. However, methyl mercury represented only 1% or less of the noncancer hazard for fish ingestion and concentrations were comparable to concentrations in fish from above Dundee Dam. Therefore, methyl mercury is not a focus for the Interim Remedy.
(b) RME mixed fish diet assumed to consist of equal fractions (20%) of American eel, white perch, channel catfish, and largemouth bass, and common carp.
(c) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]). Risks/hazards for these two groups are then summed to identify the risks/hazards for total PCBs.

DLC - Dioxin-like congener.
EPC - Exposure Point Concentration.
mg/kg - Milligrams per Kilogram.
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
RME - Reasonable Maximum Exposure.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-5b. Summary of Cancer Risks and Non-Cancer Hazards for CTE Fish Ingestion

Receptor Age Group	Exposure Medium	Chemical of Concern	Exposure Point Concentration		Cancer Risk (CTE) Intake Exposure Concentration		Cancer Slope Factor		Cancer Risk	Non-Cancer Hazard (CTE) Intake Exposure Concentration		Reference Dose		Hazard Quotient
			Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Angler - Child (1 to <7 years old)														
	RME Mixed Fish Diet (a)	TCDD TEQ	1.06×10^{-4}	mg/kg	2.01×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	3×10^{-5}	4.69×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	7
		PCBs (non DLC) (b)	1.90×10^{0}	mg/kg	4.94×10^{-6}	mg/kg-day	1.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	5×10^{-6}	1.15×10^{-4}	mg/kg-day	2.0×10^{-5}	mg/kg-day	6
		PCB TEQ (b)	2.15×10^{-5}	mg/kg	5.59×10^{-11}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	8×10^{-6}	1.30×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	2
		Exposure Route Total (b)							5×10^{-5}					15
Total of Receptor Risks (Sitewide) Across All Media (b)									5×10^{-5}					15
Angler - Adolescent (7 to <19 years old)														
	RME Mixed Fish Diet (a)	TCDD TEQ	1.06×10^{-4}	mg/kg	2.32×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	3×10^{-5}	2.70×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	4
		PCB (non-DLC) (b)	1.90×10^{0}	mg/kg	5.70×10^{-6}	mg/kg-day	1.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	6×10^{-6}	6.65×10^{-5}	mg/kg-day	2.0×10^{-5}	mg/kg-day	3
		PCB TEQ (b)	2.15×10^{-5}	mg/kg	6.45×10^{-11}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	1×10^{-5}	7.53×10^{-10}	mg/kg-day	7.0×10^{-10}	mg/kg-day	1
		Exposure Route Total (b)							5×10^{-5}					9
Total of Receptor Risks (Sitewide) Across All Media (b)									6×10^{-5}					9
Angler - Adult (>18 years old)														
	RME Mixed Fish Diet (a)	TCDD TEQ	1.06×10^{-4}	mg/kg	3.39×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	5×10^{-5}	2.64×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	4
		PCB (non-DLC) (b)	1.90×10^{0}	mg/kg	8.34×10^{-6}	mg/kg-day	1.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	8×10^{-6}	6.48×10^{-5}	mg/kg-day	2.0×10^{-5}	mg/kg-day	3
		PCB TEQ (b)	2.15×10^{-5}	mg/kg	9.43×10^{-11}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	1×10^{-5}	7.34×10^{-10}	mg/kg-day	7.0×10^{-10}	mg/kg-day	1
		Exposure Route Total (b)							8×10^{-5}					8
Total of Receptor Risks (Sitewide) Across All Media (b)									8×10^{-5}					8
Angler - Combined Adult/Child														
	RME Mixed Fish Diet (a)	TCDD TEQ	1.06×10^{-4}	mg/kg	5.40×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	8×10^{-5}					
		PCB (non-DLC) (b)	1.90×10^{0}	mg/kg	1.33×10^{-5}	mg/kg-day	1.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	1×10^{-5}					
		PCB TEQ (b)	2.15×10^{-5}	mg/kg	1.50×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	2×10^{-5}					
		Exposure Route Total (b)							1×10^{-4}					
Total of Receptor Risks (Sitewide) Across All Media (b)									1×10^{-4}					

(a) RME mixed fish diet assumed to consist of equal fractions (20%) of American eel, white perch, channel catfish, and largemouth bass, and common carp. "RME mixed fish diet" refers to the EPCs and was consistent across RME and CTE scenarios. Exposure assumptions specific to the receptors (not EPCs) differed between the CTE scenario and the RME scenario.

(b) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]). Risks/hazards for these two groups are then summed to identify the risks/hazards for total PCBs.

CTE - Central Tendency Exposure.
DLC - Dioxin-like congener.
EPC - Exposure Point Concentration.
mg/kg - Milligrams per Kilogram.
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-6a. Summary of Cancer Risks and Non-Cancer Hazards for RME Crab Ingestion

Receptor Age Group	Exposure Medium	Chemical of Concern	Exposure Point Concentration		Cancer Risk (RME)					Non-Cancer Hazard (RME)				
					Intake Exposure Concentration		Cancer Slope Factor		Cancer Risk	Intake Exposure Concentration		Reference Dose		Hazard Quotient
			Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Angler - Child (1 to <7 years old)														
		TCDD TEQ	5.96×10^{-5}	mg/kg	2.10×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	3×10^{-4}	2.45×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	35
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	1.10×10^{-5} (a)	mg/kg-day	2.0×10^{0} (a)	$(mg/kg\text{-}day)^{-1}$	2×10^{-5}	1.28×10^{-4} (a)	mg/kg-day	2.0×10^{-5} (a)	mg/kg-day	6
		PCB TEQ (b)	1.15×10^{-5}	mg/kg	4.05×10^{-10}	mg/kg-day	1.5×10^{5} (a)	$(mg/kg\text{-}day)^{-1}$	6×10^{-5}	4.73×10^{-9} (a)	mg/kg-day	7.0×10^{-10} (a)	mg/kg-day	7
		Exposure Route Total (b)							4×10^{-4}					50
Total of Receptor Risks (Sitewide) Across All Media (b)									4×10^{-4}					50
Angler - Adolescent (7 to <19 years old)														
		TCDD TEQ	5.96×10^{-5}	mg/kg	2.75×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	4×10^{-4}	1.60×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	23
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	1.44×10^{-5}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	3×10^{-5}	8.37×10^{-5}	mg/kg-day	2.0×10^{-5}	mg/kg-day	4
		PCB TEQ (b)	1.15×10^{-5}	mg/kg	5.29×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	8×10^{-5}	3.09×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	4
		Exposure Route Total (b)							5×10^{-4}					33
Total of Receptor Risks (Sitewide) Across All Media (b)									5×10^{-4}					33
Angler - Adult (>18 years old)														
		TCDD TEQ	5.96×10^{-5}	mg/kg	4.47×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	7×10^{-4}	1.56×10^{-8}	mg/kg-day	7.0×10^{-10}	mg/kg-day	22
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	2.33×10^{-5}	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	5×10^{-5}	8.16×10^{-5}	mg/kg-day	2.0×10^{-5}	mg/kg-day	4
		PCB TEQ (b)	1.15×10^{-5}	mg/kg	8.59×10^{-10}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	1×10^{-4}	3.01×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	4
		Exposure Route Total (b)							9×10^{-4}					32
Total of Receptor Risks (Sitewide) Across All Media (b)									9×10^{-4}					32
Angler - Combined Adult/Child														
		TCDD TEQ	5.96×10^{-5}	mg/kg	6.57×10^{-9}	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	1×10^{-3}					
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	3.43×10^{-5} (c)	mg/kg-day	2.0×10^{0}	$(mg/kg\text{-}day)^{-1}$	7×10^{-5}					
		PCB TEQ (b)	1.15×10^{-5}	mg/kg	1.27×10^{-9} (c)	mg/kg-day	1.5×10^{5}	$(mg/kg\text{-}day)^{-1}$	2×10^{-4}					
		Exposure Route Total (b)							1×10^{-3}					
Total of Receptor Risks (Sitewide) Across All Media (b)									1×10^{-3}					

(a) Value shown here differs from Table 7.5 RME in Appendix H of the HHRA which contained a typographical error. Final cancer risk and hazard index presented in that table and here are accurate.

(b) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]). Risks/hazards for these two groups are then summed to identify the risks/hazards for total PCBs.

(c) Value shown here differs from Table 7.8 RME in Appendix H of the HHRA which contained a typographical error. Final cancer risk presented in that table and here are accurate.

DLC - Dioxin-like congener.
mg/kg - Milligrams per Kilogram.
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
RME - Reasonable Maximum Exposure.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-6b. Summary of Cancer Risks and Non-Cancer Hazards for CTE Crab Ingestion

Receptor Age Group	Exposure Medium	Chemical of Concern	Exposure Point Concentration		Cancer Risk (CTE): Intake Exposure Concentration		Cancer Slope Factor		Cancer Risk	Non-Cancer Hazard (CTE): Intake Exposure Concentration		Reference Dose		Hazard Quotient
			Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Angler - Child (1 to <7 years old)														
	Crab Tissue	TCDD TEQ	5.96×10^{-5}	mg/kg	1.70×10^{-10}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	3×10^{-5}	3.97×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	6
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	8.88×10^{-7} (c)	mg/kg-day	1.0×10^{0} (c)	(mg/kg-day)$^{-1}$	9×10^{-7} (c)	2.07×10^{-5} (c)	mg/kg-day	2.0×10^{-5} (c)	mg/kg-day	1
	Crab Tissue	PCB TEQ (b)	1.15×10^{-5}	mg/kg	3.28×10^{-11} (c)	mg/kg-day	1.5×10^{5} (c)	(mg/kg-day)$^{-1}$	5×10^{-6} (c)	7.67×10^{-10} (c)	mg/kg-day	7.0×10^{-10} (c)	mg/kg-day	1
		Exposure Route Total (b)							3×10^{-5}					8
Total of Receptor Risks (Sitewide) Across All Media (b)									3×10^{-5}					8
Angler - Adolescent (7 to <19 years old)														
	Crab Tissue	TCDD TEQ	5.96×10^{-5}	mg/kg	1.97×10^{-10}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	3×10^{-5}	2.29×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	3
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	8.20×10^{-7}	mg/kg-day	1.0×10^{0}	(mg/kg-day)$^{-1}$	8×10^{-7}	9.57×10^{-6}	mg/kg-day	2.0×10^{-5}	mg/kg-day	0.5
	Crab Tissue	PCB TEQ (b)	1.15×10^{-5}	mg/kg	3.02×10^{-11}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	5×10^{-6}	3.53×10^{-10}	mg/kg-day	7.0×10^{-10}	mg/kg-day	0.5
		Exposure Route Total (b)							4×10^{-5}					4
Total of Receptor Risks (Sitewide) Across All Media (b)									4×10^{-5}					5
Angler - Adult (>18 years old)														
	Crab Tissue	TCDD TEQ	5.96×10^{-5}	mg/kg	2.87×10^{-10}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	4×10^{-5}	2.24×10^{-9}	mg/kg-day	7.0×10^{-10}	mg/kg-day	3
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	1.20×10^{-6}	mg/kg-day	1.0×10^{0}	(mg/kg-day)$^{-1}$	1×10^{-6}	9.33×10^{-6}	mg/kg-day	2.0×10^{-5}	mg/kg-day	0.5
	Crab Tissue	PCB TEQ (b)	1.15×10^{-5}	mg/kg	4.42×10^{-11}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	7×10^{-6}	3.44×10^{-10}	mg/kg-day	7.0×10^{-10}	mg/kg-day	0.5
		Exposure Route Total (b)							5×10^{-5}					4
Total of Receptor Risks (Sitewide) Across All Media (b)									5×10^{-5}					4
Angler - Combined Adult/Child														
	Crab Tissue	TCDD TEQ	5.96×10^{-5}	mg/kg	4.58×10^{-10}	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	7×10^{-5}					
	Crab Tissue	PCB (non-DLC) (b)	3.11×10^{-1}	mg/kg	2.03×10^{-6}	mg/kg-day	1.0×10^{0}	(mg/kg-day)$^{-1}$	2×10^{-6}					
	Crab Tissue	PCB TEQ (b)	1.15×10^{-5}	mg/kg	7.70×10^{-11} (d)	mg/kg-day	1.5×10^{5}	(mg/kg-day)$^{-1}$	1×10^{-5}					
		Exposure Route Total (b)							8×10^{-5}					
Total of Receptor Risks (Sitewide) Across All Media (b)									8×10^{-5}					

(b) Two PCB toxicity approaches were used in the BHHRA and resulted in very similar risks. Data presented here represent the approach with slightly higher risks, where PCB congeners were separated into two groups: dioxin-like congeners (PCB TEQ) and non-dioxin-like congeners (PCB [non-DLC]). Risks/hazards for these two groups are then summed to identify the risks/hazards for total PCBs.
(c) Value shown here differs from Table 7.5 CTE in Appendix H of the HHRA which contained typographical errors. Final total cancer risk and hazard index presented in that table and here are accurate.
(d) Value shown here differs from Table 7.8 CTE in Appendix H of the HHRA which contained a typographical error. Final total cancer risk and hazard index presented in that table and here are accurate.

CTE - Central Tendency Exposure.
DLC - Dioxin-like congener.
mg/kg - Milligrams per Kilogram.
mg/kg-day - Milligrams per Kilogram per day.
PCB - Polychlorinated Biphenyl.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

Table 7-7. Ecological Assessment Endpoints and Pathways

Testable Risk Question	Description of Measurement Endpoint	Data Use Objective	LPRSA Data to be Used to Derive Exposure Concentrations
Assessment Endpoint No. 1—Maintenance of the zooplankton community that serves as a food base for juvenile fish **Selected Receptor Group—**Zooplankton community (multiple species represented)			
Are COPEC concentrations in surface water in the LPRSA at levels that might affect the maintenance of the zooplankton community as a food resource for fish?	chemical concentrations in surface water collected from relevant exposure areas as compared with toxicity-based values (i.e., aquatic thresholds)	estimating the exposure of zooplankton to chemicals in surface water via various exposure pathways	surface water chemistry and conventional (i.e., physical) parameters from relevant exposure areas based on the 2011-2012 CPG sampling efforts and any additional data that meet DQOs[a]
Assessment Endpoint No. 2—Protection and maintenance (i.e., survival, growth, and reproduction) of the benthic invertebrate community, both as an environmental resource in itself and as one that serves as a forage base for fish and wildlife populations **Selected Receptor Group—**Benthic invertebrate community (multiple infaunal species represented)			
Are benthic communities different from those found in similar nearby water bodies, where chemical concentrations are at background levels?	community structure data (e.g., total invertebrate abundance, species richness, and abundance of species or specific taxonomic groups) as compared with appropriate reference information[b] datasets using diversity indices and multivariate and spatial statistical techniques; to be used as part of the benthic invertebrate SQT approach	assessing adverse effects of LPRSA chemicals on the benthic invertebrate community via various exposure pathways; evaluating reference information[b] and physical/biological stressors	benthic invertebrate community data based on taxonomy data collected during fall 2009 and spring and summer 2010 and any additional data that meet DQOs[a]
Are COPEC residues in benthic invertebrate tissues from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of infaunal invertebrates?	chemical concentrations in laboratory-exposed benthic infaunal invertebrate tissues (*Nereis virens* in the estuarine portion and *Lumbriculus variegatus* in the freshwater portion) exposed to LPRSA sediment in 28-day bioaccumulation tests as compared with CTR	assessing adverse effects of LPRSA chemicals on benthic infaunal invertebrates; developing a FWM for higher organisms	whole-body infaunal benthic invertebrate tissue from laboratory bioaccumulation tests based on LPRSA surface sediment collected during fall 2009 and any additional data that meet DQOs[a]
Are COPEC concentrations in LPRSA sediments from the biologically active zone at levels that might cause an adverse effect on survival, growth, and/or reproduction of the benthic invertebrate community?	chemical concentrations in sediment as compared with toxicity-based sediment quality values from the literature that are specific to benthic invertebrates; to be used as part of the benthic invertebrate SQT approach	estimating the exposure of benthic invertebrates to chemicals in sediment via various exposure pathways	surface (0 to 15 cm) sediment chemistry and conventional parameters based on 2008-2012 LPRSA surface sediment data, and any additional data that meet DQOs[a]
	laboratory bioassay tests (28-day survival and growth of *Hyalella azteca* throughout the LPRSA, 10-day survival and growth of *Chironomus dilutus* in the freshwater portion, and 10-day survival of *Ampelisca abdita* in the estuarine portion) using LPRSA sediment compared with control and reference information;[b] to be used as part of the benthic invertebrate SQT approach	assessing adverse effects of LPRSA chemicals in sediment on benthic invertebrates via various exposure pathways; evaluating reference information[b] and physical/biological stressors	toxicity tests based on surface (0 to 15 cm) sediment collected during fall 2009 and any additional data that meet DQOs[a]

Table 7-7. Ecological Assessment Endpoints and Pathways

Testable Risk Question	Description of Measurement Endpoint	Data Use Objective	LPRSA Data to be Used to Derive Exposure Concentrations
Are COPEC concentrations in surface water from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of the benthic invertebrate community?	chemical concentrations in surface water collected from relevant benthic invertebrate exposure areas as compared with toxicity-based values (i.e., aquatic thresholds)	estimating the exposure of benthic invertebrates to chemicals in surface water via various exposure pathways	surface water chemistry and conventional parameters from relevant exposure areas (e.g., near-bottom) based on the 2011-2012 sampling efforts and any additional data that meet DQOs[a]
Assessment Endpoint No. 3—Protection and maintenance (i.e., survival, growth, and reproduction) of healthy populations of blue crab and crayfish that serve as a forage base for fish and wildlife populations and as a base for sports fisheries **Selected Receptor Group**—Decapods (blue crab)			
Are COPEC residues in benthic macroinvertebrate tissues from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of macroinvertebrate (blue crab and crayfish) populations in the LPRSA?	chemical concentrations in site-collected benthic macroinvertebrate whole-body tissue (i.e., crab) as compared with literature-based CTR	estimating the exposure of benthic macroinvertebrates to chemicals via various exposure pathways; developing a FWM	whole-body benthic macroinvertebrate tissue of blue crab collected from the late summer/early fall 2009 sampling effort and any additional data that meet DQOs[a]
Are COPEC concentrations in LPRSA sediments from the biologically active zone at levels that might cause an adverse effect on survival, growth, and/or reproduction of macroinvertebrate populations?	chemical concentrations in sediment as compared with toxicity-based sediment quality values from the literature that are specific to benthic macroinvertebrates	estimating the exposure of benthic invertebrates to chemicals in sediment via various exposure pathways	surface (0 to 15 cm) sediment chemistry and conventional parameters based on 2008-2012 LPRSA surface sediment data, and any additional data that meet DQOs[a]
Are COPEC concentrations in surface water from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of macroinvertebrate populations?	chemical concentrations in surface water collected from relevant benthic macroinvertebrate exposure areas as compared with toxicity-based values (i.e., aquatic thresholds)	estimating the exposure of benthic macroinvertebrates to chemicals in surface water via various exposure pathways	surface water chemistry and conventional parameters from relevant exposure areas (e.g., near-bottom) based on the 2011-2012 sampling efforts and any additional data that meet DQOs[a]
Assessment Endpoint No. 4—Protection and maintenance (i.e., survival, growth, and reproduction) of healthy mollusk populations **Selected Receptor Group**—Bivalves (multiple species represented)			
Are COPEC residues in bivalve mollusk tissues from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of mollusk populations in the LPRSA?	chemical concentrations in tissue from *in situ* caged bivalves (ribbed mussel [*Geukensia demissa*] and freshwater mussel (*Elliptio complanata*])	assessing adverse effects of LPRSA chemicals on bivalves; developing a FWM	whole-body bivalve mollusk tissue of selected test bivalve species

Table 7-7. Ecological Assessment Endpoints and Pathways

Testable Risk Question	Description of Measurement Endpoint	Data Use Objective	LPRSA Data to be Used to Derive Exposure Concentrations
Are COPEC concentrations in LPRSA sediments from the biologically active zone at levels that might cause an adverse effect on survival, growth, and/or reproduction of mollusk populations?	chemical concentrations in sediment as compared with toxicity-based sediment quality values from the literature that are specific to bivalve mollusks	estimating the exposure of bivalve mollusks to chemicals in sediment via various exposure pathways	surface (0 to 15 cm) sediment chemistry and conventional parameters based on 2008-2012 LPRSA surface sediment data, and any additional data that meet DQOs[a]
Are COPEC concentrations in surface water from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of mollusk populations?	chemical concentrations in surface water collected from relevant bivalve mollusk exposure areas as compared with toxicity-based values (i.e., aquatic thresholds)	estimating the exposure of bivalve mollusks to chemicals in surface water via various exposure pathways	surface water chemistry and conventional (e.g., near-bottom) parameters from relevant exposure areas based on the 2011-2012 sampling efforts and any additional data that meet DQOs[a]
Assessment Endpoint No. 5—Protection and maintenance (i.e., survival, growth, and reproduction) of omnivorous, invertivorous, and piscivorous fish populations that serve as a forage base for fish and wildlife populations and as a base for sports fisheries **Selected Receptor Groups—**Benthic omnivore: mummichog, banded killifish/darter, common carp (a non-native species). Invertivore: white perch, channel catfish, brown bullhead, white catfish, white sucker. Piscivore: American eel, largemouth bass, northern pike, smallmouth bass			
Are COPEC concentrations in fish tissue from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of populations of fish that use the LPRSA?	chemical concentrations or toxic equivalencies measured in site-collected fish whole-body tissue (and estimated egg tissue based on egg lipid data) as compared with literature-based CTR; exposure areas and SUFs based on potential LPRSA habitat and where fish are present in LPRSA per fish community surveys	estimating the exposure of selected fish species, and other fish species that prey upon those organisms, to chemicals via various exposure pathways; evaluating background levels and physical/biological stressors as part of risk characterization to help make informed risk management decisions	whole-body fish tissue based on: fish collected in late summer/early fall 2009 and summer 2010, and any additional data that meet DQOs;[a] LPRSA mummichog egg lipid content collected in 2010; whole-body tissue concentrations for several selected fish species using the methods presented in the Data Usability Plan (Windward and AECOM 2015)
	prey taxonomy identified in selected LPRSA fish species	defining the exposure parameters (e.g., diet, trophic level) and prey composition of fish species within the LPRSA	fish stomach prey taxonomy based on regional literature; LPRSA-specific data are not available because of the limited number of fish collected in the late summer/early fall 2009 (Windward 2010a).
	physical and biological information based on gross internal/external fish health observations; histopathology of selected fish species may also be evaluated per USEPA direction	assisting in the interpretation of the results in terms of fish population health	gross internal/external health observations based on LPRSA fish community data collected in 2009 and 2010
	literature-based information on fish trophic feeding level and habitat use of selected LPRSA fish species	defining the exposure parameters (e.g., diet, trophic level) and exposure areas (e.g., habitat identification and stratification) for selected fish species within the LPRSA	LPRSA fish community data collected in 2009 and 2010; literature search[c]

Table 7-7. Ecological Assessment Endpoints and Pathways

Testable Risk Question	Description of Measurement Endpoint	Data Use Objective	LPRSA Data to be Used to Derive Exposure Concentrations
Are modeled dietary exposures to COPECs from LPRSA prey at levels that might cause an adverse effect on survival, growth, and/or reproduction of fish populations that use the LPRSA?	species-specific modeled daily doses of COPECs (estimated from surface sediment and prey [invertebrate and fish] tissue chemistry[d]) as compared with literature-based dietary effect thresholds; exposure areas and SUFs will be based on potential LPRSA habitat and where fish are present in LPRSA per fish community surveys; LPRSA water temperature data will be used to determine fish ingestion rates	estimating the exposure of selected fish species to chemicals via the dietary exposure pathway	surface (0 to 15 cm) sediment chemistry from relevant exposure areas and benthic invertebrate and fish prey (or representative prey) tissue; sediment data based on LPRSA surface sediment collected from 2008 to 2012, and any additional data that meet DQOs;[a] tissue data based on invertebrate and fish tissue collected from the late summer/early fall 2009 sampling effort and any additional data that meet DQOs[a]
Are COPEC concentrations in surface water from the LPRSA at levels that might cause an adverse effect on survival, growth, and/or reproduction of fish populations that use the LPRSA?	chemical concentrations in surface water collected from relevant fish exposure areas as compared with literature-based toxicity values (i.e., aquatic thresholds); exposure areas and SUFs will be based on potential LPRSA habitat	estimating the exposure of selected fish species to chemicals in surface water via various exposure pathways	surface water chemistry from relevant exposure areas based on the 2011-2012 sampling efforts and any additional data that meet DQOs[a]
What are the egg numbers (or mass) from estuarine benthic omnivores (i.e., mummichog) from the LPRSA?	egg counts (or mass) in selected gravid mummichog	assisting in the interpretation of the results in terms of fish population health	LPRSA mummichog eggs from selected gravid females collected in 2010
Assessment Endpoint No. 6—Protection and maintenance (i.e., survival, growth, and reproduction[f]) of herbivorous, omnivorous,[g] sediment-probing, and piscivorous bird populations; use of LPRSA habitat for breeding used to determine the relative weight for the bird egg measurement endpoint **Selected Receptor Groups—**Aquatic herbivore: mallard duck; sediment-probing invertivore: spotted sandpiper; migratory piscivore:[h] heron/egret; resident piscivore: belted kingfisher			
Are modeled dietary doses of COPECs based on LPRSA biota, sediment, and surface water and/or modeled piscivorous bird egg tissues based on LPRSA fish at levels that might cause an adverse effect on survival, growth, and/or reproduction of bird populations that use the LPRSA?	species-specific modeled daily doses (estimated from surface water, surface sediment, and prey [invertebrate and fish] tissue chemistry) as compared with literature-based dietary dose effect thresholds; modeled piscivorous bird egg tissue- residue concentrations (estimated from fish prey tissue chemistry using dietary dose/maternal transfer model) as compared with literature-based bird egg tissue-residue effect thresholds; exposure areas and SUFs will be based on potential LPRSA habitat areas and presence of species per avian community surveys	estimating the exposure of selected bird species to chemicals in surface water, sediment, and prey tissue[i] via various exposure pathways; developing a FWM	surface (0 to 15 cm) sediment and surface water chemistry from relevant exposure areas and benthic invertebrate and fish prey (or representative prey) tissue; based on surface sediment data from 2008 to 2012, surface water data from 2011 to 2012, and tissue data from 2009 to 2010

Table 7-7. Ecological Assessment Endpoints and Pathways

Testable Risk Question	Description of Measurement Endpoint	Data Use Objective	LPRSA Data to be Used to Derive Exposure Concentrations
Assessment Endpoint No. 7—Protection and maintenance (i.e., survival, growth, and reproduction) of aquatic mammal populations **Selected Receptor Group—**Piscivore: river otter			
Are modeled dietary doses of COPECs based on LPRSA biota, sediment, and surface water at levels that might cause an adverse effect on survival, growth, and/or reproduction of aquatic mammal populations that use the LPRSA?	Focal species-specific modeled daily doses (estimated from surface water, surface sediment, and prey [invertebrate and fish] tissue chemistry) as compared with literature-based dietary dose effect thresholds; exposure areas and SUFs will be based on potential LPRSA habitat areas	estimating the exposure of selected mammal species to chemicals in surface water, sediment, and prey tissue via various exposure pathways; developing a FWM	surface (0 to 15 cm) sediment and surface water chemistry from relevant exposure areas and benthic invertebrate and fish prey (or representative prey) tissue; based on surface sediment data from 2008 to 2012, surface water data from 2011 to 2012, and tissue data from 2009 to 2010
Assessment Endpoint No. 8—Maintenance of healthy aquatic plant populations as a food resource and habitat for fish and wildlife populations **Selected Receptor Group—**Aquatic plant populations (multiple species represented)			
Are COPEC concentrations in surface sediment and/or surface water in the LPRSA at levels that might affect the maintenance of healthy aquatic plant populations as a food resource and habitat to fish and wildlife?	chemical concentrations in surface water and/or sediment collected from relevant aquatic plant exposure areas as compared with toxicity-based values (i.e., aquatic thresholds); exposure areas will be based on potential LPRSA habitat	estimating the exposure of aquatic plants to chemicals in surface sediment and/or surface water via direct contact with chemicals in sediment and water	surface (0 to 15 cm) sediment and surface water chemistry and conventional parameters from relevant exposure areas; surface water data based on 2011-2012 sampling effort(s) and any additional data that meet DQOs[a]
Assessment Endpoint No. 9—Protection and maintenance (i.e., survival, growth, and reproduction) of healthy amphibian and reptile populations **Selected Receptor Group—**Amphibian (early-life stage) and reptile populations (multiple species represented)			
Are COPEC concentrations in surface water and/or surface sediment from LPRSA at levels that might cause an adverse effect on the survival, growth, and/or reproduction of amphibian and reptile populations that use the LPRSA?	chemical concentrations in surface water and/or sediment collected from relevant amphibian and/or reptile exposure areas as compared with available toxicity-based values (i.e., aquatic thresholds); exposure areas will be based on potential LPRSA habitat	estimating the exposure of amphibian and reptiles to chemicals in surface sediment and/or surface water via direct contact	surface (0 to 15 cm) sediment and surface water chemistry and conventional parameters from relevant exposure areas; surface water data based on 2011-2012 sampling efforts and any additional data that meet DQOs[a]

Notes:

Assessment endpoints as presented in the PFD (Windward and AECOM 2009). Although each endpoint focuses on chemical exposure, additional data will be collected on conventional parameters (e.g., grain size) to help in ecosystem characterization as part of the risk characterization for risk management decisions.

[a] Any additional current LPRSA data that meet the risk assessment-specific DQOs described in the data usability plan (Windward and AECOM 2015) could also be used to estimate exposure.

[b] The terminology presented in the PFD (Windward and AECOM 2009) was changed from “regional background levels” to “background and reference information” for consistency with the terminology and definition provided by USEPA (USEPA 2013b).

[c] Additional physical and biological information collected during the fish community surveys (e.g., gross internal/external health observations) will also be used in the risk assessment to assist in the interpretation of the results in terms of fish population health.

[d] For chemicals that are metabolized or otherwise regulated by fish, a tissue residue approach is not appropriate; therefore, a dietary model will be used as a LOE for evaluating risks to fish from metabolized or otherwise regulated chemicals.

[e] Surface water will not be incorporated into the fish dietary assessment, as WIRs for fish are largely unavailable, and fish toxicity studies that measure both food and water ingestion of chemicals are very limited.

[f] Given that few aquatic-feeding birds currently use the LPRSA for breeding because of habitat constraints, the reproduction assessment endpoint for birds will evaluate whether the existing chemical concentrations would impact reproduction if suitable habitat were present.

[g] Consistent with the PFD (Windward and AECOM 2009), omnivorous birds were not identified in the CSM as a feeding guild to be quantitatively evaluated. A representative species was not selected because the evaluation of other avian feeding guilds (i.e., sediment-probing and piscivorous birds) will be protective of omnivorous birds.

[h] Herons/egrets were evaluated as both migratory and resident species.

[i] Additional biological information collected during the bird community surveys will also be used in the risk assessment to assist in the interpretation of the results in terms of avian population health.

BERA – baseline ecological risk assessment COPEC – chemical of potential ecological concern CPG – Cooperating Parties Group
CSM – conceptual site model
CTR – critical tissue residue DQO – data quality objective FWM – food web model LOE – line of evidence
LPRSA – Lower Passaic River Study Area
PFD – problem formulation document SQT – sediment quality triad
SUF – site use factor
USEPA – US Environmental Protection Agency WIR – water ingestion rate

Table 7-8. Summary of Sediment Impacts and Hazard Quotients Associated with the Primary Risk Drivers for the LPRSA and the Upper 9-Mile Segment.

Risk Driver or LOE	BERA Results – RM 0-17.7		Upper 9-Mile Evaluation	
	LOAEL HQ (TRV-A)	LOAEL HQ (TRV-B)	LOAEL HQ (TRV-A)	LOAEL HQ (TRV-B)
TOTAL PCBs				
Benthic Invertebrates	0.046-0.67	**1.4-21**	0.033-0.56	1-**17**
Fish tissue	0.14-**2.1**	**1-15**	0.13-**2.1**	0.91-**15**
Fish diet	**1.3**	-----	0.5-**2.2**	-----
Fish egg	**2.2-3.6**	**11-18**	**2.5-4**	**13-20**
Bird diet	0.031-0.7	0.11-**1.2**	0.061-0.34	0.17-0.96
Bird egg	0.078-**1**	1-**284**	0.15-0.86	**1.8-240**
Mammal diet	0.94-**3.2**	**1.1-3.7**	0.53-**3.5**	0.62-**4.1**
PCB TEQ				
Fish tissue	0.010-0.74	**1-9.4**	0.010-0.14	0.7-**9.4**
Fish diet	**1.5-2.1**	-----	0.59-**2.7**	-----
Bird diet	0.030-0.78	0.13-**3.9**	0.081-0.42	0.4-**2.1**
Bird egg	0.46-**7.2**	0.57-**36**	**1.2-5.2**	**1.8-26**
Mammal diet	0.12-0.34	0.49-**1.4**	0.085-0.31	0.34-**1.2**
PCDD/PCDF and TOTAL TEQ				
Benthic invertebrate tissue	0.00077-0.021	**1.8-48**	0.000057-0.019	0.13-**44**
Fish tissue	0.2-**5.2**	**13-340**	0.017-**5**	**1.1-330**
Fish diet	**140-200**	-----	2.4-220	-----
Fish egg	<1	<1	**1-1.7**	**1-1.7**
Bird diet	0.014-**4.2**	0.071-**21**	0.014-0.74	0.068-**3.7**
Bird egg	0.38-**7.5**	0.43-**37**	0.64-**4.4**	0.66-**22**
Mammal diet	0.79-**2.9**	**3.2-12**	0.28-**2.3**	**1.1-9.4**
DDx				
Benthic invertebrate tissue	**1.6-6.8**	0.12-0.52	0.05-**5.4**	0.042-0.42
Fish tissue	**1.3**	**1.7**	0.25-**1.3**	0.33-**1.7**
Bird diet	0.018-0.26	0.16-**2.4**	0.04-0.16	0.37-**1.5**
Bird egg	0.14-**1.8**	0.19-**18**	0.27-**1**	0.37-**9.9**
IMPACTS				
	No, low or likely low impacts – 37%		No, low or likely low impacts – 40%	
	Likely or high impacts – 31%		**Likely or high impacts – 30%**	
	Unclear (medium impacts) – 32%		Unclear (medium impacts) – 29%	

Notes:

Benthic Invertebrates using Sediment Quality Triad (SQT) Approach (note that the SQT approach does not identify specific compounds related to the impacts).

TRV-A – TRVs were derived from the primary literature review.

TRV-B – TRVs based on USEPA's LPR restoration project FFS (Louis Berger et al. 2014), the first draft of the LPR restoration project FFS 9 Malcolm Pirnie 2007), or USEPA's LPR restoration project PAR (Battelle 2005).

Table 9-1. Comparison of General Characteristics of Interim Remedy Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
GENERAL CHARACTERISTICS					
Target Dioxin SWAC (ppt)	-----	85	75	65	125
Dioxin RAL (ppt)	-----	260	205	164	346
Post-IR Dioxin SWAC (ppt)	932	80	70	60	121
Percent SWAC Reduction	0%	91%	92%	94%	87%
Area (acres)	-----	90	96	104	62
Volume (cy)	0	363000	387000	419000	250000
Construction Duration (years)	-----	4.3	4.6	4.9	3.2
Cost ($M)	0	420	441	468	321

Notes:
ppt = parts per trillion
% = percent
cy = cubic yards
IR = Interim Remedy
SWAC = surface area-weighted average concentration

Table 10-1. Summary of Key Metrics in Comparative Analysis and Alternative Costs

	Alternative 1[a]	Alternative 2	Alternative 3	Alternative 4	Alternative 5[a]
KEY METRICS SUMMARY					
Delineated 2,3,7,8-TCDD surficial SWAC achieved based on CS 37 map (ng/kg)[b]	--	80	70	60	121
Delineated total PCB surficial SWAC achieved based on CS 37 map (mg/kg)	--	0.29	0.27	0.24	0.49
Area of removal (ac)	--	90	96	104	62
Volume of removal (cy)	--	363,000	387,000	419,000	250,000
Mass of 2,3,7,8-TCDD removed from the surficial interval (0-0.5 ft) (g)	--	123	124	125	117
Mass of 2,3,7,8-TCDD removed from the dredge prism (0-2.5 ft) (g)	--	590	610	630	530
Mass of total PCBs removed from the surficial interval (0-0.5 ft) (kg)	--	161	163	167	135
Mass of total PCBs removed from the dredge prism (0-2.5 ft) (kg)	--	810	840	860	630
Total water column load of 2,3,7,8-TCDD at RM 8.3 (g)[c]	50	6.8 to 9.0	6.3 to 8.2	6.1 to 8.5	8.0 to 9.1
Concentration of 2,3,7,8-TCDD on depositing fine sediment (ng/kg)	110 to 117	24 to 29	23 to 28	22 to 28	27 to 32
Total water column load of total PCBs at RM 8.3 (kg)[c]	195	135 to 138	135 to 138	134 to 139	145 to 148
Concentration of total PCBs on depositing fine sediment (mg/kg)	0.54	0.43 to 0.45	0.43 to 0.45	0.43 to 0.45	0.45 to 0.46
Construction duration (years)	--	4.3	4.6	4.9	3.2
Cost					
Cost ($M)	**0**	**420**	**441**	**468**	**321**
Incremental Cost Increase (Decrease) Relative to Alternative 2	--	0%	5%	11%	-24%

Notes:

[a] Does not achieve the metrics for the threshold criteria for the upper 9-mile interim remedy, and therefore visual comparison of performance for the balancing criteria is not included in this table.

[b] Attained SWACs are lower than the target SWACs for the remedial alternatives due to additional sediment removal to achieve RAO 2.

[c] Approximate mass over the 10-year post-IR projection period at RM 8.3.

2,3,7,8-TCDD = 2,3,7,8- tetrachlorodibenzo-*p* -dioxin
ac = acre
ARAR = applicable or relevant and appropriate requirement
cy = cubic yard
M = million
PCB = polychlorinated biphenyl
RAO = remedial action objective
SWAC = surface area-weighted average concentration

Table 10-2. Action-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Clean Water Act, 33 U.S.C.1251 et seq.			
Water Quality Certification	Section 401; 40 CFR 121.2	A Water Quality Certification (WQC) specifies the requirements so that the proposed activity will comply with applicable water quality standards. Examples of activities requiring substantial conformance with a WQC include: • Discharge of dredged material dewatering effluent • Placement of fill in waters of the United States • Temporary discharges of decant waters from dredge material disposal sites or from barges and vessels.	ARAR. New Jersey has delegated authority. Section 401 of the CWA is implemented through compliance with the New Jersey Waterfront Development Law (N.J.S.A. 12:5-3), Coastal Zone Management Rules (N.J.A.C. 7:7). Anticipated substantive requirements, which would likely include implementation of BMPs and monitoring to meet water quality criteria during barge and dredge movement, anchoring, and operations.
National Pollutant Discharge Elimination System for Point Source Discharges	Section 402; 40 CFR Part 122	Establishes specific discharge limits for direct and indirect discharges (including stormwater) to surface water. Also establishes monitoring and reporting requirements.	ARAR. Applies to discharge to surface water during remedial action.
Dredge and Fill Requirements	Section 404; 33 CFR Parts 320-323, 40 CFR 230	Regulates activities in waters of the U.S. including discharge of dredged materials, placement of fill materials, and reconstruction of mudflats. Section 404(b)(1) guidelines provide the substantive environmental criteria to be used in evaluating impacts on the aquatic ecosystem and provide for compensatory mitigation when there will be unavoidable impacts to waters of the United States.	ARAR. Substantive portions include implementation of BMPs and monitoring to meet water quality criteria during dredging, capping, barge and dredge movement, anchoring, and other in-water operations.
Pollution Prevention Regulations for Vessels	33 CFR Part 155, Subpart 1030	Intended to prevent pollution of waters by vessels, due to intentional or accidental discharges.	ARAR. Vessels are required to have spill plans and emergency spill equipment. Any fuel transfer over water necessary to run equipment on the barge would need to comply with U.S. Coast Guard regulatory requirements.
New Jersey Water Pollution Control Act, N.J.S.A. 58-10A-1 et seq. and Water Quality Planning Act, N.J.S.A. 58-11A-1 et seq.			
Pollutant Discharge Elimination System	N.J.A.C. 7:14A; N.J.A.C. 7:15	Establishes the designated uses and antidegradation categories of New Jersey's surface waters, classifies surface waters based on those uses (i.e., stream classifications), and specifies the water quality criteria and other policies and provisions necessary to attain those designated uses. Establishes discharge standards and approval process for direct and indirect discharges to protect water quality. Includes discharge standards specific to site remediation projects. Includes rules for implementing and operating project-related treatment works facility and ensures consistency with state wastewater management plans.	ARAR. Potentially applicable if remedial action includes discharge to surface water from publicly owned treatment works or project-related treatment works facility.
Stormwater Management	N.J.A.C.7:8	Design and performance standards for stormwater management during upland construction and operation of an upland facility.	ARAR. Potentially applicable if remedial action results in total land disturbance greater than 1 acre and includes preparing a stormwater pollution prevention plan and implementing BMPs to prevent discharge of pollutants. Also applicable to upland dredge material processing/treatment facility.
New Jersey Noise Control Act of 1971, N.J.S.A. 13:1G-1 et seq.			
Noise Control	N.J.A.C 7:20	Regulates noise levels for certain types of activities and facilities such as commercial, industrial, community service, and public service facilities.	ARAR for establishing allowable noise levels. A noise monitoring program will be designed as part of the Community Health and Safety Plan.

Table 10-2. Action-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Toxic Substances Control Act of 1976 (TSCA), 15 U.S.C. 2601 et seq.			
Management of PCB wastes	40 CFR Part 761	Regulates PCBs and other toxic substances from manufacture to disposal. Subpart D regulates storage and disposal of PCB waste. Establishes requirements for handling, storage, and disposal of PCB-containing materials, including PCB remediation wastes, and sets performance standards for disposal technologies for materials/wastes with concentrations in excess of 50 mg/kg. Establishes decontamination standards for PCB-contaminated debris. Prohibits the use of dilution to avoid TSCA requirements.	ARAR. Potentially applicable if any environmental media are identified containing PCBs at concentrations exceeding 50 mg/kg, which may be considered bulk PCB remediation waste.
Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6921 et seq.			
Management of Non-Hazardous Solid Waste Program (Subtitle D)	40 CFR 239-299 40 CFR 243, 40 CFR 256	Establishes requirements for generators, transporters, and facilities that manage non-hazardous solid waste.	ARAR for solid waste generated as part of the remedial action. The CERCLA Off-Site Rule (40 CFR 300.440) applies to any CERCLA response action involving the off-site transfer of any hazardous substance, pollutant, or contaminant (CERCLA wastes). The Off-Site Rule requires CERCLA wastes to be placed only in a facility operating in compliance with RCRA or other applicable federal or state requirements. These facilities include, but are not limited to, treatment, storage, and disposal facilities that are regulated under RCRA, TSCA, or any other applicable federal or state environmental law.
Management of Hazardous Waste (Subtitle C)	40 CFR 260-265, 40 CFR 268	Establishes requirements for generators, transporters, and facilities that manage hazardous solid waste. Provides for evaluation and control of materials that contain a listed waste, or that display a hazardous waste characteristic based on the toxicity characteristic leaching procedure (TCLP) test. Regulates storage, treatment, and disposal of listed or characteristic waste unless an exemption applies. Also establishes treatment standards (land disposal restrictions) for hazardous waste prior to disposal.	ARAR. Contaminated sediments that exhibit characteristics of hazardous waste (e.g., the characteristic of toxicity, based on testing according to the TCLP test) will be managed as hazardous waste. Prior to disposal as a hazardous waste, dredged material may require treatment. Requirements of the Off-Site Rule (see above) are also applicable for offsite transfer of hazardous wastes designated in accordance with RCRA Subtitle C.
Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq.			
Management of Solid Waste	N.J.A.C. 7:26-2.1 Solid Waste	Establishes requirements for generators, transporters, and facilities that manage non-hazardous solid waste.	ARAR for solid waste generated as part of the remedial action. In New Jersey, dredged material is typically excluded from the definition of solid waste.
Management of Hazardous Waste	N.J.A.C. 7:26-G-1 et seq. Hazardous Waste Facilities	Establishes requirements for generators, transporters, and facilities that manage hazardous waste, and for thermal destruction facilities.	ARAR. Relevant and appropriate to sediment that is managed as hazardous waste generated as part of the remedial action.
Brownfield and Contaminated Site Remediation Act, N.J.S.A 58:10.3-1 et seq.			
Technical Requirements for Site Investigation and Remediation	N.J.A.C. 7:26 D, 7:26 E	Establishes minimum regulatory requirements for investigation and remediation of contaminated sites being addressed under New Jersey authorities and oversight.	ARAR. Substantive requirements for remedial action potentially relevant and appropriate for some aspects of remedial action. TBC: NJDEP's "Technical Guidance on the Capping of Sites Undergoing Remediation," published pursuant to these requirements, provides general technical considerations, describes cap types and applications, and outlines monitoring considerations for the design and implementation of sediment caps for remediation of contaminated sediments.

Table 10-2. Action-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Hazardous Materials Transportation Act, 49 U.S.C. §1801-1819			
Hazardous Materials Transportation	49 CFR 171-177	Regulates the transportation of hazardous materials including procedures for packaging, labeling, manifesting, and transporting hazardous materials to a licensed offsite disposal facility.	ARAR for hazardous materials generated by the remedial action and shipped off-site for disposal.
Management and Regulation of Dredging Activities and Dredged Material Disposal in New Jersey's Tidal Water, December 1997			
Dredged Material Management	NJDEP Technical Manual	The manual provides guidance and criteria for the required sampling, testing, and permitting of proposed dredging projects and various dredged material management/disposal/use alternatives.	TBC. The remedial action will incorporate BMPs and other techniques to reduce creation and dispersal of sediments and minimize adverse effects.
Clean Air Act, 42 U.S.C. § 7401 et seq.			
Air Emissions	40 CFR Parts 50-97	Provides emissions standards for specific contaminants and for categories of operating equipment.	ARAR potentially applicable if air emissions are generated from remedial actions.
Air Pollution Control Act, N.J.S.A. §26:2C et seq.			
Air Emissions	N.J.A.C. 7:27	Regulates sources/operations that emit contaminants from a variety of sources; controls and prohibits air pollution, particle emissions, and toxic volatile organic compound emissions including odors and dusts.	ARAR potentially applicable. Prohibits emissions in such quantities and duration as are, or tend to be, injurious to human health or welfare, animal or plant life or property, or would unreasonably interfere with the enjoyment of life or property.

Notes:

ARAR = applicable or relevant and appropriate requirement
BMP = best management practice
CERCLA = Comprehensive Environmental Response, Compensation and Liability Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
N.J.A.C. = New Jersey Administrative Code
NJDEP = New Jersey Department of Environmental Protection
N.J.S.A. = New Jersey Statutes Annotated
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
TBC = to be considered
TSCA = Toxic Substances Control Act
U.S.C. = United States Code

Table 10-3. Location-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Fish & Wildlife Coordination Act, 16 U.S.C. 661			
Protection of Wildlife	40 CFR 2 6:302(g)	Requires consideration of the effects of a proposed action on wetlands and areas affecting streams (including floodplains), as well as other protected habitats. Federal agencies must consult with USFWS prior to authorizing any modification of any stream or other water body, and requires adequate consideration to protect fish and wildlife resources and their habitats. Wildlife and wildlife resources include birds, fish, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent.	ARAR. The Passaic River is a migratory pathway, nursery, and forage area for anadromous fish. NOAA will be consulted to determine if conservation measures are appropriate for the riverbed where dredging activities are occurring.
Migratory Bird Treaty Act, 16 U.S.C. 703-712			
Protection of Native and Migratory Birds	50 CFR 10	Requires that federal agencies consult with USFWS during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds. Protects native birds and migratory birds, as listed in 50 CFR 10.13, their nests, and eggs from unregulated "take," which can include disturbing active nests. Managed by USFWS.	ARAR. Bird activity has been observed along the LPR. Active bird nests cannot be removed without approval.
Endangered Species Act, Section 7, 16 U.S.C. 1531			
Protection of Threatened and Endangered Species	50 CFR Part 17 50 CFR Part 402	The Endangered Species Act provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere. Applicable if any action may have an impact on an endangered species.	ARAR. The NJDEP Division of Fish and Wildlife Service will be consulted. Threatened, endangered, and of concern species have been identified along the LPR.
The Endangered and Non Game Species Conservation Act, N.J.S.A. 23:2A-1 to 23:2A-1:15			
Protection of Endangered, Threatened, or of Special Concern Species	Title 23 Fish and Game Wild Birds and Animals	Restricts activities where endangered, threatened, or of special concern species may be present	ARAR. The NJDEP Division of Fish and Wildlife Service will be consulted. Threatened, endangered, and of concern species have been identified along the LPR.
National Historic Preservation Act, 16 U.S.C. 470			
Historic Resources	36 CFR 800	Requires federal agencies to take into account the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object that is included in or is eligible for inclusion in the National Register of Historic Places. If the undertaking results in adverse effects, the agency must consult with the New Jersey Historic Preservation Office and other parties to develop ways to avoid, reduce, minimize, or mitigate any adverse impacts to those identified properties.	ARAR. A cultural survey will be conducted during the remedial design that will comply with the National Historic Preservation Act and aid in consultations with New Jersey Historic Preservation Office.

Table 10-3. Location-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
New Jersey Register of Historic Places, N.J.S.A. 13:1B-15.128 et seq.			
Historic Resources	N.J.A.C. 7:4	Requires that actions by state, county, or local governments, which may impact a property listed in the New Jersey Register of Historic Places, be reviewed and authorized through the Historic Preservation Office.	ARAR potentially applicable. If a federally assisted undertaking on any district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places results in adverse effects, the agency must consult with the New Jersey Historic Preservation Office and other parties to develop ways to avoid, reduce, minimize, or mitigate any adverse impacts to those identified properties. A cultural resource survey (Phase I and II) will be conducted during the remedial design that will comply with the National Historic Preservation Act and aid in consultations with the New Jersey Historic Preservation Office.
Coastal Zone Management Act, 16 U.S.C. §§ 1451 et seq., §307 Coordination and Cooperation			
Coastal Resources	15 CFR Part 930	Requires that any federal agency undertaking a project in the coastal zone of a state shall ensure that the project is, to the maximum extent practicable, consistent with the enforceable policies of approved state management plans.	ARAR. Work will occur in areas that require substantive conformance with New Jersey Waterfront Development Law and New Jersey Coastal Zone Management Program and rules.
Section 10 Rivers and Harbors Act of 1899, 33 U.S.C. §403			
Wetlands; Navigable Waters	33 CFR 320-330	Regulates activities such as dredging and filling, and other construction in navigable waters of the U.S. Congressional approval required for any obstruction of the navigable capacity of the waters of the United States. Placement of pilings, or discharge of dredged material where the flow or circulation of waters of the United States may be impaired or the reach of such waters reduced must comply with Section 10.	ARAR for reaches of the river where dredging or capping will occur within navigable waters, as defined in 33 CFR 329. While permits are not required for onsite work, substantive requirements can be found in the General Permit and Regional Conditions.
New Jersey Waterfront Development Law (N.J.S.A. 12:5-3)			
Waterfront Development	Coastal Permit Program N.J.A.C. 7:7	Regulates any waterfront development, including sediment removal and fill, at or below mean high water and up to 500 ft from mean high water in the coastal zone and tidal waters of the state. Implemented through the Coastal Zone Management Program (N.J.A.C. 7:7), which provides rules and standards for use and development of resources in New Jersey's coastal zone.	ARAR. Dredging and filling projects require substantive conformance with Coastal Zone Management Program and rules. While permits are not required for onsite work, if dredged material is managed at an onsite sediment processing facility, an Acceptable Use Determination Permit-equivalent may be sought, to establish substantive requirements. Substantive requirements and BMPs include measures to minimize scouring and resuspension of sediment during dredging and placement of cap materials, slope management, and monitoring upstream and downstream.
Coastal Zone Management Rules/Standards	Coastal Zone Management N.J.A.C. 7:7	Provides standards for use and development of resources in New Jersey's coastal zone including those performed in accordance with the Waterfront Development Law. The rules are used in the review of water quality certificates subject to Section 401 of the Federal Clean Water Act, and federal consistency determinations under Section 307 of the Federal Coastal Zone Management Act, 16 U.S.C. § 1456. The rules also provide a basis for riparian grants, leases, and licenses.	ARAR. The Coastal Zone Management rules are considered in developing substantive requirements; Waterfront Development Permit/ Water Quality Certificate Permit Equivalents may be sought to establish compliance with substantive requirements.
Tidelands Act (Riparian Lands Leases, Grants, and Conveyances [N.J.S.A. 12:3-1 et seq.])			
Riparian lands owned by the State of New Jersey		Requires a tidelands lease, grant, or conveyance for the use of state-owned riparian lands, including sediment removal from rivers. The State of New Jersey owns riparian lands flowed by the mean high tide of a natural waterway, except for those lands in which it has already conveyed its interest in the form of a riparian grant.	ARAR. Sediment removal and backfill activities will require a tidelands lease. The application for the Tidelands Lease will be included in a Waterfront Development Permit-equivalent package. Substantive requirements include that development plans must be prepared by a professional engineer, and must depict the limits of the tidelands instrument, and notice to upland property owners.

Table 10-3. Location-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Protection of Wetlands, Executive Order 11990/Statement of Procedures on Wetlands Protection			
Wetlands	40 CFR Part 6, EPA policy and guidance for E.O. 11990 40 CFR Part 6, Appendix A	Requires that activities avoid, to the extent possible, long-term and short-term adverse effects associated with the modification or destruction of wetlands. Federal agencies are required to avoid direct or indirect support of new construction in wetlands where there are practical alternatives; harm to wetlands must be minimized when there is no practical alternative available.	TBC. Any remedial activities (including construction) in wetlands will be implemented consistent with EO 11990.
Wetland Act of 1970 (N.J.S.A. 13:9A-1 et seq.) and Freshwater Wetlands Protection Act (N.J.S.A. 13:9B)			
Establishes wetland and freshwater wetland regulated activities	N.J.A.C. 7:7A-2	Regulates construction or other activities (including remedial action) that will have an impact on wetlands, including working and transporting across coastal zone to upland processing facility.	ARAR for work in regulated wetlands and transition areas unless otherwise approved by USACE or covered under a water quality certificate issued by NJDEP. Requires minimization of impacts in wetlands.
Magnuson-Stevens Fishery Conservation and Management Act, as amended and authorized by the Sustainable Fisheries Act			
Fisheries	50 CFR Part 600 Public Law 94-265	Establishes 10 national standards for fishery conservation and management and requires that other federal agencies consult with the National Marine Fisheries Service (NMFS) on actions that may adversely affect essential fish habitats, which are defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."	ARAR. The LPR has been designated as essential fish habitat (EFH) for various fish species. Although measures recommended by NMFS to protect EFH are advisory, not prescriptive, EPA is required to consult with NMFS, and respond in writing to NMFS recommendations on actions or proposed actions that may adversely affect EFH. Consideration by NJDEP of actions that would create impediments to fish migration habitat impacts or that would lower water quality so as to interfere with fish movement patterns is also required under the New Jersey Coastal Zone Management standards. For the Phase 1 removal action on the LPR, EPA accepted the NMFS recommendation of a fish migration window precluding dredging from March 1 through June 30. It is anticipated that similar restrictions would be adopted for other remedial actions on the LPR. The dates of the fish window(s) precluding actions (e.g., dredging) will be set prior to scheduling those actions.
Floodplain Management: Executive Order 11988, Statement of Procedures on Floodplain Management			
Protect Floodplains	40 CFR Part 6, EPA policy and guidance for E.O. 11988 40 CFR Part 6, Appendix A	Requires evaluation of the potential effects of actions that may be taken in a floodplain and to avoid, to the extent possible, long-term and short-term adverse effects associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.	TBC. Remedial work that occurs in floodplain will be implemented consistent with EO 11988.
Flood Hazard Area Control Act, N.J.S.A. 58: 16A-50 et seq.			
Protect Floodplains	N.J.A.C. 7:13	Regulates activities (including remedial action) within flood hazard areas that will impact stream carrying capacity or flow velocity to avoid increasing impacts of flood waters, to minimize degradation of water quality, protect wildlife and fisheries, and protect and enhance public health and welfare. Consistent with N.J.A.C 7:13-10 and 7:13-11, it is not expected that the elevation of the river bottom or the mudflats would be increased above current conditions.	ARAR potentially applicable for work that occurs in flood hazard areas.

Table 10-3. Location-Specific ARARs

Act/Authority	Citation	Brief Description	Applicability and Anticipated Requirements
Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39			
Prevent erosion and provide sediment control	N.J.A.C. 2:90	Regulates construction that will potentially result in erosion of soils and sediment, such as at an upland processing facility, and requires preparation of stormwater pollution prevention plan, designation of construction waste collection site, and site plan for construction related erosion. Applicable to land disturbance activities involving greater than 5,000 sq. ft.	ARAR potentially applicable for work that potentially results in erosion of soils.

Notes:

ARAR = applicable or relevant and appropriate requirement
BMP = best management practice
CFR = Code of Federal Regulations
EFH = essential fish habitat
EPA = U.S. Environmental Protection Agency
ESA = Endangered Species Act
LPR = Lower Passaic River
NJDEP = New Jersey Department of Environmental Protection
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
TBC = to be considered
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service

Table 10-4. Summary of Cost Estimates

Alternative	Description	Direct Capital ($M) [a]	Indirect Capital ($M)	Total Capital ($M)	Annual OMM ($M/year) [a,b]	Periodic OMM ($M) [a]	Present Value ($M) [c]
1	No Action	0.0	0.0	0.0	0.0	0.0	0.0
2	2,3,7,8-TCDD target SWAC = 85 ppt, Total PCB RAL = 1 ppm	335	113	448	0.9	50	420
3	2,3,7,8-TCDD target SWAC = 75 ppt, Total PCB RAL = 1 ppm	357	116	472	0.9	50	441
4	2,3,7,8-TCDD target SWAC = 65 ppt, Total PCB RAL = 1 ppm	385	119	504	0.9	51	468
5	2,3,7,8-TCDD target SWAC = 125 ppt, no Total PCB RAL	233	100	333	0.9	47	321

Notes:

2,3,7,8-TCDD = 2,3,7,8-tetrachlorodibenzo-*p*-dioxin

M = million

OMM = operation, maintenance, and monitoring

PCB = polychlorinated biphenyl

RAL = remedial action level

SWAC = surface area-weighted average concentration

Estimates represent a feasibility level of accuracy (+50/-30%).

[a] Direct capital, annual OMM, and periodic costs include 25% contingency.

[b] Annual OMM costs are assumed to begin in Year 5 and extend for 30 years after construction is complete.

[c] Discounted at a rate of 7.0%, per the U.S. Office of Management and Budget's Circular A-94 Guideline and Discount Rates for Benefit-Cost Analysis of Federal Programs real interest rates for a 30-year time period (OMB 2018).

Table 12-1. Alternative 3 Cost Estimate Summary
2,3,7,8-TCDD target SWAC = 75 ppt, Total PCB RAL = 1 ppm

Task	Units	Quantity	Unit Price		Total Cost[a]	
KEY ASSUMPTIONS						
Contingency[b]	%	25				
Discount rate, i[c]	%	7.0				
DIRECT CAPITAL COSTS[d]						
Construction Staging Facility						
Staging Area Land Purchase/Lease	AC	5	$	200,000	$	1,000,000
Support Facilities	YR	5	$	310,000	$	1,400,000
Subtotal Construction Staging Facility					**$**	**2,400,000**
Dredging						
Mobilization/Demobilization[e]	LS	1	$	1,403,300	$	1,400,000
Protections & Controls	LS	1	$	1,420,000	$	1,400,000
Mechanical Dredging[f]	CY	387,391	$	69	$	26,900,000
Debris Removal	DY	625	$	3,880	$	2,400,000
Bathymetric Verification Survey	DY	703	$	5,600	$	3,900,000
Water Quality Monitoring	DY	703	$	11,000	$	7,700,000
Additional Construction Performance Monitoring	YR	5	$	1,000,000	$	5,000,000
Monitoring Reporting	YR	5	$	150,000	$	800,000
Barge Unloading/Material Handling	CY	387,391	$	15	$	5,800,000
Subtotal Dredging					**$**	**55,300,000**
Capping						
Mobilization/Demobilization[e]	LS	1	$	963,200	$	1,000,000
Material Purchase & Delivery[g]	CY	387,391	$	40	$	15,300,000
On-Site Material Handling & Placement	CY	387,391	$	50	$	19,400,000
Residual Management	LS	1	$	1,237,800	$	1,200,000
Subtotal Capping					**$**	**36,900,000**
Dredged Material Processing						
Sediment Processing at Commercial Facility	CY	387,391	$	160	$	62,000,000
Subtotal Dredged Material Processing					**$**	**62,000,000**
Transportation & Disposal						
Transportation & Disposal - Subtitle C	CY	387,391	$	244	$	94,500,000
Transportation & Disposal - Barge Dewatering Effluent	CY	387,391	$	88	$	34,100,000
Disposal Testing	LS	1	$	140,400	$	100,000
Subtotal Transportation & Disposal					**$**	**128,700,000**
SUBTOTAL DIRECT CAPITAL COSTS					**$**	**285,300,000**
CONTINGENCY (25%)					**$**	**71,300,000**
TOTAL DIRECT CAPITAL COSTS					**$**	**356,600,000**

Table 12-1. Alternative 3 Cost Estimate Summary
2,3,7,8-TCDD target SWAC = 75 ppt, Total PCB RAL = 1 ppm

Task	Units	Quantity	Unit Price	Total Cost[a]
INDIRECT CAPITAL COSTS[d]				
Pre-Design Investigations	LS	1	$ 50,000,000	**$ 50,000,000**
Remedial Design	LS	1	$ 21,000,000	**$ 21,000,000**
Coordination with Agencies/Stakeholders	%	0.5	TDCC	**$ 1,800,000**
Construction Management/Construction Quality Assurance	%	7	TDCC	**$ 25,000,000**
Project Management	%	5	TDCC	**$ 17,800,000**
TOTAL INDIRECT CAPITAL COSTS				**$ 115,600,000**
TOTAL CAPITAL COSTS				
TOTAL CAPITAL COSTS				**$ 472,200,000**
ANNUAL OMM COSTS[d]				
Reporting[h]	YR	1	$ 100,000	**$ 100,000**
Institutional Controls[h]	YR	1	$ 525,000	**$ 500,000**
Technical Support[h]	YR	1	$ 90,000	**$ 100,0000**
SUBTOTAL ANNUAL OMM COSTS				**$ 700,000**
CONTINGENCY (25%)				**$ 200,000**
TOTAL ANNUAL OMM COSTS				**$ 900,000**
PERIODIC COSTS[d]				
Long-Term Monitoring	EVENT	14	$ 1,100,000	**$ 15,400,000**
Cap Monitoring	EVENT	7	$ 57,600	**$ 400,000**
Bathymetric and Other Surveys	EVENT	6	$ 150,000	**$ 900,000**
Initial Surface Sediment Sampling Event	EVENT	1	$ 3,500,000	**$ 3,500,000**
Follow-Up Surface Sediment Sampling Events	EVENT	6	$ 2,000,000	**$ 12,000,000**
Cap Maintenance (Year 0 through Year 15)	EVENT	3	$ 1,595,400	**$ 4,800,000**
Cap Maintenance (Year 16 through Year 35)	EVENT	4	$ 797,700	**$ 3,200,000**
SUBTOTAL PERIODIC COSTS				**$ 40,200,000**
CONTINGENCY (25%)				**$ 10,100,000**
TOTAL PERIODIC COSTS				**$ 50,300,000**

Table 12-1. Alternative 3 Cost Estimate Summary

2,3,7,8-TCDD target SWAC = 75 ppt, Total PCB RAL = 1 ppm

Task	Units	Quantity	Unit Price	Total Cost[a]
PRESENT WORTH COSTS (7% Discount; T=30 Years After Construction)				
Capital Costs				$ 412,600,000
Annual OMM				$ 8,300,000
Periodic Costs				$ 19,900,000
TOTAL PRESENT WORTH				**$ 440,800,000**

Notes:

AC = acre
CY = cubic yard
DY = day
EPA = U.S. Environmental Protection Agency
LPR = Lower Passaic River
LS = lump sum
OMM = operation, maintenance, and monitoring
ROD = Record of Decision
TDCC = total direct capital costs
TN = ton
YR = year

[a]Approximate totals are rounded to the nearest $100,000.

[b]15% scope contingency and 10% bid contingency. These contingencies are near baseline values specified in the EPA cost guidance document (USEPA 2000).

[c]Per EPA cost guidance (USEPA 2000), discount rate is 7%.

[d]This estimate represents costs with +50/-30% accuracy. All assumptions and costs are only for feasibility study purposes and are subject to refinement in the ROD and during remedial design.

[e]5% of material and installation costs; see Tables G-2c and G-2d sheet for details.

[f]Unit cost reflects weighted average of estimated unit costs for each bucket size/type (3 CY, 5 CY, and land-based) by their proportional use. See Table G-2c for details.

[g]Unit cost reflects weighted average of estimated unit costs for each material type (sand, armor/stone, and shoal habitat reconstruction material) by their estimated proportional use. See Table G-2d for details.

[h]Annual cost starts in Year 5 and continues until 30 years after construction.

APPENDIX 3

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Site Name: DIAMOND ALKALI CO.
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616026	09/13/2021	ADMINISTRATIVE RECORD INDEX FOR OU4 FOR DIAMOND ALKALI COMPANY SITE	140	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
623505	Undated	BACKGROUND INFORMATION ON THE COMMUNITY ADVISORY GROUP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Other		
623506	Undated	DRAFT INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	13	Report		
623545	Undated	HEALTH AND SAFETY PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	169	Work Plan		
623740	Undated	SENSITIVITY OF 2,3,7,8 BIOACCUMULATION MODEL TO LOG KOW FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
623742	Undated	LOWER PASSAIC RIVER STUDY AREA DRAFT PHYSICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR THE LPRSA DATED MARCH 2014, RESPONSE TO 02/26/2019 EPA COMMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Other		(AECOM)
99861	04/06/2004	SETTLEMENT AGREEMENT AND RESPONSE COSTS FOR SETTLING PARTIES, LOWER PASSAIC RIVER STUDY AREA	54	Agreement		KENNY,JANE,M (US ENVIRONMENTAL PROTECTION AGENCY)|SANSONETTI,THOMAS,L (U.S. DEPARTMENT OF JUSTICE)

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623710	05/25/2004	TECHNICAL REPORT ENVIRONMENTAL DREDGING AND SEDIMENT DECONTAMINATION TECHNOLOGY DEMONSTRATION PILOT STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	39	Report		
616298	07/14/2005	LOWER PASSAIC RIVER RESTORATION PROJECT REVISED PRELIMINARY DRAFT FIELD SAMPLING PLAN - VOLUME 3 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	118	Work Plan		(US ARMY CORPS OF ENGINEERS)
213231	07/27/2005	PATHWAYS ANALYSIS REPORT FOR LOWER PASSAIC RIVER RESTORATION PROJECT	155	Report	(US ARMY CORPS OF ENGINEERS)|(US ENVIRONMENTAL PROTECTION AGENCY)	(BATTELLE)|(MALCOLM PIRNIE, INCORPORATED)
233452	08/01/2005	FINAL QUALITY ASSURANCE PROJECT PLAN FOR THE LOWER PASSAIC RIVER RESTORATION PROJECT FOR DIAMOND ALKALI COMPANY SITE	231	Work Plan	(US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT)|(US ENVIRONMENTAL PROTECTION AGENCY)	(MALCOLM PIRNIE, INCORPORATED)
92084	09/16/2005	SETTLEMENT AGREEMENT AND RESPONSE COSTS FOR SETTLING PARTIES, AMENDMENT NO. 1, LOWER PASSAIC RIVER STUDY AREA	21	Agreement		
205089	01/11/2006	FIELD SAMPLING PLAN - VOLUME 1 - VERSION 2006-01-11 FOR THE LOWER PASSAIC RIVER RESTORATION PROJECT	282	Work Plan	(US ARMY CORPS OF ENGINEERS)|(US ENVIRONMENTAL PROTECTION AGENCY)	(MALCOLM PIRNIE, INCORPORATED)
205091	06/16/2006	DRAFT FIELD SAMPLING PLAN - VOLUME 2 FOR THE LOWER PASSAIC RIVER RESTORATION PROJECT	306	Work Plan	(US ARMY CORPS OF ENGINEERS)|(US ENVIRONMENTAL PROTECTION AGENCY)	(EARTH TECH INCORPORATED)|(MALCOLM PIRNIE, INCORPORATED)

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99864	05/08/2007	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LOWER PASSAIC RIVER STUDY AREA	156	Legal Instrument		
99862	05/31/2007	SETTLEMENT AGREEMENT AND RESPONSE COSTS FOR SETTLING PARTIES, AMENDMENT NO. 2, LOWER PASSAIC RIVER STUDY AREA	42	Agreement		
623397	06/15/2007	LPRSA MONTHLY PROGRESS REPORT NO. 1 FOR MAY 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623398	07/16/2007	LPRSA MONTHLY PROGRESS REPORT NO. 2 FOR JUNE 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623399	08/15/2007	LPRSA MONTHLY PROGRESS REPORT NO. 3 FOR JULY 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623400	09/17/2007	LPRSA MONTHLY PROGRESS REPORT NO. 4 FOR AUGUST 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623401	10/15/2007	LPRSA MONTHLY PROGRESS REPORT NO. 5 FOR SEPTEMBER 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623402	11/15/2007	LPRSA MONTHLY PROGRESS REPORT NO. 6 FOR OCTOBER 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623403	12/14/2007	LPRSA MONTHLY PROGRESS REPORT NO. 7 FOR NOVEMBER 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623404	01/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 8 FOR DECEMBER 2007 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623405	02/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 9 FOR JANUARY 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623406	03/17/2008	LPRSA MONTHLY PROGRESS REPORT NO. 10 FOR FEBRUARY 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623407	04/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 11 FOR MARCH 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623408	05/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 12 FOR APRIL 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623409	06/13/2008	LPRSA MONTHLY PROGRESS REPORT NO. 13 FOR MAY 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623410	07/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 14 FOR JUNE 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616222	07/18/2008	RI LOW RESOLUTION CORING / SEDIMENT SAMPLING QUALITY ASSURANCE PROJECT PLAN REVISION 1 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	314	Work Plan		
623411	08/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 15 FOR JULY 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623412	09/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 16 FOR AUGUST 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623413	10/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 17 FOR SEPTEMBER 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623414	11/14/2008	LPRSA MONTHLY PROGRESS REPORT NO. 18 FOR OCTOBER 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623415	12/15/2008	LPRSA MONTHLY PROGRESS REPORT NO. 19 FOR NOVEMBER 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623416	01/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 20 FOR DECEMBER 2008 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623417	02/13/2009	LPRSA MONTHLY PROGRESS REPORT NO. 21 FOR JANUARY 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623709	02/16/2009	TRANSMITTAL OF RESULTS AND DELIVERABLES SUBMITTED BY GAHAGAN & BRYANT ASSOCIATES INCORPORATED FOR THE MULTIBEAM SURVEYS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	79	Letter		
623418	03/16/2009	LPRSA MONTHLY PROGRESS REPORT NO. 22 FOR FEBRUARY 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623419	04/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 23 FOR MARCH 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623745	04/29/2009	CORRESPONDENCE REGARDING REVIEW OF DRAFT PHYSICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623420	05/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 24 FOR APRIL 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623421	06/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 25 FOR MAY 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623422	07/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 26 FOR JUNE 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616137	07/31/2009	LPRSA HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT STREAMLINED 2009 PROBLEM FORMULATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	73	Report		(AECOM)
623546	08/01/2009	OVERSIGHT QUALITY ASSURANCE PROJECT PLAN FOR BIOLOGICAL SAMPLING, COMMUNITY SURVEYS, AND TOXICITY AND BIOACCUMULATION TESTING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	402	Work Plan		(MALCOLM PIRNIE, INCORPORATED)
623547	08/05/2009	TRANSMITTAL OF OVERSIGHT QUALITY ASSURANCE PROJECT PLAN FOR BIOLOGICAL SAMPLING, COMMUNITY SURVEYS, AND TOXICITY AND BIOACCUMULATION TESTING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|Vaughn,Stephanie (US ENVIRONMENTAL PROTECTION AGENCY)	(MALCOLM PIRNIE, INCORPORATED)|WARNER,LEN (MALCOLM PIRNIE, INCORPORATED)
459039	08/06/2009	RESPONSE TO US EPA COMMENTS ON REVISED DRAFT QUALITY ASSURANCE PROJECT PLAN FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS AND FISH COMMUNITY SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Letter		

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616289	08/06/2009	FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	425	Work Plan		(AECOM)
623423	08/13/2009	LPRSA MONTHLY PROGRESS REPORT NO. 27 FOR JULY 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623548	08/14/2009	FIELD MODIFICATION FORM FOR LOWER PASSAIC RIVER RESTORATION PROJECT - FIELD MODIFICATION NO. 1 FOR THE OVERSIGHT PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Form		(MALCOLM PIRNIE, INCORPORATED)|WARNER,LEN (MALCOLM PIRNIE, INCORPORATED)
623424	09/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 28 FOR AUGUST 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623579	09/24/2009	DRAFT QUALITY ASSURANCE PROJECT PLAN/FIELD SAMPLING PLAN ADDENDUM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	294	Work Plan		
459038	10/02/2009	RESPONSE TO US EPA COMMENTS ON DRAFT QUALITY ASSURANCE PROJECT PLAN SURFACE SEDIMENT CHEMICAL ANALYSES AND BENTHIC INVERTEBRATE TOXICITY AND BIOACCUMULATION TESTING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Letter		

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623669	10/08/2009	QUALITY ASSURANCE PROJECT PLAN SURFACE SEDIMENT CHEMICAL ANALYSES AND BENTHIC INVERTEBRATE TOXICITY AND BIOACCUMULATION TESTING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	534	Report		
623425	10/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 29 FOR SEPTEMBER 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623549	10/15/2009	FIELD MODIFICATION FORM FOR LOWER PASSAIC RIVER RESTORATION PROJECT - QAPP FIELD MODIFICATION NO. 2 FOR THE OVERSIGHT PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Form		(MALCOLM PIRNIE, INCORPORATED)|WARNER,LEONARD,J (MALCOLM PIRNIE, INCORPORATED)
623426	11/16/2009	LPRSA MONTHLY PROGRESS REPORT NO. 30 FOR OCTOBER 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623670	12/10/2009	QUALITY ASSURANCE PROJECT PLAN SURFACE SEDIMENT CHEMICAL ANALYSES AND BENTHIC INVERTEBRATE TOXICITY AND BIOACCUMULATION TESTING ERRATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report		
623427	12/15/2009	LPRSA MONTHLY PROGRESS REPORT NO. 31 FOR NOVEMBER 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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459081	12/17/2009	STATUS REPORT FOR OCTOBER, NOVEMBER, AND DECEMBER 2009 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Memorandum		
623550	12/23/2009	FIELD MODIFICATION FORM FOR LOWER PASSAIC RIVER RESTORATION PROJECT - QAPP FIELD MODIFICATION NO. 3 FOR THE OVERSIGHT PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	46	Form		(MALCOLM PIRNIE, INCORPORATED)|WARNER,LEN (MALCOLM PIRNIE, INCORPORATED)
459045	01/13/2010	TRANSMITTAL OF WINTER 2010 FISH COMMUNITY SURVEY ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS AND FISH COMMUNITY SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
623428	01/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 32 FOR DECEMBER 2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616285	01/22/2010	DRAFT WINTER 2010 FISH COMMUNITY SURVEY ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	27	Work Plan		(AECOM)
623580	02/12/2010	LOWER PASSAIC RIVER STUDY AREA PWCM QAPP REVISION RESPONSE TO EPA COMMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Other		

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623341	02/16/2010	LPRSA MONTHLY PROGRESS REPORT NO. 33 FOR JANUARY 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623342	03/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 34 FOR FEBRUARY 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459082	04/05/2010	STATUS REPORT FOR MARCH 2010 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	40	Memorandum		
623551	04/13/2010	OVERSIGHT QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR BIOLOGICAL SAMPLING, COMMUNITY SURVEYS, AND TOXICITY AND BIOACCUMULATION TESTING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	81	Form		(MALCOLM PIRNIE, INCORPORATED)|WARNER,LEONARD,J (MALCOLM PIRNIE, INCORPORATED)
623343	04/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 35 FOR MARCH 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459083	05/12/2010	STATUS REPORT FOR MAY 2010 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Memorandum		
623344	05/17/2010	LPRSA MONTHLY PROGRESS REPORT NO. 36 FOR APRIL 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623671	05/17/2010	ADDENDUM NO. 1 TO THE QUALITY ASSURANCE PROJECT PLAN SPRING AND SUMMER 2010 BENTHIC INVERTEBRATE COMMUNITY SURVEYS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	19	Report		
623673	06/04/2010	ADDENDUM NO. 3 TO THE QUALITY ASSURANCE PROJECT PLAN HABITAT IDENTIFICATION SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	33	Report		
623674	06/04/2010	TRANSMITTAL OF ADDENDUM NO. 3 TO THE QUALITY ASSURANCE PROJECT PLAN HABITAT IDENTIFICATION SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Memorandum		
623552	06/08/2010	FINAL QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #2 LATE SPRING/EARLY SUMMER 2010 FISH COMMUNITY SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	18	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623553	06/08/2010	QUALITY ASSURANCE PROJECT PLAN, FINAL ADDENDUM #3 SPRING AND SUMMER 2010 BENTHIC INVERTEBRATE COMMUNITY SURVEYS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	18	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623345	06/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 37 FOR MAY 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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616288	06/21/2010	LATE SPRING/EARLY SUMMER 2010 FISH TISSUE COLLECTION ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	43	Work Plan		(AECOM)
616287	06/22/2010	LATE SPRING/EARLY SUMMER 2010 FISH COMMUNITY SURVEY ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Work Plan		(AECOM)
459084	07/02/2010	STATUS REPORT FOR JUNE 2010 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	27	Memorandum		
459085	07/02/2010	STATUS REPORT FOR 05/19/2010 - 05/25/2010 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	29	Memorandum		
623554	07/09/2010	QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #6 HABITAT IDENTIFICATION SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)

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623555	07/09/2010	QUALITY ASSURANCE PROJECT PLAN, FINAL ADDENDUM #4 SURFACE SEDIMENT SAMPLES CO-LOCATED WITH SMALL FORAGE FISH TISSUE SAMPLES - COLLECTED IN CONJUNCTION WITH THE SUMMER 2010 BENTHIC COMMUNITY SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	67	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623346	07/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 38 FOR JUNE 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623672	07/23/2010	ADDENDUM NO. 2 TO THE QUALITY ASSURANCE PROJECT PLAN COLLECTION OF SURFACE SEDIMENT SAMPLES CO-LOCATED WITH SMALL FORAGE FISH TISSUE SAMPLES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	30	Report		
623556	07/29/2010	QUALITY ASSURANCE PROJECT PLAN, FINAL ADDENDUM #1 AVIAN COMMUNITY SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	20	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
459086	08/03/2010	STATUS REPORT FOR JULY 2010 CPG OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Memorandum		

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616286	08/09/2010	AVIAN COMMUNITY SURVEY ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	40	Work Plan		(AECOM)
623347	08/16/2010	LPRSA MONTHLY PROGRESS REPORT NO. 39 FOR JULY 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623557	08/24/2010	QUALITY ASSURANCE PROJECT PLAN, FINAL ADDENDUM #5, REVISION 1 FISH TISSUE ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	388	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623560	08/25/2010	FINAL QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #9 RIVER MILE 10.9 CHARACTERIZATION STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	707	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623348	09/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 40 FOR AUGUST 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623700	10/01/2010	PERIODIC BATHYMETRY SURVEY REPORT JUNE 2010 MULTIBEAM SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	220	Report		

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623349	10/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 41 FOR SEPTEMBER 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623350	11/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 42 FOR OCTOBER 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623351	12/15/2010	LPRSA MONTHLY PROGRESS REPORT NO. 43 FOR NOVEMBER 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623362	01/14/2011	LPRSA MONTHLY PROGRESS REPORT NO. 44 FOR DECEMBER 2010 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623352	02/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 45 FOR JANUARY 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623675	03/02/2011	ADDENDUM NO. 4 TO THE QUALITY ASSURANCE PROJECT PLAN CAGED BIVALVE STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	100	Report		
623353	03/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 46 FOR FEBRUARY 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623701	04/01/2011	PERIODIC BATHYMETRY SURVEY REPORT JUNE 2010 MULTIBEAM SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	222	Report		
623354	04/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 47 FOR MARCH 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623558	05/02/2011	FINAL QUALITY ASSURANCE PROJECT, PLAN ADDENDUM #7 CAGED BIVALVE STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	72	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623355	05/13/2011	LPRSA MONTHLY PROGRESS REPORT NO. 48 FOR APRIL 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623689	06/01/2011	FIELD MODIFICATION FORM REVISION NO. 2 FOR PROJECT NO. 60145884 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Form		
623356	06/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 49 FOR MAY 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623303	06/17/2011	RESPONSE TO USEPA COMMENTS ON HABITAT IDENTIFICATION SURVEY DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA FALL 2010 FIELD EFFORT, DATED MARCH 4, 2011, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Chart/Table		

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623363	07/14/2011	LPRSA MONTHLY PROGRESS REPORT NO. 50 FOR JUNE 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
213275	07/20/2011	FINAL FISH COMMUNITY SURVEY AND TISSUE COLLECTION DATA REPORT FOR LOWER PASSAIC RIVER STUDY AREA - 2010 FIELD EFFORTS	743	Report	(COOPERATING PARTIES GROUP)	(WIND WARD ENVIRONMENTAL LLC)
616216	07/26/2011	AECOM'S RESPONSE TO US EPA COMMENTS TO THE LOW RESOLUTION CORING REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum		(AECOM)
616217	07/26/2011	REVISED LOW RESOLUTION CORING CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	485	Report		(AECOM)
616219	07/26/2011	LOWER PASSAIC RIVER TECHNICAL UPDATE ON THE ASSESSMENT OF PCB AQUEOUS PARTITIONING AND AVAILABILITY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Memorandum		
623559	08/02/2011	FINAL QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #8 CHEMICAL WATER COLUMN MONITORING STUDY/SMALL VOLUME CHEMICAL DATA COLLECTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	295	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)

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213274	08/08/2011	FINAL AVIAN COMMUNITY SURVEY DATA REPORT FOR LOWER PASSAIC RIVER STUDY AREA - SUMMER / FALL 2010	624	Report	(COOPERATING PARTIES GROUP)	(WIND WARD ENVIRONMENTAL LLC)
623357	08/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 51 FOR JULY 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459092	08/22/2011	STATUS REPORT FOR AUGUST 2011 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	49	Memorandum		
623358	09/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 52 FOR AUGUST 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623359	10/17/2011	LPRSA MONTHLY PROGRESS REPORT NO. 53 FOR SEPTEMBER 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459098	10/20/2011	CORRESPONDENCE REGARDING SPLIT SAMPLE COMPARISON - OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR THE LOWER PASSAIC RIVER AND NEWARK BAY STUDY AREA RI/FS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1189	Report		

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623360	11/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 54 FOR OCTOBER 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620420	11/16/2011	CORRESPONDENCE REGARDING STATUS REPORT FOR 8/24/2011 - 11/03/2011 CPG OVERSIGHT OF THE RM 10.9 SEDIMENT CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	104	Memorandum		
623361	12/15/2011	LPRSA MONTHLY PROGRESS REPORT NO. 55 FOR NOVEMBER 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459044	12/23/2011	CORRESPONDENCE REGARDING REVIEW OF 2009 AND 2010 SEDIMENT SPLIT SAMPLES DATA COMPARISON AND COMMENTS ON THE CPG DRAFT 2009 AND 2010 SEDIMENT CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	58	Memorandum		
213229	01/03/2012	CORRESPONDENCE REGARDING RESOLUTION OF THE SEVEN DISPUTED ISSUES FOR THE DISPUTE RESOLUTION FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR THE LOWER PASSAIC RIVER PROJECT	43	Letter	HYATT,WILLIAM,H (K & L GATES LLP)	BASSO,RAYMOND (US ENVIRONMENTAL PROTECTION AGENCY)

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232635	01/03/2012	EPA REGION 2 STAFF STATEMENT OF POSITION ON ISSUES THAT REMAIN IN DISPUTE REGARDING THE DISPUTE RESOLUTION PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT - CERCLA DOCKET NO. 02-2007-2009 FOR RI/FS FOR THE LOWER PASSAIC RIVER PROJECT	241	Report		(US ENVIRONMENTAL PROTECTION AGENCY)
232634	01/05/2012	TRANSMITTAL OF EPA REGION 2 STAFF STATEMENT OF POSITION ON ISSUES THAT REMAIN IN DISPUTE REGARDING THE DISPUTE RESOLUTION PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT - DOCKET NO. 02-2007-2009 FOR THE LOWER PASSAIC RIVER PROJECT	1	Letter	HYATT,WILLIAM,H (LPRSA COOPERATING PARTIES GROUP)	FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)
232636	01/05/2012	CORRESPONDENCE REGARDING DISPUTE RESOLUTION PROCEEDING PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT - CERCLA DOCKET NO. 02-2007-2009 FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR THE LOWER PASSAIC RIVER PROJECT	5	Letter	BASSO,RAYMOND (US ENVIRONMENTAL PROTECTION AGENCY)	HYATT,WILLIAM,H (LPRSA COOPERATING PARTIES GROUP)
623561	01/06/2012	REVISED QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #10 LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	81	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)

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623364	01/16/2012	LPRSA MONTHLY PROGRESS REPORT NO. 56 FOR DECEMBER 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
213232	02/02/2012	TECHNICAL MEMORANDUM FOR FISH AND CRAB CONSUMPTION RATES FOR THE LPRSA HUMAN HEALTH RISK ASSESSMENT	19	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)
213230	02/06/2012	US EPA DECISION PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT - CERCLA DOCKET NO. 02-2007-2009 FOR REMEDIAL INVESTIGATION AND FEASIBILITY STUDY FOR THE LOWER PASSAIC RIVER PROJECT	30	Letter	HYATT,WILLIAM,H (K & L GATES LLP)	MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)
623365	02/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 57 FOR JANUARY 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623324	03/07/2012	TECHNICAL MEMORANDUM: DATA ANALYSIS FOR JANUARY 2012 PASSAIC RIVER RESIDUE SAMPLING RESULTS FOR DIOXINS, FURANS, DIOXIN-LIKE POLYCHLORINATED BIPHENYLS (PCBS), TOTAL PCBS AND MERCURY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	58	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|GREENBERG,MARC,S (US ENVIRONMENTAL PROTECTION AGENCY)	(LOCKHEED MARTIN INFORMATION SYSTEMS & GLOBAL SOLUTIONS)|GETTY,DONNA (LOCKHEED MARTIN INFORMATION SYSTEMS & GLOBAL SOLUTIONS)
459093	03/15/2012	STATUS REPORT FOR MARCH 2012 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Memorandum		

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623373	03/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 58 FOR FEBRUARY 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620416	03/20/2012	CORRESPONDENCE REGARDING STATUS REPORT FOR 1/9/2012 - 2/10/2012 CPG OVERSIGHT OF THE LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	73	Memorandum		
459094	04/02/2012	STATUS REPORT FOR MARCH 2012 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	33	Memorandum		
616290	04/13/2012	REVISED DRAFT USABILITY AND DATA EVALUATION PLAN FOR THE LOWER PASSAIC RIVER STUDY AREA RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	29	Report		(AECOM)
616292	04/13/2012	AECOM'S RESPONSE TO US EPA COMMENTS TO THE DATA USABILITY AND DATA EVALUATION PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Memorandum		(AECOM)
623366	04/16/2012	LPRSA MONTHLY PROGRESS REPORT NO. 59 FOR MARCH 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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124148	04/19/2012	TRANSMITTAL OF THE DRAFT RIVER MILE 10.9 CHARACTERIZATION PROGRAM SUMMARY - LOWER PASSAIC RIVER STUDY	4	Letter	BASSO,RAYMOND (US ENVIRONMENTAL PROTECTION AGENCY)|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY)	LAW,ROBERT (DE MAXIMIS INCORPORATED)
124169	04/19/2012	DRAFT RIVER MILE 10.9 CHARACTERIZATION PROGRAM SUMMARY - LOWER PASSAIC RIVER STUDY AREA	3623	Report		(AECOM TECHNICAL SERVICES NORTHEAST INCORPORATED)|(CH2M HILL)
623367	05/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 60 FOR APRIL 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459095	06/12/2012	STATUS REPORT FOR JUNE 2012 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Memorandum		
623368	06/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 61 FOR MAY 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
232657	06/18/2012	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION FOR DIAMOND ALKALI COMPANY SITE	144	Agreement		

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616244	06/25/2012	LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM QUALITY ASSURANCE PROJECT PLAN JUNE 2021 REVISION 3 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	373	Work Plan		(AECOM)
623678	07/01/2012	QUALITY ASSURANCE PROJECT PLAN FIELD SAMPLING PLAN ADDENDUM REVISION 3 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	396	Report		
623369	07/13/2012	LPRSA MONTHLY PROGRESS REPORT NO. 62 FOR JUNE 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459053	08/06/2012	SUMMER AND FALL 2012 DISSOLVED OXYGEN MONITORING PROGRAM ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	36	Report		
623370	08/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 63 FOR JULY 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623562	08/25/2012	QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #12 COLLECTION OF BACKGROUND SURFACE SEDIMENTS SAMPLES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	49	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)

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623371	09/17/2012	LPRSA MONTHLY PROGRESS REPORT NO. 64 FOR AUGUST 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459090	09/24/2012	STATUS REPORT FOR AUGUST 2013 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	36	Memorandum		
623372	10/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 65 FOR SEPTEMBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623634	10/15/2012	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 1 FOR AUGUST - SEPTEMBER 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616243	10/26/2012	LOWER PASSAIC RIVER RESTORATION BACKGROUND AND REFERENCE CONDITIONS ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	89	Work Plan		

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623374	11/15/2012	LPRSA MONTHLY PROGRESS REPORT NO. 66 FOR OCTOBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623644	11/15/2012	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 2 FOR OCTOBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623563	12/13/2012	QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #11 CHEMICAL WATER COLUMN MONITORING STUDY/ HIGH VOLUME CHEMICAL DATA COLLECTION PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	288	Work Plan	(US ARMY CORPS OF ENGINEERS)|BUCKRUCKER,ELIZABETH,A (US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
623375	12/17/2012	LPRSA MONTHLY PROGRESS REPORT NO. 67 FOR NOVEMBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623652	12/17/2012	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 3 FOR DECEMBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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459096	12/21/2012	STATUS REPORT FOR DECEMBER 2012 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Memorandum		
623376	01/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 68 FOR DECEMBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623660	01/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 4 FOR DECEMBER 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623377	02/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 69 FOR JANUARY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623661	02/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 5 FOR JANUARY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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459087	03/06/2013	STATUS REPORT FOR MARCH 2013 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING HIGH FLOW EVENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	33	Memorandum		
623378	03/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 70 FOR FEBRUARY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623662	03/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 6 FOR FEBRUARY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623500	04/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 71 FOR MARCH 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623632	04/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 7 FOR MARCH 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616250	05/09/2013	SUPPLEMENT TO FINAL DESIGN REPORT - OVERVIEW OF NUMERICAL MODELING SUPPORTING THE DESIGN OF THE ACTIVE LAYER IN THE RIVER MILE 10.9 ENGINEERED SEDIMENT CAP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	61	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)	(CH2M HILL)

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623501	05/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 72 FOR APRIL 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623663	05/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 8 FOR APRIL 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620506	05/17/2013	CORRESPONDENCE REGARDING LOWER PASSAIC RIVER SURFACE SEDIMENT CONCENTRATION MAPPING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	29	Memorandum		
616232	06/02/2013	CORRESPONDENCE REGARDING THE CONDITIONAL APPROVAL OF THE RIVER MILE 10.9 REMOVAL ACTION FINAL DESIGN REPORT LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Email		(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)
623502	06/17/2013	LPRSA MONTHLY PROGRESS REPORT NO. 73 FOR MAY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623664	06/17/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 9 FOR MAY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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459088	06/24/2013	STATUS REPORT FOR JUNE 2013 CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Memorandum		
616231	07/31/2013	RIVER MILE 10.9 REMOVAL ACTION FINAL DESIGN REPORT LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	859	Report		(CH2M HILL)
616252	07/31/2013	RIVER MILE 10.9 REMOVAL ACTION PERIMETER AIR MONITORING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	693	Work Plan		(CH2M HILL)
616253	07/31/2013	RIVER MILE 10.9 REMOVAL ACTION WATER QUALITY MONITORING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	43	Work Plan		(CH2M HILL)
623379	08/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 75 FOR JULY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623635	08/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 11 FOR JULY 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623564	08/27/2013	QUALITY ASSURANCE PROJECT PLAN, ADDENDUM #13 CHEMICAL WATER COLUMN MONITORING STUDY / SMALL VOLUME COLLECTION WATER QUALITY MONITORING FOR RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	48	Work Plan	(US ARMY CORPS OF ENGINEERS)	(CDM SMITH)|TSANG,FRANK (CDM SMITH)
616295	09/11/2013	DRAFT CARP HARVEST PILOT STUDY ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN - FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Work Plan		(AECOM)
623380	09/16/2013	LPRSA MONTHLY PROGRESS REPORT NO. 76 FOR AUGUST 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623636	09/16/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 12 FOR AUGUST 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620507	09/26/2013	LOWER PASSAIC RIVER SURFACE SEDIMENT COPC MAPPING APPROACH FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	40	Meeting Document		
623381	10/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 77 FOR SEPTEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623637	10/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 13 FOR SEPTEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459066	10/16/2013	STATUS REPORT FOR 10/23/2012 - 11/27/2012 CPG OVERSIGHT OF BACKGROUND SEDIMENT SAMPLING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	29	Memorandum		
459099	10/16/2013	STATUS REPORT FOR 10/4/2012 - 10/20/2012 BACKGROUND FISH COMMUNITY SURVEY AND TISSUE COLLECTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	146	Memorandum		
459089	10/17/2013	STATUS REPORT FOR CPG OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING HIGH VOLUME EVENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Memorandum		
616223	10/29/2013	DRAFT REVISED RISK ANALYSIS AND RISK CHARACTERIZATION PLAN FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	839	Work Plan		(AECOM)

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620417	11/15/2013	CORRESPONDENCE REGARDING STATUS REPORT FOR 9/23/2013 - 10/26/2013 CPG OVERSIGHT OF THE LOW RESOLUTION CORING SECOND SUPPLEMENTAL SAMPLING PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	125	Memorandum		
623382	11/15/2013	LPRSA MONTHLY PROGRESS REPORT NO. 78 FOR OCTOBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623638	11/15/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 14 FOR OCTOBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616254	12/09/2013	RIVER MILE 10.9 CAP ACTIVE/SAND LAYER COMPOSITION: DETERMINATION BY CORE TESTING AND MASS BALANCE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Memorandum	(DE MAXIMIS INCORPORATED)	(CH2M HILL)
623383	12/16/2013	LPRSA MONTHLY PROGRESS REPORT NO. 79 FOR NOVEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623639	12/16/2013	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 15 FOR NOVEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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459046	12/20/2013	TRANSMITTAL OF PRELIMINARY DRAFT INTERIM CONCEPTUAL SITE MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
459047	12/20/2013	PRELIMINARY DRAFT INTERIM CONCEPTUAL SITE MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	226	Report		
620508	12/20/2013	CORRESPONDENCE REGARDING LPR/NB MODELING CODE SUBMISSION LOWER PASSAIC RIVER STUDY AREA IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter		
623384	01/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 80 FOR DECEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623640	01/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 16 FOR DECEMBER 2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616269	01/22/2014	COMMENTS - QAPP DRAFT WORKSHEET #9 RECEIVED ON JANUARY 22, 2014, RIVER MILE 10.9 OPERATIONS AND MAINTENANCE PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Other		(US ENVIRONMENTAL PROTECTION AGENCY)

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459067	01/24/2014	CORRESPONDENCE REGARDING 2012 BACKGROUND SEDIMENT SPLIT SAMPLE DATA COMPARISON FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	63	Memorandum		
623385	02/18/2014	LPRSA MONTHLY PROGRESS REPORT NO. 81 FOR JANUARY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623641	02/18/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 17 FOR JANUARY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616264	03/03/2014	CORRESPONDENCE REGARDING SUBMITTAL OF STATEMENT OF WORK FOR ADMINISTRATIVE ORDER FOR REMOVAL RESPONSE ACTIVITIES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)	(VINSON & ELKINS LLP)|DINKINS,CAROL,E (VINSON & ELKINS LLP)
620415	03/03/2014	CORRESPONDENCE REGARDING 2012 LOW RESOLUTION SUPPLEMENTAL CORING SPLIT SAMPLE DATA COMPARISON FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	53	Memorandum		
616278	03/10/2014	WEEKLY PROGRESS REPORT LOWER PASSAIC RIVER DREDGE PROJECT 03/03/2014 - 03/09/2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report		

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623386	03/17/2014	LPRSA MONTHLY PROGRESS REPORT NO. 82 FOR FEBRUARY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623642	03/17/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 18 FOR FEBRUARY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616240	03/31/2014	CORRESPONDENCE REGARDING ADMINISTRATIVE CONSTRAINTS TO THE REMOVAL OF SEDIMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)	(VINSON & ELKINS LLP)|DINKINS,CAROL,E (VINSON & ELKINS LLP)
616255	03/31/2014	US EPA COMMENTS ON RIVER MILE 10.9 OPERATIONS AND MAINTENANCE PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)
239624	04/01/2014	US EPA RESPONSE TO THE COOPERATING PARTIES GROUP'S CORRESPONDENCE REGARDING EPA'S MODEL CLARIFICATION FOR THE REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES FOR THE LOWER PASSAIC RIVER STUDY AREA	4	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	BASSO,RAYMOND (US ENVIRONMENTAL PROTECTION AGENCY)
616233	04/03/2014	US EPA REVIEW OF THE RIVER MILE 10.9 PIPELINE SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)

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620500	04/07/2014	CORRESPONDENCE REGARDING LETTER DATED 4/1/2014 ABOUT THE MODELING MEETINGS US EPA AND COOPERATING PARTIES GROUP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter		
616294	04/10/2014	US EPA COMMENTS ON THE REVISED DATA USABILITY AND DATA EVALUATION PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
459091	04/14/2014	CORRESPONDENCE REGARDING REVIEW OF 2011-2013 CHEMICAL WATER COLUMN MONITORING SMALL VOLUME SPLIT SAMPLING DATA COMPARISON FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	55	Memorandum		
623387	04/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 83 FOR MARCH 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623643	04/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 19 FOR MARCH 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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616239	04/16/2014	TIERRA SOLUTIONS RESPONSE TO US EPA COMMENTS TO THE RIVER MILE 10.9 PIPELINE SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	41	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)
616276	04/16/2014	CORRESPONDENCE REGARDING RM 10.9 REMEDIAL ACTION - DAILY SCHEDULE UPDATES AND SAMPLE COLLECTION NOTIFICATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
616220	04/23/2014	REVISED LOW RESOLUTION CORING CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	228	Report		(AECOM)
616221	04/23/2014	AECOM'S RESPONSE TO US EPA COMMENTS TO THE JULY 2011 LOW RESOLUTION CORING REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum		(AECOM)
616266	05/01/2014	EPA RESPONSES (MAY 1, 2014) TO CPG COMMENTS (MARCH 31, 2014) ON THE QAPP DRAFT WORKSHEET #9 (JANUARY 22, 2014) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Other		
616256	05/08/2014	FINAL BATHYMETRIC SURVEY FOR ARMOR STONE LAYER FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Memorandum	(DE MAXIMIS INCORPORATED)	(CH2M HILL)

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616270	05/14/2014	CORRESPONDENCE REGARDING FORCE MAJEURE ACCEPTANCE – JACKSON STREET BRIDGE MECHANICAL FAILURE RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|ROLFE,JOHN (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
616273	05/14/2014	LPRSA MONTHLY PROGRESS REPORT NO. 20 FOR APRIL 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|ROLFE,JOHN (DE MAXIMIS INCORPORATED)
623388	05/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 84 FOR APRIL 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616248	05/22/2014	NJDEP COMMENTS ON RIVER MILE 10.9 MONTHLY PROGRESS REPORT NO. 20 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|NICKERSON,JAY (NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)
616265	05/22/2014	CORRESPONDENCE REGARDING COMMENTS TO THE LONG TERM MONITORING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616238	05/29/2014	US EPA COMMENTS ON THE RIVER MILE 10.9 SURVEY QUALITY ASSURANCE PROJECT PLAN REVISION 1 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)

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616284	05/30/2014	US EPA LOWER PASSAIC RIVER MILE 10.9 DAILY INSPECTION REPORTS FOR THE PERIOD TO 08/01/2013 - 05/04/2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	634	Report		(US ENVIRONMENTAL PROTECTION AGENCY)
616235	06/09/2014	US EPA APPROVAL OF THE PROPOSED SUBCONTRACTOR FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
459048	06/13/2014	NJDEP REVIEW COMMENTS ON THE INTERIM DRAFT CONCEPTUAL SITE MODEL DATED DECEMBER 2013 FOR THE LOWER PASSAIC RIVER STUDY AREA - 17 MILE RI/FS PROJECT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report		
616225	06/13/2014	TRANSMITTAL OF THE DRAFT LPRSA BASELINE ECOLOGICAL RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)
616236	06/13/2014	QUALITY ASSURANCE PROJECT PLAN REVISION 2 OF THE RIVER MILE 10.9 PIPELINE SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	91	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)
616237	06/13/2014	TRANSMITTAL OF THE QUALITY ASSURANCE PROJECT PLAN REVISION 2 OF THE RIVER MILE 10.9 PIPELINE SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)

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623645	06/13/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 21 FOR MAY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623389	06/16/2014	LPRSA MONTHLY PROGRESS REPORT NO. 85 FOR MAY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459097	06/17/2014	CORRESPONDENCE REGARDING SAMPLE RESULTS OF 2013 HIGH VOLUME CHEMICAL WATER COLUMN SPLIT SAMPLE DATA COMPARISON FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	58	Memorandum		
623749	06/18/2014	EPA COMMENTS – DRAFT SMALL VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR THE LOWER PASSAIC RIVER STUDY AREA DATED FEBRUARY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
616268	06/23/2014	CORRESPONDENCE REGARDING CPG'S CONCERNS WITH THE LONG TERM MONITORING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)	(K & L GATES LLP)|HYATT,WILLIAM,H (K & L GATES LLP)

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616234	06/26/2014	US EPA RESPONSE TO TIERRA SOLUTIONS LETTER REGARDING THE REVISED QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(TIERRA SOLUTIONS, INCORPORATED)|BLUESTEIN,PAUL (TIERRA SOLUTIONS, INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
620501	07/02/2014	CORRESPONDENCE REGARDING MODELING SUBMITTALS REQUESTED BY US EPA IN ACCORDANCE WITH THE ADMINISTRATIVE ORDER ON CONSENT FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
623390	07/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 86 FOR JUNE 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623646	07/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 22 FOR JUNE 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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620509	07/18/2014	CORRESPONDENCE REGARDING RESPONSE TO 7/2/2014 LETTER LOWER PASSAIC RIVER STUDY AREA IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter		
620502	07/24/2014	CORRESPONDENCE REGARDING RI/FS MODEL REQUEST FOR CLARIFICATION ON NEWARK BAY STUDY AREA MODELING IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
620510	07/28/2014	CORRESPONDENCE REGARDING RESPONSE TO 7/24/2014 LETTER LOWER PASSAIC RIVER STUDY AREA IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter		
620504	08/06/2014	CORRESPONDENCE REGARDING LETTER DATED 7/18/2014 RI/FS MODEL IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		

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459043	08/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 23 - JULY 2014 FOR THE LOWER PASSAIC RIVER STUDY AREA FOR RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report		
623391	08/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 87 FOR JULY 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620437	08/15/2014	OVERSIGHT SUMMARY REPORT CPG OVERSIGHT OF RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	829	Report		
620503	08/25/2014	CORRESPONDENCE REGARDING RI/FS MODEL NEWARK BAY STUDY AREA PORTION OF MODEL IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
459049	08/29/2014	TRANSMITTAL OF COMMENTS ON THE DRAFT LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION/FEASIBILITY STUDY - INTERIM CONCEPTUAL SITE MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	26	Letter		
623392	09/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 88 FOR AUGUST 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623647	09/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 24 FOR AUGUST 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616249	09/22/2014	US EPA APPROVAL OF AQUA SURVEY INCORPORATED AS A SUBCONTRACTOR FOR THE RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
620526	10/10/2014	2,3,7, 8-TCDD PATTERNS IN LOWER PASSAIC RIVER SEDIMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Meeting Document		
615298	10/13/2014	CORRESPONDENCE REGARDING RESULTS FOR 2012 BACKGROUND TISSUE SPLIT SAMPLING DATA COMPARISON FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	55	Memorandum		
623393	10/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 89 FOR SEPTEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623665	10/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 25 FOR SEPTEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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620418	10/31/2014	CORRESPONDENCE REGARDING 2013 LOW RESOLUTION CORING SECOND SUPPLEMENTAL SPLIT SAMPLE DATA COMPARISON FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	55	Memorandum		
623648	11/17/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 26 FOR OCTOBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
555731	11/19/2014	PIPELINE PROBING QUALITY ASSURANCE PROJECT PLAN REVISION NO. 1 OF THE LOWER PASSAIC RIVER STUDY AREA RIVER MILE 10.9 FOR THE DIAMOND ALKALI COMPANY SITE	73	Work Plan		(TIERRA SOLUTIONS, INCORPORATED)
555732	11/19/2014	TRANSMITTAL OF THE PIPELINE PROBING QUALITY ASSURANCE PROJECT PLAN REVISION NO. 1 OF THE LOWER PASSAIC RIVER STUDY AREA RIVER MILE 10.9 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BRZOZOWSKI,PAUL (TIERRA SOLUTIONS, INCORPORATED)
623394	11/19/2014	LPRSA MONTHLY PROGRESS REPORT NO. 90 FOR OCTOBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616245	11/24/2014	LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM CHARACTERIZATION SUMMARY NOVEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	212	Report		(AECOM)

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623680	11/25/2014	RESPONSE TO US EPA COMMENTS DATED 06/18/2014 REGARDING THE SMALL VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter		
623681	11/25/2014	RESPONSE TO US EPA COMMENTS DATED 06/18/2014 REGARDING THE HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	11	Letter		
623704	12/01/2014	2012 PERIODIC BATHYMETRY AND SINGLE BEAM SURVEYS REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	73	Report		
623706	12/01/2014	PERIODIC BATHYMETRY SURVEY REPORT FALL 2011 POST HURRICANE IRENE SURVEY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	61	Report		
623703	12/12/2014	RESPONSE TO US EPA COMMENTS FOR THE PERIODIC BATHYMETRY AND SINGLE BEAM SURVEYS REPORT 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter		

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623705	12/12/2014	RESPONSE TO US EPA COMMENTS FOR THE PERIODIC BATHYMETRY SURVEY FALL 2011 POST HURRICANE IRENE SURVEY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	19	Letter		
623395	12/15/2014	LPRSA MONTHLY PROGRESS REPORT NO. 91 FOR NOVEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623649	12/15/2014	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 27 FOR NOVEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623313	01/08/2015	SECOND SUPPLEMENTAL SEDIMENT SAMPLING PROGRAM PRELIMINARY OVERVIEW OF RESULTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Report		
623396	01/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 92 FOR DECEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623650	01/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 28 FOR DECEMBER 2014 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623429	02/16/2015	LPRSA MONTHLY PROGRESS REPORT NO. 93 FOR JANUARY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623651	02/16/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 29 FOR JANUARY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616091	02/19/2015	LPRSA FEASIBILITY STUDY WORK PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	83	Work Plan	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)	(INTEGRAL CONSULTING INCORPORATED)
616274	03/04/2015	CORRESPONDENCE REGARDING REPORT ON THE PIPELINE PROBING SURVEY AT RM10.9 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	51	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BRZOZOWSKI,PAUL (TIERRA SOLUTIONS, INCORPORATED)
616246	03/06/2015	AECOM'S RESPONSE TO US EPA COMMENTS ON THE LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)	(AECOM)
620511	03/11/2015	LOWER PASSAIC RIVER CONTAMINANT MAPPING APPROACH FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	70	Meeting Document		

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623430	03/16/2015	LPRSA MONTHLY PROGRESS REPORT NO. 94 FOR FEBRUARY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623653	03/16/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 30 FOR FEBRUARY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616241	03/26/2015	FINAL LOWER PASSAIC RIVER RESTORATION PROJECT LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2561	Report		(AECOM)
620512	04/14/2015	COOPERATING PARTIES GROUP FOLLOW UP TO US EPA CPG MEETING ON CONTAMINANT MAPPING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Meeting Document		
623431	04/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 95 FOR MARCH 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623654	04/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 31 FOR MARCH 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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620513	04/17/2015	COOPERATING PARTIES GROUP RESPONSE TO US EPA COMMENTS ON CPG'S AUGUST 2014 SEDIMENT TRANSPORT TECHNICAL MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	26	Report		
620431	04/28/2015	CORRESPONDENCE REGARDING SUMMARY OF FIELD OVERSIGHT: LPR RIVER MILE 10.9 INITIAL SPME RECONNAISSANCE 4/20/2015 - 4/21/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	20	Memorandum		
616257	05/04/2015	FIELD ACTIVITY RESULTS SUMMARY FOR LPR RIVER MILE 10.9 INITIAL RECONNAISSANCE ON 04/20/2015 - 04/21/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Memorandum		
623432	05/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 96 FOR APRIL 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623655	05/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 32 FOR APRIL 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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620522	06/10/2015	LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION AND FEASIBILITY STUDY US EPA REVIEW OF THE COOPERATING PARTIES GROUP APPROACH TO MAPPING CONTAMINANTS OF POTENTIAL CONCERN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	42	Report		
616227	06/12/2015	CORRESPONDENCE THE INVOCATION OF DISPUTE RESOLUTION - BENTHIC COMMUNITY EXPOSURE DEPTH FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY)	LAW,ROBERT (DE MAXIMIS INCORPORATED)
623433	06/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 97 FOR MAY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623656	06/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 33 FOR MAY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620419	06/16/2015	CORRESPONDENCE REGARDING SUMMARY OF FIELD OVERSIGHT RIVER MILE 10.9 POST-CONSTRUCTION MONITORING BATHYMETRY SURVEY 06/08/2015 - 06/09/2015 LOWER PASSAIC RIVER RESTORATION PROJECT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum		

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620428	06/16/2015	CORRESPONDENCE REGARDING SUMMARY OF FIELD OVERSIGHT RIVER MILE 10.9 POST- CONSTRUCTION MONITORING BATHYMETRY SURVEY 6/8/2015 - 6/9/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Memorandum		
620436	06/29/2015	INDEPENDENT REVIEW FORM SUMMARY OF OVERSIGHT OF SPME SAMPLER INSTALLATION EFFORT AT RIVER MILE 10.9, 12/09/2015 - 12/11/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Form		
616271	07/09/2015	CORRESPONDENCE REGARDING REVIEW OF REPORT ON THE PIPELINE PROBING SURVEY AT RM10.9 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	52	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|Vaughn,Stephanie (US ENVIRONMENTAL PROTECTION AGENCY)	(TIERRA SOLUTIONS, INCORPORATED)|BRZOZOWSKI,PAUL (TIERRA SOLUTIONS, INCORPORATED)
623434	07/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 98 FOR JUNE 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623657	07/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 34 FOR JUNE 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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616293	07/20/2015	FINAL USABILITY AND DATA EVALUATION PLAN FOR THE LOWER PASSAIC RIVER STUDY AREA RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Report		(AECOM)
623435	08/17/2015	LPRSA MONTHLY PROGRESS REPORT NO. 99 FOR JULY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623658	08/17/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 35 FOR JULY 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623436	09/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 100 FOR AUGUST 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623659	09/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 36 FOR AUGUST 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620430	10/14/2015	CORRESPONDENCE REGARDING SUMMARY OF SEDIMENT SAMPLING AND PROBING EFFORT: LPR RIVER MILE 10.9 AND ADJACENT AREAS (9/29/2015) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	16	Memorandum		

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623437	10/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 101 FOR SEPTEMBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623667	10/15/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 37 FOR SEPTEMBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620435	11/12/2015	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER RETRIEVAL EFFORT AT RIVER MILE 10.9, 10/27/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	33	Memorandum		
620514	11/12/2015	CORRESPONDENCE REGARDING COPC MAPPING WHITE PAPER CPG RESPONSE TO MAY 2007 IN ACCORDANCE WITH THE ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	149	Letter		
623438	11/16/2015	LPRSA MONTHLY PROGRESS REPORT NO. 102 FOR OCTOBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623633	11/16/2015	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 38 FOR OCTOBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616297	11/23/2015	AECOM'S RESPONSE TO US EPA COMMENTS TO THE DRAT 2011 BIVALVE STUDY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Memorandum		(AECOM)
616242	11/30/2015	DRAFT LOWER PASSAIC RIVER RESTORATION PROJECT LOW RESOLUTION CORING SUPPLEMENTAL SAMPLING PROGRAM ADDENDUM SECOND SUPPLEMENTAL CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1730	Report		(AECOM)
616275	12/08/2015	CORRESPONDENCE REGARDING RIVER MILE 10.9 POST CONSTRUCTION MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|POTTER,WILLARD (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
459042	12/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 39 - NOVEMBER 2015 FOR THE LOWER PASSAIC RIVER STUDY AREA FOR RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report		

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623439	12/15/2015	LPRSA MONTHLY PROGRESS REPORT NO. 103 FOR NOVEMBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620432	12/21/2015	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER INSTALLATION EFFORT AT RIVER MILE 10.9, 12/09/2015 - 12/11/2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	24	Memorandum		
620524	01/12/2016	WELCOME TO THE 2016 SERIES OF COPC MAPPING DISCUSSIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Meeting Document		
623440	01/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 104 FOR DECEMBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623631	01/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 40 FOR DECEMBER 2015 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616258	01/21/2016	RIVER MILE 10.9 MID DEPLOYMENT CHECK PHOTOGRAPHIC LOG FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Photograph		

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616277	01/26/2016	CORRESPONDENCE REGARDING FIELD ACTIVITIES AND RESULTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	77	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|CATANZARITA,JEFF (US ENVIRONMENTAL PROTECTION AGENCY)	(LOCKHEED MARTIN INCORPORATED)|GUSSMAN,CHRISTOPHER (LOCKHEED MARTIN INCORPORATED)
620433	02/05/2016	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER FIELD INSPECTION AT RIVER MILE 10.9, 01/21/2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Memorandum		
623441	02/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 105 FOR JANUARY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623590	02/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 41 FOR JANUARY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616145	02/24/2016	NJDEP REVIEW OF THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
616143	03/14/2016	NJDEP COMMENTS TO THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)

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623442	03/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 106 FOR FEBRUARY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623611	03/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 42 FOR FEBRUARY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620434	03/22/2016	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER RETRIEVAL EFFORT AT RIVER MILE 10.9, 03/08/2016 - 03/10/2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Memorandum		
616267	04/04/2016	CORRESPONDENCE REGARDING THE MARCH 2016 SPME SAMPLING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616259	04/12/2016	RESPONSE TO EPA COMMENTS ON THE LOWER PASSAIC RIVER STUDY AREA REVISED DRAFT RIVER MILE 10.9 POST-CONSTRUCTION MONITORING QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Other	(US ENVIRONMENTAL PROTECTION AGENCY)	(AECOM)
623443	04/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 107 FOR MARCH 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623586	04/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 43 FOR MARCH 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620516	04/27/2016	COPC MAPPING REFINEMENT FOR CPG AND US EPA MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	48	Meeting Document		
623444	05/16/2016	LPRSA MONTHLY PROGRESS REPORT NO. 108 FOR APRIL 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623587	05/16/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 44 FOR APRIL 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
351639	06/07/2016	CORRESPONDENCE REGARDING LOWER PASSAIC RIVER STUDY AREA 17 MILE RI/FS ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 EXPOSURE DEPTH DISPUTE RESOLUTION FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)

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351640	06/07/2016	DISPUTE RESOLUTION PROCEEDING PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR LOWER PASSAIC RIVER STUDY AREA 17 MILE RI/FS FOR THE DIAMOND ALKALI COMPANY SITE	209	Letter		FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)|NACE,CHARLES (US ENVIRONMENTAL PROTECTION AGENCY)
623589	06/09/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 45 FOR MAY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623445	06/16/2016	LPRSA MONTHLY PROGRESS REPORT NO. 109 FOR MAY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
351637	06/23/2016	CORRESPONDENCE REGARDING EXPOSURE DEPTH/ZONE DISPUTE RESOLUTION - 17 MILE LPRSA RI/FS ADMINISTRATIVE AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter	BASSO,RAYMOND (US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)	LAW,ROBERT (DE MAXIMIS INCORPORATED)

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620422	06/24/2016	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF THIRD SPME SAMPLER INSTALLATION EFFORT AT RIVER MILE 10.9 FOR 6/03/2016 - 06/05/2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	36	Memorandum		
351638	06/27/2016	CORRESPONDENCE REGARDING LOWER PASSAIC RIVER STUDY AREA 17 MILE RI/FS ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR RI/FS CERCLA DOCKET NO. 02-2007-2009 EXPOSURE DEPTH DISPUTE RESOLUTION FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum	FLANAGAN,SARAH,P (US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)|SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
351641	06/28/2016	CORRESPONDENCE REGARDING DISPUTE RESOLUTION US EPA PURSUANT TO ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION AND FEASIBILITY FOR THE LOWER PASSAIC RIVER STUDY AREA FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)
623446	07/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 110 FOR JUNE 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623588	07/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 46 FOR JUNE 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620423	07/20/2016	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER MID-POINT CHECK AND CAP INSPECTION AT RIVER MILE 10.9 FOR 7/06/2016 - 07/07/2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Memorandum		
623447	08/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 111 FOR JULY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623612	08/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 47 FOR JULY 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620427	08/26/2016	CORRESPONDENCE REGARDING SUMMARY OF SPME SAMPLER RETRIEVAL EFFORT AT RIVER MILE 10.9 FOR 8/19/2016 - 8/21/2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	46	Memorandum		

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620517	09/14/2016	CORRESPONDENCE REGARDING PROPOSED COPCS TO BE CALIBRATED IN THE LOWER PASSAIC RIVER/NEWARK BAY CONTAMINANT FATE AND TRANSPORT MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Memorandum		
623448	09/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 112 FOR AUGUST 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623613	09/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 48 FOR AUGUST 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620527	10/11/2016	EVALUATION OF SWAC VS. RAL FROM ALTERNATE COPC MAPPING GROUPS AND STRATUM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report		
623449	10/17/2016	LPRSA MONTHLY PROGRESS REPORT NO. 113 FOR SEPTEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623614	10/17/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 49 FOR SEPTEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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616141	11/07/2016	NJDEP COMMENTS TO THE 2ND DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
623495	11/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 114 FOR OCTOBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623615	11/15/2016	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 50 FOR OCTOBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616260	12/08/2016	FIELD REPORT FOR 2016 SPME POREWATER SAMPLING AND SURFACE SEDIMENT SAMPLING RIVER MILE 10.9 REMOVAL ACTION LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	53	Report		
620518	12/08/2016	CORRESPONDENCE REGARDING PROPOSED COPCS TO BE CALIBRATED IN THE LOWER PASSAIC RIVER/NEWARK BAY CONTAMINANT FATE AND TRANSPORT MODEL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Memorandum		

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616272	12/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 51 FOR NOVEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|POTTER,WILLARD (DE MAXIMIS INCORPORATED)
623496	12/15/2016	LPRSA MONTHLY PROGRESS REPORT NO. 115 FOR NOVEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616261	01/01/2017	LONG-TERM MONITORING AND MAINTENANCE PLAN LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	30	Work Plan		(AECOM)
616144	01/05/2017	US EPA RESPONSE TO THE CRP'S COMMENTS ON THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
620523	01/09/2017	A MORE REALISTIC REPRESENTATION OF SEDIMENT REMEDIATION IN NUMERICAL SIMULATIONS: APPLICATION TO THE LOWER PASSAIC RIVER FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Meeting Document		
623497	01/17/2017	LPRSA MONTHLY PROGRESS REPORT NO. 116 FOR DECEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623616	01/17/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 52 FOR DECEMBER 2016 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616262	01/24/2017	QUALITY ASSURANCE PROJECT PLAN LOWER PASSAIC RIVER STUDY AREA RIVER MILE 10.9 POST-CONSTRUCTION MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	138	Work Plan		(AECOM TECHNICAL SERVICES NORTHEAST INCORPORATED)|SIMMONS,DEBRA,L (AECOM TECHNICAL SERVICES NORTHEAST INCORPORATED)
459041	02/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 53 - JANUARY 2017 FOR THE LOWER PASSAIC RIVER STUDY AREA FOR RIVER MILE 10.9 REMOVAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report		
623498	02/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 117 FOR JANUARY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623499	03/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 118 FOR FEBRUARY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623617	03/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 54 FOR FEBRUARY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623476	04/18/2017	LPRSA MONTHLY PROGRESS REPORT NO. 119 FOR MARCH 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623668	04/18/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 55 FOR MARCH 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616214	04/26/2017	US EPA RESPONSE TO COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	139	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
616213	05/07/2017	US EPA RESPONSE TO COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
616215	05/09/2017	US EPA RESPONSE TO COMMENTS ON SECTION 7 OF THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	79	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)

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623450	05/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 120 FOR APRIL 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623666	05/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 56 FOR APRIL 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616135	06/14/2017	US EPA REVIEW OF THE REVISED DRAFT FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616136	06/14/2017	CORRESPONDENCE REGARDING REFINEMENTS TO LEAD MODELS FOR THE LPRSA HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	13	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
623477	06/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 121 FOR MAY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623618	06/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 57 FOR MAY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623537	07/14/2017	CORRESPONDENCE REGARDING LOWER PASSAIC RIVER AREA UPPER 9 MILE PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	11	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)
623478	07/17/2017	LPRSA MONTHLY PROGRESS REPORT NO. 122 FOR JUNE 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623585	07/17/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 58 FOR JULY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
620397	07/24/2017	US EPA RESPONSE TO 7/24/2017 US EPA / CPG MEETING BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) DISCUSSION ACTION ITEMS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Meeting Document		(US ENVIRONMENTAL PROTECTION AGENCY)
616138	08/02/2017	BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4801	Report		(AECOM)

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616140	08/02/2017	TRANSMITTAL THE BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter		
616142	08/02/2017	US EPA PEER REVIEW MEMO REGARDING THE BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
616092	08/08/2017	TECHNICAL BASIS FOR PHASE 1 REMEDIAL ACTION LEVELS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Memorandum		(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)
623479	08/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 123 FOR JULY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623523	08/15/2017	RESPONSES TO USEPA'S JULY 24, 2017 QUESTIONS & STATEMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Other		
623619	08/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 59 FOR JULY 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623524	08/17/2017	EXPEDITING THE 17-MILE LPRSA RI/FS & UPPER 9-MILE REMEDIAL ACTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	40	Other		
616139	08/23/2017	US EPA APPROVAL OF THE BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
620421	09/11/2017	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF CAP INSPECTION AT RIVER MILE 10.9 FOR 8/21/2017 - 8/22/2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	40	Memorandum		
623525	09/11/2017	UPPER 9-MILE PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	32	Other		
623480	09/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 124 FOR AUGUST 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623620	09/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 60 FOR AUGUST 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623526	10/04/2017	UPPER 9-MILE PLAN FOR OU4 - EPA-CPG MEETING FOR THE DIAMOND ALKALI COMPANY SITE	21	Other		

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623481	10/16/2017	LPRSA MONTHLY PROGRESS REPORT NO. 125 FOR SEPTEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623621	10/16/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 61 FOR SEPTEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623527	11/02/2017	LOWER PASSAIC RIVER: A PLAN TO EXPEDITE CLEANUP OF THE UPPER 9-MILES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Other		
623482	11/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 126 FOR OCTOBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623622	11/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 62 FOR OCTOBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623528	11/22/2017	LOWER PASSAIC RIVER: A PLAN TO EXPEDITE CLEANUP OF THE UPPER 9-MILES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Other		

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623529	11/27/2017	UPPER 9-MILE PLAN - A PROPOSAL TO EXPEDITE CLEANUP OF THE 17-MILE LPRSA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	30	Other		
623530	12/01/2017	LOWER PASSAIC RIVER: A PLAN TO EXPEDITE CLEANUP OF THE UPPER 9-MILES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	47	Other		
620519	12/07/2017	BIOACCUMULATION MODEL UPDATES IN RESPONSE TO US EPA COMMENTS (BIOACCUMULATION MODEL MEETING) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	23	Meeting Document		
623455	12/15/2017	LPRSA MONTHLY PROGRESS REPORT NO. 127 FOR NOVEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623623	12/15/2017	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 63 FOR NOVEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616279	01/11/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION 4TH QUARTER 2017 PROGRESS REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(GLENN SPRINGS HOLDINGS INCORPORATED)

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623456	01/16/2018	LPRSA MONTHLY PROGRESS REPORT NO. 128 FOR DECEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623591	01/16/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 64 FOR DECEMBER 2017 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623314	01/25/2018	CORRESPONDENCE REGARDING CAG INTERACTION ON CPG PROPOSAL TO CONDUCT INTERIM ACCELERATED CLEANUP ON THE UPPER PORTION OF THE PASSAIC RIVER FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum		
501318	02/08/2018	LOWER PASSAIC RIVER STUDY AREA 17 MILE REMEDIAL INVESTIGATION / FEASIBILITY STUDY UPDATE FOR THE COMMUNITY ADVISORY GROUP FOR THE DIAMOND ALKALI COMPANY SITE	16	Other		
501319	02/08/2018	LOWER PASSAIC RIVER STUDY AREA OVERVIEW OF PROPOSALS FOR THE UPPER 9 MILES OF THE LOWER PASSAIC RIVER - UPDATE FOR COMMUNITY ADVISORY GROUP FOR THE DIAMOND ALKALI COMPANY SITE	21	Meeting Document		

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623507	02/09/2018	A PROPOSAL TO EXPEDITE CLEANUP OF THE 17-MILE LOWER PASSAIC RIVER STUDY AREA (LPRSA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	57	Report		
616093	02/13/2018	CPG RESPONSE TO NJDEP COMMENTS ON LOWER PASSAIC UPPER 9-MILE INTERIM REMEDY PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Memorandum	(NJDEP)	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)
623519	02/13/2018	CORRESPONDENCE REGARDING COMMENTS FOR CONSIDERATION ON CONCEPT PROPOSAL TO CONDUCT AN INTERIM REMEDY ON 17-MILE LPRSA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter		
623539	02/13/2018	CORRESPONDENCE REGARDING COMMENTS FOR CONSIDERATION BY USEPA AND CSTAG FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|PRINCE,JOHN (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|PEDERSEN,MARK,J (NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)
623457	02/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 129 FOR JANUARY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623592	02/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 65 FOR JANUARY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623521	02/21/2018	COMMENTS TO THE CSTAG FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
623517	02/22/2018	THANKING THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY ("US EPA") FOR THE OPPORTUNITY TO PARTICIPATE IN THE MARCH 1, 2018, MEETING WITH CONTAMINATED SEDIMENTS TECHNICAL ADVISORY GROUP (CSTAG) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(NOAA-NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION)|MEHRAN,REYHAN (NOAA-NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION)
623515	02/28/2018	LOWER PASSAIC RIVER STUDY AREA CSTAG MEETING SIGN IN SHEET FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Other		
623516	02/28/2018	17-MILE LOWER PASSAIC RIVER STUDY AREA CSTAG PRESENTATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	94	Other		
623508	03/01/2018	LOWER PASSAIC RIVER STUDY AREA UPPER 9-MILE PLAN - CPG PRESENTATION TO CSTAG FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Other		
623518	03/01/2018	LOWER PASSAIC RIVER STUDY AREA CSTAG MEETING SIGN IN SHEET FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Other		

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623315	03/08/2018	LOWER PASSAIC RIVER STUDY AREA UPPER 9 MILES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Report		
623458	03/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 130 FOR FEBRUARY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623593	03/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 66 FOR FEBRUARY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623729	03/28/2018	BIOACCUMULATION MODEL CALIBRATION UPDATE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	24	Meeting Document		
616280	04/16/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION 1ST QUARTER 2018 PROGRESS REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(GLENN SPRINGS HOLDINGS INCORPORATED)
623459	04/16/2018	LPRSA MONTHLY PROGRESS REPORT NO. 131 FOR MARCH 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623594	04/16/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 67 FOR MARCH 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
534001	04/25/2018	CSTAG RECOMMENDATIONS ON THE LOWER PASSAIC RIVER STUDY AREA, 17 MILE REMEDIAL INVESTIGATION / FEASIBILITY STUDY AND PROPOSED INTERIM REMEDIAL ACTION	6	Memorandum	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	GUSTAVSON,KARL (US ENVIRONMENTAL PROTECTION AGENCY)
616163	04/27/2018	US EPA COMMENTS ON THE SECTIONS 1 THROUGH 3 OF THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
501295	04/28/2018	RIVER MILE 10.9 REMOVAL ACTION FINAL CONSTRUCTION REPORT, LOWER PASSAIC RIVER STUDY REPORT FOR THE DIAMOND ALKALI COMPANY SITE	4301	Report		
620390	04/30/2018	CORRESPONDENCE REGARDING 2ND DRAFT BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Letter	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)

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623531	05/10/2018	UPPER 9-MILE INTERIM ACTION – NJDEP QUESTIONS & CSTAG RECOMMENDATIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(COOPERATING PARTIES GROUP)
623316	05/11/2018	COMMUNITY ADVISORY GROUP MEETING MAY 10, 2018, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	16	Meeting Document		
623460	05/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 132 FOR APRIL 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623595	05/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 68 FOR APRIL 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616154	05/17/2018	US EPA RESPONSE TO COMMENTS ON REVISED APPENDICES G, H AND I OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616094	05/24/2018	CORRESPONDENCE REGARDING THE UPPER 9-MILE INTERIM ACTION SUGGESTED CHANGES TO THE PRELIMINARY REMEDIAL ACTION OBJECTIVES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)
534002	05/29/2018	REGIONAL RESPONSE TO CSTAG RECOMMENDATIONS ON THE LOWER PASSAIC RIVER STUDY AREA - OU4, 17 MILE REMEDIAL INVESTIGATION / FEASIBILITY STUDY AND PROPOSED INTERIM REMEDIAL ACTION	10	Memorandum	GUSTAVSON,KARL (US ENVIRONMENTAL PROTECTION AGENCY)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616146	05/30/2018	US EPA COMMENTS ON SECTION 9 AND APPENDIX K OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616159	06/01/2018	US EPA RESPONSE TO COMMENTS ON SECTION 8 OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623730	06/05/2018	BIOACCUMULATION MODEL CALIBRATION UPDATE CPG-EPA MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	34	Meeting Document		

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623731	06/05/2018	BIOACCUMULATION MODELING UPDATE MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Meeting Document		
616155	06/14/2018	US EPA RESPONSE TO COMMENTS ON REVISED SECTION 5 AND APPENDICES A AND F OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623461	06/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 133 FOR MAY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623596	06/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 69 FOR MAY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616281	07/05/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION 2ND QUARTER 2018 PROGRESS REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(GLENN SPRINGS HOLDINGS INCORPORATED)
620396	07/10/2018	CORRESPONDENCE REGARDING DRAFT BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) REVISION 2 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	64	Letter	(DE MAXIMIS INCORPORATED)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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623739	07/12/2018	BIOACCUMULATION MODEL CALIBRATION UPDATE CPG-EPA MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	39	Meeting Document		
623734	07/13/2018	BIOACCUMULATION EQUATION Q FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
623462	07/16/2018	LPRSA MONTHLY PROGRESS REPORT NO. 134 FOR JUNE 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623581	07/16/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 70 FOR JUNE 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616161	07/30/2018	US EPA COMMENTS ON APPENDICES J, L, M, N, O OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623327	08/07/2018	FINAL 2009 BIOACCUMULATION TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1396	Report	(COOPERATING PARTIES GROUP)	

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623328	08/07/2018	CORRESPONDENCE REGARDING US EPA'S REVIEW AND APPROVAL OF 2009 BIOACCUMULATION TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616228	08/11/2018	2012 SEDIMENT TOXICITY REFERENCE DATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	437	Report		
623536	08/13/2018	CORRESPONDENCE REGARDING EXPRESSION OF SUPPORT OF ADVANCING CLEANUP ACTIVITIES IN THE UPPER 9 MILES OF THE PASSAIC RIVER FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,PETER (US ENVIRONMENTAL PROTECTION AGENCY)	
616095	08/14/2018	CORRESPONDENCE REGARDING THE USE OF MODELING IN THE UPPER 9-MILE INTERIM ACTION FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)
623538	08/14/2018	CORRESPONDENCE REGARDING SUPPORT FOR ENVIRONMENTAL PROTECTION AGENCY PROPOSED INTERIM ACTION FOR THE UPPER NINE MILES OF THE PASSAIC FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,PETER (US ENVIRONMENTAL PROTECTION AGENCY)	

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623541	08/14/2018	CORRESPONDENCE REGARDING SUPPORT FOR ENVIRONMENTAL PROTECTION AGENCY PROPOSED INTERIM ACTION FOR THE UPPER NINE MILES OF THE PASSAIC FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,PETER (US ENVIRONMENTAL PROTECTION AGENCY)	
623483	08/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 135 FOR JULY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623629	08/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 71 FOR JULY 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623532	08/21/2018	CORRESPONDENCE REGARDING EXPRESSION OF SUPPORT OF ADVANCING CLEANUP ACTIVITIES IN THE PASSAIC RIVER FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,PETER (US ENVIRONMENTAL PROTECTION AGENCY)	
623540	08/28/2018	CORRESPONDENCE REGARDING SUPPORT FOR ENVIRONMENTAL PROTECTION AGENCY PROPOSED INTERIM ACTION FOR THE UPPER NINE MILES OF THE PASSAIC FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,PETER (US ENVIRONMENTAL PROTECTION AGENCY)	
623543	09/07/2018	CORRESPONDENCE REVIEW OF FINAL 2010 SMALL FORAGE FISH TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616226	09/11/2018	FINAL 2009 FISH AND BLUE CRAB TISSUE CHEMISTRY DATA, APPENDIX F LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	701	Report		
623329	09/11/2018	FINAL 2009 FISH AND BLUE CRAB TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	280	Report	(COOPERATING PARTIES GROUP)	
623331	09/11/2018	FINAL 2009 FISH AND BLUE CRAB TISSUE CHEMISTRY DATA, APPENDICES A - E, LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	552	Letter	(COOPERATING PARTIES GROUP)	
623332	09/11/2018	FINAL 2009 FISH AND BLUE CRAB TISSUE CHEMISTRY DATA, APPENDICES I - L, LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7417	Letter	(COOPERATING PARTIES GROUP)	
623330	09/11/2018	CORRESPONDENCE REGARDING US EPA'S REVIEW AND APPROVAL OF REVISED 2009 FISH AND BLUE CRAB TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623738	09/14/2018	POSSIBLE SOLUTION TO CONSUMPTION-RATE EQUATION PROBLEM: USE SPECIES-SPECIFIC FB4 META MODELS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Other		

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623463	09/17/2018	LPRSA MONTHLY PROGRESS REPORT NO. 136 FOR AUGUST 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623597	09/17/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 72 FOR AUGUST 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623725	09/17/2018	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Meeting Document		
616158	09/19/2018	US EPA RESPONSE TO COMMENTS ON REVISED SECTION 8 OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616164	09/19/2018	FINAL US EPA COMMENTS ON THE SECTIONS 1 THROUGH 3 OF THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623575	09/19/2018	LPR UPPER 9-MILE INTERIM ACTION BASELINE MONITORING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Other		

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616165	09/20/2018	FINAL US EPA COMMENTS ON THE SECTIONS 5 AND APPENDIX F OF THE DRAFT REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
459040	09/21/2018	CORRESPONDENCE REGARDING REVIEW OF REVISED DRAFT OF 2011 CAGED BIVALVE STUDY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter		
623323	09/25/2018	CORRESPONDENCE REGARDING US EPA'S REVIEW OF DRAFT 2012 BENTHIC INVERTEBRATE COMMUNITY REFERENCE DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED 08/26/2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620425	09/28/2018	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF CAP INSPECTION AT RIVER MILE 10.9 FOR 9/10/2018 - 9/11/2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	38	Memorandum		
616229	10/02/2018	US EPA APPROVAL OF THE REVISED 2012 SEDIMENT TOXICITY REFERENCE DATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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623306	10/04/2018	CORRESPONDENCE REGARDING REVIEW OF REVISED WINTER AND SPRING 2011 AVIAN COMMUNITY SURVEY DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623309	10/04/2018	CORRESPONDENCE REGARDING REVIEW OF DRAFT THE 2012 FISH TISSUE SURVEY AND CHEMISTRY BACKGROUND DATA FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED JULY 22, 2015, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
459054	10/04/2018	REVIEW OF DISSOLVED OXYGEN MONITORING PROGRAM DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA: SUMMER AND FALL 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter		
616251	10/09/2018	US EPA COMMENTS TO THE DRAFT 2017 RIVER MILE 10.9 ANNUAL VISUAL CAP MONITORING REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623534	10/10/2018	CORRESPONDENCE SUMMARIZING RECENT DISCUSSIONS BETWEEN THE ENVIRONMENTAL PROTECTION AGENCY (EPA) REGION 2 AND THE LOWER PASSAIC RIVER COOPERATING PARTIES GROUP (CPG) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)

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623535	10/10/2018	CORRESPONDENCE REGARDING APPROVAL TO SUPPORT THE IR IN THE UPPER REACHES OF THE LOWER PASSAIC FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
459055	10/11/2018	FINAL DISSOLVED OXYGEN MONITORING PROGRAM DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA: SUMMER AND FALL 2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5579	Report		
616282	10/12/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION 3RD QUARTER 2018 PROGRESS REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(GLENN SPRINGS HOLDINGS INCORPORATED)
616230	10/15/2018	US EPA APPROVAL OF THE REVISED FALL 2009 SEDIMENT TOXICITY TEST DATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623464	10/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 137 FOR SEPTEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623598	10/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 73 FOR SEPTEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623726	10/15/2018	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	13	Meeting Document		
623576	10/17/2018	UPPER 9-MILE PROPOSED BASELINE MONITORING EPA/CPG TELECONFERENCE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Other		
616283	10/18/2018	CORRESPONDENCE REGARDING THE SUSPENSION OF MONTHLY PROGRESS REPORTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(GLENN SPRINGS HOLDINGS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623311	10/18/2018	CORRESPONDENCE REGARDING REVIEW OF DRAFT 2012 SEDIMENT CHEMISTRY BACKGROUND DATA FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED OCTOBER 30, 2013, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623542	10/24/2018	FINAL 2010 SMALL FORAGE FISH TISSUE CHEMISTRY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2170	Report	(COOPERATING PARTIES GROUP)	(WIND WARD ENVIRONMENTAL LLC)

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623737	10/24/2018	POSSIBLE PROCEDURE TO CONSTRAIN GROWTH RATES GIVEN SITE-SPECIFIC DATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Meeting Document		
623317	11/08/2018	FULL CAG MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Meeting Document		
623727	11/13/2018	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Meeting Document		
623465	11/15/2018	LPRSA MONTHLY PROGRESS REPORT NO. 138 FOR OCTOBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623599	11/15/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 74 FOR OCTOBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623708	11/20/2018	CORRESPONDENCE REGARDING REVIEW OF THE EVALUATION OF THE COOPERATING PARTIES GROUP QUALITY ASSURANCE PROJECT PLAN HYDROGRAPHIC SURVEY ADDENDUM NOVEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter		

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616130	12/04/2018	NJDEP COMMENTS TO THE FEASIBILITY STUDY WORK PLAN ADDENDUM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
616133	12/04/2018	US EPA COMMENTS ON THE DRAFT FEASIBILITY STUDY WORK PLAN INTERIM REMEDY ADDENDUM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623728	12/11/2018	BIOACCUMULATION MODEL CHECK-IN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Meeting Document		
616134	12/14/2018	US EPA SUBMITTAL OF THE REMEDIAL ACTION OBJECTIVES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616160	12/14/2018	US EPA RESPONSE TO COMMENTS ON REVISED SECTION 11 OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616148	12/17/2018	US EPA APPROVAL OF APPENDIX L OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616157	12/17/2018	US EPA RESPONSE TO COMMENTS ON REVISED SECTION 7 OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616162	12/17/2018	US EPA COMMENTS ON THE REVISED DRAFT EXECUTIVE SUMMARY OF THE REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623466	12/17/2018	LPRSA MONTHLY PROGRESS REPORT NO. 139 FOR NOVEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623600	12/17/2018	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 75 FOR NOVEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623707	12/17/2018	CORRESPONDENCE REGARDING APPROVAL OF EVALUATION OF THE COOPERATING PARTIES GROUP QUALITY ASSURANCE PROJECT PLAN HYDROGRAPHIC SURVEY ADDENDUM NOVEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter		

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616156	12/18/2018	US EPA RESPONSE TO COMMENTS ON REVISED SECTION 6 OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616149	12/20/2018	US EPA APPROVAL OF APPENDIX M OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616153	12/20/2018	US EPA RESPONSE TO COMMENTS ON REVISED APPENDIX N OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616147	12/28/2018	US EPA APPROVAL OF APPENDIX I OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616150	12/28/2018	US EPA RESPONSE TO COMMENTS ON REVISED APPENDIX G OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616151	12/28/2018	US EPA RESPONSE TO COMMENTS ON REVISED APPENDIX H OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616152	12/31/2018	US EPA RESPONSE TO COMMENTS ON REVISED APPENDIX J OF THE DRAFT REMEDIAL INVESTIGATION REPORT THE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623467	01/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 140 FOR DECEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623601	01/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 76 FOR DECEMBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616096	01/17/2019	LOWER PASSAIC RIVER FEASIBILITY STUDY PROPOSAL FOR THE SUBSURFACE REMEDIAL ACTION LEVEL TO ACHIEVE RAO FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Memorandum		
623722	01/29/2019	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Meeting Document		
616125	02/04/2019	US EPA CONDITIONAL APPROVAL OF THE DRAFT FEASIBILITY STUDY WORK PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616120	02/07/2019	US EPA APPROVAL OF THE DRAFT LOWER PASSAIC RIVER INTERIM REMEDY FEASIBILITY STUDY ENGINEERING ASSUMPTIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623318	02/07/2019	COMMUNITY ADVISORY GROUP MEETING FEBRUARY 7, 2019, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	16	Meeting Document		
623578	02/08/2019	CORRESPONDENCE REGARDING ADMINISTRATIVE ORDER ON CONSENT, NO. CERCLA 02-2007-2009 DIAMOND ALKALI SUPERFUND SITE, OPERABLE UNIT 4, LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616088	02/13/2019	NJDEP COMMENTS ON THE PROPOSAL OF SUBSURFACE REMEDIAL ACTION LEVEL AND SLIDES ON THE REMEDIAL FOOTPRINT DEVELOPMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Memorandum		(NJDEP)
623468	02/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 141 FOR JANUARY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623602	02/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 77 FOR JANUARY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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616097	02/18/2019	CPG TECHNICAL RESPONSE TO THE INTERIM REMEDY FEASIBILITY STUDY RAO 2 EROSIONAL AREAS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum		(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)
623690	02/26/2019	CORRESPONDENCE REGARDING REVIEW OF REVISED HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROJECT CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Letter		
623692	02/26/2019	CORRESPONDENCE REGARDING REVIEW OF REVISED HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROJECT CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Letter		
623748	02/26/2019	CORRESPONDENCE REGARDING REVIEW OF DRAFT PHYSICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616098	02/28/2019	LOWER PASSAIC RIVER INTERIM REMEDIAL FEASIBILITY STUDY SUMMARY OF PROJECTION MODELING APPROACH FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Memorandum		(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)

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616099	03/04/2019	UPPER 9-MILE INTERIM REMEDY ADDENDUM FEASIBILITY STUDY WORK PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Work Plan	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)	(INTEGRAL CONSULTING INCORPORATED)
616126	03/08/2019	CORRESPONDENCE REGARDING THE PROPOSED REMEDIAL ACTION ALTERNATIVES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623469	03/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 142 FOR FEBRUARY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623603	03/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 78 FOR FEBRUARY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623682	03/18/2019	RESPONSE TO US EPA COMMENTS DATED 02/26/2019 REGARDING THE HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Letter		
623683	03/19/2019	RESPONSE TO US EPA COMMENTS DATED 02/26/2019 REGARDING THE SMALL VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Letter		

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616100	03/21/2019	CORRESPONDENCE REGARDING THE USE AND LIMITATIONS OF MODEL PROJECTIONS IN EVALUATING AND COMPARING REMEDIAL ALTERNATIVES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Memorandum		
623577	03/21/2019	LOWER PASSAIC RIVER STUDY AREA UPPER 9-MILE INTERIM REMEDY - PROPOSED CURRENT CONDITIONS SAMPLING PROGRAM DEVELOPMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Other		
620399	03/29/2019	US EPA RESPONSE TO NJDEP COMMENTS REGARDING THE LOWER PASSAIC RIVER BASELINE ECOLOGICAL RISK ASSESSMENT OCTOBER 2018 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Letter	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)
616124	04/02/2019	US EPA COMMENTS TO THE DRAFT LOWER PASSAIC RIVER STUDY UPPER 9-MILE INTERIM REMEDY FEASIBILITY STUDY TECHNOLOGY SCREENING TABLE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623567	04/04/2019	CURRENT CONDITIONS BIOTA SAMPLING 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Other		

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623573	04/11/2019	MEETING MINUTES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Other		
623484	04/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 143 FOR MARCH 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623604	04/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 79 FOR MARCH 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623723	04/15/2019	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Meeting Document		
623574	04/18/2019	MEETING MINUTES FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Other		
620424	04/24/2019	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF CAP INSPECTION AT RIVER MILE 10.9 FOR 3/21/2019 - 03/22/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	41	Memorandum		

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623300	04/29/2019	CORRESPONDENCE REGARDING REVIEW OF DRAFT 2012 BENTHIC INVERTEBRATE COMMUNITY REFERENCE DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED AUGUST 26, 2013, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623301	04/29/2019	CORRESPONDENCE REGARDING REVIEW OF REVISED DRAFT OF THE 2011 CAGED BIVALVE STUDY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED NOVEMBER 23, 2015, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623302	04/29/2019	CORRESPONDENCE REGARDING REVIEW OF REVISED WINTER AND SPRING 2011 AVIAN COMMUNITY SURVEY DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623321	04/29/2019	CORRESPONDENCE REGARDING US EPA'S REVIEW AND CONDITIONAL APPROVAL OF DRAFT 2012 FISH TISSUE SURVEY AND CHEMISTRY BACKGROUND DATA FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED 07/22/2015, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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623322	04/29/2019	CORRESPONDENCE REGARDING US EPA'S REVIEW AND APPROVAL OF DRAFT 2012 SEDIMENT CHEMISTRY BACKGROUND DATA FOR THE LOWER PASSAIC RIVER STUDY AREA, DATED 10/30/2013 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623687	04/29/2019	CORRESPONDENCE REGARDING COMMENTS FOR THE REVISED HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROJECT CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter		
623688	04/29/2019	CORRESPONDENCE REGARDING COMMENTS FOR THE REVISED SMALL VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROJECT CHARACTERIZATION SUMMARY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter		
623676	05/01/2019	HIGH VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12241	Report		
623684	05/01/2019	SMALL VOLUME CHEMICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3588	Report		

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623326	05/02/2019	FINAL AVIAN COMMUNITY SURVEY DATA REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA, WINTER AND SPRING 2011 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	358	Report	(COOPERATING PARTIES GROUP)	
616108	05/06/2019	US EPA COMMENTS ON THE DRAFT POTENTIAL CHEMICAL SPECIFIC ARARS TABLE FOR THE LOWER PASSAIC RIVER STUDY AREA FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623568	05/06/2019	CORRESPONDENCE REGARDING PASSAIC CURRENT CONDITIONS BIOTA SAMPLING – EVALUATION OF FISH ABUNDANCE AND POTENTIAL COMPOSITE NUMBERS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	
572343	05/08/2019	US EPA APPROVAL OF THE RIVER MILE 10.9 REMOVAL ACTION FINAL CONSTRUCTION REPORT FOR THE LOWER PASSAIC RIVER STUDY AREA, REVISION 2, DATED 04/20/2017 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
623307	05/10/2019	FINAL 2012 FISH TISSUE SURVEY AND CHEMISTRY BACKGROUND DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3433	Report	(COOPERATING PARTIES GROUP)	(WIND WARD ENVIRONMENTAL LLC)

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623308	05/13/2019	FINAL 2012 BENTHIC INVERTEBRATE COMMUNITY REFERENCE DATA FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	114	Report	(COOPERATING PARTIES GROUP)	
623732	05/13/2019	MEETING SUMMARY BIOACCUMULATION MODELING UPDATE CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Meeting Document		
623733	05/13/2019	BIOACCUMULATION MODEL CHECK-IN CPG-EPA CONFERENCE CALL FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Other		
620394	05/15/2019	CORRESPONDENCE REGARDING COMMENTS TO THE BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Letter	(NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623451	05/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 144 FOR APRIL 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623605	05/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 80 FOR APRIL 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616089	05/16/2019	NJDEP REVIEW OF THE DRAFT COMMON ENGINEERING ASSUMPTIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum		(NJDEP)

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616106	05/17/2019	US EPA COMMENTS ON THE DRAFT COMMON ENGINEERING ELEMENTS UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616107	05/17/2019	US EPA COMMENTS ON THE DRAFT BASIS OF COST ESTIMATE UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616110	05/24/2019	US EPA APPROVAL OF THE DRAFT LOWER PASSAIC RIVER STUDY AREA UPPER 9-MILE INTERIM REMEDY FEASIBILITY STUDY TECHNOLOGY SCREENING TABLE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616209	05/24/2019	US EPA COMMENTS ON THE REVISED REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	11	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620398	05/28/2019	CORRESPONDENCE REGARDING EMAIL DATED 5/7/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	33	Letter	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)
623569	05/28/2019	CURRENT CONDITIONS BIOTA SAMPLING 2019 CPG-EPA MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Meeting Document		

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623691	06/01/2019	CURRENT CONDITION MONITORING PROGRAM PHYSICAL WATER COLUMN MONITORING QUALITY ASSURANCE PROJECT PLAN FIELD SAMPLING PLAN ADDENDUM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	265	Report		
616212	06/06/2019	US EPA APPROVAL OF THE FOUR MODELS FOR USE IN THE FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	16	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620395	06/06/2019	CORRESPONDENCE REGARDING BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) REVISION 3 DRAFT CONSIDERATION OF PEER REVIEW HANDBOOK 4TH EDITION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum		SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623570	06/07/2019	CORRESPONDENCE REGARDING KEY DETAILS ON LPRSA UPPER 9-MILE CURRENT CONDITIONS BIOTA SAMPLING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Memorandum	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	
616211	06/14/2019	US EPA COMMENTS ON SECTION 9 OF THE REVISED REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620400	06/17/2019	FINAL BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	847	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	

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620401	06/17/2019	FINAL BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA APPENDIX A - J FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2414	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	
620402	06/17/2019	FINAL BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA APPENDIX K FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8010	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	
620403	06/17/2019	FINAL BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE LOWER PASSAIC RIVER STUDY AREA APPENDIX L - Q FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1153	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	
623452	06/17/2019	LPRSA MONTHLY PROGRESS REPORT NO. 145 FOR MAY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623582	06/17/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 81 FOR MAY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623743	06/21/2019	LOWER PASSAIC RIVER RESTORATION PROJECT - PHYSICAL WATER COLUMN MONITORING SAMPLING PROGRAM CHARACTERIZATION SUMMARY LOWER PASSAIC RIVER STUDY AREA RI/FS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2578	Work Plan		(AECOM)

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623744	06/21/2019	US EPA COMMENTS ON THE DRAFT CURRENT CONDITIONS MONITORING PROGRAM PHYSICAL WATER COLUMN MONITORING QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620392	06/27/2019	CORRESPONDENCE REGARDING MAY 2019 FINAL BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623746	06/27/2019	US EPA COMMENTS ON THE DRAFT CURRENT CONDITIONS MONITORING PROGRAM PHYSICAL WATER COLUMN FIELD SAMPLING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616210	06/28/2019	US EPA CONDITIONAL APPROVAL OF THE REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620393	06/28/2019	CORRESPONDENCE REGARDING MAY 2018 FINAL BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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623747	07/10/2019	FIELD MODIFICATION FORM LOWER PASSAIC RIVER RESTORATION PROJECT CURRENT CONDITIONS MONITORING PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Form		
616109	07/11/2019	US EPA RESPONSE COMMENTS OF THE CPG COMMENTS ON THE APPLICABLE OR RELEVANT REQUIREMENTS TABLE, COMMON ENGINEERING ELEMENTS, AND DRAFT BASIS OF COST ESTIMATE FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616208	07/11/2019	CPG'S RESPONSE TO US EPA CONDITIONAL APPROVAL OF THE 17-MILE REMEDIAL INVESTIGATION REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)
620391	07/11/2019	CORRESPONDENCE REGARDING US EPA FINAL APPROVAL OF THE 17-MILE BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623453	07/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 146 FOR JUNE 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623583	07/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 82 FOR JUNE 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
459076	07/19/2019	SUMMARY OF OVERSIGHT OF EQUIPMENT SERVICING FOR 07/16/2019 - 07/17/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	45	Memorandum		
623571	07/25/2019	CORRESPONDENCE REGARDING AGING ANALYTICAL FISH FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	
616168	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - REPORT AND APPENDIX A FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1238	Report		(ANCHOR QEA)
616195	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 1 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	651	Report		(ANCHOR QEA)
616173	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 2 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	220	Report		(ANCHOR QEA)

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616174	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 3 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	247	Report		(ANCHOR QEA)
616175	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 4 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	242	Report		(ANCHOR QEA)
616176	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 5 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	289	Report		(ANCHOR QEA)
616177	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 6 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12241	Report		(ANCHOR QEA)
616178	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 7 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3588	Report		(ANCHOR QEA)

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623304	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 8 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2578	Report		
616179	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 9 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3955	Report		(ANCHOR QEA)
616180	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 10 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	942	Report		(ANCHOR QEA)
616181	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 11 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1433	Report		(ANCHOR QEA)
616182	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 12 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3385	Report		(ANCHOR QEA)

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616183	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 13 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17352	Report		(ANCHOR QEA)
616166	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 14 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	793	Report		
459051	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 15 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	831	Report		
616184	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 16 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4441	Report		(ANCHOR QEA)
616185	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 17 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1639	Report		(ANCHOR QEA)

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616186	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 18 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1742	Report		(ANCHOR QEA)
616187	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 21 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3382	Report		(ANCHOR QEA)
616188	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 22 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2127	Report		(ANCHOR QEA)
616189	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 23 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2590	Report		(ANCHOR QEA)
616190	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 24 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2360	Report		(ANCHOR QEA)

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616191	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 25 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1664	Report		(ANCHOR QEA)
616192	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 26 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2086	Report		(ANCHOR QEA)
616193	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 27 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1242	Report		(ANCHOR QEA)
616194	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 28 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4113	Report		(ANCHOR QEA)
459036	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 29 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	209	Report		

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459050	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 30 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1331	Report		
623325	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 31 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1376	Report	(COOPERATING PARTIES GROUP)	
459052	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX B DATA CHARACTERIZATION REPORTS PART 32 OF 32 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	777	Report		
616196	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 1 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8614	Report		(ANCHOR QEA)
616197	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 2 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4099	Report		(ANCHOR QEA)

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616198	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 3 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1350	Report		(ANCHOR QEA)
616199	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 4 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14861	Report		(ANCHOR QEA)
616201	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 6 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8446	Report		(ANCHOR QEA)
616202	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 7 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10548	Report		(ANCHOR QEA)
616203	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 8 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	843	Report		(ANCHOR QEA)

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616204	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 9 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7600	Report		(ANCHOR QEA)
616205	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 10 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7599	Report		(ANCHOR QEA)
616206	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX C DATA VALIDATION REPORTS PART 11 OF 11 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	275	Report		(ANCHOR QEA)
616169	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDICES D THROUGH I FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2649	Report		(ANCHOR QEA)
616207	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDIX E ELECTRONIC DATA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report		(ANCHOR QEA)
616170	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDICES J THROUGH L FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	791	Report		(ANCHOR QEA)

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616171	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDICES M AND N FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	578	Report		(ANCHOR QEA)
616172	08/06/2019	JULY 2019 LOWER PASSAIC RIVER STUDY AREA REMEDIAL INVESTIGATION REPORT - APPENDICES O THROUGH AA FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1273	Report		(ANCHOR QEA)
623686	08/08/2019	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY CERCLA DOCKET NO. 02-2007-2009 REGARDING REVIEW OF THE QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Memorandum		
459077	08/12/2019	SUMMARY OF OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING AND EQUIPMENT SERVICING FOR 07/29/2019 - 08/01/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	35	Memorandum		
623544	08/13/2019	REMEDIAL INVESTIGATION/FEASIBILITY STUDY OVERSIGHT FINAL QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR PHYSICAL WATER COLUMN MONITORING - USACE CONTRACT NO. W912DQ-18-D-3008 TASK ORDER NO. F3009, ATP 01 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	65	Work Plan	(US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT)	(CDM SMITH)

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623454	08/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 147 FOR JULY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623584	08/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 83 FOR JULY 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623694	08/20/2019	NJDEP COMMENTS DATED 08/20/2019 FOR THE CURRENT CONDITIONS ADDENDUM TO THE QAPP: FISH AND CRAB TISSUE COLLECTION FOR CHEMISTRY ANALYSIS ADDENDUM NO. 7 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter		
623696	08/28/2019	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT CERCLA DOCKET NO. 02-2007-2009 REGARDING REVIEW OF THE EVALUATION OF THE CPG CURRENT CONDITIONS ADDENDUM TO THE QAPP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Memorandum		
616101	09/03/2019	CORRESPONDENCE REGARDING THE REQUEST FOR THE SUSPENSION OF REVIEW OF THE DRAFT FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)

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623566	09/03/2019	CURRENT CONDITIONS MONITORING PROGRAM (CCMP) DRAFT QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR CHEMICAL WATER COLUMN MONITORING/SMALL VOLUME DATA COLLECTION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	123	Report	(US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT)	(CDM SMITH)
623699	09/03/2019	RESPONSE TO US EPA COMMENTS FOR THE EVALUATION OF THE CPG CURRENT CONDITIONS ADDENDUM TO THE QAPP - FISH AND CRAB TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	7	Letter		
623685	09/04/2019	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY CERCLA DOCKET NO. 02-2007-2009 REGARDING APPROVAL OF THE QUALITY ASSURANCE PROJECT PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Memorandum		
623736	09/09/2019	BLUE CRAB PARAMETER ERROR FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Other		
616127	09/10/2019	NJDEP COMMENTS TO THE INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	10	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)

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623695	09/13/2019	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT CERCLA DOCKET NO. 02-2007-2009 REGARDING ACCEPTANCE OF THE EVALUATION OF THE CPG CURRENT CONDITIONS ADDENDUM TO THE QAPP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Memorandum		
623698	09/13/2019	CURRENT CONDITIONS ADDENDUM TO THE QUALITY ASSURANCE PROJECT PLAN FISH AND CRAB TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	379	Report		
623470	09/16/2019	LPRSA MONTHLY PROGRESS REPORT NO. 148 FOR AUGUST 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623606	09/16/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 84 FOR AUGUST 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616131	09/17/2019	NOAA COMMENTS TO THE DRAFT UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA))
623319	09/19/2019	COMMUNITY ADVISORY GROUP MEETING SEPTEMBER 17, 2019, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Meeting Document		

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623565	09/23/2019	CURRENT CONDITIONS MONITORING PROGRAM (CCMP) FINAL QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR FISH AND CRAB TISSUE COLLECTION FOR CHEMICAL ANALYSIS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	103	Report	(US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT)	(CDM SMITH)
623724	09/23/2019	ALTERNATIVE CALIBRATION EXAMINATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	23	Meeting Document		
623471	10/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 149 FOR SEPTEMBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623607	10/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 85 FOR SEPTEMBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616113	10/18/2019	US EPA COMMENTS TO THE DRAFT UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623533	10/21/2019	17-MILE LOWER PASSAIC RIVER STUDY AREA PRESENTATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Other		

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620426	10/25/2019	CORRESPONDENCE REGARDING SUMMARY OF SPME SAMPLER INSTALLATION EFFORT AT RIVER MILE 10.9 FOR 9/28/2019 - 9/30/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	27	Memorandum		
616090	11/01/2019	NJDEP COMMENTS ON THE DRAFT INTERIM REMEDY FEASIBILITY STUDY APPENDIX D FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Memorandum		(NJDEP)
623509	11/01/2019	COOPERATING PARTIES GROUP NRRB/CSTAG STATEMENT - UPPER 9 MILE INTERIM REMEDY AND ADAPTIVE MANAGEMENT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	30	Other		
459079	11/11/2019	SUMMARY OF OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR 09/18/2019 - 09/20/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Memorandum		
623503	11/14/2019	FULL CAG MEETING FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Meeting Document		
623510	11/14/2019	CORRESPONDENCE REGARDING LOWER PASSAIC RIVER STUDY AREA 17-MILE RI/FS PROJECT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)|NICKERSON,JAY (NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)

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623520	11/14/2019	COMMENTS TO THE EPA CSTAG FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
623472	11/15/2019	LPRSA MONTHLY PROGRESS REPORT NO. 150 FOR OCTOBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623608	11/15/2019	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 86 FOR OCTOBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623511	11/20/2019	LOWER PASSAIC RIVER INTERIM REMEDY FS: CPG PRESENTATION TO CSTAG/NRRB FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Other		
623513	11/20/2019	NJDEP COMMENTS TO CSTAG AND NRRB FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	20	Other		
623514	11/20/2019	DIAMOND ALKALI SUPERFUND SITE 17-MILE LOWER PASSAIC RIVER STUDY AREA CSTAG/NRRB PRESENTATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	100	Other		

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623572	11/25/2019	CORRESPONDENCE REGARDING RESPONSE TO USEPA PROPOSED CURRENT CONDITIONS BIOTA COMPOSITING PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Memorandum	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	
459068	11/26/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 08/20/2019 - 08/22/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Memorandum		
459075	11/26/2019	SUMMARY OF OVERSIGHT OF EQUIPMENT SERVICING FOR 08/13/2019 - 08/14/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Memorandum		
459069	11/27/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 09/04/2019 - 09/06/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Memorandum		
459078	11/27/2019	SUMMARY OF OVERSIGHT OF PHYSICAL WATER COLUMN MONITORING FOR 09/06/2019 - 09/07/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	20	Memorandum		
459080	11/27/2019	SUMMARY OF OVERSIGHT OF BIOTA TISSUE COLLECTION FOR 09/09/2019 - 09/28/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	69	Memorandum		

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459070	12/11/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 09/16/2019 - 09/17/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Memorandum		
459071	12/13/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 10/01/2019 - 10/02/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	25	Memorandum		
459072	12/13/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 10/21/2019 - 10/22/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	29	Memorandum		
459073	12/13/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 10/29/2019 - 10/30/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	26	Memorandum		
623473	12/16/2019	LPRSA MONTHLY PROGRESS REPORT NO. 151 FOR NOVEMBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616102	12/16/2019	CPG'S PROPOSED MODEL METRICS FOR THE REVISED IR FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Memorandum		(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)

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623512	12/17/2019	CORRESPONDENCE REGARDING RESPONSE AND ADDRESS TO ASSERTIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)
459074	12/17/2019	SUMMARY OF OVERSIGHT OF CHEMICAL WATER COLUMN MONITORING FOR 12/04/2019 - 12/05/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	22	Memorandum		
620429	01/03/2020	CORRESPONDENCE REGARDING SUMMARY OF OVERSIGHT OF SPME SAMPLER RETRIEVAL EFFORT AT RIVER MILE 10.9, 12/10/2019 - 12/12/2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	46	Memorandum		
616103	01/14/2020	NJDEP REVIEW COMMENTS ON APPENDIX H OF THE FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
623474	01/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 152 FOR DECEMBER 2019 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616115	01/21/2020	US EPA COMMENTS TO THE LOWER PASSAIC RIVER INTERIM REMEDY FEASIBILITY STUDY PROPOSED MODEL METRICS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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623721	01/21/2020	ALTERNATIVE CALIBRATION EXAMINATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	30	Meeting Document		
623735	01/21/2020	BLUE CRAB PARAMETER ERROR FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Other		
616129	01/27/2020	NJDEP COMMENTS TO US EPA RESPONSE TO COMMENTS ON THE DRAFT FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
623693	01/30/2020	CORRESPONDENCE REGARDING PASSAIC CURRENT CONDITIONS BIOTA SAMPLING - LESSONS LEARNED FROM 2019 SAMPLING EFFORT BY WINDWARD ENVIRONMENTAL LLC FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Memorandum		
615441	01/31/2020	CSTAG RECOMMENDATIONS ON THE REMEDIAL INVESTIGATION / FEASIBILITY STUDY, INTERIM REMEDIAL ACTION - DRAFT FEASIBILITY STUDY AND OVERALL CLEANUP STRATEGY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Memorandum	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	GUSTAVSON,KARL (US ENVIRONMENTAL PROTECTION AGENCY)
616132	02/06/2020	NJDEP REVIEW OF THE DRAFT COMPILATION OF THE FEASIBILITY STUDY COMMENTS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)

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616114	02/13/2020	US EPA RESPONSE TO COMMENTS TO THE DRAFT UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	81	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623475	02/18/2020	LPRSA MONTHLY PROGRESS REPORT NO. 153 FOR JANUARY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623487	02/18/2020	LPRSA MONTHLY PROGRESS REPORT NO. 89 FOR JANUARY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623609	02/18/2020	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 89 FOR JANUARY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623697	02/20/2020	ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT CERCLA DOCKET NO. 02-2007-2009 REGARDING TRANSMITTAL OF COMMENTS TO THE EVALUATION OF THE CPG CURRENT CONDITIONS ADDENDUM TO THE QAPP FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	6	Memorandum		
616111	02/27/2020	US EPA COMMENTS TO APPENDIX D OF THE DRAFT INTERIM REMEDY FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	12	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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607250	03/02/2020	US EPA REGION 2 RESPONSES TO THE CONTAMINATED SEDIMENTS TECHNICAL ADVISORY GROUP'S RECOMMENDATIONS FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	16	Memorandum	GUSTAVSON,KARL (US ENVIRONMENTAL PROTECTION AGENCY)	SIVAK,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
623486	03/16/2020	LPRSA MONTHLY PROGRESS REPORT NO. 154 FOR FEBRUARY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616112	03/17/2020	US EPA COMMENTS TO APPENDIX H OF THE DRAFT INTERIM REMEDY FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	9	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616128	03/19/2020	NJDEP COMMENTS TO APPENDIX D OF THE FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)	(NJDEP)
623488	04/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 155 FOR MARCH 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623320	05/01/2020	COMMUNITY ADVISORY GROUP MEETING APRIL 30, 2020, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	20	Meeting Document		
623489	05/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 156 FOR APRIL 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	5	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

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623485	06/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 157 FOR MAY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623630	06/15/2020	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 93 FOR MAY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623504	07/09/2020	COMMUNITY ADVISORY GROUP MEETING JULY 9, 2020, FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	11	Meeting Document		
623490	07/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 158 FOR JUNE 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616121	07/16/2020	US EPA COMMENTS ON APPENDIX D OF THE DRAFT INTERIM REMEDY FEASIBILITY STUDY REPORT REVISION 1 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	28	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616123	07/16/2020	US EPA COMMENTS ON APPENDIX H OF THE DRAFT INTERIM REMEDY FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	21	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616117	07/30/2020	CORRESPONDENCE REGARDING THE US EPA RESPONSE TO COMMENTS ON THE DRAFT UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY REVISION 1 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	8	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623677	08/12/2020	RESPONSE TO US EPA COMMENTS ON WORKSHEETS NO. 9, 10, 11, 17, 18 AND ADDITIONAL COMMENTS INCLUDING SOPS FOR THE HIGH VOLUME CHEMICAL WATER COLUMN MONITORING QAPP DATED 4/2012 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	15	Letter		
616116	08/13/2020	US EPA ADDITIONAL COMMENTS TO THE DRAFT UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY REVISION 1 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	14	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623491	08/17/2020	LPRSA MONTHLY PROGRESS REPORT NO. 159 FOR JULY 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616105	08/27/2020	US EPA COMMENTS ON APPENDIX H OF THE DRAFT FINAL INTERIM REMEDY FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	18	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616104	09/04/2020	US EPA COMMENTS ON APPENDIX D OF THE DRAFT FINAL INTERIM REMEDY FEASIBILITY STUDY REPORT FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	17	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
623492	09/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 160 FOR AUGUST 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623522	09/15/2020	17-MILE LOWER PASSAIC RIVER STUDY AREA PRESENTATION FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	24	Other		
623493	10/15/2020	LPRSA MONTHLY PROGRESS REPORT NO. 161 FOR SEPTEMBER 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623494	11/16/2020	LPRSA MONTHLY PROGRESS REPORT NO. 162 FOR OCTOBER 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
623610	11/16/2020	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 98 FOR OCTOBER 2020 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
616118	12/01/2020	US EPA AND NJDEP COMMENTS TO THE DRAFT FINAL UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)

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616224	12/02/2020	CORRESPONDENCE REGARDING THE STOPPING OF REVIEW OF THE RISK ANALYSIS AND RISK CHARACTERIZATION PLAN FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	1	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616087	12/04/2020	DRAFT FINAL UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	841	Report	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)	(INTEGRAL CONSULTING INCORPORATED)
616025	12/11/2020	US EPA CONDITIONAL APPROVAL OF THE DRAFT FINAL UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR DIAMOND ALKALI COMPANY SITE	6	Letter	LAW,ROBERT (DE MAXIMIS INCORPORATED)	SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
620632	12/15/2020	MONTHLY PROGRESS REPORT NO. 163 FOR NOVEMBER 2020 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) RI/FS IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2007-2009 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report		
620635	12/15/2020	MONTHLY PROGRESS REPORT NO. 99 FOR NOVEMBER 2020 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2012-2015 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report		

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616119	12/23/2020	US EPA COMMENTS TO THE DRAFT FINAL UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Letter	(DE MAXIMIS INCORPORATED)|LAW,ROBERT (DE MAXIMIS INCORPORATED)	(US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,DIANE (US ENVIRONMENTAL PROTECTION AGENCY)
616865	01/13/2021	CORRESPONDENCE REGARDING THE 2008 OVERSIGHT OF THE CPG SEDIMENT CORING PROGRAM FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	216	Memorandum	FRANKLIN,ELIZABETH (US ARMY CORPS OF ENGINEERS)	(WSP)
620633	01/15/2021	MONTHLY PROGRESS REPORT NO. 164 FOR DECEMBER 2020 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) RI/FS IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2007-2009 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report		
620636	01/15/2021	MONTHLY PROGRESS REPORT NO. 100 FOR DECEMBER 2020 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2012-2015 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report		
620634	02/15/2021	MONTHLY PROGRESS REPORT NO. 165 FOR JANUARY 2021 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) RI/FS IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2007-2009 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report		

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/13/2021

REGION ID: 02

Site Name: DIAMOND ALKALI CO.
CERCLIS ID: NJD980528996
OUID: 04
SSID: 0296
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
620637	02/15/2021	MONTHLY PROGRESS REPORT NO. 101 FOR JANUARY 2021 FOR OU4 LOWER PASSAIC RIVER STUDY AREA (LPRSA) IN ACCORDANCE WITH CERCLA DOCKET NO. 02-2012-2015 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report		
616691	02/04/2021	NJDEP CONCURRENCE WITH THE PROPOSED PLAN FOR OU4 FOR DIAMOND ALKALI COMPANY SITE	2	Letter	EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY)	PEDERSON,MARK (NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION)
609883	04/14/2021	PROPOSED PLAN FOR OU4 - UPPER 9 MILES OF THE LOWER PASSAIC RIVER STUDY AREA OF THE DIAMOND ALKALI COMPANY SITE	36	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
630223	03/15/2021	LPRSA MONTHLY PROGRESS REPORT NO. 166 FOR FEBRUARY 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630228	03/15/2021	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 102 FOR FEBRUARY 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630224	04/14/2021	LPRSA MONTHLY PROGRESS REPORT NO. 167 FOR MARCH 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/13/2021

REGION ID: 02

Site Name: DIAMOND ALKALI CO.
CERCLIS ID: NJD980528996
OUID: 04
SSID: 0296
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
630229	04/14/2021	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 103 FOR MARCH 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630230	05/12/2021	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 104 FOR APRIL 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	2	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630225	05/17/2021	LPRSA MONTHLY PROGRESS REPORT NO. 168 FOR APRIL 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630226	06/15/2021	LPRSA MONTHLY PROGRESS REPORT NO. 169 FOR MAY 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630231	06/15/2021	LPRSA RIVER MILE 10.9 REMOVAL ACTION MONTHLY PROGRESS REPORT NO. 105 FOR MAY 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
630227	08/16/2021	LPRSA MONTHLY PROGRESS REPORT NO. 171 FOR JULY 2021 FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	3	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(DE MAXIMIS INCORPORATED)
625207	09/09/2021	UPPER 9-MILE SOURCE CONTROL INTERIM REMEDY FEASIBILITY STUDY FOR OU4 FOR THE DIAMOND ALKALI COMPANY SITE	841	Report	(LOWER PASSAIC RIVER STUDY AREA COOPERATING PARTIES GROUP)	(INTEGRAL CONSULTING INCORPORATED)

APPENDIX 4

STATE LETTER OF CONCURRENCE

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Site Remediation and Waste Management Program
Mail Code 401-406
P.O. Box 420
Trenton, New Jersey 08625-0420
Telephone: 609-292-1250

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

September 7, 2021

Pat Evangelista, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Re: Lower Passaic River Study Area (LSRPA) OU4 Record of Decision Concurrence

Dear Mr. Evangelista:

The New Jersey Department of Environmental Protection (DEP) has completed its review of the Record of Decision (ROD) for an Interim Remedy (IR) in the Upper 9 Miles of the LSRPA Operable Unit 4 (OU4) of the Diamond Alkali Superfund Site dated September 2021 and concurs with the ROD. The major components of the selected IR consist of the following:

- A comprehensive pre-design investigation (PDI) will be implemented to assess baseline conditions, inform the IR design, and facilitate post-IR confirmatory sampling and response and recovery assessment.
- Surface sediments (0 to 0.5 ft) with elevated concentrations of 2,3,7,8-TCDD and total PCBs between river mile (RM) 8.3 and RM 15 will be targeted through dredging and capping to, achieving a post-IR 2,3,7,8-TCDD surface-weighted average concentration (SWAC) of 75 parts per trillion (ppt) and implementing a total PCB surface remedial action level (RAL) of 1 part per million (ppm) resulting in a post-IR PCB SWAC of 0.46 ppm.
- Areas between RM 8.3 and RM 15 that are vulnerable to erosion and have elevated subsurface concentrations of 2,3,7,8-TCDD and total PCBs will be dredged and capped.
- Dredging will be performed to the depth(s) necessary to construct a sediment cap that is designed to isolate underlying contamination, prevent contaminant migration and resist erosion, and will not diminish water depth or exacerbate flooding.
- Dredged material will be processed, stabilized and then disposed of off-site.
- The specific composition and thickness of the cap will be determined in the IR design, and dredge depth and cap composition/thickness may vary in portions of the remediation footprint.
- Principles of dredging without capping will be applied in the IR design to determine if any areas will be dredged to reach a native surface without the need for an engineered cap and associated operation and maintenance (O&M), which could enhance the overall long-term effectiveness and permanence of the IR.

- The area above RM 15 will be assessed carefully during the IR design based on the PDI data and will be included in the IR, if necessary.
- Appropriate and necessary institutional controls (ICs) will be implemented in conjunction with the IR.
- Monitoring and sampling will be performed to evaluate the IR during construction and to assess post-IR conditions.
- Adaptive management will be applied to evaluate IR performance, assess the response of the system to the IR and the long-term recovery of the system and to inform selection of a final risk-based remedy in a final ROD.

This response action is protective of human health and the environment in the short term and is intended to provide adequate protection until a final ROD for the LPRSA is signed and the final remedy implemented; it complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action; and is cost-effective. Although the IR is not intended to address fully the statutory mandate for permanence it will provide remedy elements (e.g., the engineered cap) that are permanent and will not be incompatible with nor preclude a final remedy.

Because the IR will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, five-year reviews will be required to ensure that the remedy is, or will be, protective of human health and the environment. In addition, because the selected remedy is an IR, review of this remedy will be ongoing as EPA continues to develop final remedial alternatives for the LPRSA.

The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the Administrative Record file for this site. The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The DEP appreciates the opportunity to participate in the decision-making process to select an appropriate remedy. If you have any questions, please call me at (609) 292-1250.

Sincerely,

Mark J. Pedersen
Assistant Commissioner

C: Stephen Maybury, Bureau Chief, BCM
Julia Galayda, Case Manager, BCM

APPENDIX 5

RESPONSIVENESS SUMMARY

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List of Acronyms

2,3,7,8-TCDD	2,3,7,8- tetrachlorodibenzo-*p*-dioxin
ADCPs	Acoustic Doppler Current Profilers
AOC	Administrative Order of Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BMP	Best Management Practices
CAG	Community Advisory Group
CCMP	Current Conditions Monitoring Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	cubic feet per second
CIP	Community Involvement Plan
COC	Contaminants of Concern
CPG	Cooperating Parties Group
CS	Conditional Simulation
CSTAG	Contaminated Sediment Technical Advisory Group
DDx	Dichlorodiphenyltrichloroethane [DDT] and its breakdown products
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ETM	Estuarine Turbidity Maximum
FEMA	Federal Emergency Management Agency
FFS	Focused Feasibility Study
FS	Feasibility Study
IC	Institutional Control
IR	Interim Remedy
LPR	Lower Passaic River
LPRS	LowerPassaic River Study Area
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NOAA	National Oceanic and Atmospheric Administration
OCC	Occidental Chemical Corporation
O&M	Operations and Maintenance

OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCB	polychlorinated biphenyls
PDI	Pre-Design Investigation
PDT	Project Delivery Team
ppt	parts per trillion
PRG	Preliminary Remediation Goal
PSU	practical salinity unit
RAL	Remedial Action Level
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
RG	Remediation Goal
RI	Remedial Investigation
RM	River Mile
RNA	Regulated Navigation Area
ROD	Record of Decision
SSS	Side-Scan Sonar
SUST	System Understanding of Sediment Transport
SWAC	Surface Weighted Average Concentration
TAG	Technical Assistance Grant
TCDD-TEQ	TCDD-Toxic Equivalency
TEF	Toxicity Equivalence Factors
TSCA	Toxic Substances Control Act
USFWS	U.S. Fish and Wildlife Service
YSI	Yellow Springs Instruments

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for the sediment source control interim remedy (IR) at the Diamond Alkali Superfund Site (the Site), Operable Unit (OU) 4, and the U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. All comments and concerns summarized in this document have been considered in EPA's decision for the selection of the IR for OU4.

This Responsiveness Summary is divided into the following sections:

I. INTRODUCTION AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

   This section provides a brief introduction and the history of community involvement and interests regarding the Site.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES

   This section contains summaries of oral and written comments received by EPA at the public meeting and during the public comment period, as well as EPA's responses to these comments.

This Responsiveness Summary includes attachments that document public participation in the IR selection process for OU4. They are as follows:

Attachment A – April 2021 Proposed Plan for the Diamond Alkali Superfund Site, OU4

Attachment B – Public Notices published in the *Bergen Record* and *El Diario*

Attachment C – April 27, 2021 Public Meeting Transcript

Attachment D – Copies of public comments received

RESPONSIVENESS SUMMARY
UPPER 9 MILES OF THE LOWER PASSAIC RIVER PART OF THE DIAMOND ALKALI SUPERFUND SITE

I. INTRODUCTION AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

This Responsiveness Summary provides a summary of the public's comments to the U.S. Environmental Protection Agency (EPA) regarding the Proposed Plan (Attachment A) for the upper 9 miles of the Lower Passaic River (LPR), part of the Diamond Alkali Superfund Site (the Site), and EPA's responses to those comments. A Responsiveness Summary is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 C.F.R. 300.430(f)(3)(F). All comments summarized in this document have been considered in EPA's decision for the selection of the sediment source control interim remedy (IR) for the upper 9 miles of the LPR.

From the discovery of dioxin at 80 Lister Avenue in Newark, New Jersey, in 1983, community interest in the Diamond Alkali Superfund Site has been high. A more detailed history of community involvement at the Site is provided in the Lower Passaic River Restoration Project and Newark Bay Study Community Involvement Plan (EPA 2006b) and in the updated 2017 Community Involvement Plan.

Since 2004, soon after EPA began the Remedial Investigation and Feasibility Study (RI/FS) for the LowerPassaic River Study Area (LPRSA)—the 17-mile tidal portion of the river from the Dundee Dam to Newark Bay—EPA has used a number of community involvement tools to keep the public informed about project issues and maintain a meaningful public dialogue. Examples of community involvement activities include:

- From 2004 to 2011, EPA held quarterly Project Delivery Team (PDT) meetings, open to the public, to report on the progress of various aspects of the LPR remediation, including the focused study of the lower 8.3-mile portion of the LPRSA (which began in 2006). Special meetings were held to discuss specific issues, such as developing sampling programs, formulating remedial alternatives, and evaluating a dredging pilot program. In 2011, PDT meetings were replaced by Community Advisory Group (CAG) meetings, described below.
- From 2009 to the present, EPA attended bi-monthly public CAG meetings. The CAG consists of approximately 20 members representing local citizens and businesses, environmental and recreational groups, municipalities and educators, and other stakeholders with a broad range ofinterests. EPA and its Partner Agencies[1] attend in an *ex officio* capacity. The CAG was first convened to elicit community input with respect to the implementation of the removal action in the river near the former Diamond Alkali facility (known as the Tierra Removal). Subsequently, the CAG

[1] EPA is one of a group of Partner Agencies (including the U.S. Army Corps of Engineers [USACE], New Jersey Department of Environmental Protection [NJDEP], National Oceanic and Atmospheric Administration [NOAA] and U.S. Fish and Wildlife Service [USFWS]) that are working cooperatively to remediate and restore the LPR under separate authorities.

broadened its mission to develop consensus values and provide a forum to discuss other aspects of the investigation and remediation of the LPR. Between 2017 and 2021, EPA provided extensive information to the CAG about the 17-mile RI and the upper 9-mile sediment source control IR FS, including presentations about topics such as surface weighted average concentrations (SWACs) and remedial action levels (RALs), recommendations from the Contaminated Sediments Technical Advisory Group (CSTAG), and the upper 9-mile IR alternatives.

- In 2017–2018, EPA met with a number of stakeholders regarding the idea of an IR for the upper 9 miles, including the CAG, NJDEP, NOAA, USFWS, and CSTAG.
- In April 2019, EPA briefed local government officials from the municipalities along the upper 9 miles about the idea of an IR, which included Clifton, Garfield, Passaic, Wallington, Rutherford, East Rutherford, Nutley, Lyndhurst, North Arlington, and Belleville. In attendance were representatives of New Jersey State Senators, Assembly members, municipalities, and from U.S. Senator Booker's office.
- EPA held public availability sessions in Clifton on July 25, 2019 and in East Rutherford on October 21, 2019 regarding the idea of an IR for the upper 9 miles of the LPR. EPA received letters of support for the idea of an IR from Belleville, Clifton, Garfield, Lyndhurst, Nutley, and Rutherford.
- EPA has maintained a listserv, an electronic information distribution system, to quickly provide the public with timely information on project developments and news. EPA created the projectwebsite www.ourPassaic.org, which contains project background information, frequently asked questions, project updates and news, and a digital library of project documents.
- From 2004 to 2013, EPA awarded a Technical Assistance Grant (TAG) to the Passaic River Coalition to assist the community in the interpretation of technical documents generated by the study of the LPR, including the upper 9 miles. From 2013 to the present,the TAG has been held by the New York/New Jersey Baykeeper.

EPA's Proposed Plan for the upper 9 miles of the LPR was released to the public on April 14, 2021. A copy of the Proposed Plan, RI Report, IR FS Report, and other documents that comprise the administrative record file were made available to the public in the information repositories located at the Newark and Elizabeth Public Libraries and the EPA Region 2 Superfund Records Center, and are also available at http://www.ourPassaic.org and http://www.epa.gov/superfund/diamond-alkali. Public notices about the release of the Proposed Plan were published in the *Bergen Record* and in *El Diario* (a Spanish publication) on April 14, 2021 (Attachment B). EPA extended the end of the public comment period from May14, 2021 to June 14, 2021. Throughout the public comment period, EPA sent numerous news advisories by email, listserv, and regional social media accounts announcing the release of the Proposed Plan, reminding the public about EPA's public meetings and the public forums organized by other entities, announcing the extension of the comment period, and reminding the public about the end of the comment period.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES

Comments received by EPA showed overwhelming support for an IR in the upper 9 miles of the LPR. EPA received six formal governmental resolutions in support of the proposed IR from the

Township of Lyndhurst, Borough of Rutherford, Borough of East Rutherford, Borough of Wallington, City of Garfield, and Township of Belleville. EPA also received letters of support from the Borough of North Arlington, City of Garfield, City of Clifton, Mayor of the Township of Nutley, State Senator (36th District) Paul A. Sarlo, Bergen County, and Assemblyman (36th District) Clinton Calabrese. In particular, the letters and resolutions support aligning the upper 9-mile IR time frame with the lower 8-mile final remedy time frame, utilizing barges (and minimizing overland truck transport through adjacent communities) for transport, not impacting flooding, facilitating overall economic improvement by cleaning up the LPR, and addressing Environmental Justice (EJ) concerns.

EPA received comments asking about potential impacts to individual property owners, communities along the river, and populations within those communities, questioning the protectiveness of dredging, capping, and off-site sediment disposal as IR components, and requesting clarification on how sediment sources will be identified, how the cleanup of the LPR will be monitored, and how the community will be kept informed of cleanup progress. EPA also received comments requesting clarification on the overall cleanup schedule for the LPR, assurance that the IR will not be abandoned due to lack of funding, and that the agency consider alternative technologies and certain specific technologies for treatment of contamination in the upper 9 miles, as opposed to dredging and capping.

The comments are organized by subject, and the organized comments and EPA responses are provided below. Transcripts from the April 27, 2021 Proposed Plan public meeting are included in Attachment C and written comments submitted during the public comment period are included in Attachment D.

TECHNICAL

A.1. General Cleanup

A.1.1 Comment: Holding polluters accountable and extent of cleanup

Commenters stated that numerous plans have been proposed for the cleanup of the Passaic River, with little to no action of actual cleanup, and that it is time for those responsible for the pollution of the Passaic River to be held accountable. Commenters requested that EPA clean up the river by dredging more of the river than already addressed in the cleanup plan, i.e., the entire river needs to be dredged.

Response:

EPA has previously overseen the implementation of cleanup actions in and around the LPRSA to address areas of substantial contaminant impact (e.g., the River Mile [RM] 10.9 Removal, see below). With these prior actions, the remedy for the lower 8.3 miles (which was selected in 2016 and is currently being designed), and selection of the IR for the upper 9 miles, EPA is overseeing an extensive cleanup of the LPR to protect human health and the environment. Consistent with EPA's "enforcement first" policy, potentially responsible parties have undertaken extensive work, and are continuing to perform work.

EPA's general approach to cleaning up contaminated sites includes investigating site characteristics and contaminant impacts and sources, assessing potential human health and ecological risk from exposure to contamination, evaluating remediation options to meet specific remedial action objectives (RAOs), selecting and implementing a remedy to attain those objectives, and monitoring to confirm attainment of goals. For a large and complicated sediment Superfund site such as the Diamond Alkali Superfund Site, EPA often breaks the site into manageable parts, called operable units (OUs), to better facilitate understanding the site characteristics and addressing site impacts. Investigating and evaluating the OUs of a large and complicated sediment Superfund site such as the Diamond Alkali Superfund Site takes time to sufficiently understand the complex site conditions and make appropriate management decisions. It is EPA's practice, in general and at the Diamond Alkali Superfund Site specifically, to implement appropriate investigations, carefully characterize risks, and perform cleanup in a manner that effectively addresses site risks as efficiently and expeditiously as possible. It is also EPA's practice, in general and at the Diamond Alkali Superfund Site specifically, to follow the "enforcement first" approach to site remediation where responsible parties can be identified.

Since the 1980s, the LPRSA has been the subject of: 1) many investigations to identify the sources and the nature and extent of contamination at properties adjacent to the river, as well as in river sediments, surface water, and fish and crab; 2) a number of removal actions in and near the river to address immediate threats to the health and well-being of residents and communities; and 3) studies to evaluate the long-term impact of contamination and strategies to address these impacts. Past actions in the LPRSA, the remedy for the lower 8.3 miles, and the IR for the upper 9 miles of the LPRSA are a direct result of those investigations, actions, and studies.

After the former Diamond Alkali chemical manufacturing facility at 80-120 Lister Avenue was identified as a significant source of dioxin and other contaminants, as well as a contributor of contamination to the river, emergency cleanups were performed at nearby properties to immediately address potential risks, and an action was implemented at the facility itself to contain contamination as well as to prevent additional impact to the river. That action consisted of placing an engineered cap over the land at the facility, installing an impermeable barrier in the subsurface between the facility and the river, and constructing a groundwater pump-and-treat system within the facility boundary. This has functioned to isolate contamination and prevent further exposure to humans and the environment, including to the LPR. This remedy remains in place at the former Diamond Alkali facility and is periodically reviewed by EPA to confirm its proper function. The remedy was implemented and paid for by Occidental Chemical Corporation (OCC), the successor to the former owner/operator of the Diamond Alkali facility, under a judicial consent decree with EPA, and ongoing operations and maintenance (O&M) and monitoring continue to be performed by that party under EPA oversight. The former Diamond Alkali facility is being addressed as OU1 of the overall Diamond Alkali Superfund Site.

In 2008, EPA entered into an agreement with OCC to address an area of significant contamination, where sediments at depth were found to have the highest concentrations of dioxin identified in the LPR, adjacent to the 80-120 Lister Avenue facility. This removal action, referred to as the "Tierra Removal," was originally expected to include removal of 200,000 cubic yards (cy) of contaminated sediments, in two phases (Phase 1 removing 40,000 cy and Phase 2 removing the remainder). Phase 1 was completed in 2012, resulting in the removal of contaminated sediments with some of the very highest concentrations of dioxin from the river. The Phase 2 area will be addressed as part of the remedial action for the lower 8.3 miles of the LPR, as described below.

In 2012, EPA entered into an agreement with a group of parties to address a mudflat on the east bank of the river in Lyndhurst where high contaminant concentrations had been detected in surface sediments, through a response action known as the RM 10.9 Removal. Approximately 16,000 cy of highly contaminated sediments were removed by the performing parties under EPA oversight, and an engineered cap was placed in the area of sediment removal to contain any remaining contamination in underlying sediments. This cap was designed to be stable against erosion and to prevent the migration of contamination from underlying sediments upward through the cap. EPA is monitoring the RM 10.9 Removal area to ensure the performance of the engineered cap, and EPA periodically reviews the cap to confirm it continues to function as intended. As described, these actions have been implemented and paid for by potentially responsible parties, under EPA oversight.

Through the course of multiple investigations, EPA determined that the bulk of fine-grained sediments and, consequently, the bulk of contamination within the LPRSA, is present in the lower 8.3 miles of the LPR. EPA completed an RI and Focused Feasibility Study (FFS) for the lower 8.3 miles, and in 2014 issued a Proposed Plan for public review and comment. In March 2016, EPA issued a ROD selecting the remedy for the lower 8.3 miles, which is OU2 of the Diamond Alkali Superfund Site. The remedy includes an engineered cap covering the entire lower 8.3 miles, bank to bank, preceded by sediment dredging of the river bottom prior to placement of the cap so that the cap does not increase the potential for flooding and to allow for the continued commercial use of the federally authorized navigation channel, and implementation of institutional controls (ICs) designed to protect the engineered cap. The remedy for the lower 8.3 miles will result in the removal, processing, and disposal of approximately 3.5 million cy of contaminated sediments (including contaminated sediments within the Phase 2 area of the Tierra Removal discussed above) and the construction of an engineered cap that is resistant to erosion, isolates underlying contamination, and prevents the migration of underlying contamination upward through the cap. This remedial action will meet specific risk-based concentration goals for the contaminants of concern (COCs) identified in the ROD for the lower 8.3 miles and is currently being designed by OCC, under EPA oversight. Consistent with EPA's principles, EPA anticipates that the remedy will be performed and/or paid for by responsible parties, and that EPA will oversee and review this cleanup to ensure the remedial goals are attained. As described in the ROD for the lower 8.3 miles, the estimated cost of the remedy is $1.38 billion.

The IR documented in this ROD for the upper 9 miles of the LPR is predicated on the understanding that there are some areas of fine-grained sediments in the upper 9 miles, elevated concentrations of contaminants are associated with the fine-grained sediments, and these sediments act as an ongoing contaminant source that inhibits recovery of the river system. However, the contamination in the upper 9 miles is not as spatially continuous and generally not as severe as in the lower 8.3 miles, leading EPA to conclude that a focused (i.e., not bank-to-bank) remedial strategy for the upper 9 miles is an appropriate response. Addressing the more isolated areas of elevated contaminant concentrations through the sediment source control IR will rapidly lower concentrations on an average basis in the upper 9 miles, accelerate the overall recovery of sediments, surface water, and fish and crab, and reduce human health and ecological exposures and risks. EPA evaluated the expected performance of multiple IR alternatives, which would use consistent remediation strategies to attain post-IR average concentrations at or below background for polychlorinated biphenyls (PCBs) and specific target post-IR 2,3,7,8- tetrachlorodibenzo-*p*-

dioxin (2,3,7,8-TCDD) concentrations (85 parts per trillion [ppt] for Alternative 2, 75 ppt for Alternative 3, and 65 ppt for Alternative 4). From Alternative 2 to Alternative 3, additional remediation footprint area would be included, and from Alternative 3 to Alternative 4, even more remediation footprint area would be included. The additional footprint area for Alternative 3 includes more comprehensive control of source material than Alternative 2, enhancing the outcome of the IR relative to its objective, while also minimizing inclusion of non-source material associated with Alternative 4. The IR for the upper 9 miles will be accomplished in a manner similar to the remedy for the lower 8.3 miles of the LPR, by removing, processing, and disposing of approximately 387,000 cy of contaminated sediments, and constructing an engineered cap that is resistant to erosion, isolates underlying contamination, prevents the migration of underlying contamination upward through the cap, and does not change river flooding potential.

The IR for the upper 9 miles of the LPR will be performed within an adaptive management strategy. Following construction of the IR, the system response to the IR will be monitored, additional information will be gathered to understand complicated relationships between sediment contamination, fish and crab bioaccumulation and recovery, and human health risks associated with fish and crab consumption. Based on that subsequent evaluation and assessment, EPA will be able to evaluate whether and to what extent a final remedial action is needed to address remaining risks to human health and the environment. The implementation of the IR for the upper 9 miles of the LPR during the same time period as the remedy for the lower 8.3 miles will expedite the cleanup process for the LPR, minimize the amount of time remediation activities are ongoing in the LPR overall, minimize direct impacts to surrounding communities associated with the construction, allow EPA to evaluate and mitigate impacts of each action on the other action, and leverage economies of scale for common processes between the two projects. As with the remedy for the lower 8.3 miles, EPA anticipates that the IR will be performed and/or paid for by responsible parties, and that EPA will oversee and review this cleanup to ensure the IR goals are attained. The estimated cost, as described in this ROD, is $441 million.

Based on post-IR monitoring, evaluation, and assessments EPA will release a proposed plan that explains its proposed decision regarding final action for the entire 17-mile LPRSA for public review and comment and will issue a final ROD for the LPRSA to address the unacceptable risks to human health and the environment from the contamination in the LPR including surface water throughout the LPR.

Through past, current, and future actions, EPA is managing the complicated Diamond Alkali Superfund Site to ensure that community residents, river users, and wildlife are protected from excess risk through exposure to hazardous substances and is undertaking enforcement action consistent with the principles of the Superfund program.

A.1.2 Comment: Shortcomings in the proposed interim action

Commenters noted the following shortcomings in EPA's preferred alternative identified in the Proposed Plan: flooding and intense weather events would disperse sediments during dredging; the plan would harm fish migration; there are low clearance bridges; without a geomembrane, low-density activated carbon in the cap will be lost over time; a compromised cap can cause contaminants to remain a health risk; and boat users have concerns about usage of anchors.

Response:

The IR for the upper 9 miles of the LPRSA is a source control action, targeting sediments with elevated concentrations of 2,3,7,8-TCDD, a particularly toxic dioxin, and PCBs (and other contaminants that are collocated in the IR footprint) through sediment removal, placement of an engineered cap, management and off-site disposal of the removed sediment material, institutional controls (ICs), and various types of monitoring.

As the Proposed Plan and this ROD for the IR for the upper 9 miles of the LPRSA indicate, several specific aspects of the IR will be determined during IR design. This is common practice at environmental cleanup sites, including Superfund sites such as this one. The IR design will determine:

- Final RALs and the final IR footprint based on pre-design data that has yet to be collected, as well as evaluation of those data that has yet to be performed.
- The impact of and mitigation associated with anticipated construction constraints, including utility crossings, bridge abutments, and critical shoreline infrastructure.
- Potential application of alternative technologies (e.g., in situ treatment) in isolated portions of the IR footprint to overcome construction constraints (see Response to Comment A.11.1 for more information pertaining to the potential application of alternative technologies).
- The specific approach to and sequencing of sediment removal activities, including scheduling construction activities around relevant fish windows to protect migratory fish and considering materials transport requirements (e.g., barges with low air drafts) and procedures for flow- and weather-related impacts.
- Application of dredging without capping principles to identify portions of the IR footprint where sediment removal might be performed to reach a clean sediment interval and avoid the need for an engineered cap.
- The specific composition and design of the engineered cap to provide isolation of underlying sediments, prevent the migration of contamination through the cap, be durable and resistant to erosion, and not exacerbate flooding issues.
- O&M requirements, including inspections and cap repair, to ensure the long-term integrity of the cap.
- Overall needs for habitat enhancements, protection, and/or mitigation.
- Specific best management practices (BMPs) to be implemented during in-river work to minimize the potential for construction-related impacts (e.g., generation and spread of dredging residuals), along with construction monitoring approaches and contingency measures to address construction issues.
- ICs to be implemented, monitored, and enforced, in consideration of present and future site uses (the Response to Comment A.14.1 contains additional information pertaining to boating on the LPR).
- Health and safety practices to be followed to protect site workers and surrounding communities from impacts during construction of the IR.

EPA has already overseen a successful dredging and capping project at the RM 10.9 Removal area, and lessons learned from that project will be applied to the upper 9-mile IR.

A.1.3 Comment: Relationship to the lower 8.3 miles of the Lower Passaic River; sediment processing facility

Commenters support the EPA's plan to coordinate the remedial actions for the upper 9 miles and the lower 8.3 miles of the LPR. Since the EPA is nearing completion of the lower 8.3-mile design, the commenters expressed concern about the ability to capture the benefits of connecting the upper 9 miles with the lower 8.3 miles, including the location and functionality of the sediment processing facility.

Response:

There are a number of benefits that may be achieved by the ability to coordinate the lower 8.3-mile remedy and upper 9-mile IR. The potential for the IR to utilize resources developed for the lower 8.3-mile remedy is just one of the benefits. Additional benefits include the ability to reduce the duration of impacts to the river ecology and the communities along the river during construction of both remedies during the same time period.

The OU2 design has experienced some delays due to various factors, including difficulty in securing a location for the sediment processing facility. This OU4 IR ROD is being issued while the OU2 design is on-going, which may allow for the consideration of whether OU2 infrastructure can be built with enough capacity for OU4 IR work. If OU2 infrastructure cannot accommodate the OU4 IR work, then potential back-up plans are available, as discussed in the IR FS and in the response to comments below.

A.1.4 Comment: Remedial Design Specifics

Commenters requested more information concerning the IR design. One commenter stated that during Hurricane Sandy, most of the available land for the dewatering sites was flooded and requested that EPA identify the potential location of the sediment processing facility, and indicated that the land should be raised by approximately 16 feet to comply with FEMA requirements. Another commenter asked for information about the process for transporting sediments to the processing facility and the impacts that this transport will have on the river and surrounding communities. A commenter asked for information about the capacity and throughput of the dewatering processes used and the plans for interim storage of contaminated sediments at the site. A commenter asked about the ultimate disposal location and transportation methods for moving contaminated sediments to final secure disposal.

Response:

Generally, Superfund remedial actions must comply with "applicable or relevant and appropriate requirements" (ARARs) including federal environmental laws, and state environmental and facility siting laws, unless a basis for a waiver is established. The siting and design of the lower 8.3-mile sediment processing facility will occur as part of the remedial design for the lower 8.3-mile remedial action. For information about the lower 8.3-mile sediment processing facility siting and design, please see the Site Selection and Evaluation Report dated May 2018, available in the ourPassaic.org Digital Library.

Sufficient information is not yet available for EPA to respond in any detail to the questions asking for information related to the sediment processing facility that may be sited and constructed for the lower 8.3-mile remedy. If the OU2 infrastructure cannot accommodate the upper 9-mile IR dredged material, then the sediments from the upper 9 miles can be processed at commercial facilities identified in the upper 9-mile IR FS as potential options. For example, there are three commercial sediment processing facilities located within a 3-mile radius of the mouth of the Passaic River. The selected remedy assumes, for cost estimating purposes, that a commercial sediment processing facility will be used to manage the removed sediments. Identification of the specific facility(ies) to be used will occur during the remedial design phase of the IR.

The process(es) for transporting sediments removed during the IR will be determined during IR design, factoring in the type of dredge equipment used, location within the river, any related physical constraints (e.g., low bridges, water depth), and where and how the sediments will be processed. EPA does assume that in-river transport (e.g., barges) will be used to the maximum extent possible.

EPA will oversee the design process for the lower 8.3-mile remedy and the upper 9-mile IR, including resolving specific implementation approaches, identifying staging, processing, and disposal locations/facilities, and considering opportunities for synergies and direct coordination between the two projects. In turn, EPA will continue to communicate with the public through community outreach, including the CAG meetings.

A.1.5 Comment: Area from River Mile 15 to the Dundee Dam

Commenters urged the EPA to evaluate the area above RM 15 to the Dundee Dam. Commenters requested EPA to ensure that the performing parties spend the necessary time and effort to protect human health and safety above RM 15.

Response:

The area between RM 15 and Dundee Dam will be carefully examined, and necessary action will be taken in this portion of the river to meet the overall sediment source control objective of the IR for the upper 9 miles of the LPRSA.

The area above RM 15 will be evaluated as part of the pre-design investigation (PDI), during which a spatially extensive sediment sampling program will be performed to refine understanding of surface and subsurface sediment contaminant concentrations. The PDI data will be combined with other data, such as that collected during the current conditions monitoring program (CCMP). Bathymetry and light detection and ranging (LiDAR) survey data will also be collected across the entire upper 9 miles. All the information will better inform the understanding of erosion potential, help establish the IR footprint, and inform an IR design that will effectively accomplish the IR objectives.

Current data suggest that the sediment source areas to be targeted by the IR for the upper 9 miles of the LPR are located between RM 8.3 and RM 15. The river reach between RM 8.3 and RM 15 contains some fine-grained sediments, with which contaminants in the LPRSA are associated, though not to the same extent as the lower 8.3 miles. Overall, the sediments above RM 15 tend to be coarser and demonstrate a significantly lower level of contamination.

If IR design data collected between RM 15 and Dundee Dam identify sediments with concentrations in excess of the final surface sediment RALs, these areas will be evaluated during IR design to determine whether they constitute a source that is inhibiting the recovery of the LPR. If EPA determines that there are areas above RM 15 that constitute a source inhibiting system recovery, and that it is feasible to address these areas in conjunction with the IR to achieve the IR objectives, then these areas will be addressed as part of the IR construction. A framework to assess the data above RM 15 to determine the presence of source sediments and to evaluate the feasibility of addressing such sediments will be developed in the IR design by the performing parties, with oversight by EPA and in close coordination with the NJDEP, and other stakeholders.

The IR will be followed by a period of monitoring to evaluate the response of the river system to the source removal and track the longer-term recovery of sediment, the water column, and biota. Based on the results of this monitoring, and additional evaluation and assessments, EPA will release a proposed plan that explains its proposed decision regarding final action for the entire 17-mile LPRSA for public review and comment and will issue a final ROD for the LPRSA that establishes final risk-based remediation goals (RGs) and specifies any additional actions beyond the IR that are needed to address the remaining unacceptable risks and attain the RGs. The final ROD will address sediments in the upper 9 miles of the river and surface water throughout the LPRSA. EPA will oversee the implementation of the final remedy—as selected in the final ROD—to ensure that overall protection of human health and the environment is attained for the LPR, including the area above RM 15.

A.1.6 Comment: Impacts on well water

One commenter from the public meeting asked if the remediation may create issues or complications to a residential 95-foot-deep artesian private drinking water well near the LPRSA.

Response:

EPA does not expect the IR to adversely affect groundwater wells. The dredging and capping will occur in, approximately, the top 2.5 feet of the sediment bed. It is possible that some areas will be dredged slightly deeper than 2.5 feet into the sediment bed to reach clean native material (i.e., dredging without capping), if it is cost effective to do so. Since the IR is focused on the shallow sediment bed, which is well above the elevation where groundwater is encountered in a well, there is no reason to believe the remedy will have an impact on a well that draws from groundwater 95 feet below ground surface.

A.1.7 Comment: Shoreline erosion

Commenters requested that, while designing and implementing the IR, EPA focus on the erosion that has occurred along the shorelines of Rutherford and continues during major storm surge events.

Response:

Dredging may potentially impact the stability of existing bulkheads, natural shorelines, riprapped banks, utility crossings, and bridge abutments along the upper 9 miles of the LPR. During the IR design, the stability of these structures will be analyzed. Protective measures, buffers, temporary bulkhead installation, and other mitigation measures will be considered where needed. Where maintaining the stability of these structures limits or precludes dredging, other design options may be proposed. However, under Superfund law, EPA's authority is to implement the OU4 IR to address sediments that act as an ongoing contaminant source that inhibits LPR system recovery, not to repair eroding shorelines which are the responsibility of shoreline owners.

A.1.8 Comment: Disruptions to highway traffic

Commenters asked if there will be disruptions to highway traffic along the river as a result of the dredging.

Response:

For alternative comparison purposes in the IR FS, and as summarized in this ROD, EPA assumed that potential impacts during IR construction operations would occur during a 6-month construction season, July 1 to December 31, each year of construction, with operations potentially occurring 24 hours per day, 6 days per week. As described in Appendix A of the IR FS Report, construction is assumed not to occur during an annual winter shutdown, January 1 to March 1, or during the dredging restriction period associated with the fish migration window, March 1 to June 30. Final construction hours, days, and windows will be determined during the IR design.

EPA anticipates that the transport of dredged sediments will be largely via barge on the river and that rail will be used to move dredged sediments from the processing location(s) to disposal facilities and to deliver capping materials to the river. However, some amount of local truck hauling will likely be needed. Therefore, potential short-term community impacts during the construction period could include vehicular delays as a result of bridge closures, road closures, and railroad crossings due to the transportation of dredged sediments and cap material. Locally, temporary increases in traffic may occur as workers and some material providers access the construction areas. Various means of transporting dredged sediments will be evaluated during IR design based on, among other factors, minimizing community impacts. After IR design and during implementation of the sediment dredging/removal, EPA will endeavor to keep the public informed when and where local traffic may be impacted through its enhanced community outreach programs.

A.2 Salt Front Location and Other Contamination Sources

A.2.1 Comment: Consistent description of salt wedge intrusion

Commenters stated that the description of the "salt wedge" in the OU4 Proposed Plan conflicts with the 2016 ROD for the lower 8.3 miles. Commenters requested that EPA revise the description of the salt wedge in the OU4 Proposed Plan to be consistent with the description of the salt wedge in the 2016 ROD for the lower 8.3 miles. Commenters noted that the 2016 ROD for the lower 8.3 miles describes the salt wedge as extending to RM 12; however, the OU4 Proposed Plan demonstrates that the dredging and capping footprint for 2,3,7,8-TCDD includes river segments up to RM 15. Commenters referred to Figure 7-2 from the IR FS as an example and included it in the submitted comment.

Response:

Investigations of the LPR have used two different definitions for the salt front. The investigations for OU2 and OU4 used both 0.5 practical salinity units (psu) and 2 psu to define the salt front at different times and in different documents. The salt front definition that the comment cites from the OU4 Proposed Plan is the 0.5 psu definition. When this definition is used, the salt front extends to approximately RM 14. Where the OU2 and OU4 documents refer to RM 14 as the extent of the salt front, they refer to the System Understanding of Sediment Transport (SUST) (Sea Engineering, Inc. (SEI) and HDR|HydroQual 2011), which was a work product developed by EPA to synthesize datasets during preparation of the RI/FFS for the lower 8.3 miles. The definition that the comment cites from the OU2 ROD is the 2 psu definition, which corresponds to a salt front that extends to approximately RM 12. Where the OU2 and OU4 documents refer to RM 12 as the extent of the salt front they are citing a 2010 study, "The Shaping of an Estuarine Superfund Site: Roles of Evolving Dynamics and Geomorphology" (Chant et al. 2010).

Although the particular salt front definition (2 psu or 0.5 psu) is generally identified in EPA's discussions of the salt front location, whether those discussions concerned either OU2 or OU4, there have been some instances where EPA did not explicitly state the definition. This is the case in the two instances cited by the commenter. EPA has written this IR ROD to note both definitions of the salt front and clarify which definition is being used when discussing the salt front location.

As noted above, the definition of the salt front impacts the identified extent of the salt front intrusion, with the 2 psu salt front extending to approximately RM 12 and the 0.5 psu salt front extending to approximately RM 14. Sediment transport analyses in estuaries often use a value of 2 psu, based on physical observations of the location of the estuarine turbidity maximum (ETM) (SEI and HDR|HydroQual 2011). This appears to be generally consistent with observations from the LPR as well (see below). However, the ETM and the salt front do not define the maximum extent of upstream transport within the LPR.

Chant et al. (2010) shows an ETM of approximately 50 milligrams per liter (mg/L) near kilometer 28 (approximately RM 12) just upstream of the 1 psu salinity location, with a gradual decline in turbidity moving upstream to approximately 30 mg/L at the extent of the survey at kilometer 30 (approximately RM 13.5). More recent longitudinal transects collected as part of the CCMP physical water column monitoring program (which was initiated in 2019 and remains underway) show a similar pattern with the peak in solids concentrations occurring near the 2 psu salt front but the elevated solids associated with the ETM extending upstream beyond the 0.5 psu salt front (see Figures 1 (A.2.1-1a) through 6 (A.2.1-1f) at the end of this Responsiveness Summary). This series of figures presents the longitudinal transect data for each physical water column monitoring event along with the mooring data collected over the period of the longitudinal survey (approximately 2 to 3 hours). The continuous velocity measurements and depth average turbidity-based solids estimates from the surveys are presented as solid lines, with the surface and bottom data collected at each of the vertical profile locations plotted as triangles. The coinciding mooring data are plotted as circles. The time of the event, the flow, and the tide are indicated at the top of each figure. For the flood-tide surveys, the velocities are in the upstream direction; for the ebb-tide surveys, the velocities are in the downstream direction. For each of the events, the ETM (top right solids, and bottom right turbidity) approximately coincide with the location of the 2 psu to 0.5 psu salt front, but the elevated solids associated with the ETM extend for miles in upstream and downstream directions.

In addition to the longitudinal surveys, acoustic doppler current profilers (ADCPs), conductivity, temperature and depth (CTD), and optical backscatter (OBS) nephelometer sensors deployed during 2009, 2010, 2019, and 2020 at RM 13.8 (RM 13.5 in the RI RM system) collected current velocity and salinity measurements for extended periods of time. The ADCP data demonstrate that there are regularly depth average currents in the upstream direction, although the 2 psu salt front was not observed and the 0.5 psu salt front was rarely observed. In the OU4 RI, Appendix L, Figures 6-5, 6-14, and 6-15 present the surface- and bottom-measured current velocities at RM 13.8 with frequent velocities in the upstream direction. In the same figures, there is little observed variability in the salinity, with concentrations remaining near zero. Figure 7 (A.2.1-2) presents the flow, depth average currents, and bottom salinity for the 2009, 2010, 2019, 2020, and 2021 physical water column monitoring deployments at RM 13.8. Approximately 20 percent of the observations show depth average currents in the upstream direction (see Table A.2.1-1 below). Plotting the measured depth average currents against the freshwater flow at Dundee Dam shows that the flood currents reverse in the upstream direction on a daily basis for flows less than about 1,300 cubic feet per second (cfs) (see Figure 8 [A.2.1-3] at the end of this Responsiveness Summary).

	Table A.2.1-1. RM 13.8 Frequency of Depth Average Current Velocities					
	12-minute data		15-minute data			Total
	Fall 2009	Spring 2010	Summer 2019	Spring 2020	Spring 2021	
Deployed	10/11/2009	3/24/2010	6/29/2019	3/9/2020	4/8/2021	
Retrieved	12/15/2009	7/23/2010	1/6/2020	8/26/2020	5/26/2021[2]	
Total Number of Measurements	7784	14490	18272	16350	4580	61476
Downstream	6219	11464	14257	12805	3665	48410
Upstream	1565	3026	4015	3545	915	13066
Percentage Upstream	20%	21%	22%	22%	20%	21%

The exact extent of upstream tidal currents falls somewhere above RM 13.8, with the currents decreasing further upstream. As the tidal currents decrease, there is less mixing of sediments in the upstream direction, thus resulting in a gradient in sediment concentrations moving upstream from approximately RM 12. This gradient can be observed in OU2 ROD Figure 3 and OU4 RI Figure ES-4 (repeated as OU4 RI Figure 4.1-9a, OU4 Proposed Plan Figure 2, and Figure 5-3 from this ROD

[2] Preliminary 2021 data through May 26, 2021. Data not yet available for May 26, 2021 through the end of the deployment on June 29-30, 2021.

for the IR for the upper 9 miles of the LPRSA).

Another factor relevant to the extent of the salt front, over time, has been maintenance of the navigation channel. For example, as described in the SUST document, "the deepening of channels due to dredging or other processes is accompanied by a more landward extent of estuarine circulation, which results in dispersion of sediments farther upstream. Thus, it is likely that the rate of deposition has varied spatially and temporally as the LPR is readjusting towards its equilibrium morphology." In other words, compared to the current conditions, the salt front likely extended further upstream under historical conditions when the navigation channel was maintained up to RM 15.4.

The 2009 through 2020 data were collected over a period of relatively stable bathymetry within the LPR compared to historical conditions when many of the discharges to the river occurred. When the navigation channel was maintained up to RM 15.4, the upstream extent of tidal mixing was likely farther than present day conditions. The extent of upstream transport was also likely greater under historical conditions when the navigation channel was maintained up to RM 15.4.

A.2.2 Comment: Sources of contamination to the Lower Passaic River

Commenters noted that there are dioxin sources to the river other than the Lister Avenue facility and other than the sediments of the lower 8.3 miles that should be acknowledged in the OU4 IR ROD.

Response:

The upper 9 miles of the LPR is part of OU4 of the Diamond Alkali Superfund Site. The OU4 RI and IR FS were conducted based on iterative investigation of the nature and extent of contamination originating from the Lister Avenue facility. However, the Proposed Plan for the upper 9-mile IR also clarifies that investigations have found many other contaminants not clearly linked to operations at the Lister Avenue facility and that EPA also identified other potentially responsible parties (PRPs) for the LPRSA besides those responsible for the operations at the Diamond Alkali facility. A number of companies that owned or operated facilities from which hazardous substances were potentially discharged to the river formed the Cooperating Parties Group (CPG). This ROD for the IR for the upper 9 miles of the LPRSA also states, of the overall LPR, that its large urban watershed and many industrial facilities have been sources of dioxin, polycyclic aromatic hydrocarbons (PAHs), PCBs, pesticides, and metals.

In summary, the iterative investigation of the LPRSA was initiated in response to the discovery of significant contaminant releases from the Lister Avenue facility to the LPR.. The LPRSA RI and the IR FS, and the Proposed Plan and this ROD for the IR for the upper 9 miles of the LPRSA recognize that there were a number of contributions to the contamination present in the sediments of the LPR, but it is not the purpose or intent of these documents to explicitly discern the relative contributions of contamination among various contributors. The IR is intended to address the occurrence of elevated levels of contamination in sediments in the upper 9 miles of the LPR that themselves act as an ongoing source to the water column, other areas of the sediment bed, and biota, and ultimately inhibit recovery in the system.

A.3 Consistency in Technical Terminology

A.3.1 Comment: Chemicals of concern should be consistently defined

Commenters requested that EPA revise the descriptions of the COCs throughout the OU4 Proposed Plan to ensure those descriptions are consistent with the 2016 ROD for the lower 8.3 miles and the OU4 IR FS. In particular, one commenter stated that the OU4 Proposed Plan implies that 2,3,7,8-TCDD is the only chemical of concern for the LPR.

Response:

The IR Proposed Plan describes the COCs for the upper 9 miles of the LPRSA. EPA disagrees that the IR Proposed Plan implies that 2,3,7,8-TCDD is the only COC for the lower 8.3-mile remedy. The IR Proposed Plan simply states that the lower 8.3-mile ROD documents a final sediment RG of 8.3 ppt for 2,3,7,8-TCDD, which has comparative relevance when describing the IR for the upper 9 miles.

The IR Proposed Plan discusses that 2,3,7,8-TCDD is, along with PCBs, a primary contributor to risk, and that moving forward in the near term with an IR that reduces 2,3,7,8-TCDD and PCB concentrations would provide significant reduction of ecological and human health risk and allow for closer alignment of the remedial activities in the upper 9 miles with the remedial action for the lower 8.3 miles of the LPRSA. The IR Proposed Plan also identifies other dioxins/furans, dieldrin, copper, lead, DDx (dichlorodiphenyltrichloroethane [DDT] and its breakdown products), PAHs, and mercury as COCs. For the upper 9 miles, copper, lead, and dieldrin were not primary causes of human health or ecological risk, but risk is sufficiently significant to identify them as COCs. The COC list has been clarified in this ROD for the IR for the upper 9 miles of the LPRSA.

A.3.2 Comment: Remedial Action Level language

Commenters noted an inconsistency in the Proposed Plan. The commenters noted that the final surface RAL for the preferred alternative will be determined based on the results of the IR PDI and IR design to achieve a 2,3,7,8-TCDD SWAC of 75 ppt which is inconsistent with the Proposed Plan text on page 3: *"[t]he PDI sediment sampling results would also be used to determine the final RALs to be adhered to during the IR*." The commenters recommended that EPA strengthen language in the ROD stating that final RALs and anticipated percentage SWAC reductions will be established based on the results of the IR PDI.

Response:

The RALs are concentration levels above which sediments will be remediated during the IR. RALs are frequently used to guide the implementation of sediment remediation projects, particularly when the ultimate objective is to attain a SWAC-based concentration goal. As noted by the commenters, while the Proposed Plan identifies a RAL of 205 ppt for 2,3,7,8-TCDD based on delineation of the remedial footprint in the IR FS to attain a 2,3,7,8-TCDD SWAC of 75 ppt, the actual final upper 9-mile IR RAL for 2,3,7,8-TCDD will be established during the IR design using data from the PDI sediment sampling program. The PDI data will also refine the pre-IR SWACs (i.e., the SWACs prior to the start of remediation, which will be recalculated using the newer and more densely spaced PDI data) and the percentage reduction in those SWACs that will be achieved through the IR for the Alternative 3 target SWACs of 75 ppt for 2,3,7,8-TCDD and at or below background for total PCBs. The RAO 1 footprint needed to attain the SWAC targets will be identified first and then the RAO 2 footprint will be identified to include additional area beyond the RAO 1 footprint where remediation is needed, based on observed subsurface concentrations, the subsurface RALs, and the potential for erosion. RAO 1 and RAO 2 areas will be combined to delineate the IR footprint to be remediated. Remediation will be performed throughout the final IR footprint during IR construction.

A.4 Issues Related to Surface Area-Weighted Average Concentrations

A.4.1 Comment: Concept of surface area-weighted average concentration

An attendee at the public meeting asked EPA to explain the concept of SWAC and if it means that there are concentrations both higher and lower than the target value of 75 ppt.

Response:

The SWAC is a weighted average of sample data intended to estimate a mean contaminant concentration over a specified spatial area. If data are collected on an unbiased grid, the SWAC can be estimated as the average of the sample data. However, if there are variations in the spatial density of the data across that spatial area, the sample concentrations need to be weighted by the portion of the area that each sample represents in order to estimate the mean over that area. A SWAC, like all averages, includes concentrations above and below the average concentration. The goal of the IR will be to remove sediments with elevated contaminant concentrations that act as an ongoing source preventing recovery of the system, and these elevated concentrations also contribute to the magnitude of the pre-IR SWAC.

A.4.2 Comment: Number of concerns about surface area-weighted average concentration goals

Commenters requested that EPA ensure sufficient and accurate data and properly used modeling determine the SWAC and consider implications for the final remediation. The commenters also noted that it is extremely important to reach health-based standards for the long-term remedy and they strongly encourage EPA to create an in-field assessment process to remove additional hot spots that might be allowed to remain under the SWAC but could likely require future action under a more stringent risk-based approach for the final remedy. The commenters requested a robust and transparent process for evaluating the performance of any IR and the identification of any final actions needed to achieve full protection of human health and the environment.

Another commenter supported the SWAC concept but qualified this to state that it is essential to identify and address the right areas of contamination. They noted that although this is an IR, long-term effectiveness needs to be a more significant consideration in evaluating the SWAC. In addition, they noted that they would like to see a more robust evaluation to understand how different SWACs will impact the areas requiring source removal.

Response:

EPA recognizes the uncertainty in the current estimate of the SWACs and areas of elevated concentrations based on the RI/FS level data, and this is reflected in the RI and the IR FS as well. RI Appendix J details how mapping of contaminants was done to incorporate the uncertainty inherent in RI/FS level data. EPA intends that the uncertainty associated with the IR footprint will be minimized during IR design using the high-density gridded sediment sampling data that will be generated during the PDI and, to the extent necessary, a second round of PDI sediment sampling intended to fill in areas of higher data variability. This approach is described in the IR FS (IR FS Appendix H, Section 2.1, Mapping of Concentrations and Areas Vulnerable to Erosion). The planned density of the PDI data will allow for reduced uncertainty in the estimate of the pre-IR SWAC and the areas to be targeted for remediation. The IR footprint areas identified in the IR FS, Proposed Plan, and this ROD for the IR for the upper 9 miles of the LPRSA will be refined and further identified based on the PDI data. In addition to the robust PDI data that EPA anticipates will be used to define the pre-IR SWAC and IR footprint, the suite of models will also be refined to incorporate the CCMP and PDI data during the IR design to improve the ability of the models to simulate system conditions and responses.

In selecting the IR preferred alternative, EPA has conducted a robust evaluation to consider how different SWACs would affect the area to be addressed. Reducing the SWAC goal that is targeted by the IR would increase the size of the IR footprint. With each successive reduction in the SWAC goal for each of the evaluated alternatives, additional areas were added to the area identified for the previously higher SWAC goal. The IR FS considered this impact across the four active IR alternatives for a single conditional simulation (CS) representation of the RI data (called CS map #37), and across a range of CS maps derived from the same dataset (IR FS Table 8-3). Based on available data (using CS map #37), the average 2,3,7,8-TCDD concentration addressed by the 90-acre footprint for Alternative 2 is 2,870 ppt, while the average concentration addressed in the additional 6 acres added for Alternative 3 is 220 ppt, and the average concentration addressed in the yet additional 8 acres added for Alternative 4 is 170 ppt. The average concentration in the additional footprint area for Alternative 3 is within the range of concentrations defined as source, whereas the average concentration in the additional footprint area for Alternative 4 is below the range. This demonstrates that Alternative 3 is the most suitable to accomplish sediment source control per the intent and purpose of the IR. Meanwhile, Alternative 4 would go beyond source control, addressing areas that may be experiencing natural recovery.

The final mapping of contamination that will be used in the IR design to identify the IR footprint will have far less uncertainty in both the magnitude of the pre-remedy SWAC and the spatial distribution of contaminants. This final pre-IR mapping of contaminant concentrations will be used by the party(ies) conducting the IR design for the IR footprint, with oversight from EPA and in coordination with NJDEP. While the IR FS provided sufficient understanding of the IR footprint for purposes of remedy selection, the Proposed Plan and ROD explain that the total area to be remediated to accomplish the sediment source control action, and the specific areas to be removed to attain the RAOs, will be developed using that final pre-IR mapping of contamination.

Following IR construction and confirmation sediment sampling, EPA will assess attainment of the IR RAOs according to a multiple lines of evidence evaluation framework, including a statistical evaluation of the post-IR sediment data, which is discussed in the IR FS (Appendix H of the IR FS Report). As part of this multiple lines of evidence framework, if the RAOs cannot be demonstrated conclusively to have been attained, the pre-IR data, IR implementation data, and post-IR data will be evaluated and action may be taken to address additional areas of sediment (if needed) to meet the intent of the IR. Whether or not any such additional actions are needed, the IR will be followed by a period of monitoring to assess system recovery against the preliminary remediation goals (PRGs) that will be developed during/in parallel with the IR design. Based on the results of this monitoring, and additional evaluation and assessments, EPA will release a proposed plan that explains its proposed decision regarding final action for the entire 17-mile LPRSA for public review and comment and will issue a ROD selecting a final remedy decision that includes final, risk-based RGs. Regardless of what the final ROD documents as the final remedy, EPA will oversee implementation of that final remedy and monitor it to demonstrate a successful completion.

A.4.3 Comment: 2,3,7,8-TCDD vs TCDD-TEQ as the surface area-weighted average concentration basis

A commenter noted that preferred alternative in the OU4 Proposed Plan, which targets a SWAC of 75 ppt for 2,3,7,8-TCDD, is inconsistent with the 2019 RI Report, in which the risk analysis was based on “TCDD-TEQ” (TCDD-toxic equivalency). A commenter noted that the target SWAC concentration in the Proposed Plan should be changed from 2,3,7,8-TCDD to TCDD-TEQ.

Response:

EPA does not agree that it would be appropriate to identify a SWAC using TCDD-TEQ instead of 2,3,7,8-TCDD. The risk assessment for the 17-mile LPRSA was completed for TCDD-TEQ. The TEQ is a toxicity equivalence based on individual congener toxicity equivalence factors (TEFs). Dioxin-like compounds (including 2,3,7,8-TCDD, other dioxin/furan congeners, and dioxin-like PCBs) typically occur as mixtures in the environment and their toxic effects are additive. The toxicity of dioxin-like compounds can be assessed by considering their toxicity relative to 2,3,7,8-TCDD. A TEF is a measure of the relative potency of a compound to cause a particular toxic or biological effect relative to 2,3,7,8-TCDD. By convention, 2,3,7,8-TCDD is assigned a TEF of 1, and the TEFs for other compounds with dioxin-like effects range from 0.00003 to 1. For a single dioxin-like compound, TCDD TEQ is the product of the concentration of the dioxin-like compound in the environment and its corresponding TEF. Total TEQ—for a mixture of dioxin-like compounds—is the sum of the individual TCDD TEQs across those compounds. The TCDD TEQ provides a means for determining the total dioxin-like toxicity of a mixture of dioxin-like compounds.

The IR is not a risk-based remedy (however, notably, the human health risk assessment did find that among the dioxins/furans that are included in the TCDD TEQ, 2,3,7,8-TCDD contributes approximately 95% of total TCDD TEQ for LPRSA fish and crab tissue). The IR is a source control action, addressing sediments with elevated contaminant concentrations that act as a continuing source and, overall, inhibit recovery in the system. The approach to the IR, including the derivation of the IR footprint and the intent to address sediment source areas, is not incompatible with nor will it preclude a final risk-based remedy, which EPA will be evaluating and selecting in a final ROD for the LPRSA after evaluating the recovery of the system following the IR, satisfying the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). All of the analyses completed in support of the upper 9-mile IR were developed based on concentrations of 2,3,7,8-TCDD and total PCBs observed on water column particulates and in the sediment. Because of the strong correlation between grain size and the majority of the COCs, and the processes governing their fate and transport, the IR footprint that addresses sources of 2,3,7,8-TCDD and total PCBs will also address sources of the other COCs, including the other dioxins and furans that contribute to the TCDD-TEQ.

For the LPRSA, the magnitude of the TCDD-TEQ is well correlated with the 2,3,7,8-TCDD concentration. The correlation between total TEQ and 2,3,7,8-TCDD is shown in Figure 9 (A.4.3-1) at the end of this Responsiveness Summary. The figure shows 2,3,7,8-TCDD and total TEQ data for surface sediment samples collected in the upper 9 miles of the LPR after 2005. For reference, the figure shows the TEQ, calculated using the World Health Organization 2005 mammal TEFs, both with and without the 12 dioxin-like PCB congeners. In addition, the figure presents the RAL for the selected remedy (Alternative 3) . Although there are samples at the lower end of the concentration range where the TEQ and 2,3,7,8-TCDD are less correlated, in the range of concentrations above the RAL, which defines the area that will be targeted for remediation, the two are very well correlated. The PDI program will analyze sediment samples for the full suite of COCs, including all of the chemicals with dioxin-like toxicity. EPA anticipates that if there are any TEQ outliers in the PDI dataset, they will be considered when determining the IR footprint.

A.5 Nature and Extent of Contamination

A.5.1 Comment: Fine sediments and dioxin contamination

Commenters requested more information to fully understand the concept of fine sediments and dioxin contamination. The commenters asked if EPA has any new sediment core sampling data in areas of fine and coarse sediments or in areas of high erosion. They also asked if any additional confirmatory sampling will occur to support the interim ROD and how many total sediment samples were collected in the upper 9 miles of the river in relation to the total number of samples that were collected to characterize the lower 8.3 miles.

Response:

Based on data collected in the upper 9 miles of the LPRSA and throughout the LPR, EPA has confidence that higher contamination levels generally occur in more fine-grained sediments in the LPR. This conclusion is reached by comparing contaminant concentrations to corresponding sediment grain sizes for numerous sediment samples collected from the LPR. The association of higher levels of contamination in finer-grained sediments reflects the higher amount of organic matter typically found in fine sediments and the importance of organic carbon in sorbing many of the contaminants found in the river.

The increasing occurrence of fine-grained sediments downstream contributes to the large-scale longitudinal trend in contaminant concentrations. Figures 5-3 and 5-4 in this ROD for the IR for the upper 9 miles depict the occurrence of 2,3,7,8-TCDD and total PCBs as a function of location in the river and the relative proportion of fine-grained sediments (based on data collected between 2005 and 2013 and including data from the RM 10.9 area prior to the RM 10.9 Removal) and demonstrate the general trend of higher concentrations associated with finer-grained sediments. The distribution of other contaminants is plotted in similar fashion in the RI Report. Spatial patterns of contaminants other than 2,3,7,8-TCDD do differ (at least to some degree) from those of 2,3,7,8-TCDD, as other contaminants (e.g., metals, pesticides, PAHs, and also to some degree

PCBs) are likely impacted to a greater degree by upstream, downstream, and/or watershed sources. Evaluation of sediment bed types is facilitated by side-scan sonar (SSS) data collected in the river.

Observed patterns of contaminant concentrations also reflect geomorphic evolution and susceptibility to episodic erosion and cyclic erosion/deposition in the river. Higher surface sediment concentrations tend to be in fine-grained sediments that have not experienced net deposition of newer sediments in the last few decades. Concentrations tend to be lower in areas where net deposition continues or in areas of cyclic erosion/deposition where the surface sediments reflect the recent deposition of less contaminated solids. The lowest concentrations occur in areas of high energy, where fine-grained sediments have not accumulated. The evaluation of erosion and deposition of sediments in the river is supported by numerous bathymetric surveys and the resolution of sediment bed elevation differences between surveys.

Regarding sample counts, sediment sampling programs were performed in the upper 9 miles of the LPR between 2005 and 2007, in 2008, between 2011 and 2012 (including a program focused on characterizing the RM 10.9 area for the RM 10.9 Removal), and in 2013. Overall, sediment samples were collected at 279 sampling locations in the upper 9 miles between 2005 and 2013, including 261 between RM 8.3 and RM 15. Over the same time period of 2005 to 2013, sediment samples were collected from 205 sampling locations in the lower 8.3 miles of the LPR. (Other sediment sampling was performed between RM 1 and RM 7 in 1995, but is not included in this count, and sediment sampling associated with the design of Phase 1 of the Tierra Removal is also not included in this count.) Extensive sediment sampling was also performed in the lower 8.3 miles of the river during the PDI implemented to support the in-progress remedial design for the lower 8.3-mile reach. During that PDI, sediment sampling was performed at over 730 sampling locations in the lower 8.3 miles. Because the selected remedy for the lower 8.3 miles is a bank-to-bank remedy, the lower 8.3-mile PDI sediment sampling was not performed with the objective of defining a remedial footprint or characterizing surface sediment concentrations. The lower 8.3 miles PDI sediment data are considerably less dense (slightly more than one sample per acre) compared to the sampling that EPA anticipates for the upper 9 miles during the upper 9-mile PDI (approximately eight samples per acre).

Beginning in 2019, under the 2007 RI/FS AOC, a CCMP was performed in the upper 9 miles of the LPRSA which also provided data that will be relevant to the IR by providing information for comparison with data that will be collected during and after the IR. An extensive bathymetric and SSS survey program was performed in 2019 as part of the CCMP to provide current data on sediment bed types and patterns of erosion and deposition. EPA expects that a spatially dense PDI sediment sampling program will be performed in the upper 9 miles, during which sediment cores will be collected over a closely spaced grid resulting in approximately 2,000 sediment sampling locations, resulting in the sampling density of approximately eight samples per acre, as described above. A second round of PDI sediment sampling will be performed as necessary to resolve issues of spatial data variability. The IR for the upper 9 miles is predicated on the understanding that sediments with elevated contaminant concentrations are an ongoing source that inhibits system recovery, and that elevated contaminant concentrations are more localized in comparison to the lower 8.3 miles, where the vast majority of the sediment bed is composed of fine-grained sediments. Collectively, data from the upper 9-mile CCMP and PDI will be used to develop the IR footprint, targeting areas of elevated contaminant concentrations, and areas where erosion could expose elevated concentrations. While sediment grain size is an important factor in the Conceptual

Site Model (CSM) for understanding the distribution of contamination, the IR footprint developed to attain the IR objectives will be driven by surface sediment concentrations that exceed surface sediment RALs and areas of potential erosion with subsurface sediment concentrations that exceed subsurface sediment RALs. EPA will oversee the development of the IR footprint to ensure it captures the areas of source sediments sufficiently to achieve the IR objectives.

A.6 Preferred Alternative

A.6.1 Comment: Alternative Selection

Commenters stated that EPA's selection of Alternative 3 represents a conservative selection, but also demonstrates the Agency's commitment to implementing an adaptive management strategy for OU4. Commenters stated that implementing an alternative with a larger footprint would remove non-source sediments and, therefore, would not provide further enhancement of the ongoing recovery of the entire LPRSA and progress toward protection of human health and the environment.

Commenters stated that Alternative 2 meets all of EPA's and NJDEP's objectives and would achieve these objectives within a shorter time frame and at a lower cost than Alternative 3. Commenters also stated that the Proposed Plan is following an "adaptive approach" with "longer-term monitoring and selection and implementation of a final remedy in an adaptive approach," and that therefore, there is no reason to preemptively select Alternative 3. Commenters indicated that Alternative 2 satisfies all remediation goals, with future opportunity to address any additional residual source sediments, and therefore EPA should select Alternative 2 as the preferred remedy.

Response:

In selecting a remedy for a site, EPA performs analyses and considers factors in accordance with CERCLA and the NCP. A detailed analysis is performed, consisting of an assessment of the individual alternatives being considered against each of nine CERCLA evaluation criteria, and a comparative analysis focusing on the relative performance of each alternative within the criteria. The first two criteria (overall protection of human health and the environment, and compliance with applicable or relevant and appropriate requirements [ARARs]) are considered threshold criteria because they are the minimum requirements that a response measure must meet to be eligible for selection as a remedy. The next five criteria (long-term effectiveness and permanence; reduction in toxicity, mobility, or volume of contaminants through treatment; short-term effectiveness; implementability; and cost) are considered balancing criteria, and the performance of each alternative is weighed in the context of these criteria to ensure the best option is chosen, given site-specific information and conditions. The final two criteria (state acceptance and community acceptance) are considered modifying criteria and take into consideration comments received on the proposed plan and any new information made available after publication of the proposed plan that significantly changes basic features of the remedy with respect to scope, performance, or cost.

EPA selected Alternative 3 (implementing sediment source control to achieve a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt for RM 8.3 to RM 15, incorporating a total PCB surface sediment RAL of 1 ppm) for the IR for the upper 9 miles of the LPRSA. This alternative meets the two threshold criteria, and EPA believes it offers the best balance of tradeoffs within the balancing criteria among the alternatives EPA considered eligible for selection (i.e., Alternative 2 with a post-IR target 2,3,7,8-TCDD SWAC of 85 ppt, Alternative 3, or Alternative 4 with a post-IR target 2,3,7,8-TCDD SWAC of 65 ppt). In addition, implementing Alternative 3 would not be incompatible with nor preclude a final remedy, another important consideration for an interim action under CERCLA. NJDEP agrees with the selection of Alternative 3 for the IR, as do leaders from a number of communities along the upper 9 miles of the LPR who represent populations affected by the contamination in the river and the cleanup of this contamination.

Following are the key factors that led EPA to select this IR alternative:

- The IR is for sediment source control. Source sediments are those with elevated concentrations, defined generally as those with concentrations between 200 and 400 ppt of 2,3,7,8-TCDD and above. This range has been identified because water column solids, which can eventually deposit onto the sediment bed, have been observed to contain 2,3,7,8-TCDD concentrations within this range. The water column solids originate from the source material (i.e., sediments that are disturbed in the sediment bed and migrate into the water column), mix with other solids in the water column, and redeposit onto the river bottom. The 2,3,7,8-TCDD surface RALs, developed based on available data for evaluation of the alternatives and remedy selection, are 260 ppt for Alternative 2, 205 ppt for Alternative 3, and 164 ppt for Alternative 4. The RAL for Alternative 3 aligns with the lower end of the range of concentrations representing source. The RAL for Alternative 2 is within but not at the lower end of this range and would be expected to not address some areas of sediments that might be source, while the RAL for Alternative 4 is below the range and would be expected to capture sediments that are not source sediments and themselves likely to be recovering. Therefore, Alternative 3 will most effectively address source sediments consistent with the intent and purpose of the IR.

- Based on available data, the average 2,3,7,8-TCDD concentration addressed by the footprint for Alternative 2 is 2,870 ppt, while the average concentration addressed in the additional 6 acres included for Alternative 3 is 220 ppt, and the average concentration addressed in the yet additional 8 acres included for Alternative 4 would be 170 ppt. The average concentration in the additional footprint area for Alternative 3 is within the range of concentrations defined as source and the average concentration in the additional footprint area for Alternative 4 would be below the range. Therefore, this further demonstrates that Alternative 3 is most suitable to accomplish sediment source control per the intent and purpose of the IR, addressing source material not addressed by Alternative 2, while Alternative 4 would go beyond source control, addressing areas that may be experiencing natural recovery.

- Contaminant concentrations generally correlate with sediment type in the LPR, with higher concentrations tending to be found in finer-grained sediments. Progressively larger IR footprints would capture progressively coarser sediments. Alternative 2 would capture sediments that are approximately 60 to 65 percent fine-grained, while the additional sediments captured by Alternative 3 (beyond Alternative 2) are approximately 40 percent fine-grained and the yet additional sediments captured by Alternative 4 (beyond Alternative 3) would be on average approximately 35 percent fine-grained. Based on the distribution of 2,3,7,8-TCDD concentrations in sediment samples from the upper 9 miles of the LPRSA in comparison to the grain size of the samples, relatively high concentrations are associated with sediments that are on the order of 40- to 60-percent fine-grained (resulting from higher concentrations in the fine-grained fraction of those sediments), while the likelihood of high contaminant concentrations diminishes significantly when the sediments are only 35-percent fine-grained. This indicates that implementing Alternative 3 will address additional source material beyond that addressed by Alternative 2, even if the additional sediments captured by Alternative 3 are relatively coarser, whereas Alternative 4 would include yet coarser-grained sediments not likely to exhibit high contaminant concentrations indicative of source sediments. This shows that the additional footprint area for Alternative 3 includes more comprehensive control of source material than Alternative 2, while minimizing inclusion of non-source material that might be associated with Alternative 4.

- Alternative 3 will be cost effective in that it provides overall effectiveness (taking into account long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness) proportional to its cost.

The IR for the upper 9 miles of the LPRSA will be implemented within an overall adaptive management approach that will include post-IR response and recovery monitoring and, ultimately, a decision regarding the need for further remediation to address sediments in the upper 9-mile reach and surface water throughout the LPRSA in a final ROD. For the IR, EPA focused on selecting an alternative that accomplishes the objectives and meets the intent of the IR. Leaving sediments that meet the definition of source sediments unaddressed by the source control IR on the theory that the adaptive management approach would allow these sediments to be addressed later would be inconsistent with the source control objective. Additional action may be warranted for the LPRSA following implementation and monitoring of the IR, and EPA will make a decision regarding additional action through the adaptive management process. The selection of Alternative 3 reflects the EPA's careful consideration of tradeoffs among the alternatives considered and this alternative represents the most appropriate approach to meet the intent of the IR and accomplish the goals of the IR.

A.7 Data and Modeling

A.7.1 Comment: Provide greater detail on RI and IR FS data and modeling

The commenters requested a better understanding of the full set of RI data in order to have a full understanding of the contamination present in the upper nine miles. The commenters also stated that at the time of the 2018 CSTAG meeting, EPA noted that sufficient sediment sampling had been conducted to support the development of an interim remedy, but that additional modeling development was necessary to fully understand this part of the river. The commenters also noted that conceptual site model presented at that time as a fairly high-level concept, and they would like to have more time to see and explore the details.

Response:

The data collected to support the RI and IR FS are available to the public in the Passaic River Digital Library (https://sharepoint.ourpassaic.org/SitePages/Passaic%20River%20Datasets.aspx), as well at the administrative record file, which also includes the RI and IR FS reports. The RI Report includes the most complete record of the data used in the RI, IR FS, and was relied on by EPA in developing the Proposed Plan and ROD. In particular, RI Report Section 4, Physical and

Chemical Characteristics of the LPR Sediments, presents extensive displays of the RI sediment data, including bathymetry, erosion/deposition history, SSS sediment characterization, and sediment grain size, organic carbon, and contaminant distributions, including maps of COCs and sediment properties by reach. Similarly, Section 6 of the RI Report, Contaminant Fate and Transport Processes in the Lower Passaic River, presents the water column data across the range of conditions that were sampled, with the data broken down by depth, tide (flood, ebb, and slack), flow, and tidal range.

The sediment data were further evaluated in RI Appendix J, where the distribution of 2,3,7,8-TCDD and Tetra-PCB (as a surrogate for total PCBs) was mapped based on an approach called CS in order to use a statistical method to account for spatial uncertainty.

The calibration of the suite of mathematical models developed for the system was documented in the RI documentation in the locations below:

- RI Report, Section 7, Summary of Modeling Results for the LPRSA
- RI Report, Appendix L, Hydrodynamic Model of the LPR
- RI Report, Appendix M, Sediment Transport Model of the LPR
- RI Report, Appendix N, Organic Carbon Model of the LPR
- RI Report, Appendix O, Contaminant Fate and Transport Model for the LPRSA

The models were approved by EPA for use in the IR FS on June 6, 2019 (https://semspub.epa.gov/work/02/616212.pdf). The RI documentation was approved and released to the public in July 2019.

As previously stated, RI Report Appendix J details how mapping of contaminants was done to incorporate the uncertainty inherent in RI/FS level data. This approach was carried forward into the IR FS to understand the potential uncertainty in drawing an IR footprint. Until a remedy had been selected, data specific to the design of the IR could not be collected; therefore, an approach that factors in uncertainty was necessary for drawing remedial footprints at the IR FS stage. The CS approach allowed the CPG, under the oversight of EPA and in coordination with NJDEP, to evaluate the uncertainty in the potential location and area of remediation associated with each of the IR alternatives. For each alternative, the CS approach allowed the calculation of 100 possible remediation maps—each with its own associated area and volume (in this case volume is proportional to the area since each location in each alternative was assumed to be dredged and capped to the same depth). This uncertainty associated with the IR footprint will be minimized during IR design using the high-density gridded sampling data generated during the PDI and, to the extent necessary, a second round of sediment sampling in areas with higher levels of data variability (IR FS Appendix H, Section 2.1, Mapping of Concentrations and Areas Vulnerable to Erosion).

In addition to the uncertainty in the RI data, the IR FS Report also recognized the uncertainty in the mathematical models developed for the LPRSA (IR FS Report Section 6, Modeling to Support the Evaluation of Remedial Alternatives). The uncertainty in the model suite generally falls into two categories: (1) limitations related to the data used to develop the model, and (2) limitations of the model suite itself. Both of these limitations will be addressed as part of the IR design.

A.7.2 Comment: Provide greater detail on current data collection

Commenters stated that beyond the 2019 bathymetry survey, little of the new data that would be required to implement the IR has been collected. They also stated that the entire IR concept is dependent on identifying and confining the pockets of contamination that are present. They recognized that more sampling is planned and will be necessary to prepare a full design but wanted to better understand the approach and level of sampling to be conducted and how new data will be used in final decision making. The commenters stated that it is essential that a reasonable grid-based sampling is conducted to fully define the nature and extent of contamination and make appropriate cleanup decisions, and that no reasonable support for the final decision can be provided before they gain this understanding. The commenters expressed strongly that any final decisions must be dependent on the sampling results and the modelling that is conducted based on those results and they would like to have the opportunity to discuss and comment on this enhanced understanding of the river and the resulting decisions.

Response:

Data collection to establish current conditions as a baseline for the IR began with the collection of detailed bathymetry (and SSS) data in 2019. This was followed by the deployment of in-river water quality instrumentation that continuously recorded water quality parameters (including temperature, turbidity, conductivity, salinity, and velocity) for the periods from June 2019 to January 2020, March 2020 to August 2020, and April 2021 to June 2021. During the same general period of those mooring deployments, numerous discrete water column monitoring events were conducted as part of the CCMP. During these water column monitoring events, surface water samples have been collected from various locations and depths in the upper 9 miles of the LPR, and at varying river flow and tide conditions, for analysis of chemical and/or physical parameters to inform greater understanding of system dynamics and greater confidence in the model suite to predict system behavior.

As explained in response to Comment 1.7.1, until a remedy had been selected, data specific to the design of the IR could not be collected. This ROD documents EPA's selected remedy and will be the basis for the remedial design. Once the PDI data have been collected, the high-density gridded sampling data will allow the models to be refined and the IR footprint to be defined with an appropriate level of uncertainty.

During the IR design, EPA will continue its active outreach to communities affected by the IR and will share information about data collection, modeling, and development of the IR footprint.

A.7.3 Comment: Provide greater detail on remedial design data and modeling

Commenters noted they would like to have more time to assess the details of the data; they posed the following questions:

- How and when will modeling ultimately be completed?
- Will the IR include additional or enhanced modeling to understand river conditions in its altered state?
- How will modeling results be used in the determination of the performance of the hot spot removal and decision-making with regard to the final remedy?

Response:

The IR FS Report and Proposed Plan detail the use of the model suite and data in the feasibility-level assessment, and also discuss the planned data collection and model improvements during and after IR design and implementation. The additional data that will be collected in the future begin with the PDI data. As part of the IR design, the PDI data, along with the existing data, will be used to refine the inputs to the models and reduce related uncertainty. In addition to the refined inputs, the models will be refined to have a higher resolution grid to better represent the IR footprint. These improvements in the models will minimize the known uncertainties in the models that were identified in the IR FS.

The refined model suite will be used in the IR design stage to project the resulting SWACs at the end of the IR and may be used to give feedback into the design of the IR footprint. The model suite will include a representation of the IR processes, any changes in bathymetry associated with the IR, and changes in bed composition resulting from cap material placement. The model suite will then be used to project the system response to the IR into the future after the completion of the IR. In addition to the refined suite of models used to compute sediment and water column responses in the system, the bioaccumulation model will be updated during IR design to allow for the calculation of tissue (e.g., fish and crab) responses to the IR. The bioaccumulation model will also be able to predict initial estimates of sediment-tissue relationships.

IR FS Report, Appendix H, Section 2.4.1, Post-IR Confirmation Sediment Sampling Program, describes the data collection approach that EPA anticipates will be followed to confirm achievement of the IR RAOs after the IR construction is complete. Once EPA is able to evaluate the data to determine if the IR has achieved its RAOs, monitoring will begin to measure the system response to the IR (IR FS Report, Appendix D, Section 4, Adaptive Element 2: System Response). The details of that monitoring program to evaluate system response will be determined during IR design.

If the model projections developed during IR design are not in agreement with the post-IR monitoring data, additional diagnostic data may be needed to identify the source of the deviation and additional refinements to the model suite may be necessary. During/in parallel with the IR design, EPA will oversee the development of risk based PRGs. If the system is not recovering as EPA anticipates it will be following implementation of the IR and confirmation that IR construction is complete, EPA will evaluate if additional remedial action is necessary to achieve risk-based goals, with additional characterization and assessment, release of a proposed plan for public review and comment, and issuance of a final ROD for the LPRSA that documents final risk-based RGs.

In conclusion, implementation of the IR will include extensive analyses of the existing data and data to be collected as part of the PDI, and the model results. Additional data collection during the PDI, and model refinements, will target remaining uncertainties and attempt to minimize them. The adaptive management approach under which the IR is being implemented will be used to identify ongoing uncertainties into the future and collect the necessary data to reduce those uncertainties. While this work is underway, EPA will continue its active outreach to communities affected by the IR and will share information about the IR design and implementation.

A.8 Remedial Action Objective Application

A.8.1 Comment: Clarify the order of Remedial Action Objective application

Commenters pointed out that the Proposed Plan text concerning the application and sequence of the RAOs is not clear. The Proposed Plan states: "*[t]he RAO 1 footprint will be remediated first followed by the RAO 2 footprint*". Based on the IR FS Report, the commenter understood that the intent of this statement is: (1) areas above the final surface RAL will be identified to meet RAO 1 and the design SWAC of 75 ppt 2,3,7,8-TCDD; (2) the final surface RAL and the subsurface RAL multiplier will be used to identify areas to address RAO 2; and (3) both RAO1 and 2 areas will be combined to create the IR footprint to be remediated.

Response:

The referenced language from the Proposed Plan for the IR for the upper 9 miles of the LPRSA was inadvertently unclear and has been clarified in this ROD. In developing the final IR design remediation footprint (based on the PDI sediment sampling program), the RAO 1 footprint, which will target contaminant concentrations in surface sediments exceeding the surface RALs, will be identified first. This will be followed by the RAO 2 footprint identification, which will target contaminant concentrations in subsurface sediments exceeding subsurface RALs in areas with demonstrated potential for erosion. RAO 1 and RAO 2 areas will be combined to create the IR footprint to be remediated. Remediation will be performed throughout the final IR footprint during IR construction. EPA will oversee the development of the IR footprint to ensure it captures the areas of source sediments to achieve the IR objectives.

A.9 Capping

A.9.1 Comment: Capping protectiveness

Commenters stated that capping contaminated sediments does not address risk for current and future generations. Commenters expressed concern about the possibility of the cap failing. Commenters requested detailed information on the engineering and installation of the caps in the upper 9 miles. Commenters noted concern on relying on capping in a river with fast-moving currents.

Response:

The selected IR is an interim response action for sediment source control in the upper 9 miles of the LPRSA that will be implemented via removing (e.g., dredging) sediments with 2,3,7,8-TCDD and/or total PCB concentrations greater than RALs needed to attain target SWACs or to prevent exposure of contaminated subsurface sediments in areas susceptible to erosion, followed by placement of a cap over areas of sediment removal.

Sediment caps are a well understood remedial technology that are used extensively at contaminated sediment sites throughout the country. The caps that will likely be utilized at the LPRSA are "engineered caps" and serve multiple purposes. They physically and chemically isolate any remaining contaminants within sediments in the remedial footprint from human and ecological receptors and prevent these same sediments from being eroded by currents and storm forces and subsequently redistributed throughout the river system. Implementation of ICs will also help to ensure the protectiveness and permanence of the cap. Based on site-specific experience with the effective sediment cap at the River Mile 10.9 Removal area in Lyndhurst, NJ, EPA believes that sediment caps in the upper 9 miles of the LPR can be engineered to both isolate any remaining contaminants within the remedial footprint and withstand erosion. Furthermore, it is EPA's intention that any cap utilized as part of this interim action will include long-term physical and chemical monitoring. The physical monitoring will assess the cap's resistance to erosion, geotechnical stability, and similar parameters. The chemical monitoring will assess the cap's effectiveness in preventing any contaminants in the underlying sediments and porewater from reaching the surface water. Any failures noted by the physical or chemical monitoring will trigger further investigation as to the cause of the failure and potential corrective actions under an O&M plan that will be developed as part of the IR design.

During the IR design the specific off-site disposal location(s) and transportation process(es) that will be used to send processed sediment material for off-site disposal will be determined by EPA, together with the parties performing the work.

A.9.2 Comment: Natural resource restoration

Commenters inquired about relying on capping for remediation and how it affects the restoration of the river, in particular species recovery and natural resource restoration. The comments requested that EPA bring the Passaic River back to a more natural state and protect species listed under the Endangered Species Act. The commenters encouraged EPA to work with its natural resource partners to explore ways to include restoration work in conjunction with the IR to accelerate restoration along with an expedited cleanup approach.

Response:

EPA has collaborated with its Partner Agencies, including natural resource partners such as NOAA, USFWS and NJDEP, throughout the entire CERCLA process to date at the LPRSA. Furthermore, EPA intends to continue this collaboration throughout the IR design and construction process. Opportunities to include restoration work in conjunction with the IR will be investigated as the design progresses. The sediment cap designed for the IR will consider necessary habitat functions and use of cap materials to support those functions. Overall, the IR design will include management of habitat areas to approximately restore the habitat that supports ecological value equal to current conditions and avoid net loss of habitat, in accordance with ARARs. Such an approach was utilized at the River Mile 10.9 Removal area sediment cap, where a habitat layer was included in the cap design and construction. The specific composition of the cap for the upper 9-mile IR will be determined in the IR design, in close consultation with EPA and Partner Agencies. The overall intent of the IR is to support the long-term recovery of the LPRSA system, including sediments, surface water, and wildlife, and monitoring will be performed following the IR to specifically evaluate this recovery.

A.10 Dredged material management

A.10.1 Comment: Plan for dredged material

Commenters asked about the location of the sediment processing facility as well as the off-site disposal facility. Commenters asked what types of sediment processing facilities are being assessed. An additional question from the public meeting asked for EPA's plan for all the dredged material.

Response:

For cost estimating purposes, the ROD assumed dredged sediments would be placed on barges, dewatered while on the barges, transported via barge to a nearby commercial facility for processing (e.g., further dewatering and stabilization), and transported via railcar and/or truck for off-site disposal at licensed disposal facilities determined based on the quantity and chemical constituents of the sediments and the capacity and acceptance criteria of the facilities. Any water produced during dewatering will be characterized for proper treatment/disposal at an appropriate facility or treated and discharged to an adjacent waterbody in accordance with New Jersey Water Quality Certification requirements. EPA will require that precautions be taken during transport to prevent the release of contamination; specific actions will be identified during IR design and implementation to reduce and minimize releases during transportation. The requirement that these issues be addressed will be included in the IR remedial design documents (e.g., environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and BMP plans), which will also include requirements for monitoring during the construction period.

Facility capacity and accessibility evaluations will be required during the IR design to identify which processing and disposal location(s) are appropriate, available, and accessible. One of the benefits of implementing the IR during the same window of time as the lower 8.3-mile remedy is the possibility that the sediments dredged as part of the IR might be processed at the same facility as the dredged material generated by the lower 8.3-mile action. The specific nature and location of the processing facility for the lower 8.3-mile remedy is being evaluated during the ongoing design for the lower 8.3 miles cleanup. During the IR design, EPA will determine the specific approach to processing the dredged sediments and the specific location where the processing will be performed. As part of that evaluation, EPA will consider whether the processing facility identified for the lower 8.3-mile remedial action can also be used for the sediment dredged as part of the upper 9-mile IR.

Nonhazardous dredged material may be accepted for direct disposal in a Resource Conservation and Recovery Act (RCRA) Subtitle D facility (i.e., a facility that is permitted to accept only nonhazardous wastes and not hazardous wastes), contingent upon the facility's permit, available space, and facility-specific acceptance criteria for material impacted by chlorinated dioxins and furans and other chemicals. Hazardous dredged material will require disposal in a RCRA Subtitle C facility, possibly following some degree of pre-treatment to meet regulatory requirements. EPA has previously determined that sediments from the LPR do not contain RCRA-listed hazardous waste. However, during Phase I of the Tierra Removal (i.e., the removal action near the Lister Avenue facility), sediments were encountered that had to be managed as characteristic hazardous waste, and an analysis of the Phase I removal data in the lower 8.3-mile ROD responsiveness summary estimated 5 percent of the sediments by volume to be addressed by the selected remedy exceeded RCRA hazardous waste characterization criteria. If PCB concentrations indicate Toxic Substance

Control Act (TSCA)-regulated sediments are encountered during dredging, then TSCA regulations will be followed (currently available data from the upper 9 miles do not suggest TSCA-regulated sediments are likely to be encountered). Waste characterization sampling conducted preliminarily during the PDI, with final testing taking place prior to disposal and in accordance with receiving facility requirements, will be used to identify dredged material requiring management as a RCRA hazardous or TSCA regulated waste.

A.11 Alternative technologies

A.11.1 Comment: Alternative technologies as a remedial approach

Commenters inquired if EPA will evaluate different technologies for sediment treatment. The commenters expressed that these technologies would address climate concerns (e.g., excessive flooding and tidal impacts), meet zero carbon emission standards, create nonhazardous marketable products, and/or produce economic benefits. Additional comments asked if EPA is willing to explore other options for treatment and if it is possible to completely destroy contaminated material, as opposed to capping.

Response:

All active alternatives presented in the IR FS and evaluated by EPA in the Proposed Plan, including the selected IR for the upper 9 miles of the LPRSA, were developed by evaluating general response actions and combining remediation technologies and process options (i.e., a specific tool, method, or approach within a technology category) that were retained after a screening evaluation performed in accordance with CERCLA and the NCP. Technologies/process options were retained if they were judged to be suitable for the LPR, suitable for the contaminants of interest, overall effective relative to IR objectives, implementable, and appropriately cost effective.

The selected IR is predicated on removing contaminated sediments and installing an engineered cap that would isolate remaining contamination and not exacerbate flooding in the river. Dredging is a very mature sediment remediation technology used at contaminated sediment sites throughout the country. Capping is considered to be a viable long-term protective solution, and remaining contamination within the dredge footprint will be covered by materials designed to isolate underlying sediments, prevent the migration of contamination through the cap, and to resist erosion.

However, certain technologies/process options were identified in the IR FS as "retained for further evaluation during IR design." Certain technologies/process options were considered to be potentially effective and potentially implementable and may warrant further consideration during IR design, though they were not incorporated directly into the IR alternatives, including the selected IR. These include enhanced natural recovery, in situ sediment treatment, ex situ sediment treatment (e.g., soil washing, thermal desorption, thermal destruction, incineration, vitrification), composite capping or reactive capping, specialty dredging, hydraulic dredging, hydraulic transport, confined aquatic disposal, and beneficial use. Specifically, ex situ sediment treatment options, including soil washing, and in situ sediment treatment options have been retained for consideration in the IR design for particular contingencies, and—if determined to be necessary and if implemented during the IR—could address contaminants in remediation areas where active dredging and capping are not possible (e.g., utility crossings, bridge abutments, and critical shoreline structures).

During the IR design, alternative technologies could be considered if and as necessary to overcome identified design and implementation challenges for discrete portions of the IR footprint. EPA will evaluate any proposed use of alternative technologies by the parties designing the IR to ensure the alternative technologies are appropriate for their purpose and the objectives of the source control action. EPA will document changes to the selected remedy consistent with the requirements of the NCP.

A.11.2 Comment: Additive Desorption System, Cement Lock®/Ecomelt®, and nanobubble technology

Commenters inquired about Additive Desorption System (ADS), an improved soil-washing system using an ethanol blend, that the commenters claimed is more effective than other technologies to remove dioxins and PCBs from sediments. The commenters claimed that the washed sediments can be either placed back in as clean fill or that elevated contaminant concentrations can be reduced to safer concentrations.

Commenters inquired about Cement Lock®/Ecomelt®, an alternative technology that is claimed to permanently destroy the toxicity of contaminated materials and convert those materials into a nonhazardous building product. The commenters claimed that the technology has the ability to reduce greenhouse gases (GHG), to convert contaminated sediments to a material that can be commercially reintroduced to industry for food preservation or building materials, and complies with EJ mandates.

Commenters indicated they had submitted a proposal to the U.S. National Science Foundation (NSF) to investigate the idea of remediating contaminated sediments with ultrasound and ozone nanobubbles (NSF Award Abstract #1634857 "Remediation of Contaminated Sediments with Ultrasound and Ozone Nanobubbles"). The commenters claimed that the technology would not be impacted by weather, leads to no dispersion of sediments, has no impact on fish migration, causes no loss of activated carbon, does not require that barges pass through low-clearance bridges, does not need a dewatering facility or a final disposal facility for the dewatered sediments, creates no health risk for current and future generations and has a much lower cost. A commenter at the public meeting also inquired about this technology.

Response:

During the IR design, EPA will determine the specific approach to the IR, including specific sediment removal, processing, and disposal methods and the location where the processing will be performed. One of the notable benefits of implementing the IR during the same window of time as the lower 8.3-mile remedy is the possibility that the sediments dredged as part of the IR might be processed at the same facility as the dredged material generated by the lower 8.3-mile action. The specific nature and location of the processing facility for the lower 8.3-mile remedy is being evaluated during the ongoing design for the lower 8.3 miles clean up. During the IR design, EPA will consider whether the processing facility identified for the lower 8.3-mile remedy can also be used for the sediment dredged as part of the upper 9-mile IR.

As noted in this ROD for the upper 9-mile IR, certain technologies/process options were identified in the IR FS as "retained for further evaluation during IR design." Specific technologies/process options were considered to be potentially effective and potentially implementable and may warrant further consideration during IR design, though they were not incorporated directly into the IR alternatives or the selected IR. These include enhanced natural recovery, in situ sediment treatment, ex situ sediment treatment (soil washing, thermal desorption, thermal destruction, incineration, vitrification), composite capping or reactive capping, specialty dredging, hydraulic dredging, hydraulic transport, confined aquatic disposal, and beneficial use. During the IR design, alternative technologies could be considered if and as necessary to overcome identified design and implementation challenges for discrete portions of the IR footprint.

EPA will continue to review and evaluate the development and application of innovative technologies for management of contaminated sediments and other environmental media. It is the responsibility of the parties designing/implementing the IR to consider any specific technology and incorporate it, as appropriate, into the IR design for EPA review. However, it would be inappropriate for EPA to endorse, promote, or advocate for any specific technology to be incorporated into the IR design. EPA will evaluate the IR design prepared by the performing parties to ensure that any suggested technologies will accomplish project objectives.

A.12 Long-term Cleanup

12.1.1 Comment: Long-term cleanup goals and a final Record of Decision

Commenters stressed the importance of reaching a level of cleanup that ensures long-term protection of human health and the environment; specifically, asking how the effectiveness of the interim action and evaluation of ultimate cleanup levels are determined, evaluated, and ultimately implemented. The commenters pointed out that the cost and opportunity of remobilization a decade or more from now to clean up a few spots will be considerable, and it may not be done. The commenters also noted that the anticipated monitoring is very significant and requested a more detailed understanding of how such monitoring will be designed, how final effectiveness of the IR will be evaluated, and how the final ROD will be structured to ensure that this evaluation will be robust, and its recommendations implemented. The commenters also asked questions concerning how the RALs are determined and how they are typically selected for these types of sites. Finally, the commenters requested a more detailed understanding of how the proposed 10-year "natural recovery" period is determined.

The commenters also noted that the initial importance of utilizing shared resources to make the upper 9 interim plans possible should not overshadow any potential future work to ensure a complete and total cleanup.

Response:

The IR for the upper 9 miles of the LPR is predicated on the understanding that there are some areas of fine-grained sediments in the upper 9 miles, and elevated concentrations of contaminants are associated with the fine-grained sediments, Following IR construction, EPA will assess if the IR RAOs have been attained using a multiple lines of evidence evaluation framework developed during the IR FS under EPA oversight and in consultation with the NJDEP (Appendix H of the IR FS Report). This framework will allow EPA to evaluate if SWAC goals for 2,3,7,8-TCDD and total PCBs have been attained, using a statistical data assessment approach. EPA will also evaluate the potential need for any additional action under the IR to satisfy the intent of the sediment source control interim action.

The IR for the upper 9 miles will be performed within an overall adaptive management strategy described in Appendix D of the IR FS Report. The IR itself is not a risk-based action; rather, it is a source control action focused on addressing areas of sediments with elevated contaminant concentrations. The IR will significantly reduce the average contaminant concentrations in sediments and accelerate the recovery of the system. Addressing areas with elevated sediment contaminant concentrations and reducing average contaminant concentrations will also reduce risks to humans and ecological receptors, although the specific degree of risk reduction will not be a direct measure of IR success.

Following the conclusion of the IR construction and application of the multiple lines of evidence post-IR evaluation framework, the system response to the IR and longer-term recovery of the system will be monitored through collection of sediments, surface water, and biota tissue samples. Additional information will be gathered to understand complicated relationships between sediment contamination, fish and crab bioaccumulation and recovery, and human health risks associated with fish and crab consumption. EPA will evaluate the need for a final remedial action. Recovery of the system will initially be monitored against PRGs that are developed during/in parallel with the IR design. During this adaptive management framework, numerical models used to understand the system and predict its response will be refined, and data will be collected to address project uncertainties in a structured manner. Site data will be relied on to evaluate recovery trends, even as the numerical models are refined to provide more accurate predictions. Based on the additional data collection and subsequent evaluation and assessment, EPA will be able to evaluate whether and to what extent a final remedial action is needed. EPA will release a proposed plan and a final ROD that includes risk-based RGs selecting the final action, if any, beyond the IR that is needed to attain the risk-based RGs in a reasonable time frame. EPA expects to identify a reasonable time frame based on the NCP, EPA policy and guidance, and input from stakeholders, including the public. EPA assumes that the post-IR system recovery data will be collected and assessed over a period of approximately 10 years before EPA is able to make an informed decision about the need for any additional remedial action, and during this time EPA will ensure that interim information related to system improvement (i.e., reductions in sediment, surface water, and biota tissue concentrations) will be communicated to the public. This will allow an adequate amount of data to be collected, models to be refined to ensure accurate predictions of future conditions, and project uncertainties to be resolved to the maximum extent possible to support EPA's final remedial decision. The final action for the LPRSA will address any remaining excess risk associated with exposure to sediments in the upper 9 miles, and surface water throughout the LPR.

The IR will focus on 2,3,7,8-TCDD and total PCBs, which are primary contributors to human health and ecological risk but will also address other COCs that are collocated with the IR target chemicals. Prior to, during, and after the IR, all COCs will be monitored so that final remedy decision-making can take into account all COCs. Implementing the IR for the upper 9 miles of the Lower Passaic River during the same time period as the remedy for the lower 8.3 miles will expedite the cleanup process for the upper 9 miles, minimize the amount of time remediation activities are ongoing in the LPR overall, minimize direct impacts to surrounding communities associated with the construction, allow EPA to evaluate and mitigate impacts of each action on the other action, and may allow for economies of scale for processes that are common to the two projects.

Implementing the IR will not be incompatible with nor preclude a final remedy, an important consideration for an interim action under CERCLA. NJDEP agrees with the source control IR (and with the selection of Alternative 3, or a 2,3,7,8-TCDD SWAC target of 75 ppt, for the IR), as do leaders from a number of communities along the upper 9 miles of the LPR who represent populations affected by the contamination in the river and the cleanup of this contamination. Until the post-IR system recovery data has been collected and assessed, EPA is not able to make a fully informed decision about the need for any additional remedial action, so cannot predict if it will be necessary to remobilize for additional sediment removal or capping. This potential is inherent in the adaptive management approach. On balance, EPA has determined that the benefits of proceeding with an interim remedy now outweigh the risk that some additional work might be needed in the future.

EPA's decision regarding final action for the LPRSA will be documented as its preferred approach in a Proposed Plan that will be released for public review and comment, and as a selected remedy in a final ROD. Any final action for the LPRSA will be selected by EPA in accordance with all requirements under CERCLA and the NCP. If an additional action is required, EPA anticipates that consistent with current EPA policy, the work would be performed by responsible parties under EPA oversight

A.13 Environmental Justice

A.13.1 Comment: Environmental Justice and air emissions

Commenters inquired about issues of EJ during remediation (e.g., would the community be exposed to more industrial pollution in the form of air emissions). The commenters requested that EPA provide the public with a written plan that details how the Agency will ensure that, during soil dredging and other remediation, all air emissions from the site will not affect the surrounding community.

Response:

During IR design, a community health and safety plan will be developed to evaluate risks to surrounding communities and to adopt practices to mitigate these short-term risks. Risks that will be evaluated include those associated with potentially increased levels of traffic, the potential for air emissions, issues associated with the transportation of contaminated materials, and potential issues associated with noise and lighting. EPA will oversee the development of this plan to ensure protection of surrounding communities against short-term risks associated with IR implementation.

EPA has experience protecting the community from air emissions associated with dredging in the Passaic River. During implementation of Phase 1 of the Tierra Removal, EPA placed air quality monitors around the dredge area and in the community. Laboratory results were evaluated daily against health protective standards. During the year and a half project, the only air exceedance was for chlorobenzene at 1% over the standard for one day at a monitoring station adjacent to the dredge area. The closest residential air monitor also detected chlorobenzene on that day, but at a level ten times lower than the standard. There was no health threat to the community. The air quality monitoring program for the IR will be detailed in the community health and safety plan to be developed during the design.

EPA will continue to brief the community, via the CAG, in the steps of the IR design and implementation of the IR. All presentations and information regarding planned activities will be translated into languages of the surrounding communities, and information will be disseminated through websites, meetings, and notices in various publications.

A.13.2 Comment: Environmental Justice and alternative technologies

Commenters pointed out that the community, like many other minority communities, faces the possibility of health risks due to a contaminated waste storage facility failure. The commenters stated that the Proposed Plan disregards EPA's EJ mandates, specifically the April 30th Memorandum on Strengthening Enforcement in Communities with Environmental Justice Concerns, and the manner by which cleanup plans are selected, as established under the EPA's CERCLA regulations.

Commenters indicated that EPA should seek out new technological resources that may prove to be more equitable, efficient, and effective with permanent contamination solutions rather than the current status quo. They also suggested that EPA consider and evaluate other technologies that conform to CERCLA's cleanup criteria and to zero carbon emissions standards, and that perhaps fulfill a critical need for forthcoming infrastructure projects. The commenters stated that communities with EJ concerns have a right to comprehensive contamination removal as well as economic benefits in the form of jobs and continued natural restoration of the riverfront, and that changing climate demands that consequences of weather events on remediation Superfund sites should be considered. The commenters stated, "accountability remains steadfast for the polluting parties to optimize contamination removal for environmental justice communities and to consider the impact of climate change on cleanup sites."

Response:

EPA is committed to taking EJ into account in all aspects of environmental protection for the LPR and is aware of the environmental and other challenges faced by many local communities. An EJSCREEN analysis of the local communities along the upper 9 miles of the LPR was completed that includes the river and one mile on each side of the river. The analysis found community information including: 35 percent of the population in the local communities is considered low income, as compared to 24 percent of the population in the State of New Jersey; the area is above the state average in air particulate matter (8.62 micrograms per cubic meter (ug/m^3) compared to 8.3 ug/m^3 for New Jersey as a whole); and the traffic proximity and volume in the area is 1400 (daily traffic count/distance to the road) as opposed to 830 for New Jersey overall. EJSCREEN is an EJ mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators.[3] As described in Response to Comment A.13.1, during IR design, a community health and safety plan will be developed to evaluate risks to surrounding communities and to adopt practices to mitigate these short-term risks. Risks that will be evaluated include those associated with potentially increased levels of traffic, the potential for air emissions, issues associated with the transportation of contaminated materials, and potential issues associated with noise and lighting.

As part of EPA's oversight, when approving a processing or disposal facility for the upper 9-mile IR, an important goal will be to minimize the impact on communities as much as possible. As demonstrated during Phase 1 of the Tierra Removal and the RM 10.9 Removal, EPA is committed to reaching out to inform affected communities about the potential adverse impacts of remedial actions and to working with communities to mitigate or minimize those impacts. EPA will continue this level of outreach while the IR is designed and implemented and following the IR during longer-term adaptive management.

A benefit of implementing the IR is that by starting work on the upper 9 miles within the same time period as the lower 8.3 miles, EPA will be able to minimize disruption to the river communities by encouraging the shared use of infrastructure for both remedies, limiting the amount of time required for in-river remediation work for the entire 17-mile reach of the LPR, and allowing for coordinated activities for both remedies, thereby increasing efficiencies.

The IR will also expedite the recovery of the river and the reduction of levels of dioxins and PCBs (and other contaminants) in the fish and crabs that continue to be caught for personal consumption. Fishing and crabbing for personal consumption have been documented along the LPR and Newark Bay. This consumption continues, despite NJDEP having fish and crab consumption advisories in place for the entire LPR and maintaining fish/crab advisory signage along the Passaic River in multiple languages. These fish/crab consumption advisories will remain in place and be included in the IR as ICs. EPA expects that fishing and crabbing for personal consumption may continue in the LPR, even as ICs are implemented, monitored, and enforced. EPA will evaluate enhancing the advisories with additional community outreach to encourage greater awareness.

During the Tierra Removal in 2012, the performing party worked with the Superfund Job Training Initiative, an EPA-sponsored job readiness program that provides unemployed and underemployed local residents with training that allowed them to be hired to work on the remediation activities. In many cases, this program also enables workers to find continued employment after completion of the project. This program was well received by the community and resulted in the hiring of local residents. While participation by performing parties is voluntary, EPA will encourage parties implementing the lower 8.3-mile remedy and the upper 9-mile IR to participate in this valuable program. Implementation of the Superfund Job Training Initiative for the forthcoming remedial work would potentially involve a significantly larger number of trainees than could be accommodated during the previous removal action.

With respect to climate, climate change and sea-level rise are long-term changes with unpredictable year-to-year effects in the short term. EPA believes that such changes are accounted for within the

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[3] EJSCREEN users choose a geographic area; the tool then provides demographic and environmental information for that area. All of the EJSCREEN indicators are publicly-available data. EJSCREEN provides a way to display this information and includes a method for combining environmental and demographic indicators into EJ indexes.

uncertainty bounds of model projections used to evaluate IR alternatives in the IR FS and considered by EPA when selecting the IR. Any cap installed in the river as part of the IR will be designed so as not diminish water depth or exacerbate flooding. In addition, potential effects of climate change and sea-level rise will be considered further in IR design to understand potential influences on IR success.

The IR for the upper 9 miles of the LPR is one component in a multicomponent remediation process being implemented under an adaptive management framework. The IR includes removal of sediments targeted based on elevated concentrations, disposal of the sediments off-site, and construction of a permanent cap designed to isolate underlying contamination, prevent the migration of contamination into surface water, and not exacerbate river flooding. This IR will significantly reduce contaminant concentrations in the riverbed sediment (and significantly reduce associated risks to humans and the environment). The Responses to Comments A.9.1 and A.11.1 further describe the effectiveness and permanence of capping as a sediment remediation strategy and the potential application of alternative technologies during the IR, respectively. Following the IR, the river system will be monitored to evaluate its recovery (sediments, surface water, and fish tissue), and a decision will be made about the need for further action and what that action needs to be to address any remaining risks in sediments in the upper 9 miles and surface water throughout the LPR. A final ROD will be developed that documents that decision and, regardless of the selected final remedy, the action will be taken to ensure all risks in the LPR are addressed.

The LPR runs through 10 communities with different demographics and income levels. Among these are portions of Newark, including the "Ironbound" community, which is generally considered to be an EJ community and is located near the site of the former Diamond Alkali facility. Some of the highest levels of dioxin are found in this portion of the river. This area is part of the lower 8.3 miles of the LPR, which is the subject of the 2016 lower 8.3-mile ROD and is currently undergoing remedial design for the implementation of a bank-to-bank remedy to mitigate human health and ecological risk. Through this overall process of remediating the LPR, EJ is served.

A.13.3 Comment: Environmental Justice and dewatering facility

Commenters noted shortcomings in EPA's preferred alternative described in the Proposed Plan concerning the dewatering facility, including that the dewatering facility site may be in a flood zone and may impact communities with EJ concerns, potential frequent clogging of the dewatering facility, and that the dewatering site should be fully secure against climate change and should not affect or be located in or near the communities with EJ concerns.

Response:

As the Proposed Plan and this ROD for the IR for the upper 9 miles of the LPRSA indicate, several specific aspects of the IR will be determined during IR design. This is common practice at environmental cleanup sites, including Superfund sites such as this one. During the IR design, EPA will determine the specific approach to processing dredged sediments (dewatering and stabilizing) and the specific location or locations where this processing will be performed. As part of this evaluation, EPA will consider many factors in the selection of a sediment processing facility, including EJ concerns identified in the comment, such as the location relative to climate change issues and floodplains. EPA will also consider whether the processing facility identified for the lower 8.3-mile remedial action can also be used for the sediments dredged as part of the upper 9-mile IR.

A.13.4 Comment: Environmental Justice and dredged material

Commenters requested that EPA consider the EJ impacts of the transportation and final disposal of the contaminated material.

Response:

As described in Response to Comment A.10.1, dredged material will be transported off-site for treatment and/or disposal at properly permitted and licensed facilities. EPA will consider the EJ impacts of transportation, processing, and disposal choices in accordance with applicable state and federal laws and regulations, as well as federal EJ guidance. Throughout the IR design process and, ultimately, the process of dredging, sediment processing, and waste disposal during IR implementation, EPA will keep the public informed of project status and related decisions through ongoing community outreach.

During the IR design, the specific off-site disposal location(s) and transportation process(es) that will be used to send processed sediment material for off-site disposal will be determined by EPA, together with the parties performing the work. Selection of the off-site disposal location(s) will consider the quantity and characteristics of the sediments to be disposed of, and the capacity and acceptance criteria disposal facilities.

A.14 Site Access and Use

A.14.1 Comment: River access and boating concerns

Commenters noted that boating is an important consideration to the community, as there are numerous clubs and teams that use the river. Access and ability to use the river in all phases of the cleanup process, and as a priority outcome of the cleanup itself are important. Commenters requested that EPA coordinate with crew teams and boating clubs on cleanup plans and how they might impact major boating events, consider using the migratory fish window to coordinate with boating clubs, implement no-wake zones, avoid widespread restrictions on anchoring, and ensure that the design minimizes impacts to rowing shells from the use of armor stone and other possibly harmful materials. The commenters requested that consideration should be given to increasing the water depths of the river.

Commenters submitted questions about when access to the river will be restricted from the river/docks and how long that will last. The commenters requested advance notice when EPA restricts access. They also asked if there will be future restrictions to types of equipment, such as anchors, launch boats, and motorized equipment. Commenters asked what the impacts are going to be to navigation in terms of boating and whether the depth will be greater after remediation.

Response:

Throughout the LPR, particularly between RM 2 and RM 12, college, high school, and community rowing clubs use the river for recreation and competition. It is expected that recreational uses of the river will continue in the future. Where dredging and capping is included in the IR, the area to be capped will first be dredged to a depth such that the cap will not reduce the depth of the river or impact navigation. There may be times during remedial activities that access to the water from boating facilities may be temporarily restricted for the safety of the facility users. EPA will communicate to the public the approximate start and stop dates and locations for all in-water remedial work.

EPA's purpose for cleaning up Superfund sites is to reduce risks to human health and the environment from exposure to hazardous substances. During development of alternatives for remediation, EPA considers the future use of the resources being cleaned up; however, increasing the water depth for purposes unrelated to EPA's cleanup action would be outside of the scope of the selected remedy.

During the investigation and remedy selection process for the lower 8.3 miles, EPA engaged in extensive study and consultation regarding the waterway uses in the Lower Passaic River, and during EPA's development of the alternatives for the upper nine miles, EPA again considered reasonably anticipated future land and waterway uses. A 2010 USACE Commercial Navigation Analysis report for the LPR established that the river continues to be used for commercial navigation from RM 0 to RM 1.7. Following EPA's selection of a remedy for the lower 8.3 miles, and consistent with the remedy, the federal navigation channel above RM 1.7 was deauthorized by Congress in 2018, and the depth from RM 0.6 to RM 1.7 was reauthorized from 30 feet to 20 feet.

EPA also reviewed local government master plans and evaluated a 2007 State of New Jersey study that showed that the communities above RM 2.5 have included future increases in recreational access to the river in their master plans. Reasonably anticipated future uses include recreation (rowing and boating) and light commercial uses (water taxis). EPA's review identified that water depths of approximately 10 feet are sufficient to support these future uses in the upper reaches of the Lower Passaic.

ICs will be a component of the IR for the upper 9 miles of the LPR, to ensure the protectiveness of the remedy by affecting human activities to prevent or reduce the potential for exposure to contaminated media and to protect the integrity of the remedy. Where necessary, ICs may potentially include a combination of governmental controls, proprietary controls, and informational devices. Specific ICs will be evaluated during the IR design process. Possible ICs include:

- Governmental controls (e.g., monitoring and notification of waterway users)
    - Prohibitions on anchorage within areas that are capped
    - Prohibitions on grounding of small vessels on shorelines
    - Restrictions on vessel draft, horsepower, and speed (e.g., no wake zones)
    - Restrictions on dredging, piling placement or removal, or other construction activities that may disturb the sediment
- Proprietary controls (e.g., easements and restrictive covenants related to capping)
- Informational devices (e.g., deed notices, fish consumption advisories, and signage)

Under the Code of Federal Regulations (22 CFR Part 165) a regulated navigation area (RNA) may be established to regulate vessel navigation by the appropriate government agency within a defined boundary. Examples of RNA restrictions include limitations on anchoring, spudding, or grounding vessels in capped areas.

EPA does not anticipate that recreational non-motorized boating uses of the river, such as rowing and kayaking/canoeing, will be subject to ICs. However, anchoring buoys for boats in cap areas may be restricted. EPA will continue to involve the community during the IR design process, consistent with community involvement to date on the project.

EPA currently assumes that the migratory fish window (when there would be a restriction on dredging and capping) is between March 1 and June 1. It is also assumed that there may be annual shutdowns in dredging for winter weather, potentially from January 1 to March 1. Further evaluation of construction constraints, including specific seasonal restrictions and physical/infrastructure impediments, and potential strategies to mitigate the associated impact on construction will be completed during the IR design. EPA will communicate the estimated dates of the fish window to the public and decide whether the winter work stoppage will occur.

NON-TECHNICAL

B.1 General Timeline

B.1.1 Comment: Anticipated project timeline including the Newark Bay

Commenters asked about the anticipated timeline for request for proposal (RFP) release for the construction contracts. A commenter during the public meeting asked when the Newark Bay portion of this problem will be addressed.

Response:

EPA anticipates that the IR design and associated tasks will take 3 years following the issuance of the ROD for the IR for the upper 9 miles of the LPRSA. These tasks include the process of establishing a legal enforcement instrument with the parties that will be responsible for designing the IR, implementing the PDI, and developing the IR design package. EPA further anticipates that the implementation/construction of the IR will require approximately 4.6 years. This construction estimate assumes an annual window of restricted operations from March 1 to June 1 to protect migratory fish and an annual construction shutdown for winter weather that could run potentially from January 1 to March 1. Based on these assumptions and EPA's schedule projections, the IR would be in construction from mid-2024 (or before to account for mobilization and support facility preparation) to the end of 2028. This schedule is not exact, however, because the specific sequencing of construction activities will be developed during the IR design. EPA further assumes that the procurement process associated with IR construction will be undertaken by responsible parties performing the IR under oversight of (and with approval by) EPA.

Newark Bay is being addressed as a separate OU of the Diamond Alkali Superfund Site and is currently at the RI/FS stage. When the RI/FS has been completed, the Superfund process will continue to be followed with EPA issuing a Proposed Plan documenting EPA's preferred remedial approach, which will be released for public comment, after which EPA will issue a ROD. The specific nature of the remedy for Newark Bay and the associated timeline for its implementation will be better understood as the FS is completed and when the Proposed Plan and ROD are developed, during which EPA will continue to keep the public informed of the status of Newark Bay.

B.2 Funding

B.2.1 Comment: Remedial action funding running out

Commenters expressed concern that EPA may run out of funds for the remediation and leave the site in a condition that poses more of a hazard than before remediation. The commenters requested that the EPA set goals, budget with contingency, and explore all possible derailments. Commenters noted EPA has a margin of error in their cost analysis and asked who is going to pay up to $660 million for Alternative 3.

Response:

The purpose of the Responsiveness Summary is to respond to public comments on the alternatives evaluated in the RI/FS and Proposed Plan, and generally does not address questions of funding or liability in any detail. EPA agrees that the parties responsible under CERCLA should pay for the cleanup. As discussed in a number of Responses to Comments, under CERCLA, EPA searches for parties legally responsible for the contamination and seeks to hold those parties accountable for the costs of investigations and cleanups, by requiring them to perform or fund the necessary investigatory and remediation. EPA will follow this approach for the Passaic River but given the confidentiality of the enforcement process, is not able to provide further detail.

B.3 Community Involvement

B.3.1 Comment: Long-term and continuous community engagement

Commenters expressed a belief that the scope and uncertainty of this IR present a bigger challenge to decision-making than the more permanent approach of the lower 8.3 miles. As such, some of the key decision points will possibly occur post-ROD and even well into the future. The commenters pointed out that it is important that a long-term community engagement process is considered as part of this process. Commenters extend support to the need to continue the ground-level community engagement that the Passaic River Superfund team is known for. In particular, the commenters pointed out that planning incorporates community involvement, Green Infrastructure projects, and explores future Natural Resource Restoration projects that are beneficial for the communities along the Passaic River and the health and recovery of the River.

Response:

EPA agrees that it is important and necessary for the Agency to reach out to the community, including residents, recreational users, local businesses, locally employed workers, and all others potentially affected by the planned IR, during the IR design and throughout the remedial action. This would include consideration of green infrastructure and future beneficial use and restoration of the LPR system, consistent with EPA's Superfund authority.

EPA is committed to the same high level of public outreach and community involvement, as has been extended to stakeholders during the course of the LPR investigation and prior response actions.

During the IR design, EPA will continue its active outreach to communities affected by implementation of the upper 9-mile IR. The Community Involvement Plan (CIP) (EPA 2006) provides specifics on currently established community outreach programs. Details of any additional outreach specific to the upper 9-mile IR will be documented as an amendment to the CIP.

Currently, EPA anticipates that the outreach during the upper 9-mile IR will include regular public meetings with rowing clubs, the CAG, local and state government representatives, and residents of municipalities on both sides of the Passaic River. It is EPA's desire that stakeholders understand the potential impacts of IR implementation and have an opportunity to provide input into plans to minimize, to the degree possible, those impacts.

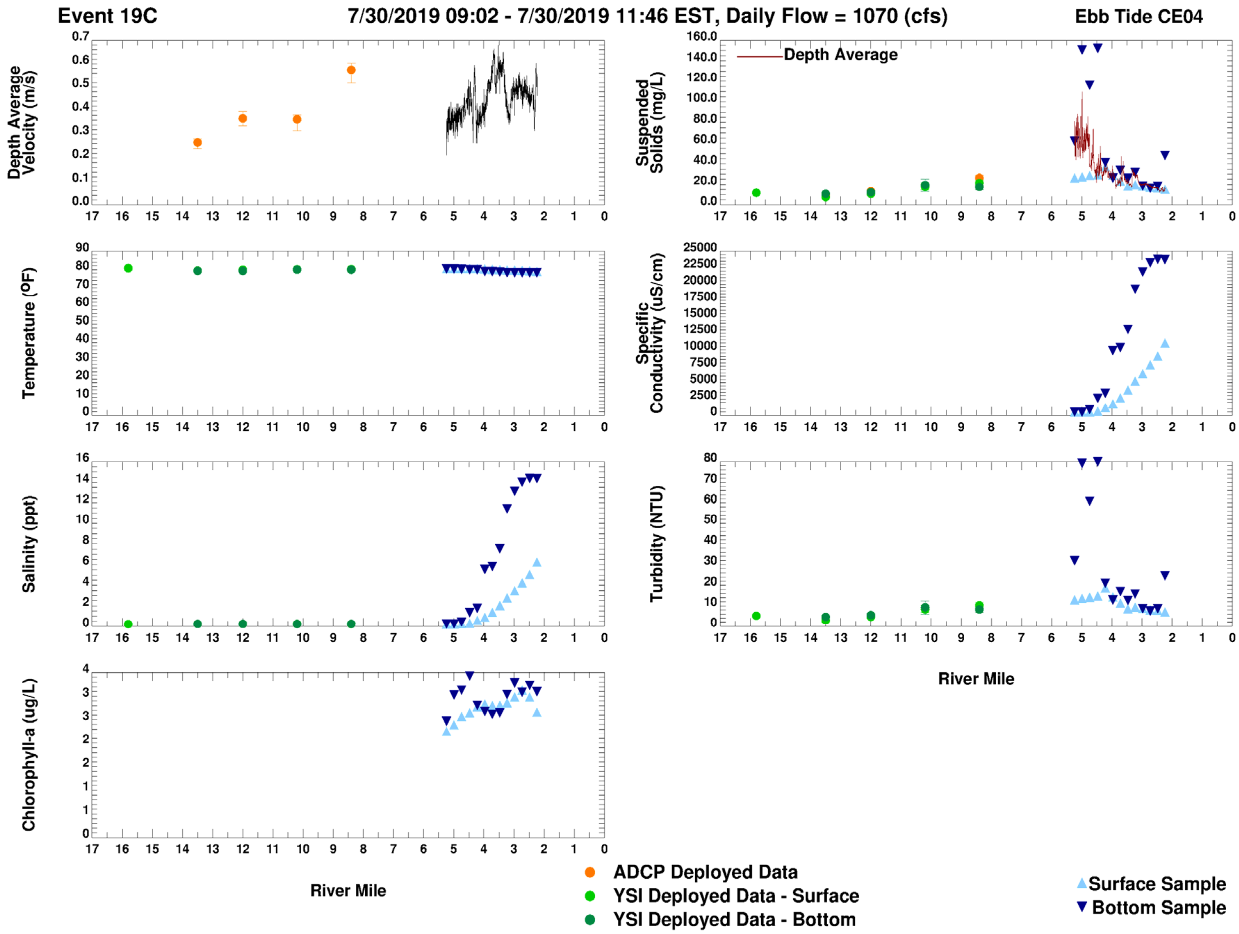

***Figure 1**: A.2.1-1a Longitudinal Survey 19C - Ebb Tide*

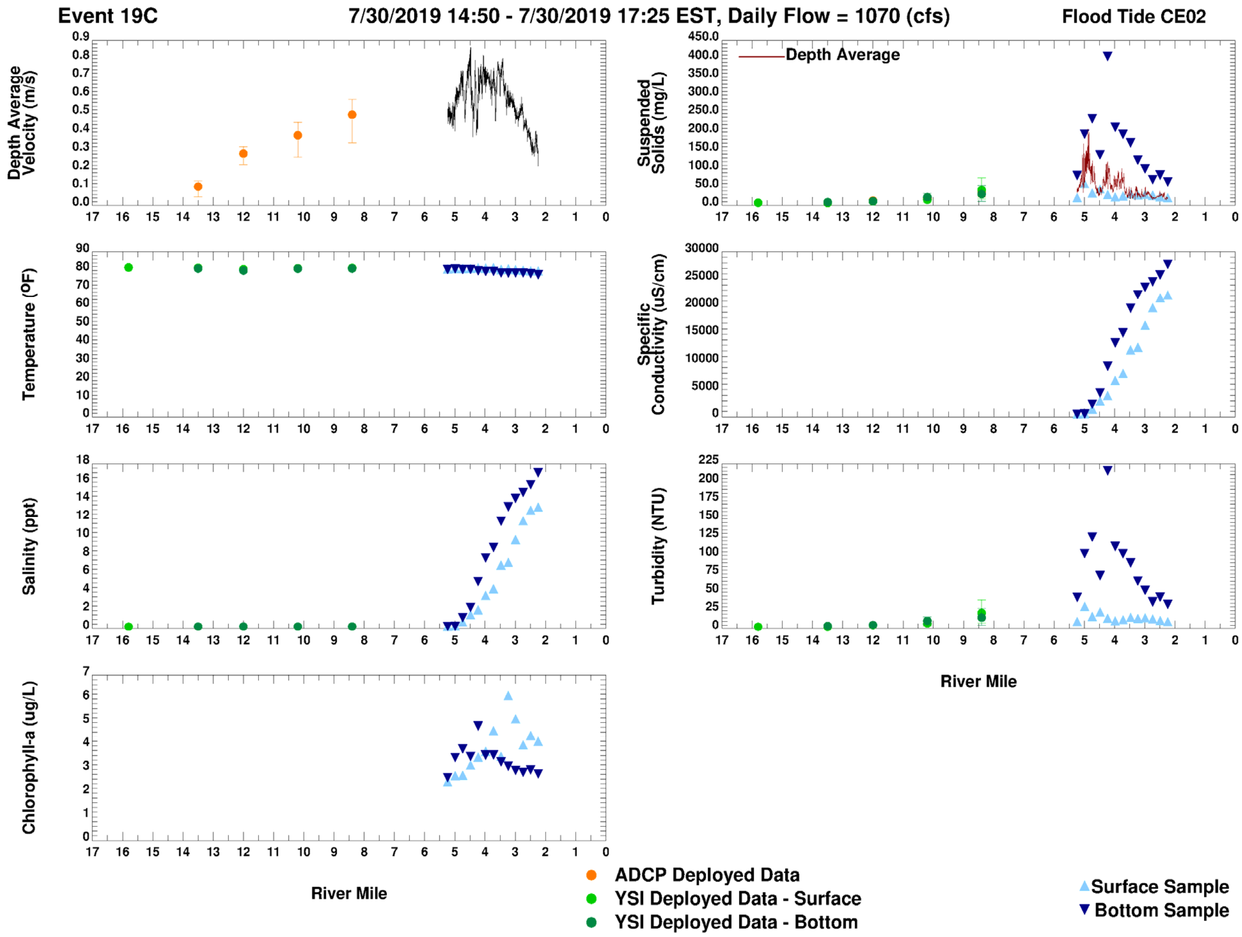

Figure 2: A.2.1-1b Longitudinal Survey 19C - Flood Tide

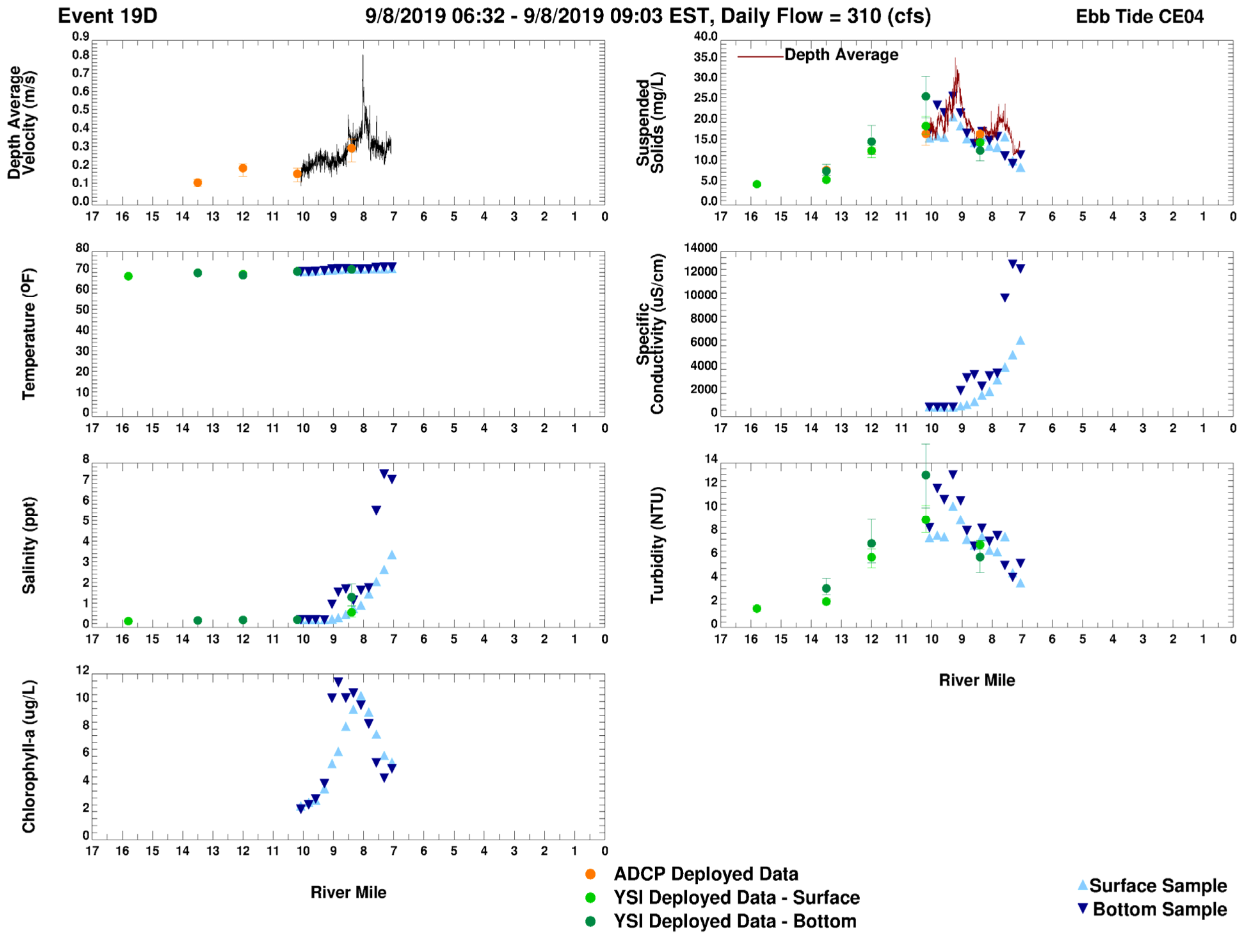

Figure 3: *A.2.1-1c Longitudinal Survey 19D - Ebb Tide*

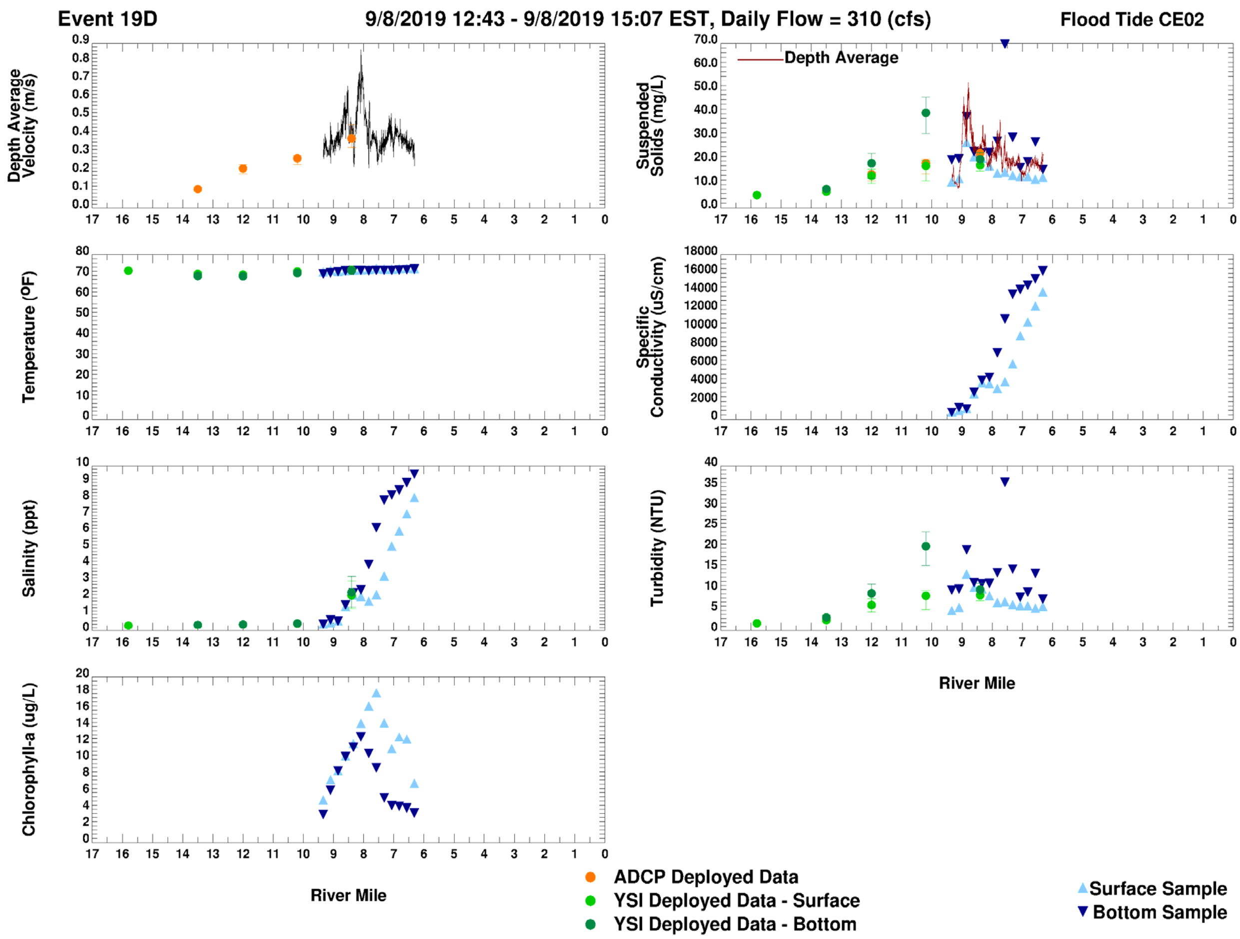

***Figure 4**: A.2.1-1d Longitudinal Survey 19D - Flood Tide*

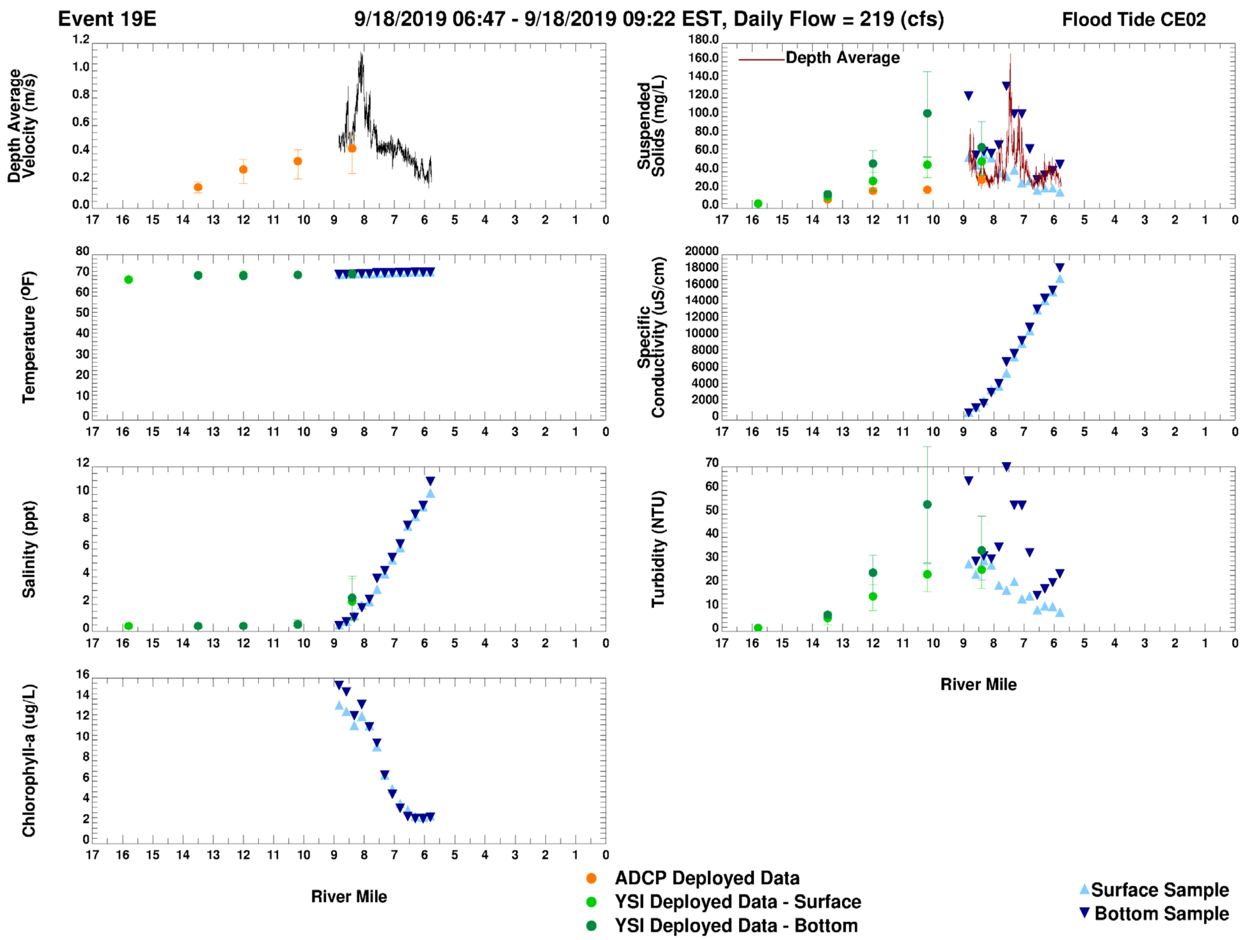

Figure 5: A.2.1-1e Longitudinal Survey 19E - Flood Tide

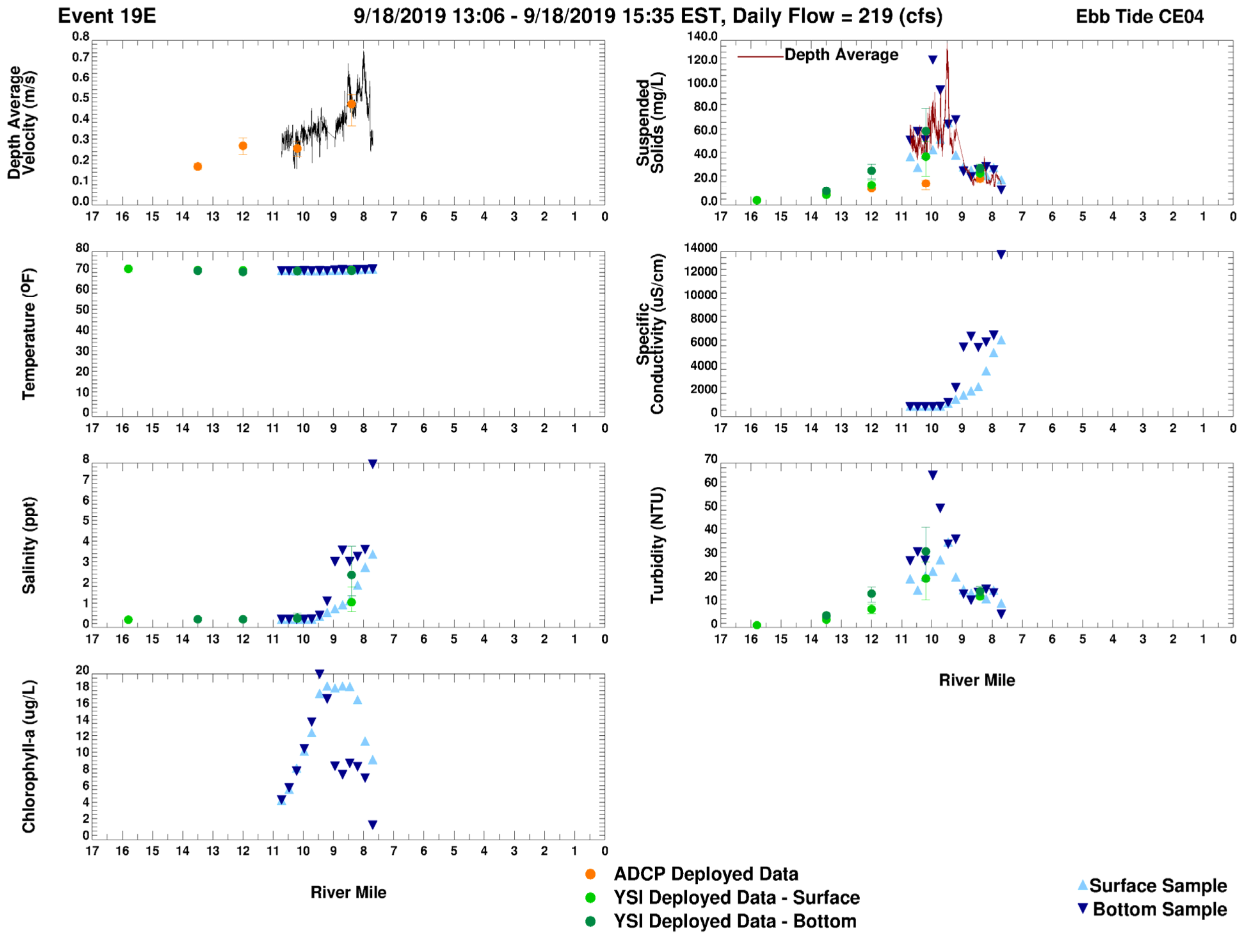

__Figure 6__: A.2.1-1f Longitudinal Survey 19E - Ebb Tide

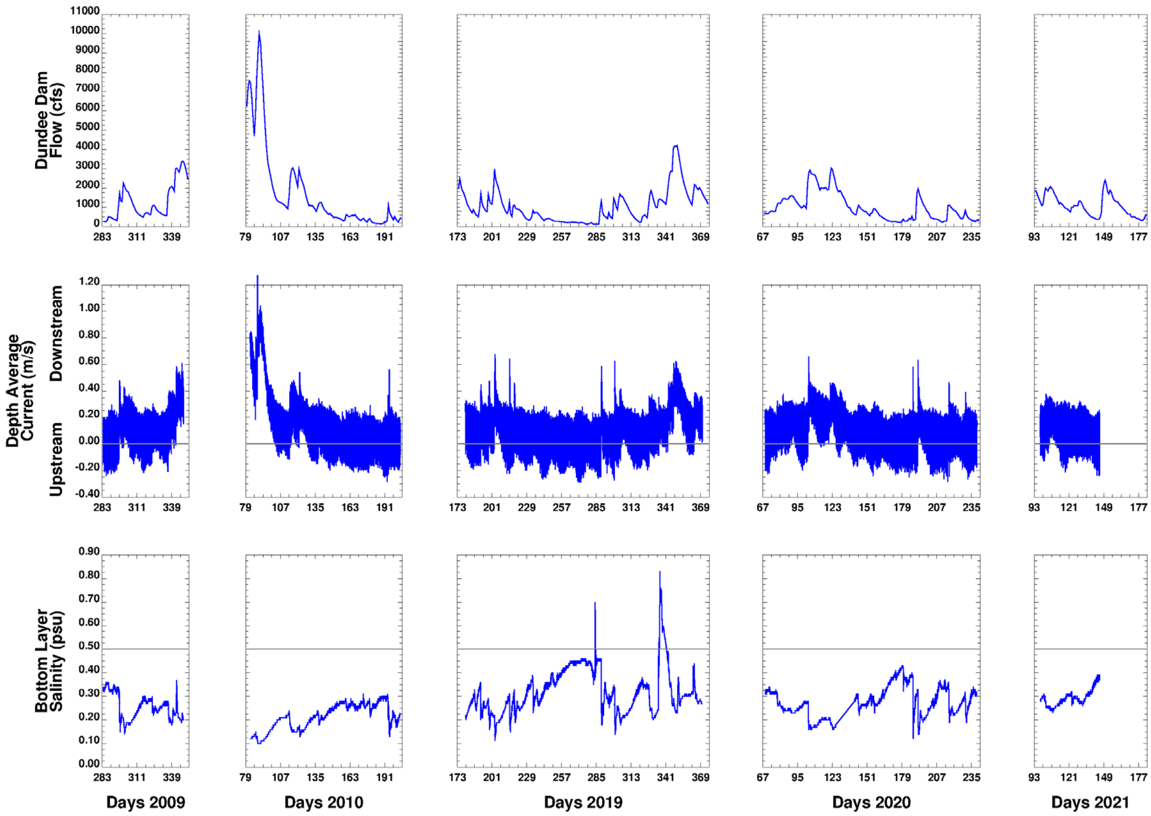

__Figure 7__: A.2.1-2 RM 13.8 Current and Salinity Data

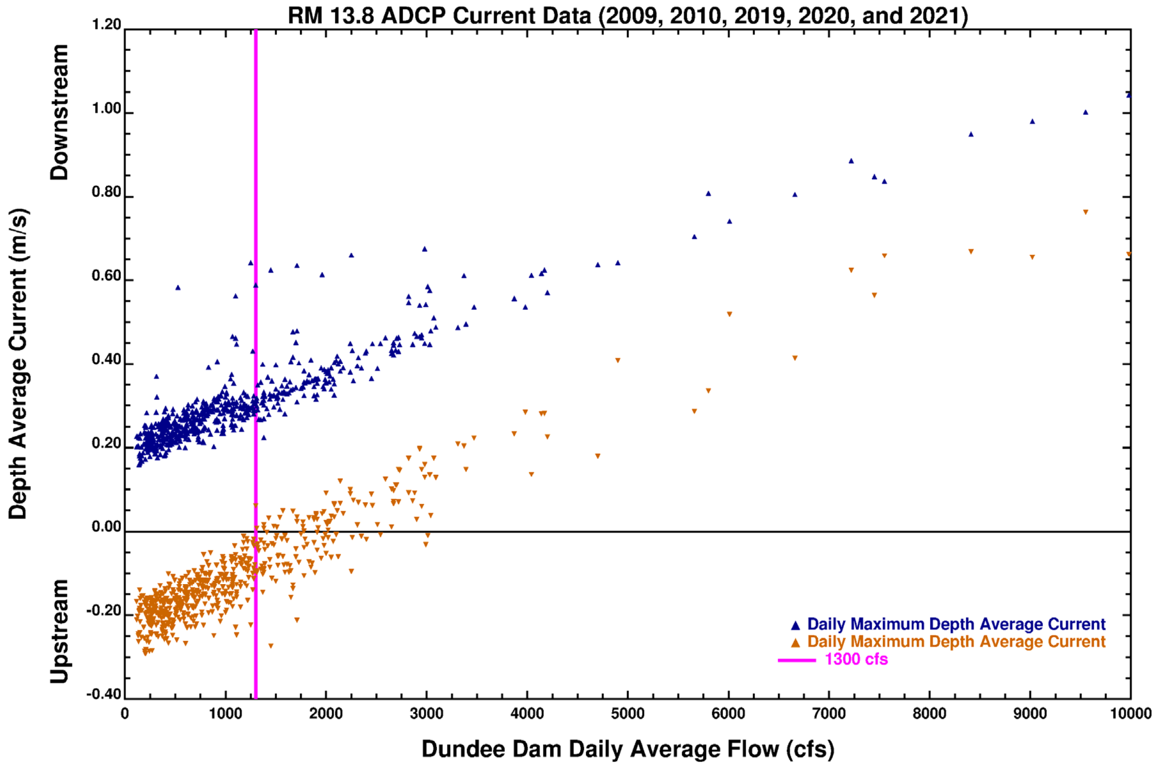

__Figure 8__: A.2.1-3 Current Data Versus Flow

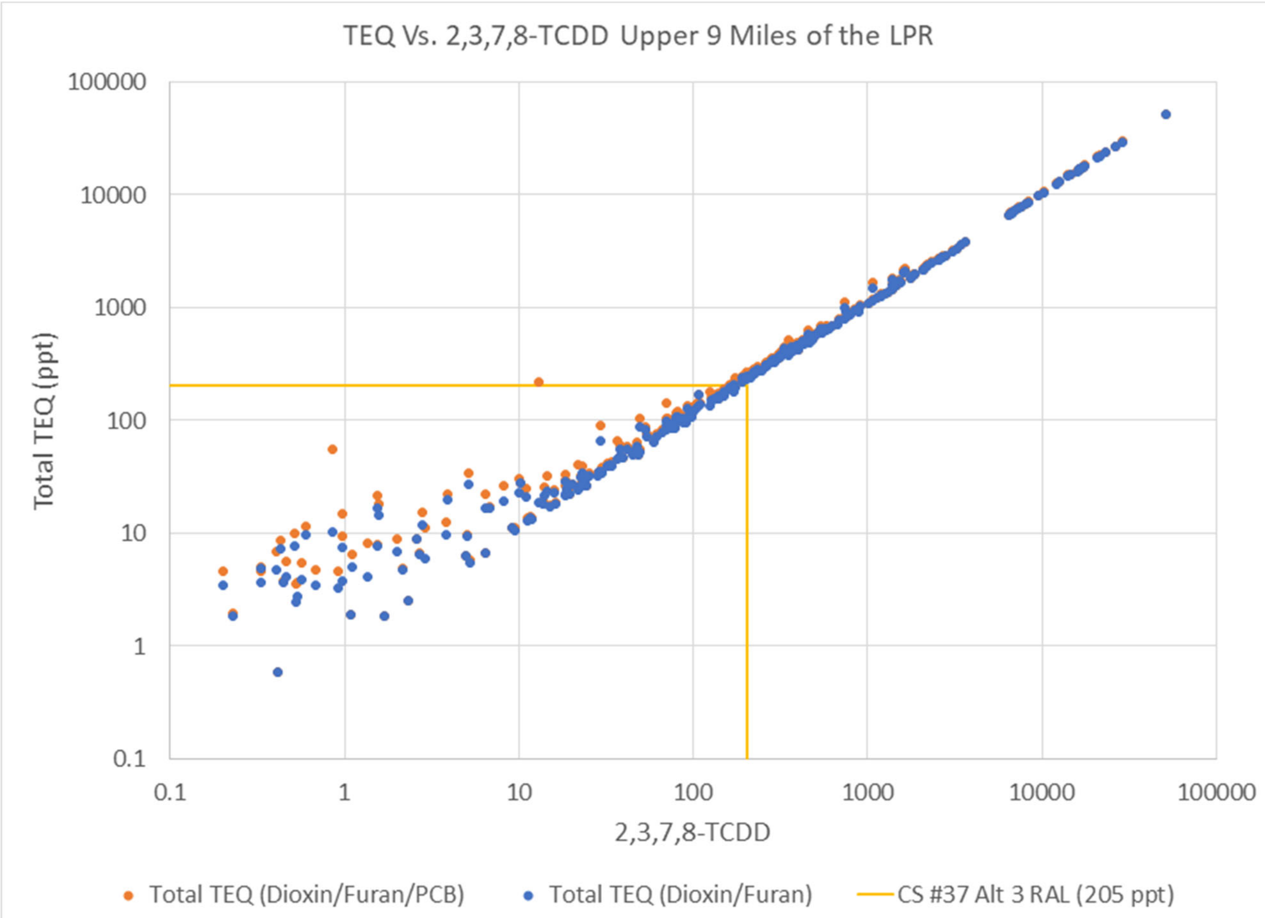

***Figure 9**: A.4.3-1 Total TEQ and 2,3,7,8-TCDD correlation*

References

Chant, R.J., D. Fugate, and E. Garvey. 2010. *"The Shaping of an Estuarine Superfund Site: Roles of Evolving Dynamics and Geomorphology."* Estuaries and Coasts 34(1):90–105. https://semspub.epa.gov/src/document/02/207279

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ATTACHMENT A

PROPOSED PLAN

U.S. Environmental Protection Agency

Region II

Lower Passaic River Study Area

Diamond Alkali Superfund Site Operable Unit 4

Essex, Bergen, and Passaic Counties, New Jersey

April 2021

Superfund Proposed Plan

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered to address sediments acting as sources of contamination that inhibit recovery in the upper 9 miles of the Lower Passaic River Study Area (LPRSA) and identifies the preferred remedial alternative along with the rationale for this preference. The LPRSA is Operable Unit 4 (OU4) of the Diamond Alkali Superfund Site (the Site) and encompasses the entire Lower Passaic River (LPR) from Newark Bay at river mile (RM) 0 to the Dundee Dam at approximately RM 17.7.

In March 2016, EPA issued a Record of Decision (ROD) selecting a final remedy for sediments, and an interim action for the water column, in the lower 8.3 miles of the LPRSA (OU2 of the Site, from Newark Bay to RM 8.3), where a large majority of the contamination in the LPR is concentrated. The ROD for the lower 8.3 miles requires bank-to-bank remediation with a sediment remediation goal (RG) of 8.3 parts per trillion (ppt) for dioxin (specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD], the most toxic form of dioxin). That remedy, which includes a bank-to-bank engineered cap preceded by sediment dredging so the cap can be placed without increasing the potential for flooding, and to allow for continued commercial use of a federally authorized navigation channel in the 1.7 miles of the river closest to Newark Bay,

MARK YOUR CALENDAR

Public Comment Period:

April 15 – May 14, 2021

EPA will accept written comments on the Proposed Plan during the public comment period. Written comments should be addressed to:

Diane Salkie, Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866
e-mail: salkie.diane@epa.gov

Public Meeting:
April 27, 2021 at 6:00 P.M.: Virtual Public meeting
One may find meeting participation details using the following links:

www.epa.gov/superfund/diamond-alkali and www.ourpassaic.org.

Alternately, one may participate by telephone using the following conference line number:
315-565-0493; Code: 88557323# for **English** or
315-565-0493; Code: 7960512# for **Spanish**

Please register in advance of the virtual meeting by accessing:
https://epa_proposed_plan_lprsa.eventbrite.com
or contacting Shereen Kandil, Community Involvement Coordinator, at: Kandil.Shereen@epa.gov or (212) 637-4333.

Anyone interested in receiving materials for the public meeting in hard copy should either email or call Shereen Kandil with such a request by April 23, 2021.

and accommodate reasonably anticipated future recreational use above RM 1.7, is currently in the remedial design (RD) phase. The lower 8.3-mile ROD and supporting information are part of the publicly available administrative record for OU2.

This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), the lead agency for the Site, in consultation with the New Jersey Department of Environmental Protection (NJDEP). In addition, in 2002, EPA formed a partnership with the US Army Corps of Engineers (USACE), NJDEP, the National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service, known as the Partner Agencies, to conduct a joint study that would bring each agency's authorities to bear on the complex LPRSA. EPA has consulted with the Partner Agencies, who are key state and federal stakeholders in the LPR, Newark Bay, and New York-New Jersey Harbor Estuary. Another key stakeholder in the Site is a very active and involved Community Advisory Group (CAG). EPA has briefed the CAG throughout every stage in Site history since the CAG's inception in 2009.

EPA's response at the Site began in the 1980s, initially at a former manufacturing facility located at 80-120 Lister Avenue, Newark, New Jersey. Apart from some initial sampling in the river in the 1980s, the investigation of the LPRSA began in 1994, when Occidental Chemical Corporation (OCC) agreed to an administrative order on consent (AOC) with EPA to perform a remedial investigation and feasibility study (RI/FS) to investigate a six-mile stretch of the LPR encompassing the Lister Avenue facility. The purpose of the RI/FS was to characterize conditions and determine risks within the study area and evaluate remedial alternatives to address those risks. EPA halted the six-mile study and in 2002, EPA expanded the scope of the investigation to include the entire LPRSA.

While that work was underway, EPA identified additional potentially responsible parties (PRPs) for the LPRSA, and a number of PRPs, comprising companies that owned or operated facilities from which hazardous substances were potentially discharged to the river, formed the Cooperating Parties Group (CPG). In 2004, EPA signed a settlement agreement with the CPG in which the settling parties agreed to pay for EPA to perform the LPRSA RI/FS. In 2007, the CPG entered into a new agreement with EPA, in which the settling parties agreed to take over the performance of the LPRSA RI/FS from EPA, with EPA oversight. Since 2007, the members of the CPG have continued to change from time to time.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination in the upper 9 miles of the LPRSA and the remedial alternatives summarized in this Proposed Plan are described in greater detail in two documents, the 2019 *Remedial Investigation Report, Lower Passaic River Study Area* (RI Report) and the 2020 *Upper 9-Mile Source Control Interim Remedy Feasibility Study Report* (IR FS Report). Those and other documents are part of the publicly available administrative record file for OU4 and are located in the information repository for the Site. EPA encourages the public to review those documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

The findings of the RI Report support an adaptive, multi-phased approach to remediating contamination in the upper 9 miles of the LPRSA. The initial phase of cleanup, described in this Proposed Plan, would address source sediments in the upper 9 miles that have elevated contaminant concentrations and act as a reservoir for potential migration of contamination to the water column, other areas of the sediment bed, and biota.

Therefore, the sediment source control action would be an interim remedy (IR) for the upper 9 miles of the LPRSA. This action would be followed by a period of monitoring to evaluate the response of the river system to the IR and track the recovery of sediments, the water column, and biota. Following the period of system response and system recovery monitoring, EPA will issue a final ROD to document risk-based cleanup levels and any additional actions to address remaining unacceptable risks, in both sediments in the upper 9 miles and surface water throughout the LPRSA. Information learned during the IR and the system response and system recovery monitoring that follow the IR, along with identifying project uncertainties, providing a mechanism for how these uncertainties would be addressed, and modifying the conceptual site model as necessary, would inform selection of the final remedy in the final ROD. The ultimate objective of the adaptive management approach would be to select, implement, and demonstrate the success of a final remedy.

EPA's preferred alternative, Alternative 3, for the sediment source control IR consists of dredging and capping to:

- Control sediment sources of 2,3,7,8-TCDD and polychlorinated biphenyls (PCBs) by remediating surface sediments (within 6 inches of the sediment bed) with elevated concentrations
- Achieve a post-IR 2,3,7,8-TCDD surface area-weighted average concentration (SWAC) of 75 ppt from RM 8.3 to RM 15
- Achieve a post-IR total PCB SWAC equal to or below the established total PCB background concentration of 0.46 parts per million (ppm) from RM 8.3 to RM 15
- Control subsurface sediments (greater than 6 inches below the sediment bed) from becoming sources of 2,3,7,8-TCDD and PCBs through erosion

A SWAC is an average of sample data that weights each sample point relative to the area it represents and is intended to estimate the mean contaminant concentration over a certain area when sample density is not necessarily uniform throughout the area. EPA would use SWAC as the measurable goal to demonstrate that the IR is effective in remediating sediment sources. To achieve target post-IR SWACs, remedial action levels (RALs) guide remediation. Surface sediments with 2,3,7,8-TCDD concentrations above the 2,3,7,8-TCDD surface RAL would be remediated by dredging and capping. Surface sediments with total PCB concentrations above a surface RAL of 1 ppm would also be remediated by dredging and capping. Subsurface RALs would also be established to guide the remediation of sediments in erosional areas. Based on the current estimated SWACs, the preferred alternative would immediately reduce the 2,3,7,8-TCDD SWAC from RM 8.3 to RM 15 by approximately 92 percent and the total PCB SWAC by approximately 82 percent.

In the IR FS, areas of active remediation, known as remedial footprints, were delineated for each alternative based on sediment concentration mapping and mapping of erosional areas developed from the RI sediment and bathymetry data. Bathymetry refers to the elevation of the river bottom (analogous to topography on land) and is typically expressed as the water depth relative to a fixed datum (e.g., the North American Vertical Datum of 1988). Bathymetry is measured using acoustic signals to determine the depth of water over the sediment bed and create a topographic map of the bed. Alternative-specific RALs were also derived in the IR FS through the process of delineating the alternative-specific remedial footprints. The final IR remedial footprint would be determined based on the results of pre-design investigation (PDI) sediment sampling that would be conducted at high spatial density during the IR RD phase and additional bathymetric surveying information that would provide current understanding of erosion and deposition. The PDI sediment sampling results would also be used to determine the final RALs to be adhered to during the IR. During the IR, sediments throughout the final IR remedial footprint would be removed to the depths necessary to accommodate a sediment cap that is resistant to erosion and contaminant migration.

A source control IR would support adaptive management of the overall cleanup of sediments in the upper 9 miles of the LPRSA and surface water throughout the LPRSA. EPA anticipates that under the adaptive management approach (see Appendix D of the IR FS Report), the design and implementation of the IR, followed by post-IR response and recovery assessment monitoring, would systematically incorporate new information to reduce final remedy uncertainties (e.g., what specific actions would be needed to attain final cleanup in a reasonable timeframe), and provide a framework for future remedial action decisions and confirmation of final remedy completion that are consistent with CERCLA and the NCP.

EPA, in consultation with NJDEP, may modify the preferred alternative or select another alternative presented in this Proposed Plan based on new information and/or public comments. The final decision regarding the selected IR alternative will be made after EPA has taken into consideration all public comments. Therefore, EPA is soliciting comment on all the information and alternatives summarized in this Proposed Plan.

Community Role in the Selection Process

This Proposed Plan is being issued to inform the public of EPA's preferred alternative for sediment source control in the upper 9 miles of the LPRSA and to solicit public comments pertaining to all of the IR alternatives evaluated, including the preferred alternative. Changes to the preferred alternative, or a change from the preferred alternative to another alternative, may be made if public comments and/or additional data indicate that such a change would result in a more appropriate IR. The final decision regarding the selected IR alternative will be made after EPA has taken into consideration all public comments. This Proposed Plan has been made available to the public for a public comment period that is from April 15 – May 14, 2021

A virtual public meeting will be held during the public comment period on **April 27, 2021** at 6:00 p.m. regarding the investigations of the upper 9 miles of the LPRSA, the IR alternatives considered, and the preferred alternative, and to receive public comments. The public meeting will include a formal presentation by EPA of the preferred alternative and other options considered for the sediment source control IR.

Information on the public meeting and submitting written comments can be found on page 1. Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary in the IR ROD. The IR ROD is the document that will formalize the selection of the IR for the upper 9 miles of the LPRSA.

SITE DESCRIPTION

The LPR and Newark Bay are part of the New York/New Jersey Harbor Estuary. The LPR refers to the tidal portion of the river (i.e., from Newark Bay to Dundee Dam) and its watershed, which includes the major tributaries Saddle River, Third River, and Second River. See Figure 1. Dundee Dam isolates the Upper Passaic River (UPR) from the tidal mixing that influences the lower portions of the river.

Notably, two RM systems have been developed for the LPRSA. A RM system was developed by USACE that follows the navigation channel of the LPR. RM 0 in the USACE system is just offshore of Kearny Point, and RMs continue upriver to the Dundee Dam, which is at RM 17.7 in this system. RM 8.3, which designates the upriver extent of OU2 and the downriver extent of the upper 9-mile reach of the LPRSA covered by this Proposed Plan, is named in the USACE RM system. The RI RM system followed the geographic centerline of the

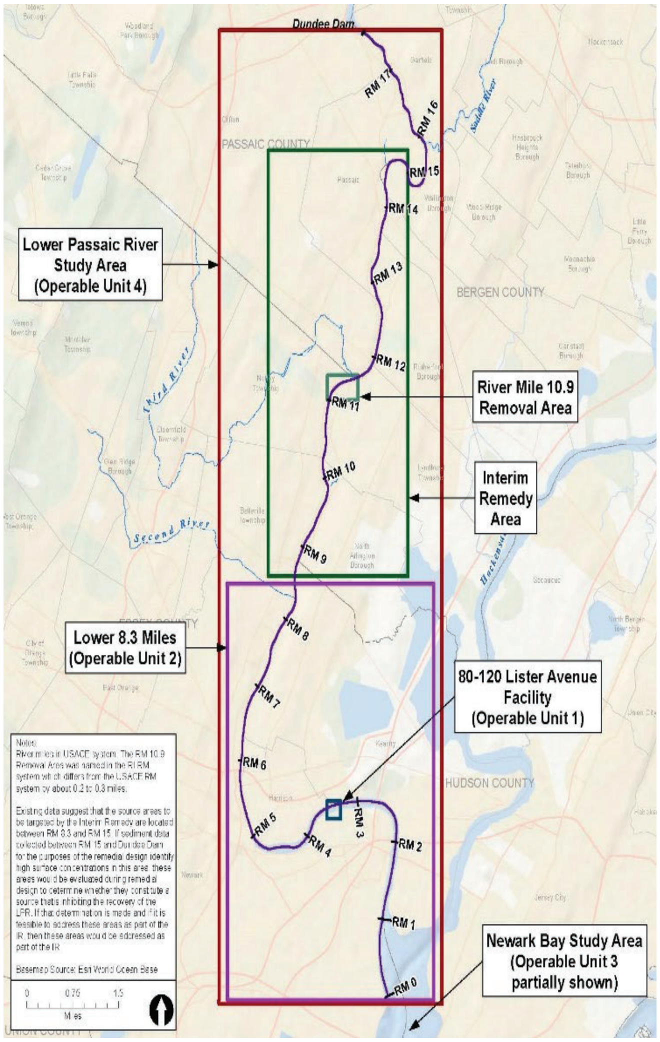

Figure 1: Map of the Lower Passaic River (Source: IR FS Report)

river (which was developed by EPA and used for the RI evaluations). In the RI RM system, RM 0 is defined by an imaginary line between two marker lighthouses at the confluence of the LPR and Newark Bay: one in Essex County just offshore of Newark; and the other in Hudson County just offshore of Kearny Point. RMs in the RI RM system then continue upriver to Dundee Dam (at RM 17.4 in the RI RM system). The two RM systems are about 0.2 to 0.3 miles apart. RM designations in this Proposed Plan are in the USACE system unless otherwise specified.

The LPR is in a highly developed urban area. The predominant adjacent land uses from the mouth of the LPR (RM 0) to approximately RM 4 are industrial and commercial. Adjacent land use above approximately RM 4 begins to also include residential and recreational uses. The upper portions of the LPR generally feature steeper and hardened shorelines on the west bank with limited areas of riparian vegetation. Moving upriver from RM 8.3, land use increasingly transitions to commercial and recreational, with pockets of residential use. A four-lane highway (Highway 21) runs parallel to the river along the western bank between approximately RM 7 and RM 14. A strip of parkland runs along much of the eastern shoreline between approximately RM 7 and RM 14, with six parks and recreation areas of note and four boathouses/crew facilities. The east bank tends to be less modified, consisting of more natural shoreline, residential areas, and parks. In the parks on the eastern shore, access to the riverbank is possible in some clearings and areas where vegetation growth is limited, and the riverbank is not too steep. Above approximately RM 14, the river becomes narrower, shallower, and the adjacent uses become more residential. Pulaski Park is located on the western bank between approximately RM 15.5 and RM 16. Much of the shoreline between approximately RM 16 and Dundee Dam is vegetated with several points of public access to the water.

The New Jersey Surface Water Quality Standards classify the LPR from its mouth to the Second River as saline-estuarine 3. The LPR from Second River to Dundee Dam is classified as freshwater 2 non-trout and saline-estuarine 2.

SITE BACKGROUND

The LPRSA is a part of the Diamond Alkali Superfund Site. EPA's response at the Site began at a former manufacturing facility located at 80-120 Lister Avenue (RM 3.4) in Newark, New Jersey. The manufacturing process associated with the release of 2,3,7,8-TCDD from the Lister Avenue facility started in the late 1940s.[1] In the 1950s and 1960s, the facility was operated by the Diamond Alkali Company (later purchased by and merged into Occidental Chemical Corporation, or OCC). Between March 1951 and August 1969, the Diamond Alkali Company manufactured the chemical 2,4,5-trichlorophenol and the herbicides 2,4-dichlorophenoxyacetic acid and 2,4,5-trichlorophenoxyacetic acid, ingredients in the defoliant "Agent Orange." A by-product of the manufacturing was 2,3,7,8-TCDD. These substances have all been found in LPR sediments and fish/crab tissue.

Based on investigations by EPA and NJDEP, the Diamond Alkali Site was placed on the National Priorities List in 1984. After further investigations and several emergency response actions that addressed dioxin found on nearby properties, EPA issued a ROD in 1987 to select an interim containment remedy for the Lister Avenue facility (OU1). The remedy consisted of demolishing a warehouse and other structures on site; installing subsurface walls around the site to contain the contaminated soils and materials; capping the site; and collecting and treating the contaminated groundwater.

In 1994, OCC agreed to an AOC with EPA to investigate a six- mile stretch of the LPR encompassing the Lister Avenue facility. This investigation found contaminants that originated from the Lister Avenue facility, in particular 2,3,7,8-TCDD and pesticides, throughout the six miles, with the highest concentrations adjacent to the facility. This investigation also found many other contaminants not clearly linked to operations at the Lister Avenue facility and indicated that contaminated sediments moved into and out of the six-mile stretch, leading to the conclusion that a more comprehensive study was required. EPA halted the six-mile study, and in 2002, EPA expanded the scope of the investigation to include the entire LPRSA.

While working with OCC on the Lister Avenue facility and the first studies of the river, EPA also identified other PRPs for the LPRSA. As noted above, a number of companies that owned or operated facilities from which hazardous substances were potentially discharged to the river formed the CPG, and in 2004, EPA signed a settlement agreement with CPG members in which the settling parties agreed to pay for EPA to perform the LPRSA (OU4) RI/FS. The settlement agreement was amended in 2005 and 2007, adding more parties to reach a total of over 70 settling parties. From 2004 to 2007, EPA investigated contamination in sediments and water of the LPR, and investigated the major tributaries, combined sewer overflows (CSOs), and storm water outfalls (SWOs) to the river. In 2007, CPG members entered into a new AOC with EPA, in which the settling parties agreed to take over the performance of the LPRSA RI/FS from EPA, with EPA oversight.

During the comprehensive investigation of the LPRSA, the sediments of the lower eight miles were found to be a major source of contamination to the overall LPR and to Newark Bay (OU3). Unlike many rivers, where remediation is typically performed from upstream to downstream because flow is in only one direction, the tides in the LPR move water, suspended sediments, and contaminants back and forth twice a day, and therefore the mass and volume of contaminated sediments dictated the focus of investigations. EPA undertook a targeted RI and focused FS (FFS) of the lower 8.3 miles, while the comprehensive LPRSA RI/FS was on-going. In March 2016, EPA selected

[1] EPA has previously identified that the Diamond Alkali Company began operating at 80 Lister Avenue in 1951 (2014 *Focused Feasibility Study Report for the Lower Eight Miles of the Lower Passaic River*). While this is accurate, the manufacturing of dichlorodiphenyltrichloroethane (DDT) and phenoxy herbicides began in or about 1946, by Kolker Chemical Works, Inc., a corporate predecessor of Diamond Alkali. Reconstruction of historical records suggests that releases of 2,3,7,8-TCDD likely began in the late 1940s (2018 *Reconstruction of Historical 2,3,7,8-Tetrachlorodibenzo-p-dioxin Discharges from a Former Pesticide Manufacturing Plant to the Lower Passaic River*, from Chemosphere, Volume 212, Robert Parette et al., pages 1125-1132).

the remedy for OU2, which includes the construction of an engineered cap over the river bottom of the lower 8.3 miles of the LPRSA, dredging of the river bottom from bank to bank prior to placement of the cap, and implementation of institutional controls (ICs) designed to protect the engineered cap.

Two removal actions have been conducted in the LPRSA. In June 2008, EPA and OCC signed an AOC for a non-time-critical removal action to remove 200,000 cubic yards (cy) of contaminated sediments from the river adjacent to the 80-120 Lister Avenue facility. Dredging, dewatering, and transport off site of the first 40,000 cy of sediments (known as Phase 1) was completed in 2012. The remainder of the project is being incorporated into the lower 8.3-mile remedial action. In June 2012, EPA and the CPG signed an AOC for a time-critical removal action to address the risks posed by high concentrations of dioxins, PCBs, and other contaminants found at the surface of a mudflat on the east bank of the river at RM 10.9 (note that the RM 10.9 designation is in the RI RM system) in Lyndhurst, New Jersey. This action is referred to as the "RM 10.9 Removal". Dredging and capping at RM 10.9 were completed between 2013 and 2014 and monitoring of the performance of the cap continues for this area.

SITE CHARACTERISTICS

The LPRSA has been methodically evaluated through various investigations. The results of these studies are detailed in the RI and IR FS Reports, prepared by the CPG pursuant to the 2007 RI/FS AOC, and in the lower 8.3-mile ROD and its administrative record. Tables 1 and 2 summarize 2,3,7,8-TCDD and total PCB data, respectively, for the upper 9 miles of the LPRSA, for surface and subsurface sediments. The major processes controlling contaminant fate and transport in the LPRSA are illustrated in the discussion below and in the conceptual site model (CSM) description.

Table 1. 2,3,7,8-TCDD in Sediments (parts per trillion)

Statistic	Depth (feet)				
	0.0 to 0.5	0.5 to 1.5	1.5 to 2.5	2.5 to 3.5	3.5 Feet to End
River Mile 8.3 - 15					
Minimum	0.4	0.01	0.01	0.02	0.04
Maximum	51,100	57,176	30,500	29,800	18,849
Mean	2,094	3,426	3,186	3,332	1,576
Median	260	402	272	315	107
River Mile 15 - Dundee Dam					
Minimum	0.03	0.03	0.04	0.03	0.02
Maximum	0.8	0.2	6.7	12	9
Mean	0.3	0.09	1.4	3	3
Median	0.3	0.07	0.07	0.2	0.2

Table 2. Total PCBs in Sediments (parts per million)

Statistic	Depth (feet)				
	0.0 to 0.5	0.5 to 1.5	1.5 to 2.5	2.5 to 3.5	3.5 Feet to End
River Mile 8.3 - 15					
Minimum	0.002	0.0001	0.000004	0.000003	0.000003
Maximum	34	35	34	34	22
Mean	2.9	4.2	4.6	4.7	3
Median	0.9	1.3	1.6	1.6	0.7
River Mile 15 - Dundee Dam					
Minimum	0.01	0.000002	0.000003	0.00001	0.000002
Maximum	2.9	0.6	0.3	0.5	0.6
Mean	0.3	0.2	0.1	0.2	0.2
Median	0.09	0.01	0.0004	0.1	0.03

Physical Characteristics

The LPR varies considerably from the mouth at Newark Bay moving upstream to Dundee Dam. The water depth and cross-sectional area decrease moving upstream, with a marked constriction at RM 8.3. At that location, there is also a pronounced change in sediment texture within the riverbed. The riverbed from RM 0 to RM 8.3 is dominated by fine-grained sediments. Above RM 8.3, the riverbed is dominated by coarser sediments with smaller areas or pockets of fine-grained sediments, often located outside the channel. The inside bends of the river generally accumulate finer sediments, while the outside bends generally experience little or no sediment accumulation and in some cases experience erosion due to higher shear stresses. In the vicinity of structures such as bridge abutments and at tributary confluences, sediments tend to be coarse or absent due to associated turbulence that prevents long-term accumulation of fine sediments (or any sediments). About 85 percent of the fine-grained sediment surface area (90 percent by volume) of the LPR is located below RM 8.3. As discussed in the OU2 ROD, wider beds of contaminated sediments accumulated below RM 8.3 than above it is due to a combination of a wider cross-section and a deeper navigation channel.

Hydrodynamics of the LPR are governed by the freshwater discharge, tides, estuarine circulation, and changes in mean water level caused by storm surges moving into Newark Bay and the LPR from the Atlantic Ocean. Denser saline waters from Newark Bay enter the LPR as a salt wedge in the lower portion of the water column tending to flow in the upstream direction beneath fresher water flowing in the seaward direction, producing a two-layer flow pattern. The interface between fresh and brackish waters in the LPR, referred to as the salt front (at the upstream extent of the salt wedge), moves several miles during each tidal cycle and typically resides within the lower 10 miles, but it can extend upstream beyond approximately RM 14 under extreme low-flow conditions.

The salt front typically coincides with the region of maximum turbidity known as the estuarine turbidity maximum (ETM). The ETM results from a combination of resuspension of bottom sediments by tidal currents and the convergence of bottom water transport around the salt front. The geometry and density gradients in the LPR (under normal flow conditions) result in higher resuspension rates and higher suspended sediment concentrations during flood (rising) tides compared to ebb (falling) tides (referred to as tidal asymmetry). Tidal asymmetry, coupled with estuarine circulation, increases sediment retention in the LPR and provides a mechanism for contaminant transport in the upstream direction within the salt wedge and in the downstream direction in fresher surface layer waters.

The estuarine circulation, tidal asymmetry, and freshwater flow affect sediment transport over time scales longer than tidal cycles. During low river flow conditions, tidal asymmetry and estuarine circulation are dominant, leading to import of sediments from Newark Bay, net upstream transport within the salt wedge, and trapping of sediments within the LPR. In moderate river flow conditions, sediment transport is more impacted by river flow, and sediments accumulated in the ETM and in unconsolidated surface sediments that are easily eroded are generally flushed downstream and into Newark Bay. During high river flow conditions, the riverbed may experience scour and the system as a whole exports sediments and erodes even beyond the easily erodible unconsolidated surface sediments. These processes promote a continual redistribution of contaminants associated with fine-grained sediments.

CONCEPTUAL SITE MODEL

Deposition and erosion in the LPR have been assessed through the analysis of a series of high-resolution bathymetry surfaces developed from multi-beam survey data obtained over a six-year period from 2007 to 2013, including a high flow associated with Hurricane Irene in August 2011. Flow over Dundee Dam reached 24,700 cubic feet per second (cfs) following Hurricane Irene. As a point of comparison, the annual average flow at Dundee Dam is approximately 1,200 cfs.

Contaminant concentrations in the LPR are largely driven by variations in sediment type and depositional/erosional history. Two contaminants found throughout the LPRSA that have shown unacceptable risk based on risk assessments and would be addressed through a sediment source control IR are 2,3,7,8-TCDD and PCBs. Other contaminants found in the LPRSA, but not contributing to human health and/or ecological risk to the same degree, include DDx (DDT and its derivatives), PAHs, and metals (including mercury). Contaminants are generally found in greatest concentrations in fine-grained sediments such as the RM 10.9 mudflat, which was found to contain surface sediment 2,3,7,8-TCDD levels exceeding 50,000 ppt and total PCB levels exceeding 33.9 ppm in some instances prior to the RM 10.9 Removal. Variations in spatial patterns for PCBs, total DDx, and mercury suggest these contaminants may also be impacted by other sources, including from the UPR, Newark Bay, tributaries, and/or watershed sources. Figure 2, located at the end of this Proposed Plan, demonstrates the nature and extent of 2,3,7,8-TCDD and PCB contamination in surface sediments in the LPRSA.

Continuing contaminant sources to recently deposited sediments of the LPR are the internal sediment inventory (e.g., resuspended contaminated sediments within the LPR), tidal exchange with Newark Bay, flows from above Dundee Dam, CSOs and SWOs, overland flow, groundwater, and various other point and non-point sources. The contaminated fine-grained sediments already within the LPR are the most significant continuing contaminant source and will be addressed to a large degree by the bank to bank capping of RM 0 to RM 8.3. In comparison, UPR and Newark Bay contributions of contaminants are small, and all other sources are minor. The IR focusing on source control that is the subject of this Proposed Plan targets sediments with higher contaminant concentrations in the upper 9 miles of the LPRSA.

Dundee Lake and other UPR sediments are isolated from hydrodynamic impacts and sediment transport from the LPR by Dundee Dam. The concentrations of the contaminants detected in recently deposited sediments collected from the UPR immediately above Dundee Dam are representative of current background conditions for the LPR.

EPA investigated potential sources of contaminants to the LPR, including atmospheric deposition, groundwater, industrial point sources, the UPR, Newark Bay, major tributaries, CSOs, and SWOs. Based on analyses discussed in the lower 8.3-mile targeted RI and FFS, direct atmospheric deposition, groundwater discharge, and industrial point sources of contaminants currently are not significant contributors of contaminant mass in the recently deposited sediments or water column of the LPR. The UPR, Newark Bay, the three main tributaries, and CSOs and SWOs were sampled between 2005 and 2011. A mass balance of suspended sediments and contaminant loads was performed with the data as part of the analysis from the lower 8.3-mile ROD. The results indicate that the tributaries, CSOs, and SWOs are minor contributors of contamination to recently deposited sediments, since they are minor contributors of sediment particles compared to the UPR and Newark Bay, and the mass of contaminants delivered by those particles is low compared to the sediments of the LPR main stem. For contaminants such as 2,3,7,8-TCDD, total PCBs, and mercury, concentrations on sediment particles from the tributaries, CSOs, and SWOs are clearly lower than those on LPR surface sediments. Contributions to the recently deposited sediments of the LPR were summarized in the lower 8.3-mile ROD.

As presented in the lower 8.3-mile ROD, resuspension of LPR sediments contributes well over 90 percent of the dioxin in recently deposited sediments of the LPR, followed by Newark Bay (approximately 5 percent) and the UPR (3 percent or less). Resuspension of LPR sediments contributes approximately 80 percent of PCBs in recently deposited sediments, followed by the UPR (approximately 10 percent) and Newark Bay (less than 10 percent).

A detailed discussion of the LPRSA CSM is presented in the RI Report, as well as the lower 8.3-mile ROD and the OU2 administrative record.

SCOPE AND ROLE OF THE ACTION

Although the RI Report documented investigations that were developed and implemented for the entire LPRSA, the analysis of the proposed sediment source control IR is focused on the upper 9 miles of the LPRSA. The rationale for undertaking a source control IR is supported by the CSM for the upper 9 miles, which is derived from RI data and evaluations of contaminant distributions, sediment characteristics, and sediment and contaminant fate and transport. The CSM allowed EPA to identify areas of the riverbed with high contaminant concentrations that act as ongoing sources to the water column, the remainder of the sediment bed, and biota. Remediating these sources will immediately reduce SWACs, accelerate recovery of the water column and the remaining areas of the sediment bed, and reduce exposure to biota. The IR would be performed using an adaptive management approach that will support a final ROD, consistent with CERCLA and the NCP.

For this proposed source control IR, sediment sources are defined as sediments in the upper 9 miles of the LPRSA that:

- have elevated concentrations (2,3,7,8-TCDD concentrations in the range of 200 to 400 ppt and above and total PCB concentrations of 1 ppm and above)
- have a low potential for recovery through ongoing natural processes such as the accumulation of cleaner sediments at the surface
- act as a reservoir for potential migration of contamination to surface water and biota, thereby inhibiting overall abiotic and biotic recovery in the system

Existing data suggest the source areas to be targeted by the proposed IR are located between RM 8.3 and RM 15. However, the PDI will generate data throughout the upper 9 miles of the LPRSA. Surface RALs will also be applied to the area between RM 15 and Dundee Dam.

Concentrations in surface sediments represent an exposure to biota. However, because the specific relationship between sediment concentrations and tissue concentrations is not fully understood at this time, it is not possible to determine at present whether contaminant concentrations in biota would be reduced in direct proportion to the reductions in sediment concentrations. As such, EPA will use reduction in SWAC as the measurable goal to determine effectiveness of the IR. EPA expects that ecological exposure and tissue concentrations would be reduced in response to the IR, which is expected to result in a reduction in ecological and human health risk. A comprehensive food web model is under development for the LPRSA, which will be used to understand the relationship between sediments and tissue. This food web model should be complete by the time an IR is implemented, such that long-term reductions in risk could be evaluated and communicated during the post-IR monitoring period and inform decision-making for the final remedy.

Sediment and surface water data collected during the RI and post-remediation data collected in the RM 10.9 Removal area suggest reasonable thresholds for classifying source sediments for the IR are 2,3,7,8-TCDD concentrations in the range of 200 to 400 ppt and above and total PCB concentrations of 1 ppm and above. In the design and implementation of the IR, sediments to be targeted as source would be specifically defined by final RALs.

Implementation of a source control IR would provide several expected benefits: a greater than 90 percent reduction in the average surficial sediment concentration of 2,3,7,8-TCDD, one of the dioxins/furans that are the primary contaminants causing risk to human health; significant reduction of ecological and human health risk; and alignment of remedial activities between the upper 9 miles and the lower 8.3 miles of the LPRSA. An IR would also address other contaminants in sediments that are collocated with 2,3,7,8-TCDD and PCBs in the IR footprint. Remediation in both reaches of the river within a similar timeframe would accelerate overall risk reduction and recovery for the entire LPR. In addition, an alignment of construction schedules for the two reaches may allow opportunity to share resources (e.g., a sediment processing facility) for increased efficiency.

The adaptive management approach would provide a mechanism for interpreting and responding to new data and potential changed understanding of system conditions. Incorporating structured adaptive management into the remediation would ensure that data collected during the monitoring phases of the project can be used to reduce uncertainties associated with selecting a protective final remedy for the LPRSA. The adaptive management approach would define how key project uncertainties would be addressed through additional data collection and how the system response to the IR and long-term system recovery would be integrated into a structured final remedy-selection process to ensure that the goal of protecting human health and the environment is achieved, consistent with CERCLA and the NCP.

In addition to the food web model, a suite of numerical models that describe hydrodynamic and sediment and contaminant fate and transport processes in the LPR has been developed by EPA, and by performing parties with EPA oversight. This suite of models would be refined using newly generated data and information and would be used to predict system conditions in the future and inform the final ROD for the LPRSA. While the numerical models would provide important predictive tools, EPA would rely on actual data collected during various monitoring phases to understand Site conditions and make decisions.

Figure 3, located at the end of this Proposed Plan, presents a highly conceptualized depiction of the adaptive approach to cleanup of the upper 9 miles of the LPRSA. The adaptive approach would include assessing completion of the IR in terms of the following adaptive elements: attaining IR Remedial Action Objectives (RAOs) and adequately removing sediment sources; system response to the IR in terms of an accelerated recovery trajectory; and overall longer-term recovery of the system. Longer-term recovery of the system following the IR would be assessed against risk-based preliminary remediation goals (PRGs) developed in parallel with the IR design, and data collection would be prioritized to allow for selection of final RGs and a final remedy to attain the final RGs in a reasonable timeframe through the final ROD. The adaptive approach would culminate with verifying attainment of final RGs after implementation of the final remedy.

PRINCIPAL THREAT WASTE

The identification of principal and low-level threats is made on a site-specific basis to help streamline and focus waste management options by categorizing the suitability of the waste for treatment or containment. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. No “threshold level” of toxicity/risk has been established to equate to “principal threat”. However, where toxicity and mobility of source material combine to pose a potential risk of 1×10^{-3} or greater, generally treatment alternatives should be evaluated. The NCP states that EPA expects to use treatment to address principal threats posed by a site whenever practicable.

The dioxin, PCB, and other contaminant concentrations in sediments throughout the LPRSA are present at levels contributing to significant risks (greater than 1×10^{-3}) for humans consuming fish and crab caught in the LPRSA. As previously stated, the action described in this Proposed Plan is developed to control sediments that have elevated contaminated concentrations and act as a reservoir for potential migration of contamination to the water column, other areas of the sediment bed, and biota. Although the engineering and sediment transport modeling work done as part of the IR FS has determined that the source area sediments, despite their toxicity, under current conditions, may be reliably contained, EPA nevertheless considers the most highly contaminated sediments as principal threat wastes.

EPA does not believe that treatment of all the sediments in the upper 9 miles of the LPRSA is practicable or cost effective given the high volume of sediments and the number of contaminants that would need to be addressed and lack of applicable in-situ (i.e., in-place) treatment technologies. However, as discussed below, EPA has considered treatment as a component of dredged material management.

SUMMARY OF SITE RISKS

Baseline human health and ecological risk assessments were conducted for the LPRSA to estimate the risks associated with exposure to contaminants based on current and likely future uses of the LPR. These baseline risk assessments are detailed in the RI Report.

Baseline Human Health Risk Assessment

A Baseline Human Health Risk Assessment (BHHRA) was conducted to assess the cancer risks and noncancer health hazards associated with exposure to contaminants of potential concern (COPCs) present in the LPRSA. The risk assessment was conducted using the standard EPA risk assessment process comprised of Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see text box).

People can be exposed to COPCs present within the upper 9 miles of the LPRSA mainly through consumption of fish and crabs. Recreational exposure to accessible surface sediments and surface water during boating, wading, fishing, or swimming in the LPR and worker exposures to accessible surface sediments do not pose unacceptable cancer risks or noncancer hazards.[2] For each assumed use, a reasonable maximum exposure (RME), which uses conservative exposure values, was evaluated to estimate cancer risks and noncancer hazard.

At RME exposure levels, which represent an upper bound by definition, the potential cancer risks and noncancer hazards to recreational anglers who are assumed to regularly consume their catch (i.e., eat approximately 56 LPRSA fish meals per year or approximately 30 meals per year of 6 crabs per meal) exceed the values used by EPA for determining whether a site poses unacceptable risk (see Table 3).

Consumption of fish and crab constitutes the predominant source of human health risk. The dominant potential contaminants of concern (COCs) for the fish and crab consumption scenarios are TCDD-TEQ (TEQ, or toxic equivalency, expresses the aggregate risk based on the cumulative effect of several tetra dioxin compounds) and PCBs, with methylmercury, pesticides, and, to a lesser extent, inorganic arsenic and inorganic mercury, contributing to risk. The primary human health risk drivers are 2,3,7,8-TCDD and PCBs. Other bioaccumulative compounds, including pesticides and mercury, also contribute to human health risk—but to a lesser extent. Background risks from consuming fish from the upstream area above Dundee Dam also exceed EPA's risk management goals due to levels of PCBs, pesticides, and mercury in background fish.

[2] An analysis of direct contact exposure to accessible surface sediments by 3-mile river segments in the BHHRA indicates that it is only in RM 6 to RM 9, and specifically the east bank of this river segment, that direct contact poses potential noncancer hazards in excess of a hazard index equal to 1 (maximum hazard index of 5), due primarily to TCDD-TEQ, which contributes more than 90% of noncancer hazards. Further analysis of the TCDD-TEQ data indicates that no elevated direct contact hazard is associated with the sediments in the portion of the east bank RM 6 to RM 9 above RM 8.3.

What is Human Health Risk and How is it Calculated?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate the hazardous substances under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media are identified based on such factors as toxicity, concentration and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the COPCs in the various media identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated surface water and sediments. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated. A "central tendency exposure" scenario, which portrays the average or typical level of human exposure that could occur, is calculated when the reasonable maximum exposure scenario results in unacceptable risks, as discussed below under *Risk Characterization.*

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess lifetime cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten thousand to a one-in-a-million excess cancer risk. For noncancer health effects, a "hazard index" (HI) is calculated. The key concept for a noncancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which noncancer health hazards are not expected to occur. The goal of protection is 10^{-6} and an HI of 1 for a noncancer health hazard. Cumulative risks that exceed a 10^{-4} cancer risk or an HI of 1 require remedial action at the site.

Table 3. Summary of BHHRA

Receptor	Fish Consumption		Crab Consumption	
	Cance r Risk	Non-Cancer Hazard	Cancer Risk	Non-Cancer Hazard
Child	$1x10^{-3}$	193	$4x10^{-4}$	50
Adolescent	$2x10^{-3}$	127	$5x10^{-4}$	33
Adult	$3x10^{-3}$	123	$9x10^{-4}$	32
Adult/Child	$4x10^{-3}$	---	$1x10^{-3}$	---

Baseline Ecological Risk Assessment

The Baseline Ecological Risk Assessment (BERA) evaluated the potential for adverse effects to ecological receptors from exposure to contaminants within the LPRSA. The BERA was conducted in accordance with EPA's 1997 *Ecological Risk Assessment Guidance for Superfund* and its updates. The ecological receptors evaluated included:

- Benthic invertebrate community
- Blue crab
- Mollusks
- Fish – benthic omnivores (mummichog, other forage fish, and common carp), invertivores (white perch, channel catfish, brown bullhead, white catfish, and white sucker), and piscivores (American eel, largemouth bass, smallmouth bass, and northern pike)
- Birds – spotted sandpiper, great blue heron, and belted kingfisher
- Mammals – river otter and mink
- Zooplankton
- Amphibians/reptiles
- Aquatic plants

The potential for unacceptable risk was assessed using empirical and modeled data collected from a variety of chemical and biological sampling events and surveys conducted as part of the LPRSA RI. A step-by-step process included an initial screening level ecological risk assessment, which identified media-specific chemicals of potential ecological concern (COPECs). Site-specific exposure data and a range of effect-level thresholds

What Is Ecological Risk and How Is It Calculated?

A Superfund baseline ecological risk assessment is an analysis of the potential adverse health effects to biota caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future land and resource uses. The process used for assessing site-related ecological risks includes:

Problem Formulation: In this step, the contaminants of potential concern (COPCs) at the site are identified. Assessment endpoints are defined to determine what ecological entities are important to protect. Then, the specific attributes of the entities that are potentially at risk and important to protect are determined. This provides a basis for measurement in the risk assessment. Once assessment endpoints are chosen, a conceptual model is developed to provide a visual representation of hypothesized relationships between ecological entities (receptors) and the stressors to which they may be exposed.

Exposure Assessment: In this step, a quantitative evaluation is made of what plants and animals are exposed to and to what degree they are exposed. This estimation of exposure point concentrations includes various parameters to determine the levels of exposure to a chemical contaminant by a selected plant or animal (receptor), such as area use (how much of the site an animal typically uses during normal activities); food ingestion rate (how much food is consumed by an animal over a period of time); bioaccumulation rates (the process by which chemicals are taken up by a plant or animal either directly from exposure to contaminated soil, sediments or water, or by eating contaminated food); bioavailability (how easily a plant or animal can take up a contaminant from the environment); and life stage (e.g., juvenile, adult).

Ecological Effects Assessment: In this step, literature reviews, field studies or toxicity tests are conducted to describe the relationship between chemical contaminant concentrations and their effects on ecological receptors, on a media-, receptor- and chemical-specific basis. In order to provide upper and lower bound estimates of risk, toxicological benchmarks are identified to describe the level of contamination below which adverse effects are unlikely to occur and the level of contamination at which adverse effects are more likely to occur.

Risk Characterization: In this step, the results of the previous steps are used to estimate the risk posed to ecological receptors. Individual risk estimates for a given receptor for each chemical are calculated as a hazard quotient (HQ), which is the ratio of contaminant concentration to a given toxicological benchmark. In general, an HQ above 1 indicates the potential for unacceptable risk. The risk is described, including the overall degree of confidence in the risk estimates, summarizing uncertainties, citing evidence supporting the risk estimates and interpreting the adversity of ecological effects.

were used to derive risk estimates (expressed as hazard quotients) to identify the potential for unacceptable ecological risk under baseline conditions using multiple lines of evidence. COPECs with hazard quotients greater than or equal to 1.0 based on effect-level toxicity reference values were identified as preliminary ecological COCs. Ecological risk drivers were identified based on a comparison to background concentrations as described in the BERA and the uncertainty of the assessment used in the BERA. In addition to ecological risk drivers, a weight-of-evidence approach was evaluated to draw conclusions about the benthic invertebrate community using a sediment quality triad approach. The triad approach integrates sediment chemistry, toxicity, and benthic community assessment information.

Unacceptable risk to ecological species based on exceedances of a range of effect-level thresholds for various ecological receptor groups and lines of evidence was primarily driven by exposure to polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans, total dioxin and dioxin-like compound TEQ, total PCBs, PCB TEQ, and total DDx; these were the ecological risk drivers identified in the BERA. An evaluation limited to just the upper 9 miles of the LPRSA resulted in the same list of ecological risk drivers as in the BERA for the entire LPRSA.

It is EPA's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or welfare.

REMEDIAL ACTION OBJECTIVES

RAOs provide a general description of what a remedial action is intended to accomplish. RAOs for the sediment source control IR in the upper 9 miles of the LPRSA are as follows:

RAO 1—Addressing Surface Sediment Source Areas

Control surface sediment sources containing elevated concentrations of 2,3,7,8-TCDD and PCBs, by remediating these sources and thereby reducing the SWACs of 2,3,7,8-TCDD and total PCBs from RM 8.3 to RM 15. Achieve a post-IR 2,3,7,8-TCDD SWAC from RM 8.3 to RM 15 of not more than 85 ppt and achieve a post-IR total PCB SWAC from RM 8.3 to RM 15 that is at or below the established total PCB background concentration of 0.46 ppm.

RAO 2—Addressing Subsurface Sediment Source Areas

Control subsurface sediment from becoming a source of 2,3,7,8-TCDD and PCBs. Sediment between RM 8.3 and RM 15 with a demonstrated potential for erosion will be remediated to prevent the exposure of subsurface concentrations above the subsurface RALs.

The RAO 1 footprint will be remediated first followed by the RAO 2 footprint. Existing data suggest the source areas to be targeted by the proposed IR are located between RM 8.3 and RM 15. However, the PDI will generate data throughout the upper 9 miles of the LPRSA. If sediment data that support IR design and are collected between RM 15 and Dundee Dam identify surface concentrations in excess of a final surface RAL (as specified in the IR design for RM 8.3 to RM 15), these areas would be addressed as part of the IR.

EPA defines the source areas for the proposed IR as sediments having elevated concentrations. These sediments have a low potential for recovery, and act as a reservoir for potential migration of contamination to surface water and biota, thereby inhibiting overall abiotic and biotic recovery in the system. Sediments with low recovery potential are those with 2,3,7,8-TCDD and/or total PCB concentrations greater than current water column particulate concentrations, which for 2,3,7,8-TCDD is a range of 200 to 400 ppt. Water column particulates influence system recovery through transport and deposition. Addressing source sediments would greatly reduce the 2,3,7,8-TCDD and total PCB SWACs (and reduce SWACs for other collocated contaminants that are addressed by the remediation footprint), which would in turn reduce concentrations on suspended water column particulates, reduce concentrations in surface sediments where water column particulates are deposited, reduce sources to biota, and accelerate system recovery.

The not-to-exceed SWAC for 2,3,7,8-TCDD of 85 ppt represents an over 90 percent reduction compared to the current SWAC from RM 8.3 to RM 15, and is approximately an order of magnitude higher than the OU2 sediment remediation goal for 2,3,7,8-TCDD of 8.3 ppt. EPA, in consultation with NJDEP, determined that the 85 ppt not to exceed SWAC is an appropriate objective for a sediment source control IR for the upper 9 miles of the LPRSA that would be followed by longer-term monitoring and selection and implementation of a final remedy in an adaptive approach. Final cleanup levels will be determined in the final ROD for the LPRSA.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Requirements

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, and use permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must require a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains applicable or relevant and appropriate requirements (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).

This Proposed Plan presents EPA's preferred sediment source control IR alternative for the upper 9 miles of the LPRSA and evaluates whether it satisfies the various mandates of CERCLA. Interim actions must be protective of human health and the environment, cost-effective, and consistent with the final remedy. The IR alternatives evaluated in the IR FS Report utilize the same technologies (i.e., dredging and capping) to achieve different SWAC targets. The IR alternatives, except for the statutorily-required No Action alternative and/or Alternative 5 (SWAC target of 125 ppt for 2,3,7,8-TCDD), are all protective of human health and the environment, comply with ARARs, are cost-effective, and would not be incompatible with nor preclude a final remedy, thus satisfying the requirements of CERCLA. As discussed below, most alternatives include the use of treatment technologies as part of dredged materials management and incorporate sediment capping materials designed to prevent the migration of contained contamination.

The alternatives evaluated for the IR (except for the No Action alternative) focus on sediment source control, consistent with the intent and purpose of the IR. Four active alternatives were developed for the IR based on reduction in 2,3,7,8-TCDD and total PCB SWACs. Brief descriptions of the alternatives evaluated for the IR are given below.

Common Elements of the Active Alternatives

All of the active alternatives (i.e., alternatives other than No Action) contain common elements, as described below.

Dredging and Sediment Management: For each alternative, sediments would be removed to the depths necessary to accommodate sediment capping. Dredge depths are anticipated to be 2 to 3 feet, including allowable overdredging. For the purpose of the IR FS cost estimate, EPA assumed a removal depth of 2.5 feet (2-foot target dredge depth plus 0.5-foot overdredge allowance to account for typical dredge precision) for all alternatives using mechanical dredging methods, and that dredged sediments would be transported via barge to a nearby commercial facility for processing. Following dewatering of the sediments on the barge and stabilization at the processing facility, sediments would be transported via railcar and/or truck for offsite disposal at licensed disposal facilities determined based on the chemical constituents of the sediments and the acceptance criteria of the facilities. For the cost estimate, EPA assumed disposal at a Subtitle C landfill facility. Precautions would be taken during transport to prevent the release of contamination; specific actions would be identified during design and implementation to reduce and minimize releases during transportation.

It is assumed that dredging would be feasible within the entirety of the IR footprint, and all possible effort would be taken to perform active dredging throughout the IR footprint. If, during IR design, portions of the IR footprint are identified to have significant constraints (e.g., utility crossings, bridge abutments, or critical shoreline structures) limiting or precluding dredging and capping, thin-layer capping and/or the in-situ placement of reactive amendments would be considered as alternate technologies for those areas.

Dredging without capping is an approach that includes removal of sediments to a surface that does not require capping to isolate remaining sediments. During the IR design, EPA expects to assess data using the following principles to determine if dredging without capping would be appropriate:

- Would be considered within the dredge footprint developed to meet the sediment source control IR RAOs.
- Would be considered where native material is visually observed in the sediment cores collected in the PDI.
- Would be considered where the costs associated with deeper dredging to reach native sediments and backfill placement (backfill would be accomplished by placing sand only and would not require long-term performance monitoring) are not higher than the cost of dredging to the

nominal dredge depth, capping, and long-term cap monitoring. [3]

- Would be evaluated where the depth to native material over an area of 0.25 or more contiguous acres yields the cost condition described in the bullet above, as determined using the depth to native material of at least two adjacent PDI cores.
- Would be implemented in a manner compatible with engineering, constructability, sediment stability, and safety constraints that may affect short-term effectiveness and implementability (e.g., dredging without capping may not be possible in areas where sensitive infrastructure could be undermined by deeper dredging).

A cost comparison model would be developed prior to the PDI, so that the principles above could be applied and appropriate data collected to inform a detailed evaluation during the IR design of the potential application of dredging without capping. As part of the IR design, the cost comparison model would be updated using refined cost data (e.g., from remediation contractors and disposal facilities) and based on location-specific conditions that may vary for portions of the IR footprint area (e.g., dredging and capping costs associated with deeper and/or steeper portions of the river). The updated cost comparison model would be used to determine the cost comparison for discrete areas of remediation. Dredging without capping would be implemented for those discrete areas where dredging without capping would cost no more than dredging with capping.

Capping: Common sediment cap types include engineered granular caps, composite caps, and reactive caps. Typical cap configurations may include sand, armoring, geotextile, and reactive layers. The primary functions of a sediment cap are:

- Physical isolation of contaminated sediments from human and ecological receptors.
- Stabilization of contaminated sediments and prevention of resuspension and transport to other areas.
- Reduction of the flux of dissolved contaminants into the water column.

For each alternative, sediment capping would be implemented following dredging. All capped areas would be pre-dredged to result in no net loss of water depth and/or increase in flooding potential once the cap is installed. It is assumed that cap material would be transported via barge and placed mechanically. Upstream of RM 13.9, land-based cap material placement is assumed to accommodate fixed, low-clearance bridge constraints that preclude barge and tug operations upstream of RM 13.9.

Consistent with the RM 10.9 Removal design (2013 *River Mile 10.9 Removal Action Final Design Report*), a 1-foot isolation layer was evaluated over a 100-year time frame in the IR FS to determine the cap composition that would be effective at limiting migration of underlying sediment contaminants. An evaluation of potential armor size and thickness was performed with flows associated with a 100-year return period, consistent with EPA guidance[4]. For the purposes of the FS-level cap stability analysis, armor was assumed to be placed throughout the cap footprint, to a thickness of 1 foot. Armor thickness would be refined in the IR design. In shoal areas, habitat reconstruction material similar to existing substrate would be placed as the top 1 foot of the cap. Further consideration and refinement of the ecological and recreational function of the cap would be considered during the IR design, at which time its specific composition would be determined. Cap

[3] Dredging without capping can provide a high degree of long-term effectiveness and permanence, as compared to dredging and capping, in areas where it is technically feasible. Other factors may be considered during IR design in evaluating the feasibility of implementing dredging without capping.

[4] https://semspub.epa.gov/work/HQ/174471.pdf

type and thickness may vary depending on location and armoring requirements. Bathymetric data, geomorphic evaluations, and hydrodynamic and sediment transport model results would be used to determine erosional areas that would require armored cap placement. Additional design considerations, such as the addition of reactive amendments to the cap and ensuring that an engineered cap would not exacerbate erosion adjacent to the cap, would be established during IR design. Data and lessons learned from cap construction, cap construction monitoring, and physical and chemical cap performance monitoring at the RM 10.9 Removal area would be relied on to inform the cap design during the IR design phase. Placement of caps on slopes greater than 3:1 would require additional geotechnical analyses and design considerations. For the IR FS, it was assumed that cap thicknesses would vary from approximately 2 feet (in low-energy areas) to approximately 2.5 feet (in areas subject to greater erosion potential). A 2.5-foot cap was assumed throughout the IR footprint for the purpose of the IR FS cost estimate.

In addition, it is assumed that a residuals management cover (RMC) would be placed outside of the dredge and cap footprint for each alternative, as a mechanism to mitigate potential impacts of dredge residuals that might redeposit on the sediment bed outside the remediation area. RMC would potentially also be placed immediately following dredging if capping were to be delayed. The IR FS assumes that RMC would be placed to an extent equivalent to 20% of the remediated area.

Institutional Controls: ICs refer to non-engineering measures intended to ensure the protectiveness of a remedy and to affect human activities to prevent or reduce the potential for exposure to contaminated media. Potentially applicable ICs for each of the IR alternatives for the upper 9 miles of the LPRSA can be grouped into the following technologies:

Governmental controls – A commercial fishing ban may be implemented by NJDEP to restrict harvesting and consumption of fish and seafood. Other governmental controls may be implemented to protect the integrity of the IR or a specific IR element by prohibiting activities that could disturb or otherwise compromise its performance. Under the Code of Federal Regulations (22 CFR Part 165) a regulated navigation area (RNA) may be established to regulate vessel navigation by the appropriate government agency within a defined boundary. Examples of RNA restrictions include limitations on anchoring, spudding, or grounding vessels in capped areas.

Proprietary controls – A proprietary control is a private contractual mechanism contained in the deed or other document transferring a property. On privately owned lands, restrictive covenants can be effective in maintaining the long-term integrity of capping or other containment actions and can be used to help control exposure scenarios (e.g., residential versus recreational uses of land). Proprietary controls may be required for siting of upland facilities that are part of the proposed IR and/or IR components such as capped areas within private or publicly owned, leased, or used in-waterway lands (i.e., tidelands or riparian grant lands). Such proprietary controls are referred to as "land use restrictions."

Deed notices – A deed notice could be filed and recorded that would describe restrictions on property to protect capped areas and could remain in effect until the federal or state government states in writing that a change in site condition(s) warrants its removal.

Public advisories – Fish and crab consumption advisories are an IC subject to informed voluntary compliance by the public. There is currently a NJDEP fish and crab consumption advisory for the LPR (Dundee Dam to Newark Bay).[5] This advisory recommends restrictions on consumption of fish

[5] https://www.nj.gov/dep/dsr/Fish_Advisories_2019.pdf

and shellfish and bans on collection of blue crabs from the entire LPR. It is assumed that the advisory would remain in effect during and, as necessary, following the proposed IR. Possible modifications to this advisory would be reviewed and evaluated with NJDEP throughout the IR, based on long-term monitoring data.

Signs to warn vessel operators of critical remedy area boundaries (e.g., sediment caps) could be installed to provide added protection and notify vessel operators of applicable RNA restrictions. Signage could also be used to warn vessel operators and other potential users of risks and provide information about pertinent advisories.

Monitoring: For each alternative, monitoring associated with the IR and overall cleanup of the upper 9 miles of the LPRSA would consist of data collection with respect to current conditions/PDI, IR construction, post-IR confirmation, operations and maintenance (O&M), and long-term monitoring. Anticipated monitoring activities are summarized below:

- The current conditions sampling program, which is being performed pursuant to the 2007 RI/FS AOC, includes the following data that would also be relevant to the IR:
  - Continuous monitoring of surface water quality using deployed sensors
  - Periodic sampling of surface water for physical and chemical parameters across varying river flow conditions
  - Comprehensive sampling of fish and crab tissue
  - Bathymetric surveying
- EPA anticipates a PDI sampling program would include:
  - Sediment sampling on a spatially dense grid (approximately 2,000 locations) from RM 8.3 to Dundee Dam to evaluate surface and subsurface conditions (the density of the sampling grid may be less in areas of coarse sediments)
  - A second round of sediment sampling to refine the delineation of the IR footprint and reduce variability in the PDI dataset, which would be based on results from the first round of sampling
  - Bathymetric surveying
  - Debris identification surveying
  - Supporting surveys (e.g., geotechnical, habitat, cultural, fish spawning)
- Construction monitoring would be anticipated to include confirmatory bathymetric surveys, water quality monitoring, and some limited scope of sediment sampling. Construction monitoring would also be anticipated to include sediment coring to physically verify the thickness and composition of cap layers as prescribed by the IR design. Performance metrics would be established during the IR design to ensure achievement of dredging and capping extents and other construction requirements. Water quality and sediment sampling would be used to understand and mitigate potential issues associated with dredging releases.
- Post-IR confirmation sampling would include sufficient sediment samples to provide a statistically unbiased estimate of the post-IR SWACs and would include not less than 400 (and not more than 800) sediment sample locations at which 3-point composite samples would be collected. The calculated post-IR SWACs would be statistically assessed to verify that the RAO 1 SWAC goals had been attained. In the event that the RAO 1 SWAC goals were not attained based on the statistical assessment, the construction monitoring conducted during the IR would be evaluated with respect to compliance with the construction requirements specified by the IR design (i.e., water quality monitoring, bathymetric surveys, discharge monitoring, inspection surveys, sediment monitoring) and the overall distribution of concentrations in the post-IR dataset would be evaluated to determine if any sediment sources remain. A multiple lines of evidence framework would be applied in this case to determine if the IR had met its intent and could be concluded to be

complete or if additional source removal is necessary. The statistical testing methodology and multiple lines of evidence framework for evaluating IR completion are described in Appendix H of the IR FS Report.

- O&M monitoring of cap areas would be conducted following construction to ensure long-term effectiveness. Bathymetry surveys and chemical sampling would be performed to assess the stability and chemical isolation performance of the cap and any potential need for maintenance to ensure continued performance (e.g., replacement of eroded cap material and/or armor stone). For cost estimating purposes, EPA assumes cap O&M monitoring would continue for 30 years after the end of IR construction, and also that some amount of cap material would need to be replaced during this 30-year period.
- Long-term monitoring would be performed following IR completion. For cost estimating purposes, EPA assumes long-term monitoring would continue for 30 years after IR construction, which would include both system response and recovery assessment monitoring following the IR and the portion of additional long-term monitoring that would occur within the 30-year timeframe after a final remedy is selected. (While not addressed in this Proposed Plan, long-term monitoring following selection of a final remedy and issuance of the final ROD will likely be needed in perpetuity.)

The CPG is performing current conditions sampling of biota and surface water under the 2007 RI/FS AOC. Those data and the PDI data would establish pre-IR baseline conditions for comparison to post-IR data and provide data to support the IR design. Details of various monitoring components would be established in the IR design, and data and lessons learned from cap construction, cap construction monitoring, and/or physical and chemical cap performance monitoring at the RM 10.9 Removal area would be relied on to inform those details. As necessary (i.e., as part of the current conditions sampling under the 2007 RI/FS AOC and as part of PDI and long-term monitoring), monitoring would include comprehensive laboratory analysis of samples so that appropriate decisions can be made related to all risks and a protective final remedy.

Since contamination would remain after the IR above levels that allow for unlimited use and unrestricted exposure, five-year reviews would be conducted to monitor the contaminants and evaluate the need for future actions.

Remedial Alternatives

The following summaries of the IR alternatives are based on the assumptions and analyses in the IR FS Report, which rely on the available data for the upper 9 miles of the LPRSA collected during the RI and documented in the RI Report. The 85 ppt target 2,3,7,8-TCDD SWAC alternative directly addresses the IR RAOs. The 75 ppt and 65 ppt target 2,3,7,8-TCDD SWAC alternatives also address the RAOs, but with the lower SWAC targets for 2,3,7,8-TCDD allowing EPA to assess whether a lower SWAC target would accomplish meaningfully greater sediment source control or provide meaningfully greater acceleration of system recovery. The attainable post-IR SWAC for total PCBs is controlled by the established total PCB background concentration of 0.46 ppm, and the available data suggest that a total PCB RAL of 1 ppm will result in a SWAC at or below this concentration. Therefore, the 85 ppt, 75 ppt, and 65 ppt target 2,3,7,8-TCDD SWAC alternatives all incorporate a surface RAL of 1 ppm. The 125 ppt target 2,3,7,8-TCDD SWAC alternative (Alternative 5) was also evaluated to allow comparison to a smaller IR footprint and better frame the comparison between the other active alternatives. To ensure a smaller footprint, the 1 ppm total PCB surface RAL was not applied for the 125 ppt target 2,3,7,8-TCDD SWAC alternative (i.e., applying the 1 ppm total PCB surface RAL would drive the remediation footprint to a size more consistent with the other active alternatives). In deriving alternative-specific footprints in the IR FS, RAO 1 was applied first to address sediments until the target 2,3,7,8-TCDD SWAC was attained. RAO 2 was then applied sequentially after attaining the target 2,3,7,8-TCDD SWAC, addressing additional area characterized as erosional and further lowering the resulting SWAC. Table 4 provides a summary of the SWACs, RALs, and technical specifications for all active alternatives evaluated.

ARARs can be location-specific, action-specific, or chemical-specific. There are no chemical-specific ARARs for sediments, and because the IR is not intended to address surface water (a final remedy for surface water throughout the LPRSA will be established in the final ROD for the entire OU4), chemical-specific ARARs for surface water do not apply for the IR. Since there is no active remediation associated with Alternative 1 (No Action), action-specific and location-specific ARARs do not apply to this alternative. The same location-specific and action-specific ARARs would apply to Alternatives 2, 3, 4, and 5. Key potential location-specific ARARs for Alternatives 2, 3, 4, and 5 include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, the Rivers and Harbors Act, and the Wetland Act of 1970/Freshwater Wetlands Protection Act, and key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, the New Jersey Pollution Control Act, the Clean Air Act, and the Hazardous Materials Transportation Act.

Alternative 1: No Action

Present Value (PV) Capital Cost:	**$0**
PV Annual O&M Cost:	**$0**
Total PV Cost:	**$0**
Construction Time:	**0 years**
Time to Achieve RAOs:	**N/A**

CERCLA requires that the No Action alternative be considered as a baseline for comparison with the other alternatives. The No Action alternative would not include any remedial measures or monitoring.

Alternative 2: 2,3,7,8-TCDD SWAC of 85 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$392 Million**
PV Annual O&M Cost[6]:	**$0.93 Million**
Total PV Cost:	**$420 Million**
Construction Time:	**4.3 years**
Time to Achieve RAOs:	**7.3 years**

Alternative 2 includes dredging and capping between RM 8.3 and 15 in the remedial footprint delineated during the IR FS (which would be refined during IR design based on the PDI). Alternative 2 targets source sediments with high concentrations of 2,3,7,8-TCDD and total PCBs,

Table 4 Comparison of General Characteristics of IR Alternatives

Alternative	Target Dioxin SWAC (ppt)	Dioxin RAL (ppt)	Post-IR Dioxin SWAC (ppt) and % SWAC Reduction	Area (acres)	Volume (cy)	Construction Duration (years)	Cost ($M)
1	-----	-----	932 (0%)	-----	0	-----	0
2	85	260	80 (91%)	90	363,000	4.3	420
3	75	205	70 (92%)	96	387,000	4.6	441
4	65	164	60 (94%)	104	419,000	4.9	468
5	125	346	121 (87%)	62	250,000	3.2	321

[6] PV total annual and periodic O&M costs averaged over the 30-year post-construction monitoring period to estimate the PV annual O&M cost.

achieving a post-IR target 2,3,7,8-TCDD SWAC of 85 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1. The delineation of the remedial footprint to attain a 2,3,7,8-TCDD SWAC of 85 ppt results in a surface RAL for 2,3,7,8-TCDD of 260 ppt.[7] Alternative 2 also includes additional dredging and capping in areas with erosional potential and high subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with high subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (520 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs).[5] The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 80 ppt and a total PCB SWAC of 0.29 ppm. Figure 4, located at the end of this Proposed Plan, shows the area targeted under Alternative 2 (areas in red).

Alternative 2 includes all of the common engineering assumptions and considerations described above. Dredged materials would be processed at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. Following completion of the IR, system response and recovery assessment monitoring and adaptive management would be implemented to assess progress towards PRGs[8] developed in parallel with the IR design and ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 4, Alternative 2 would target approximately 363,000 cy of contaminated sediments across a total area of approximately 90 acres. For the IR FS, it is assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.3 years, considering the anticipated seasonal fish window (i.e., the annual period of time that dredging is permitted due to fish spawning/migration), typical winter shutdown periods, and assumed production rates.

Alternative 3: 2,3,7,8-TCDD SWAC of 75 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$413 Million**
PV Annual O&M Cost:	**$0.94 Million**
Total PV Cost:	**$441 Million**
Construction Time:	**4.6 years**
Time to Achieve RAOs:	**7.6 years**

Alternative 3 includes dredging and capping between RM 8.3 and 15 in the remedial footprint delineated during the IR FS (which would be refined during IR design based on the PDI). Alternative 3 targets source sediments with high concentrations of 2,3,7,8-TCDD and total PCBs, achieving a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1. The delineation of the remedial footprint to attain a 2,3,7,8-TCDD SWAC of 75 ppt results in a surface RAL for 2,3,7,8-TCDD of 205 ppt. Alternative 3 also includes additional dredging and capping in areas with erosional potential and high

[7] The final RALs for surface and subsurface sediments would be defined in the IR design. The application of a multiplier of 2 to the surface RALs to derive subsurface RALs is supported by an analysis of erosion potential and represents a site management decision agreed to by EPA and NJDEP for the purpose of the proposed IR. This site management decision represents an uncertainty that could affect the rate and degree of natural recovery post-IR if subsurface sediments are exposed. The effect of this site management decision will be discerned through chemical and physical monitoring of the sediment bed post-IR. That information will be used in developing the final, protective remedy as part of the Site's adaptive management framework consistent with CERCLA and the NCP's nine criteria. During the IR design, the subsurface RAL multiplier will be evaluated based on more current bathymetry data and will not exceed 2.

[8] PRGs would be developed in parallel with the IR design; PRGs would not be used to evaluate the performance of the IR itself, but would be used to evaluate longer-term system recovery following the IR.

subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with high subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (410 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs). The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 70 ppt and a total PCB SWAC of 0.27 ppm. Figure 4, located at the end of this Proposed Plan, shows the additional area targeted under Alternative 3 (areas in green) compared with Alternative 2 (areas in red), which includes an additional 6 acres of footprint from RM 8.3 to RM 15, located mostly below RM 12.

Alternative 3 includes all of the common engineering assumptions and considerations described above. Dredged materials would be processed at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. Following completion of the IR, system response and recovery assessment monitoring and adaptive management would be implemented to assess progress towards PRGs developed in parallel with the IR design and ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 4, Alternative 3 would target approximately 387,000 cy of contaminated sediments across a total area of approximately 96 acres. For the IR FS, it is assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.6 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

Alternative 4: 2,3,7,8-TCDD SWAC of 65 ppt, Total PCB RAL of 1 ppm

PV Capital Cost:	**$440 Million**
PV Annual O&M Cost:	**$0.95 Million**
Total PV Cost:	**$468 Million**
Construction Time:	**4.9 years**
Time to Achieve RAOs:	**7.9 years**

Alternative 4 includes dredging and capping between RM 8.3 and 15 in the remedial footprint delineated during the IR FS (which would be refined during IR design based on the PDI). Alternative 4 targets source sediments with high concentrations of 2,3,7,8-TCDD and total PCBs, achieving a post-IR target 2,3,7,8-TCDD SWAC of 65 ppt and implementing a total PCB RAL of 1 ppm for surface sediments (0 to 0.5 ft) to address RAO 1. The delineation of the remedial footprint to attain a post-IR 2,3,7,8-TCDD SWAC of 65 ppt results in a surface RAL for 2,3,7,8-TCDD of 164 ppt. Alternative 4 also includes additional dredging and capping in areas with erosional potential and high subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with high subsurface concentrations were delineated in the IR FS by applying subsurface RALs that are twice the surface RALs (328 ppt for 2,3,7,8-TCDD and 2 ppm for total PCBs). The inclusion of additional areas to address RAO 2 results in a 2,3,7,8-TCDD SWAC of 60 ppt and a total PCB SWAC of 0.24 ppm. Figure 4, , located at the end of this Proposed Plan, shows the additional area targeted under Alternative 4 (areas in blue) compared with Alternative 3 (areas in green) and Alternative 2 (areas in red), which includes an additional 8 acres of footprint from RM 8.3 to RM 15, located mostly below RM 13.

Alternative 4 includes all of the common engineering assumptions and considerations described above. Dredged materials would be processed at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. Following completion of the IR, system response and recovery assessment monitoring and adaptive management would be implemented to assess progress towards PRGs developed in parallel with the IR design and ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the IR alternatives shown in Table 4, Alternative 4 would target approximately 419,000 cy of contaminated sediments across a total area of approximately 104 acres. For the IR FS, it is assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 4.9 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

Alternative 5: 2,3,7,8-TCDD SWAC of 125 ppt

PV Capital Cost:	**$294 Million**
PV Annual O&M Cost:	**$0.89 Million**
Total PV Cost:	**$321 Million**
Construction Time:	**3.2 years**
Time to Achieve RAOs:	**N/A**

Alternative 5 includes dredging and capping between RM 8.3 and 15 in the remedial footprint delineated during the IR FS. Alternative 5 targets source sediments with high concentrations of 2,3,7,8-TCDD, achieving a post-IR target 2,3,7,8-TCDD SWAC of 125 ppt. For this alternative, PCBs are not specifically targeted to ensure a smaller IR footprint for comparison purposes; therefore, no total PCB RAL was applied in the IR FS. The delineation of the remedial footprint to attain a post-IR 2,3,7,8-TCDD SWAC of 125 ppt results in a surface (0 to 0.5 ft) RAL for 2,3,7,8-TCDD of 346 ppt. Alternative 5 also includes additional dredging and capping in areas with erosional potential and high subsurface sediment concentrations (0.5 to 1.5 ft) to address RAO 2. Areas with high subsurface concentrations were delineated in the IR FS by applying a subsurface RAL that is twice the surface RAL (692 ppt for 2,3,7,8-TCDD). Inclusion of these additional areas in the IR footprint results in a 2,3,7,8-TCDD SWAC of 121 ppt and a total PCB SWAC of 0.49 ppm.

Alternative 5 includes all of the common engineering assumptions and considerations described above. Dredged materials would be processed at one or more nearby commercial processing facilities, for off-site disposal at licensed disposal facilities. Following completion of the IR, system response and recovery assessment monitoring and adaptive management would be implemented to assess progress towards PRGs developed in parallel with the IR design and ultimately, RGs that will be established and documented in a final ROD.

Based on the estimated technical specifications for the remedial alternatives shown in Table 4, Alternative 5 would target approximately 250,000 cy of contaminated sediments across a total area of approximately 62 acres. For the IR FS, it is assumed that an approximate equivalent quantity of clean fill materials would be imported for cap, armoring, backfill, and RMC placement.

The estimated construction time frame is approximately 3.2 years, considering the anticipated seasonal fish window, typical winter shutdown periods, and assumed production rates.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In this section, the IR alternatives are evaluated in detail to determine which would be the most effective in attaining the RAOs for the upper 9-mile sediment source control IR and in achieving the goals of CERCLA. The alternatives are compared to each other based on the nine criteria set forth in the NCP at 40 CFR 300.430(e)(9)(iii) (see box below) to assess the relative performance of the alternatives in accomplishing sediment source control.

Overall Protection of Human Health and the Environment

A primary requirement of CERCLA is that the selected remedial action be protective of human health and the environment. In evaluating an

THE NINE SUPERFUND EVALUATION CRITERIA

1. Overall Protection of Human Health and the Environment evaluates whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. Cost includes estimated capital and annual operations and maintenance costs, as well as present value cost. Present value cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

9. Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

interim remedy, as opposed to a final remedy, EPA may conclude that an alternative is protective if it achieves and maintains adequate protection of human health and the environment in relation to the limited scope and goals of a remedial action.

Alternatives 2, 3, and 4 would provide overall protection of human health and the environment by remediating source sediments with high concentrations to achieve the RAOs and accelerating the recovery of sediment and water column contaminant concentrations. These alternatives would reach post-IR surface sediment SWACs for 2,3,7,8-TCDD of less than 85 ppt and for total PCBs of less than 0.46 ppm and would control subsurface sediments from becoming sources. Alternative 1, the No Action alternative, would not provide overall protection of human health and the environment. Alternative 5, while it has the ability to accelerate recovery and progress towards overall protection of human health and the environment, would not accelerate recovery to the same degree as Alternative 2, 3, or 4 and would not achieve the RAO 1 requirement to reach a post-IR surface sediment SWAC for 2,3,7,8-TCDD of 85 ppt.

Remediation of sediments within the IR footprint for Alternatives 2, 3 and 4 would be anticipated to achieve the following:

- Attainment of RAO 1, post-IR target SWACs of 85 ppt for 2,3,7,8-TCDD and 0.46 ppm for total PCBs (subject to post-construction confirmation of IR completion in accordance with the IR remedy completion framework).
- Remediation of sediments with high concentrations of 2,3,7,8-TCDD and total PCBs, reducing the potential for these contaminated sediments to resuspend and become sources of contamination to the water column, to other areas of the sediment bed, and to biota.
- Reduction of 2,3,7,8-TCDD surface sediment SWAC of greater than 90 percent and reduction of total PCB surface sediment SWAC of greater than 80 percent.
- Accelerated recovery of surface sediment concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants following IR completion.
- Accelerated recovery of surface water concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants following IR completion.

- Recovery of fish and crab tissue concentrations of 2,3,7,8-TCDD, total PCBs, and other contaminants resulting from reduced concentrations in sediments and the water column.
- Reduced potential for human health exposure to 2,3,7,8-TCDD, total PCBs, and other contaminants resulting from sediment, water column, and fish and crab tissue concentration reductions.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Any alternative considered by EPA must comply with all federal and state environmental standards, requirements, criteria or limitations, unless they are waived under certain specific conditions.

Since there is no active remediation associated with Alternative 1 (No Action), action-specific and location-specific ARARs do not apply. This alternative would not contribute significantly toward eventual achievement of federal and state surface water ARARs.

There are no chemical-specific ARARs for sediments. Alternatives 2, 3, 4, and 5 would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, the Rivers and Harbors Act, and the Wetland Act of 1970/Freshwater Wetlands Protection Act) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, the New Jersey Water Pollution Control Act, the Clean Air Act, and the Hazardous Materials Transportation Act). The active alternatives could require one or more ARAR waivers during construction (i.e., chemical-specific ARARs related to surface water quality) to meet the threshold criterion of compliance with ARARs.

Alternatives 2, 3, 4, and 5 would be anticipated to comply with the ARARs through appropriate engineering design and agency review processes. Confirmation of ARARs compliance is typically demonstrated during remedial design and through the remedial action work plan (e.g., environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and best management practices [BMPs]) as well as monitoring during the construction period.

A final remedy for surface water throughout the LPRSA (in addition to a final remedy for sediments in the upper 9 miles) will be established in the final ROD for the entire OU4. While Alternatives 2, 3, 4, and 5 would be anticipated to improve water quality, ARARs for water quality may not be achieved following completion of any of the active IR alternatives. It is anticipated that the final ROD for OU4 will evaluate achievement of surface water ARARs.

Long-Term Effectiveness and Permanence

This criterion takes into account the residual risk remaining at the conclusion of remedial activities, and the adequacy and reliability of containment systems and ICs.

Alternatives 2, 3, and 4 achieve a high degree of performance for this criterion. All three of these alternatives would provide source control that would reduce concentrations in the water column and promote accelerated recovery in the unremediated areas of the sediment bed. Dredging and capping would reduce the surface SWAC from RM 8.3 to RM 15 by 91 to 94 percent for 2,3,7,8-TCDD and 81 to 84 percent for total PCBs for these three alternatives.

The surface RALs for 2,3,7,8-TCDD under Alternatives 2, 3, and 4 are to varying degrees within or below the range of concentrations (200 to 400 ppt) that define source sediments that inhibit recovery. The 2,3,7,8-TCDD surface RAL of 164 ppt for Alternative 4 is less than the low end of this range, indicating this alternative may include areas in the active footprint that are currently subject to recovery on their own and not consistent with the definition of source sediments for the IR. The 2,3,7,8-TCDD surface RAL of 260 ppt for Alternative 2 is within the range of concentrations defined as source, while the 2,3,7,8-TCDD surface RAL of 205 ppt for Alternative 3 coincides with the low end of the range of concentrations defined as source. Thus, Alternative 3 provides the greatest certainty of meeting the IR source control objective, without including areas that are or may already be experiencing natural recovery.

The areas and volumes of sediment removal increase incrementally from Alternative 2 to Alternative 4 to meet the progressively lower 2,3,7,8-TCDD SWAC targets, without a commensurate degree of incremental 2,3,7,8-TCDD and PCB mass removal. While the overall remedial acreage and volume increases by more than 15 percent from Alternative 2 to Alternative 4, the increase in mass of 2,3,7,8-TCDD and PCBs removed from the top 0.5 ft of the sediment bed is much more modest, increasing by less than 2 and 4 percent, respectively.

The IR footprint and RALs are derived by addressing the highest sediment concentrations first followed by lower concentrations until the target SWAC is reached. Therefore, the highest concentrations on average are targeted by the alternative with the smallest footprint. Progressively lower concentrations are targeted as remedial area is added to achieve the lower SWACs of the alternatives with increasingly larger footprints. The average 2,3,7,8-TCDD concentration targeted in the IR footprint is 2,870 ppt for Alternative 2. It is 220 ppt in the 6 acres added for Alternative 3 (which is within the range of concentrations considered source sediments for the IR) and 170 ppt in the further 8 acres added for Alternative 4 (which is below the range of concentrations considered source sediments for the IR). The change in the distribution of post-IR concentrations relative to pre-IR concentrations is similar for Alternatives 2, 3, and 4 (i.e., the distribution of remaining concentrations is similarly skewed towards lower concentrations for each alternative).

Alternatives 2, 3, and 4 all target LPR sediments classified as fine-grained sediments. However, the additional areas of sediments targeted under Alternatives 3 and 4 (compared with Alternative 2) include sediments that are progressively coarser. Because the contamination in the LPR is more closely associated with fine-grained sediments, the increasing volume of coarser sediments addressed by the alternatives with larger footprints, and particularly Alternative 4, may not represent source material.

Alternatives 2, 3, and 4 are expected to provide similar degrees of recovery potential based on numerical modeling of several recovery metrics, including average water column concentrations, total water column loads, gross and net erosion flux, and the average concentration on depositing fine sediments over the 10 year period following IR construction, and would result in similarly accelerated recovery of the sediments and water column. Reductions of erosion flux of contaminants from the sediment bed for each alternative would result in reduced concentrations on depositing fine sediments and downstream loads of 2,3,7,8-TCDD and PCBs. The projected recovery half-lives for 2,3,7,8-TCDD and PCBs (a representation of recovery trajectory) for Alternatives 2, 3, and 4 are similar, indicating they would yield similarly accelerated recovery.

Reduction in Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and/or significantly reduce the toxicity, mobility, or volume of hazardous substances as their principal element.

For Alternative 1 (No Action), only natural recovery processes would potentially reduce contaminant concentrations in sediments and surface water. Under Alternative 1, there would be no reduction of toxicity, mobility, or volume through treatment.

The active alternatives would use two treatment components to reduce the toxicity and/or mobility of contaminants: solidification/stabilization during processing after removal; and in-situ sequestration via capping including a carbon amendment. The degree to which reductions would be achieved would be proportional to the contaminant mass removed and the area of the cap footprint. The mass fraction of 2,3,7,8-TCDD removed from the upper 0.5 ft of the sediment bed ranges from 92 to 94 percent of the total surface mass from RM 8.3 to 15, and ranges from 80 to 85 percent of the total mass for the upper 2.5 ft of the sediment bed for the three alternatives (Alternatives 2, 3, and 4) that achieve the threshold criteria. The mass fraction of total PCBs removed from the upper 0.5 ft of the sediment bed ranges from 82 to 85 percent of the total surface mass from RM 8.3 to 15, and ranges from 64 to 68 percent of the total mass for the upper 2.5 ft of the sediment bed for the three alternatives that achieve the threshold criteria. The area over which an erosion and chemical migration resistant cap that would reduce the mobility of contaminants would be placed to isolate remaining sediments would be 90 acres for Alternative 2, 96 acres for Alternative 3 (7 percent larger than Alternative 2), and 104 acres for Alternative 4 (8 percent larger than Alternative 3).

Short-Term Effectiveness

This criterion addresses the effects of each alternative during construction and implementation until RAOs are met. It considers risks to the community as well as on-site workers and the environment, available mitigation measures, and the time frame for achieving the response objectives.

Alternatives 2, 3, and 4 would achieve the RAOs in approximately 7.3, 7.6, and 7.9 years, respectively, following the start of construction, based on estimated respective construction durations of 4.3, 4.6, and 4.9 years and the IR completion assessment process taking approximately 3 years for any alternative. The IR completion assessment process will include implementation of sediment sampling, validation and analysis of results, potential additional sampling to address uncertainty in the data or the need for additional data for statistical interpretation, and the decision-making process following completion of data collection activities. The 3-year timeframe for the IR completion assessment process represents a period of measurement, after which it can be stated the RAOs have been achieved. Despite this 3-year timeframe, Alternatives 2, 3, and 4 would be designed and implemented to attain the RAOs at the completion of construction.

The estimated construction durations vary with the area and volume of the remedial footprints, with construction activities assumed to occur 24 hours per day, 6 days per week during the construction season. Appropriate health and safety plans and contingency plans would be in place during implementation of an IR to protect workers and the community.

Alternative 2, which has the smallest IR footprint (of the alternatives that achieve the threshold criteria) and the shortest estimated construction duration, would have the fewest short-term impacts on and risks to workers, communities, and the ecosystem, in a relative comparison with the alternatives with larger footprints. These impacts are expected to arise in general proportion to the size of the remedial footprint of the remedial alternatives. The extent to which habitat and ecological disturbance may increase in proportion to the IR footprint is uncertain and would depend on final delineation of the IR footprint using the PDI data. Alternative 4, the alternative with the largest IR footprint (approximately 14 acres larger than Alternative 2) and longest estimated construction duration (approximately 0.6 years longer than Alternative 2), would have the greatest short-term impacts.

While Alternatives 2, 3, and 4 are all estimated to be complete within approximately 5 years, the larger the footprint, the greater the potential that work would extend into another construction season if delays are encountered, which would result in another season of worker risks and community impact.

Resuspension of contaminants during construction would be expected to be generally similar for Alternatives 2, 3, and 4, based on model projections of annual average water column concentrations. During active construction, average annual water column concentrations for Alternatives 2, 3, and 4 are projected to be higher than the No Action alternative. For all of the alternatives, annual average water column concentrations at the completion of active construction would be expected to be generally lower than pre-construction concentrations.

At RM 15, there is little projected impact of IR implementation, as the average annual and cumulative net upstream water column load would be expected to be nearly the same for Alternatives 2, 3, and 4 as compared to No Action. At RM 8.3, the implementation of an IR is projected to increase the downstream loads of 2,3,7,8-TCDD and total PCBs in the water column during construction, compared to the No Action alternative, with similar increases for Alternatives 2, 3, and 4. At the conclusion of active construction, the water column loads for Alternatives 2, 3, and 4 at RM 8.3 would be expected to be at or near the projected load under No Action. The implementation of an IR is projected to have a small impact on the water column loads at RM 0, evidenced in the projections of total load, which are generally similar for all alternatives over the construction period.

Implementability

This criterion considers the technical and administrative feasibility of implementing each alternative, including availability of services and materials needed during construction.

There are no implementability issues for Alternative 1 (No Action), which does not involve any active remediation.

The technologies and methods to perform the active alternatives are well established. Necessary equipment, materials, facilities, and transportation capacity would be available for the active alternatives with sufficient lead times. The active alternatives would require BMPs during implementation to manage dredge residuals and potential recontamination. Construction of the IR would face implementability challenges in the upper 9 miles of the LPRSA due to the urban environment. Specific challenges that could impact dredging and would need to be considered during IR design and implementation include utility crossings, existing shoreline structures, in-water bridge structures, and hard river bottom. For example, designing and implementing the IR where the footprint abuts hardened or engineered shoreline could require significant effort to avoid damaging engineered shoreline structures or to rebuild or replace failing structures, and/or result in lower production rates or unanticipated delays. Alternative 2 would abut an estimated 37,792 linear feet of hardened shoreline, compared with 39,551 and 41,454 linear feet that would be abutted by Alternatives 3 and 4, or 5 and 10 percent additional hardened shoreline, respectively.

The transport of materials up and down the LPR would also present implementability challenges due to low clearance and/or narrow bridges, which could necessitate custom or specialized equipment, as well as transiting tugs and barges through the lower 8.3 miles during active remediation of that reach of the river. Implementation of the IR could require additional removal in and/or around the RM 10.9 Removal area, which could introduce additional implementability challenges associated with protecting the existing armored cap over that previously remediated area. The extent of remediation in and/or around the RM 10.9 area will be determined during the IR design when the IR footprint is finalized.

Among the active alternatives, the larger the remedial footprint, the greater challenges and constraints, because of the need to dredge in more areas and over a longer time frame. Although implementability challenges would be similar in type for all active alternatives, the degree of the challenges can be anticipated to increase in general proportion to the size of the remedial footprint. It is anticipated that any of the alternatives can be designed to address these challenges.

Cost

Cost estimates are summarized in Table 4. A discount rate of 7 percent was used in the PV calculations, consistent with EPA guidance.

Alternatives that achieve the RAOs (Alternatives 2, 3, and 4) are estimated to have a PV cost of $420 million, $441 million, and $468 million, respectively. There are no remedial response costs associated with Alternative 1. Alternative 5 is estimated to cost $321 million. Costs that are assumed to be the same for the active alternatives include the PDI and IR design, long-term monitoring, and periodic sediment sampling (which includes remedy completion confirmation sampling). Other costs vary with area, volume, and construction duration. The cost estimate assumes that long-term monitoring and maintenance will occur over a 30-year period following completion of construction, including both system response and system recovery assessment monitoring following the IR and additional long-term monitoring to be specified when a final remedy is selected under a final ROD.

Alternatives 2, 3, and 4 all achieve the RAOs for the IR, but with an additional cost of $21 million and $48 million for Alternatives 3 and 4, respectively, compared with Alternative 2.

State Acceptance

NJDEP concurs with EPA's preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative will be addressed in the Interim ROD (Responsiveness Summary) following review of the public comments received on the Proposed Plan.

PREFERRED ALTERNATIVE

EPA's preferred alternative is Alternative 3. Alternative 3 would target surface sediments (0 to 0.5 ft) with high concentrations of 2,3,7,8-TCDD and total PCBs between RM 8.3 and 15 through dredging and capping to address RAO 1, achieving a post-IR 2,3,7,8-TCDD SWAC of 75 ppt and implementing a total PCB surface RAL of 1 ppm. Alternative 3 would also include dredging and capping of areas between RM 8.3 and 15 that are vulnerable to erosion and have elevated subsurface concentrations of 2,3,7,8-TCDD and total PCBs to address RAO 2. Dredging would be performed to the depth(s) necessary to construct a sediment cap that would not diminish water depth or exacerbate flooding. The IR FS Report assumed a uniform dredge depth of 2.5 feet followed by the placement of a uniformly 2.5-foot thick cap. Dredged material would be processed and disposed off-site. The specific composition and thickness of the cap would be determined in the IR design, and dredge depth and cap composition/thickness may vary in portions of the remediation footprint. Principles of dredging without capping would be applied in the IR design to determine if any areas would be dredged to reach a native surface without the need for an engineered cap and associated O&M, which could improve the overall permanence of the IR. Appropriate and necessary ICs would be implemented in conjunction with the IR.

Surface sediments with 2,3,7,8-TCDD concentrations above the surface RAL (205 ppt based on the IR FS) and with total PCB concentrations above the surface RAL of 1 ppm would be remediated. For subsurface sediments, sediments in areas characterized as erosional and having concentrations in excess of the subsurface RALs would be remediated. In the IR FS, the subsurface RALs were established at twice the surface RALs, as a site management decision by EPA in consultation with NJDEP, supported by an analysis of erosion probability using available bathymetric data. That analysis, which is presented in the IR FS Report, demonstrates that a subsurface RAL multiplier of 2 is appropriate given the probability of erosion exposing subsurface concentrations in RAO 2 footprint areas. During IR design, the PDI data and newer bathymetry information would be used to establish the comprehensive distribution of 2,3,7,8-TCDD and total PCB concentrations and erosional areas, establish the final IR footprint, derive the 2,3,7,8-TCDD surface RAL, and verify the subsurface RAL multiplier. The final footprint would be established by attaining RAO 1 first and then sequentially including additional area to attain RAO 2. The subsurface RAL multiplier would not exceed 2.

Combining areas addressed by Alternative 3 to attain RAO 2 with areas addressed to attain RAO 1, and based on existing data, EPA estimates that this alternative would achieve a 2,3,7,8-TCDD SWAC of approximately 70 ppt (i.e., lower than the 75 ppt SWAC target due to sequentially addressing RAO 2 after RAO 1) and a total PCB SWAC of 0.27 ppm (compared to background of 0.46 ppm). Based on current estimates of SWACs from existing data, the preferred alternative would reduce the 2,3,7,8-TCDD SWAC in the upper 9 miles of the LPR by approximately 92% and the total PCB SWAC by approximately 82%. Based on existing data and the IR footprint derived in the IR FS, the preferred alternative would result in remediation of approximately 387,000 cy of contaminated sediments over approximately 96 acres. Alternative 3 construction would take an estimated 4.6 years to complete, with an additional 3 years anticipated to perform the IR completion determination process.

During implementation of a selected IR, the above technical specifications would be updated in the IR design using the PDI data. With the development of the final IR footprint in the IR design using the PDI data, EPA anticipates that the actual post-IR 2,3,7,8-TCDD SWAC would be lower than the SWAC target of 75 ppt; however, the degree to which the actual post-IR SWAC would be lower than the SWAC target would be determined in the IR design.

Existing data suggest the source areas to be targeted by the proposed IR are located between RM 8.3 and RM 15. However, if sediment data that support IR design and are collected between RM 15 and Dundee Dam identify surface concentrations in excess of a surface RAL (specified in the IR design for RM 8.3 to RM 15), these areas would be addressed as part of the IR.

The proposed IR would be determined by EPA to be complete via a statistical methodology based around post-IR confirmatory sediment sampling, or otherwise using a weight of evidence framework that incorporates information from the IR design, IR implementation, and post-IR sampling phases. A specific decision process would be utilized in this weight of evidence framework to determine completion (Appendix H of the IR FS Report).

The proposed sediment source control IR would support adaptive management of the overall remedy for the upper 9 miles of the LPRSA. The design and implementation of the IR, followed by post-IR response and recovery assessment monitoring, would reduce final remedy uncertainties and provide a framework for future remedial action decisions and confirmation of final remedy completion that are consistent with CERCLA and the NCP. Additional current conditions data collected in the upper 9 miles of the LPR, not available as of the time of this Proposed

Plan, would inform the adaptive management decisions. EPA expects that data would continue to be collected during the IR design, IR implementation, and the period of post-IR monitoring, and ultimately inform the protective final remedy in a final ROD.

RATIONALE FOR SELECTION OF PREFERRED ALTERNATIVE

The selection of the preferred alternative is accomplished through the evaluation of the criteria as specified in the NCP. Based on the information above, EPA believes the preferred alternative meets the threshold criteria and provides the best balance of tradeoffs relative to the other alternatives with respect to the balancing and modifying criteria. It would satisfy the following statutory requirements of CERCLA 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the statutory preference for treatment as a principal element to the extent practicable or explain why the preference will not be met. With respect to the two modifying criteria (state acceptance and community acceptance), NJDEP concurs with EPA's preferred alternative and community acceptance will be evaluated after the public comment period.

Alternative 3, with a post-IR target 2,3,7,8-TCDD SWAC of 75 ppt, meets the threshold criteria of Overall Protection of Human Health and the Environment and Compliance with ARARs. This alternative effectively achieves sediment source control based on the definition of source sediments for the IR and would yield accelerated recovery of the LPR system. The IR would be followed by a period of system response and system recovery assessment monitoring to evaluate the response of the system to the sediment source removal and track the recovery of sediments, the water column, and biota.

Alternative 3 would attain the IR RAOs, including achieving a post-IR 2,3,7,8-TCDD SWAC of not more than 85 ppt and a post-IR total PCB SWAC equal to or less than background, at a cost of $441 million, which is $21 million more than Alternative 2, and $27 million less than Alternative 4.

Following are the key factors that lead EPA to propose this sediment source control IR alternative over the others:

- The IR is for sediment source control. Source sediments are defined as those with concentrations between 200 and 400 ppt of 2,3,7,8-TCDD. The 2,3,7,8-TCDD surface RAL is 260 ppt for Alternative 2, 205 ppt for Alternative 3, and 164 ppt for Alternative 4. The RAL for Alternative 3 aligns with the lower end of the range of concentrations representing source. The RAL for Alternative 2 is within but not at the lower end of this range, while the RAL for Alternative 4 is below the range and therefore would be expected to capture sediments that are not source sediments and themselves likely to be recovering. Alternative 3 therefore would most effectively address source sediments consistent with the intent and purpose of the IR.
- The average 2,3,7,8-TCDD concentration addressed by the footprint for Alternative 2 is 2,870 ppt, while the average concentration addressed in the additional 6 acres added for Alternative 3 is 220 ppt, and the average concentration addressed in the yet additional 8 acres added for Alternative 4 is 170 ppt. Given the average concentration in the additional footprint area for Alternative 3 is within the range of concentrations defined as source and the average concentration in the additional footprint area for Alternative 4 is below the range, this further demonstrates that Alternative 3 is most suitable to accomplish sediment source control per the intent and purpose of the IR while Alternative 4 would go beyond source control, addressing areas that may be experiencing natural recovery.

- Contaminant concentrations generally correlate with sediment type in the LPR, with higher concentrations tending to be found in finer-grained sediments. Progressively larger IR footprints would capture progressively coarser sediments. Alternative 2 would capture sediments that are on average approximately 60 to 65 percent fine-grained, while the additional sediments captured by Alternative 3 (beyond Alternative 2) are on average approximately 40 percent fine-grained and the yet additional sediments captured by Alternative 4 (beyond Alternative 3) are on average approximately 35 percent fine-grained. Based on the distribution of 2,3,7,8-TCDD concentrations in sediment samples from the upper 9 miles of the LPRSA in comparison to the grain size of the samples, it appears that relatively high concentrations are associated with sediments that are on the order of 40 to 60 percent fine-grained (resulting from higher concentrations in the fine-grained fraction of those sediments) while the likelihood of high contaminant concentrations diminishes significantly when the sediments are only 35 percent fine-grained. This indicates that implementing Alternative 3 would address additional source material beyond that addressed by Alternative 2, even if the additional sediments captured by Alternative 3 are relatively coarser, whereas Alternative 4 would include yet coarser-grained sediments not likely to exhibit high contaminant concentrations indicative of source sediments. This shows that Alternative 3's additional footprint includes more comprehensive control of source material while minimizing inclusion of non-source material.
- The estimated acceleration in recovery for Alternatives 2, 3, and 4 (as expressed by the half-lives of 2,3,7,8-TCDD and total PCBs) is similar. While Alternative 5 would accelerate recovery compared to No Action, Alternatives 2, 3, and 4 would further accelerate recovery with this rate of recovery being very consistent across the alternatives.
- Alternative 3 would be cost-effective in that it provides overall effectiveness (taking into account long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short–term effectiveness) proportional to its cost.

For further information on Diamond Alkali OU4 Superfund Site, please contact:

Diane Salkie
Remedial Project Manager
(212) 637-4370
salkie.diane@epa.gov

Shereen Kandil
Community Relations Coordinator
(212) 637-4333
kandil.shereen@epa.gov

The public liaison for EPA Region 2 is:
George H. Zachos
Regional Public Liaison
Toll-free (888) 283-7626, or (732) 321-6621
U.S. EPA Region 2
2890 Woodbridge Avenue, MS-211
Edison, New Jersey 08837-3679

The administrative record file, which contains copies of the Proposed Plan and supporting documentation, is available at the following locations:

Newark Public Library
5 Washington Street, Newark, NJ 07101
(973) 733-7784
Hours: Mon, Tues, Thurs, Fri: 9:00 AM - 500 PM
Wed: 12:00 PM – 8:00 PM; Sat: 10:00 AM – 2:00 PM

Elizabeth Public Library
11 South Broad Street, Elizabeth, NJ 07202
(908) 354-6060
Hours: Tues – Fri: 10:00 AM – 6:00 PM
Sat, 10:00 AM – 2:00 PM

EPA Region 2, Superfund Records Center
290 Broadway, 18th Floor, New York, NY 10007
(212) 637-4308
Hours: Mon - Fri, 9:00 AM - 5:00 PM

Information can also be found on the internet:

www.epa.gov/superfund/diamond-alkali

http://www.OurPassaic.org

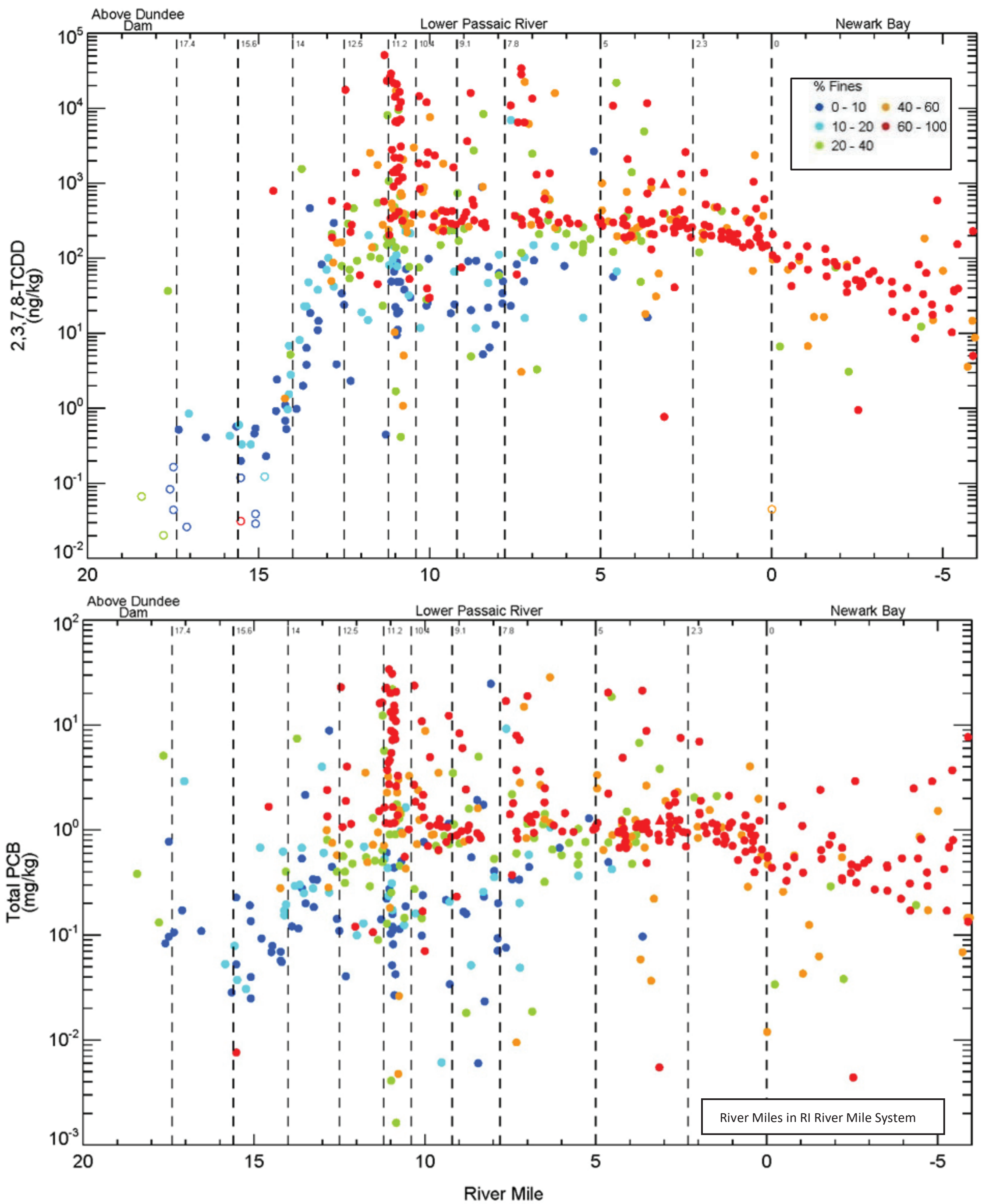

Figure 2: Post-2005 2,3,7,8-TCDD and Total PCB Surface Sediment Concentrations in the Lower Passaic River (Source: IR FS Report)

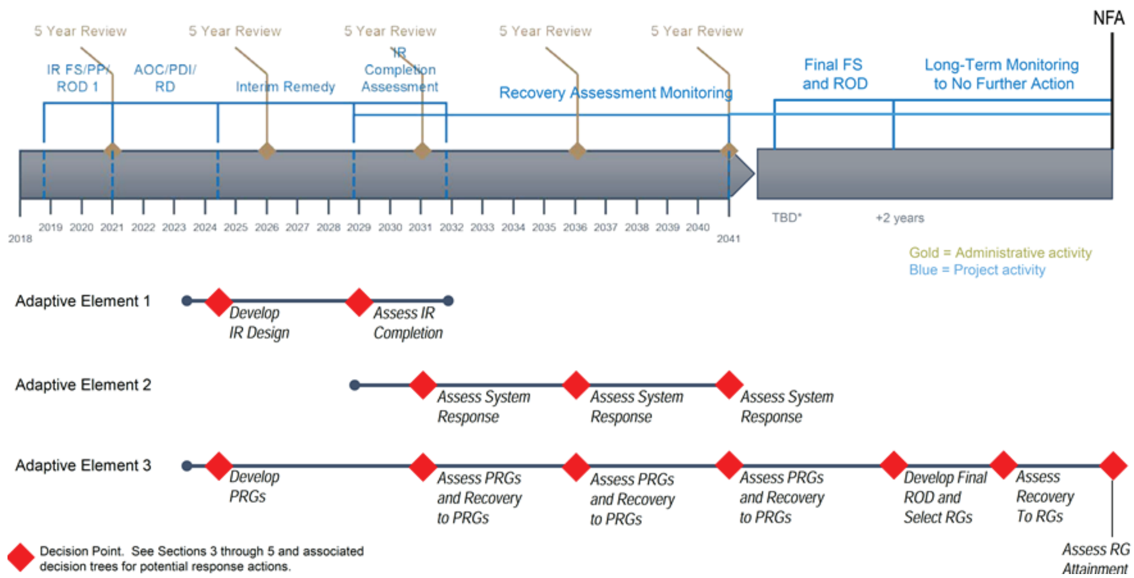

Figure 3: Conceptual Adaptive Management Approach for the Upper 9-Mile Cleanup (Source: IR FS Report)

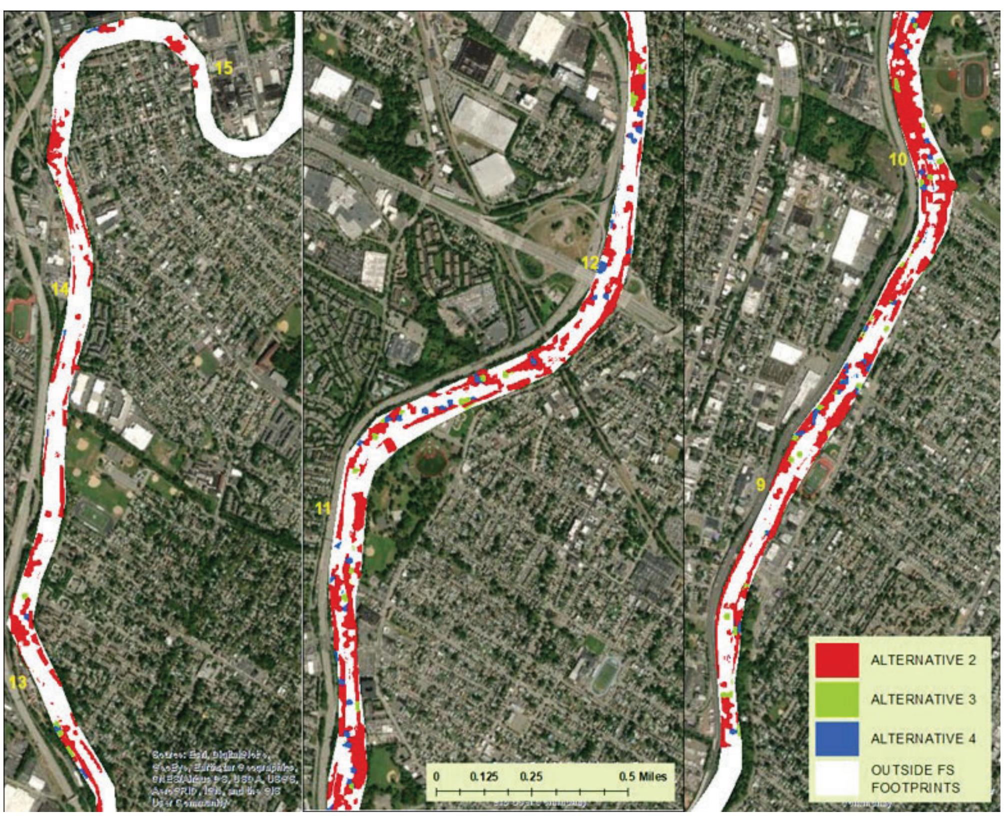

Figure 4: Comparison of Footprints between Alternatives 2, 3, and 4

ATTACHMENT B

PUBLIC NOTICE

#Ecología

Recuperación de suelos
Chile se sumará a la iniciativa Suelos Vivos de las Américas, un plan del Instituto Interamericano de Cooperación para la Agricultura, que pretende recuperar suelos para garantizar la producción agrícola y la seguridad alimentaria.

Urgen un mayor compromiso contra las emisiones de gases.

El deshielo de los glaciares provocará la mitad del aumento del nivel del mar

EFE
MADRID

Investigación indica que la inundación de zonas habitadas afectará a unos 680 millones de personas

En las próximas décadas, todos los estudios indican que la subida del nivel del mar seguirá aumentando de forma considerable como consecuencia del cambio climático. Aproximadamente la mitad de esa subida provendrá del deshielo de los glaciares, según un estudio de la Universidad Politécnica de Madrid (UPM).

Ese aumento del nivel del mar tendrá dos consecuencias inmediatas en las zonas costeras: la erosión del litoral y la inundación de zonas habitadas, que se calcula afectará a unos 680 millones de personas, por eso, una de las cuestiones más estudiadas por la ciencia es cuánto puede llegar a crecer el nivel del mar y qué factores serán los desencadenantes.

Francisco Navarro, investigador de la UPM, ha estudiado el papel que estas enormes masas de hielo pueden jugar en el incremento del nivel del mar en los próximos años y ha determinado que la pérdida de masa de los glaciares será responsable de la mitad del incremento.

"Se prevé que el aumento del nivel del mar para finales del siglo XXI esté entre 43 y 84 cm, dependiendo del escenario de emisiones de gases de efecto invernadero considerado. De este aumento, entre el 47 y el 56 % provendrá de la pérdida de masa de los glaciares, bien por fusión o por incremento de las tasas de descarga de icebergs", calcula el catedrático del Grupo de Simulación Numérica en Ciencias e Ingeniería de la UPM.

En los últimos años, el nivel del mar crece unos 3,6 mm/año, de los cuales, se atribuyen a la pérdida de glaciares y mantos de hielo 1,8 (1,7-1,9) mm/año, mientras que 1,4 (1,1-1,7) mm/año corresponden a la expansión térmica del océano.

Pero no todos los glaciares contribuyen por igual a este fenómeno. Actualmente, el manto de hielo de Groenlandia pierde masa más rápido que el de la Antártida (casi el doble), pese a que el manto de hielo Antártico almacena un volumen de hielo diez veces superior al groenlandés.

Si se amplían las proyecciones más allá del año 2100, llegando incluso hasta el año 2300, el aumento acumulado del nivel del mar proyectado para entonces es de entre 0,6 metros y 1,07 metros para el escenario de menor nivel de emisiones y de 2,3 a 5,4 metros para aquellos escenarios en los que el nivel de emisiones es mayor.

Sobre la contribución de los glaciares frente a la de los grandes mantos de hielo, "los estudios coinciden en que los glaciares tendrán una importancia limitada porque, para entonces, habrán perdido gran parte de su masa y muchos habrán desaparecido por completo", pero sobre la contribución de los mantos de hielo, aún "hay grandes discrepancias" entre los científicos y "mucha incertidumbre", advierte.

A la vista de los datos, Navarro recuerda que el incremento del nivel del mar es una realidad que habrá que afrontar en las próximas décadas y el papel de los glaciares dependerá de las acciones que acuerden los países para reducir las emisiones y luchar contra el cambio climático.

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Passaic river

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Notice Publish Date:
Wednesday, April 14, 2021

Notice Content

EPA Invites Public Comment on a Proposed Cleanup Plan for the upper 9 miles of the Lower Passaic River Study Area (LPRSA), a portion of the Diamond Alkali Superfund Site in Essex, Bergen, and Passaic Counties, New Jersey The U.S. Environmental Protection Agency (EPA) has issued a Proposed Plan identifying its preferred cleanup alternative to address the sediments acting as sources of contamination that inhibit recovery in the upper 9 miles of the Lower Passaic River Study Area (LPRSA). The LPRSA is Operable Unit 4 (OU4), a portion of the Diamond Alkali Superfund site that encompasses the entire Lower Passaic River from Newark Bay at river mile 0 to the Dundee Dam at approximately river mile 17.7. A separate operable unit (OU2) is addressing river mile 0 to 8.3. EPA supports an adaptive, multi-phased approach to remediating contamination in the upper 9 miles of the LPRSA. The initial phase of cleanup addresses source sediments in the upper 9 miles. EPA's preferred alternative, for the sediment source control interim remedy, consists of dredging and capping between river miles 8.3 and 15 by remediating surface sediments, as well as additional dredging and capping in areas with erosional potential and high subsurface sediment concentrations. A 30-day public comment period on the Proposed Plan begins on April 15, 2021 and ends on May 14, 2021. As part of the public comment period, EPA will hold a virtual public meeting on the Proposed Plan on April 27, 2021 from 6:00-8:00 p.m. To participate in the meeting, please visit EPA's website for more information: www.epa.gov/superfund/diamond-alkali or www.ourpassaic.org. Please register in advance of the meeting at https://epa_proposed_plan_lprsa.eventbrite.com or by emailing Shereen Kandil, Community Involvement Coordinator, at kandil.shereen@epa.gov or calling her at (212) 637-4333. The Proposed Plan and other site documents are available on EPA's website: www.epa.gov/superfund/diamond-alkali or www.ourpassaic.org. The public can also contact Shereen Kandil, EPA's Community Involvement Coordinator for the project at 212-637-4333 or kandil.shereen@epa.gov, with any questions or to request a copy by mail. Written comments on the Proposed Plan must be postmarked no later than May 14, 2021 and may be mailed to Diane Salkie at EPA Region 2 Office, 290 Broadway, New York, New York 10007 or sent electronically to the following address: salkie.diane@epa.gov. The Administrative Record file containing the documents used or relied on in developing the alternatives and preferred cleanup plan is available for public review at the following information repository: USEPA Records Center, 290 Broadway, New York, New York 10007. The Record-April 14, 2021-Fee: $38.70 (86) 0004673177

ATTACHMENT C

PUBLIC MEETING TRANSCRIPT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

---X

PUBLIC MEETING

RE: Diamond Alkali Operable Unit 4

17 Mile Lower Passaic River Study Area

Interim Remedy Proposed Plan

---X

Held Remotely Via
MS Teams
April 27, 2021
6:05 p.m.

APPEARANCES:

FOR THE EPA:

SHEREEN KANDIL, Community Involvement Coordinator

DIANE SALKIE, Remedial Project Manager, 17 Miles

MICHAEL SIVAK, Branch Chief

MARIAN OLSEN, Human Health Risk Assessor

CHUCK NACE, Ecological Risk Assessor

FRANCES ZIZILA, ESQ., Site Attorney

ALICE YEH, RPM Lower 8.3 Mile

FOR NJDEP:

JAY NICKERSON, Case Manager

ANTHONY CINQUE, Case Manager

MYLA RAMIREZ, Technical Coordinator

CONTRACTOR SUPPORT:

ANDREW BULLARD, CDM Smith

EDWARD GARLAND, HDR

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MS. KANDIL: Welcome to the Diamond Alkali Public Meeting for the proposed plan of the Upper 9 miles or OU4. My name is Shereen Kandil, and I'm the Community Involvement Coordinator for the site, and I'll be facilitating tonight's meeting.

I do want to let everybody know that if you need Spanish interpretation we do have a conference line for that, and I'm going to ask my colleague to unmute her line right now, Donette, if you could just translate for us, that would be great.

Donette, are you on?

THE SPANISH INTERPRETER: Yes, I'm here.

MS. KANDIL: Thank you. Can you just translate the conference line information to everyone on the conference line?

THE SPANISH INTERPRETER: Yes.

(Information repeated in Spanish)

MS. KANDIL: Thank you, thanks, Donette. And we'll put the conference

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information in the chat box in case you need to look it up later.

I did want to go over some logistical information before we get into the presentation. And we'll be introducing the team shortly.

For those of you who have joined via the Team's chat features of the link, there are a few icons I wanted to point out. So during the presentation itself we will be muting lines; however, during the Q and A session you'll be able to unmute yourselves. And for those of you who have, like I said, joined via the chat, the Team's link, you can unmute yourselves using the microphone icon. So if you look at your screens, all the way at the top there are a bunch of icons. It's towards the right near that big red "leave" button. You can just click on that, that unmutes and mutes your line.

The other icon I wanted to point out was the chat icon. It looks like a little

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thought bubble. If you open that up, it opens up your chat dialogue box. And although, although we're going to hold questions until after the presentation, if you have questions or comments throughout the presentation, you may, you may type those in in the chat box. And we will then respond to it during the Q and A session. Though we do want to, want to let you know that you can communicate with us through that chat box during the, during the presentation.

Two other, two other features I wanted to show you. If you look at the icon with the three dots, if you kind of hover over it, it says "more actions." If you click on it, there are two things I wanted to point out. One is the full screen, it's about midway through. That opens up your screen a little bit bigger so that you can see better if you need to. The other, the other option I wanted to show you was the turn on live captions option. If you need closed

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captioning during the meeting, you just click on that link, that turn on live captioning options, and live captioning will appear for you.

So those are the options that I wanted to point out. If you hold on a second, okay.

So during the presentation, as I mentioned, we will be locking all audio lines just so that we can get through the presentation, without any disruptions, but then we will unmute the lines during the Q and A portion of the meeting.

As I mentioned, the chat box will be open so if you need to communicate with us, if you have any questions throughout the presentation you can include it in the chat box and we will read it, we will read it during the Q and A session.

Now, just so everybody knows, we are -- we do have a court reporter. We will have an official transcript of this meeting.

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So we do ask that you state your name and affiliation before your comment or question. And this goes for the chat box and the audio lines. So, for instance, I would either type or say Hi, this is Shereen Kandil, I'm a resident of Staten Island, my question is where is the site located. And, like I said, that would -- we ask that you do that in the chat box, and when you unmute your lines if you want to do it verbally that would be great.

A few more items before we jump into the presentation. It's going to sound a bit tedious, but during the Q and A session we are going to be very strategic about how we call on questions, call on the questions. So we're going turn to the chat box first. And, as I mentioned, we have the court reporter, so I will be reading your name, your affiliation and your question out loud for the court reporter. And then after each question is read we will respond to those questions. Once

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we go through the questions in the chat box we'll turn to the audio lines. I will call on everyone by category and then alphabetically. So first I'll say any elected official with the last names A through G that have questions, please unmute your lines now. And so in order to unmute your line via the phone line you can press star six. And then we'll go through residents, then businesses, and then finally the general public. After we go through the phone lines we'll then turn to the Spanish phone lines to see if there's anybody in the Spanish conference line that has any questions. We'll have the interpreters interpret those questions for us, we'll respond, and then, and then they will interpret that, those responses to the folks, to the participants in the conference line. And we'll go back to the chat box in case other questions come in during the time that we're asking or we're hearing or responding to the questions via the audio line.

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I do want to begin our presentation now. We are going start with introductions. Diane, if you can please go to the next slide. So we are going to do just quickly the agenda, we're going to do introductions, a background. As you can see, the Upper, or some of you can see we're going to talk about the Upper 9 miles and the Lower 8.3 miles. We'll talk a little bit about the interim remedy for the Upper 9 miles. And then we'll talk in detail about EPA's preferred alternatives.

Next slide, please.

So just so you know who is on the call today, from EPA, as I mentioned, I'm Shereen Kandil, I'm the community involvement coordinator. We have Diane Salkie, who's the RPM for the 17 miles. We have Michael Sivak, who's the branch chief. Marian Olsen, the human health risk assessor. Chuck Nace, the ecological risk assessor. Frances Zizila, the site attorney. And Alice Yeh, the RPM for the Lower 8.3 miles. From NJDEP we have Jay

Nickerson, case manager. Anthony Cinque, I'm sorry, Cinque, I hope I pronounced that correctly, case manager. And Myla Ramirez, the technical coordinator. And then we do have a few folks, our contractor support, Andrew Bullard from CDM, and Edward Garland from HDR.

We can go to the next slide, Diane.

All right, so that's it for me. We're going to turn to Diane to get into the actual presentation.

MS. SALKIE: Okay. Thank you, Shereen.

Good evening, everyone. I am going to turn my camera on for now while I present, but then I'll put it back on later for questions.

Okay. So, as Shereen mentioned, I am Diane Salkie. I am the remedial project manager for the Diamond Alkali site, or the 17 miles of the lower Passaic River. I will be talking to you today about the proposed plan for

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an interim remedy for source control in the Upper 9 miles of the 17 miles. But first I'm going to give you a little background and history of Diamond Alkali.

Okay. So this is an orientation slide that shows you what we call our box in a box diagram. So at EPA we break down our large, complex sites into manageable operable units, or OUs. And our story begins at 80-120 Lister Avenue, right here where the red star is. This is where the facility of Diamond Alkali was located, and this became Operable Unit 1. The purple box right here is what we call the Lower 8.3 miles of the Lower Passaic or Operable Unit 2. I'll be getting into that a little bit more later in the slides. And then the big orange box is the full 17 miles that encompasses Dundee Dam down to Newark Bay at the bottom. And that's Operable Unit 4. That's the part that I'm the project manager for. And then at the mouth of the river down here is the Newark Bay, or Operable Unit 3.

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Okay, so I'm going to talk a little bit of background on what the Superfund process looks like. So, as you can see, on the left side is community involvement. The Passaic community is involved throughout the entire Superfund process. And this begins at the top with our site inspection or our site discovery.

The next in line is what we call the National Priorities List or the Superfund listing, when a Superfund actually gets on the list.

The next step is our remedial investigation, where we study what exactly is going on at the site, all different Superfund sites. A feasibility study is, you know, looking at different ways of how to treat this contamination that we found. And that goes into what we call our proposed plan. And once we get public comment then we -- that becomes a Record of Decision in the final document. After we get the Record of Decision we go into

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our design phase, where we decide how we're going to treat this contamination that we found. And then into the actual remediation, getting our, you know, shovel in the ground where we actually do the action. And the final step of course is deletion, coming off the list or long term monitoring. And you will notice on the right what we have here is the interim remedy process.

So what I'm going to be talking about today is an interim remediation proposed plan. So we had gone through the first few steps, we finished with our feasibility study of Operable Unit 4, and now we're looking at an interim remedy. So we are now at the interim remedy proposed plan, which I'll be talking to you today about. And once we have all of our public comments and we go through our public comment period, we memorialize this into a Record of Decision. We'll then move, the same path, of remedial design and remedial action, and then you'll see this goes back

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into a final Record of Decision. So I'll be talking about that throughout the presentation. But I just wanted to point out that we're still on the normal Superfund process, we are just cutting over to an interim process and then coming back to a final.

Okay. A little bit of history on Diamond Alkali, the site itself. So in the 1950s and '60s the Diamond Alkali Company manufactured chemicals and herbicides, including ingredients in Agent Orange. A byproduct of this manufacturing is what we call 2,3,7,8-TCDD, or dioxin. The facility was operated by Diamond Alkali on Lister Avenue, and then it was later purchased and merged into Occidental Chemical Corporation.

So based on investigation by the New Jersey Department of Environmental Protection and the EPA, the site was placed on the NPL or the National Priorities List in 1984. That's the Superfund list I talked

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about in the previous slide.

In the mid-80s we found that dioxin made its way into the Passaic River, which is right next to the facility itself. And from 1984 until 1987 Occidental completed a study at the Lister Avenue site itself, which showed that the property was contaminated by a large number of substances, including dioxin, but also chemical compounds, herbicides, pesticides, PCBs. So in 1987 we selected an interim containment remedy at that site to prevent exposure and to keep this contamination from getting into the river further.

In 1994 Occidental and EPA signed an agreement to investigate the river. So they were looking at the six miles of up river and down river of the chem -- of the site itself. But by 2002 EPA realized that the contamination actually expanded 17 miles due to the tidal nature of this river. So we started investigating the full 17 miles from

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Dundee Dam down to the Newark Bay.

A little timeline of the investigations we've done. In 2004 to 2007 EPA was doing the investigation into the 17 miles. And then in 2007 a group of parties called the Cooperating Parties Group or the CPG agreed to take over this remedial investigation feasibility study. And in 2008 to '14 we began -- they began the investigation with EPA oversight. So that's when they collected all this data and all this information of what's going on in the river. And from 2014 to now we have been looking at the data and seeing exactly what the story is of the river itself.

So there were some early actions that were done in the history of the site. What we call the Tierra Removal, was right next to the Lister Avenue facility itself, were some high levels of contaminated sediment. You could see it here in this figure for whoever is online. So we removed about 40,000 cubic yards of sediment in 2012 and completed phase one. There's, we did find some more contamination, as you can see, 200,000 cubic yards of contaminated sediment is planned for removal. And that will be actually part of the Lower 8 remediation, which is Operable Unit 2. So that's just being moved into the other Operable Unit itself.

Another early action that was performed at the river is what we call the river 10.9 removal. So during our investigation we discovered that during low tide there were high levels of contaminated sediment exposed, right next to a park in Lyndhurst, that had the potential to expose people at low tide. And also it had a risk of going, you know, bringing that contamination downstream. So we removed 16,000 cubic yards of contaminated sediment and followed it with a cap. This is, on the screen you can see the cap design profile. And this remediation was

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completed in 2014, followed by some years of monitoring. So because this cap is in the river itself, it gives us some lessons so we can figure out exactly how things work and don't work in the river. So this was a good study that we had done. As well as protection of health because of the park right next door.

So EPA is not alone in investigating this large, complex Superfund site. We have what we call partner agencies that we work with closely, including New Jersey Department of Environmental Protection, the National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife, and the Army Corps of Engineers. These partner agencies are provided updates and review reports along with us, and we brief them regularly.

In addition, we've also consulted with what we call the Contaminated Sediments Technical Advisory Group, or CSTAG. The CSTAG is a group of EPA scientists and engineers and

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site managers that have expertise in these large sediment sites. And we have consulted with CSTAG throughout our entire process of this remedial investigation and feasibility study, and we have responded to any recommendations that they have made. We also had two official CSTAG meetings in 2018 and 2019. So this is a group that provides consistency among these large sediment sites throughout the country, such as Hudson River and Portland Harbor.

So, as I mentioned in that earlier slide, the community is a very large part of this site. We have a great Passaic River Community Advisory Group, which is a group of local residents, environmental groups, local government, that are very involved in this site. They meet every other month, and EPA presents to them on all of our activities across the different operable units of the site, you know, the 10.9 removal, the Lower 8, the Upper 9, we have been talking to them a lot about lately.

EPA also maintains a website called OurPassaic.org. This meeting itself was available through that website as well as the proposed plan is there as well. We also have upcoming CAG meetings. And any back old data on all -- on the site in different operable units is there.

We've also done some additional community outreach. So when the CAG started it was more focused on the Lower 8 because that was where the remedy was happening at the time or where it was beginning the investigations. So the Community Advisory Group was located down in the Newark area. But since now we're talking about the Upper 9, we have been doing some outreach to these Upper 9 communities. So in 2019 we briefed some local officials and state officials, and then in, later in 2019 we had two meetings, in Clifton and in Rutherford.

So just to show you what I mean by

the Upper 9 communities, this is a simplified map of the area, and you can see the Upper 9 is between these two red lines. The Lower 8 is down here where there's a couple of towns and cities around the site, but the Upper 9 has several communities. On the east side there's Garfield, Wallington, East Rutherford, Rutherford, Lyndhurst, North Arlington. And on the west side of the river you have Clifton, Passaic, Nutley and Belleville. There's ten different communities with all different demographics and income levels representative. The main languages we found are spoken to be English and Spanish, so our fact sheets have been released in both languages, and there is an interpreter on this call that will give you Spanish language if you find, you know, if it's necessary.

Okay. So first I'm going to talk about the difference between the Upper 9 and the Lower 8 miles of the Passaic River.

So, as I mentioned, we've started

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looking, we've investigated 17 miles. So that investigation looked at water sampling, sediment sampling, fish and crab tissue. We also looked at what we call bathymetry, which is the depth of water over time. It shows you where the sediments can erode and where they deposit. And I'll explain a little bit more about in the next slide.

So the bathymetry is, you know, one of the many pieces of our puzzle that shows us exactly what's going on in the river. So what this figure shows is a bathymetry evaluation. This is one stretch of river around river mile 9.5, about the Belleville, North Arlington area, and this shows in this first box, if you can see on the left, is from 2007 to 2008. So the blue in this area shows that it's actually depositing in these areas where the sediment is piling up. And then if you look from 2008 to 2010, the next one, you actually see areas of erosion. So we continue to do this over time until we get this final box all the way on the right, and that shows the areas that erode and where they deposit. And again, these are just all pieces of the puzzle that shows exactly what's going on in this full 17 miles. We need the chemical data, but we also need this erosional and depositional data.

Another important piece of the puzzle is the grain size. So all river beds have a mix of sediments, from large pebbles at the top all the way down to silt and clay at the bottom. And one thing we found when we started investigating the Passaic River is that where you have this fine grained sediment is where the contamination of dioxin and PCB is found. That was another important piece of information. And this is where it fits in.

So when we were looking at the 17 miles, and this figure shows you all the way on the right is the Newark Bay and as it goes up, it goes up river. So it goes all the way up to about river mile 16. And in this figure the red area is the silt, okay. And as you move the different types of materials, the yellow is more of the gravelly. So what we started noticing in the earlier days of investigating this river is that these first eight miles, 8.3 miles is, as you see, almost all red, almost all silt. And, as I said earlier, that's where the contamination is. So in about 2005 when we noticed this is when we broke out a separate Operable Unit for the Lower 8.3 miles.

And then if you look upriver you'll see it's a little bit spottier. There's sections of silt but there's also sections of gravel and rock. So this was some important information that let us know how to, how to treat this site as a whole.

So, as I said, this Lower 8 became Operable Unit 2. So what's happening in Operable Unit 2. So this is the Lower 8.3 miles. As Shereen mentioned, that's Alice Yeh, she's the project manager. And in 2016 they came up with a Record of Decision. I

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know a lot of people on the call were very involved in that. So this decision is to put an engineered cap over the entire 8.3 miles, bank to bank. As you saw, it was almost all red. So it requires a bank to bank remedy. That's about 3.5 million cubic yards of sediment dredged just to make room for that cap, in addition to a navigation channel lower river.

So with the Operable Unit 2 addressed that leaves the Upper 9 miles, which is what I have been focusing on as my part of the project. So this figure shows just the Upper 9 miles. It starts at river eight and goes all the way to about fifteen. And this is surface sediment dioxin data. The red is the higher levels. As you go down to the nondetect it becomes blue. So, as you can see, this is a bit more spottier, it's not the bank to bank all red contaminated. It's there's areas, there's pockets of sediment contamination. So it looks different than the

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Lower 8.

Okay, so in our process we came up with a conceptual site model. This is a very complicated sketch, but I just want to point out a few items.

So the contamination, what we found has been in the surface sediment. And surface sediment is what is getting into the biota, into the surface water. So this is a view coming down from Dundee Dam looking toward Newark Bay. So there are other sources of contamination that come into the river. There's what we call non-point source, which basically just runs off of grass and off of streets. And then there's point source contamination, which is from pipes and from combined sewer outlets.

So one point I want to make out with this, make with this, is that's there an exchange with Newark Bay. So, as I mentioned, it is a tidal river. And it does have an exchange to Newark Bay, which is a much saltier, saline water. So the salt water does come into the river throughout the Lower 8. It does come up to the Upper 9 but not quite as far, not as much. So there is a difference, like I said, in the silty sediment down at the Lower 8, but there's also a difference in the salt water content between the two different parts of the river. The salt water tends to diminish as you come up river.

So during the 17 mile investigation we do risk assessments to see if there's any risk. And what we found is there are unacceptable risks to the ecological receptors from exposure to the contamination in the river. So we found risks to blue crabs, worms, several fish, like catfish and bass, some birds, mammals like mink and otter. And what we found from our risk assessment is that the contaminants that pose this risk is the dioxins, the PCBs and the DDx, which is a pesticide.

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We also conducted a human health risk assessment to see if there's any unacceptable risk from cancer and noncancer from eating the contaminated fish and the crabs, and yes, there is. There's, there is, from these species that are listed here, carp, white perch, eel, catfish and bass, and as well as crab. So there are -- there is a potential if you eat the fish or the crabs to get exposed to contaminants. And the contaminants that cause this risk are primarily dioxin and PCBs once again.

That kind of shows you the difference between the Lower 8 and the Upper 9. So now I'm going to focus what my proposed interim remedy is for the Upper 9 miles.

So why an interim remedy? In about 2017 the Cooperating Parties Group proposed an interim remedy approach to accelerate the schedule so that we can get in the river for all 17 miles at the exact same, at the same time frame basically. So the Lower 8, like I

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said already, has a Record of Decision, so they're working on their design. So, you know, the CPG and EPA believe that if we can get into the river during that time that the Lower 8 is working, then possibly we can share infrastructure, like sediment processing facilities, there might be some cost savings. We'll also disrupt the river in one time during the entire 17 miles, which disrupts the river itself and the surrounding communities.

Sorry, did I stop sharing? Can anybody see me?

MS. KANDIL: Yeah, we don't see your presentation.

MS. SALKIE: Sorry, let me just check, because for some reason the Team screen came up and then -- apologies, I don't know what just happened, give me one second. Sorry for technical difficulties. Is it okay?

MS. KANDIL: It's loading, we see it now.

MS. SALKIE: But you -- that's not

the screen I had open. Okay, I'm just going to move it through. For some reason it's a different method, but that's okay. Can you see it large enough?

MS. KANDIL: Yes.

MS. SALKIE: Okay. That's fine, I'll just used a different screen.

Okay. So, as I was saying, we're looking at an interim remedy. So we were looking at, you know, the possibility of getting into the river at the same time as the Lower 8, we can share some infrastructure, we can disrupt the river all in one time. And we will, because this is an interim remedy, it will be followed by a final Record of Decision with risk-based cleanup levels.

So this next slide will show you a little bit of what I mean by the schedule. So this top line shows the Lower 8 schedule. As you can see, we're in 2021 right now. Hopefully you can see my pointer.

A SPEAKER: I can.

MS. SALKIE: Okay, great. So they are in design at this point. What this stands for is the preliminary design investigation, remedial design. So the Lower 8 is currently in their design. Schedules change, so this is just an estimate but, you know, in the next few years they should be able to get into the river and start the actual action.

And if you go down to this last bar, this is if we were going to do a final remedial action, a final remedy. We don't have what we call risk-based numbers. What we need is our bioaccumulation model. And that's going to take some time. That's why we're looking at this interim remedy. So you see from this schedule that that would put us a bit further behind, behind the Lower 8 schedule, because right now we are at the proposed plan, and that proposed plan for a final remedy and then design and mobilization would actually not get you in the river during the same time frame.

So that's we have been looking at. Someone else just took over. Okay, somebody else just started sharing their screen. I guess this is something that happens with --

MS. KANDIL: Just, if you just share your screen again, Diane.

MS. SALKIE: Yeah, I will.

MS. KANDIL: We just ask that everybody please mute yourselves and please don't click on icons during the presentation. Thank you.

MS. SALKIE: Okay, I'm trying. Share screen. Okay, here we are again in the beginning. Oh, there we go, resume. Great, okay.

So if you look at this middle bar, this is our interim remedy. So we have completed the feasibility study on a pretty expedited schedule and we are right here in our proposed plan, which gets released, as it was a few weeks ago, to the public. We received public comments. And then that goes

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into what we call a Record of Decision. Once that's complete we enter a remedial design phase and where we collect our information and then we get into the river around 2025, you know, about four years from now. So as you can see from the schedule, that would get us in the river at the same time. That's why we are looking at this, one of the main reasons we are looking at this interim remedy.

Okay, so what are the objectives for this. So what we are looking at is the source control remedy, as I said in the beginning. So we want to remediate the significant sources, source areas of sediment. As I showed you in that map, there are these pockets, these, these smaller areas of sediment contamination in the Upper 9. So we want to remediate those source areas. We are going to use what we call adaptive management to evaluate and see how this remedy works and see how we can get toward a final remedy. So our outcome would be a reduced exposure, you know, it's not going to get into the -- we are going to prevent the sediment from getting into the water column and into the biota, and we are going to accelerate the recovery in the sediment and biota.

Okay, so what do I mean by adaptive management. So adaptive management is basically taking new information and optimizing your process. So you take this new information, this new data that you collect throughout the process, and you use it to make your better final decisions. So we are going to be using this interim remedy as an adaptive management process and see how the river recovers after the adaptive management. We're going to collect post remedy data to determine if any further in river work is needed to get the final remedy, these risk-based goals. We already started and came up with a framework during our feasibility study.

Okay. So a general overview of the process is that right now we're looking at an

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interim remedy, a Record of Decision. We're going to remediate the sediment source areas. We are going to monitor, see how this reacts, see how it recovers, see how the river responds. And that's going to be followed by this final remedy with these risk-based cleanup goals that I mentioned before that we don't have right now.

So the -- apologies. The process is, and the CAG will know this, that we've seen this screen, we've seen this red star move along, that we've completed our remedial investigation, we've completed our feasibility study, and we're now at the proposed plan. And, as I said before, once we receive our comments and we respond to them and we memorialize it into a Record of Decision, then we're going to go into the river and collect a lot more data. It's pre-design investigation data which will feed into our remedial design. That shows us how we're going to address these contaminated areas. That will go into our

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interim remedy, where we actually get in the river and start remediating. Then we're going to monitor and see how the river recovers. This will be -- this will give us information that's going to go into a final Record of Decision. And also, you know, there is a five year review process where every five years after the remedy is completed we are going to see how the remedy functions and see if it's functioning as we designed.

Okay. So to begin our feasibility study the first step -- okay, I think somebody was just sharing again. Okay. Here we go.

MS. KANDIL: Again, we ask folks not to click on any of the icons, please, and to keep themselves muted. Thank you.

MS. SALKIE: Okay, now we are back to the screen.

Okay. So the first step in a feasibility study is to come up with what we call at EPA remedial action objectives. These objectives are what we're going to meet to show that our remedy is complete.

So our first objective is to control the sediment source of dioxin and PCBs by remediating the surface sediment. So we want to, we want to remediate the surface sediment and get a post-interim remedy of dioxin, a SWAC from river mile 8.3 to 15 of no more than 85 parts per trillion. SWAC is a surface-area weighted average concentration, which I'll get into in the next slide, but basically it's the average concentration in an area. So we have these goals now, these interim remedy goals of a SWAC of no more than 85 parts per trillion for dioxin and no more than background for PCBs, which is about 0.46 parts per million.

And our second objective is to control the subsurface sediment, the sediments that are deeper than the surface. And we want to keep them from eroding. That's where that bathymetry data comes into play. So we want to keep this, these areas between river mile

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8.3 and 15 from actually becoming sources. And what we're going to use is a remedial action level to do that. And I will get into that again in the next few slides.

So you'll notice, for those of you who are really familiar with the river, that we are talking about river mile 8.3 to 15. The Dundee Dam actually goes up to river mile 17. However, all of the studies we have done so far between river mile 15 and 17 show that the levels are a lot lower up there, a lot -- there isn't as much contamination. There's a lot more of the rockier areas and the high flowing river, if anybody is familiar with it, up by Dundee Dam. We are going to collect samples during our design, once we get to the point we are going to collect more samples, and it will be addressed if we find contamination. But when you look at this SWAC, this average concentration, we're focused on river mile 8.3 to 15, that's where all those pockets of contamination we found are.

Okay. So what do I mean by SWAC. And I apologize ahead, this is a bit of a complicated concept. So this is a very generalized demonstration of what surface weighted average area -- average concentration -- surface weighted average concentration is. So this circle that you see in front of you is very general, these are estimated numbers, so don't take these numbers to heart. So this is basically a pie of the SWAC of dioxin. It's about 1,000 parts per trillion for the entire pie. So if you look at a slice of the pie, the maroon area, that's high concentrations of dioxin. So those are over 1,000 parts per trillion. And that's about 13 percent of the pie. And a concentration in that little slice, the SWAC, is about 6,300 parts per trillion. When you multiply those, you end up with 845. And if you do that for each of these pies, that's how you get this 994 parts per trillion SWAC,

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about 1,000.

So this just shows you how we calculate our SWAC. Which again, is basically the average concentration in an area. And as I said in the last slide, we are trying to get an average concentration at about 85 or below. So we're starting at about 1,000, we want to get to 85. So how do we do that. That's where the remediation action level comes into play, or the RAL.

So this is the same, this first square is the same as the last slide exactly. So what if we were to take out that maroon pie slice, that over -- everything over 1,000. Well, that becomes our remedial action level, our RAL is 1,000. So everything over 1,000 comes out. Well, what would happen. We would calculate all of these other pies together, slices together, what's remaining in this pie, and the SWAC is 151. So you can see just by removing this one large slice of pie you end up with 83 -- 85 percent reduction in SWAC.

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So that's great. So we want to see exactly how we can get to 85 parts per trillion, what we have to actually get to. So just to summarize, SWAC is the average concentration that's left in an area, and the RAL is what we have to remediate to to get to that number.

Okay, so why do we need to know this. So the next step of our feasibility study was to create alternatives. This is a table of alternatives. So the first one, as is required under Superfund, is no action, what would happen if we did nothing in the river. Well, the RAL would -- the SWAC would stay the same. The actual number is more like 932 parts per trillion.

So we looked at different alternative SWACs. So number two, alternative two, is that we would leave a SWAC of 85 parts per trillion in the river. To do that we would have to remediate everything over 260 for dioxin, everything over one for PCBs. And you can see a 91 percent dioxin SWAC reduction and an 81 percent PCB reduction. That's about 90 acres, 360 -- 3,000 cubic yards of sediment, and it costs about $420 million.

Then we looked at alternative three, for 75 parts per trillion. The RAL for that would be 205 for PCBs, again, one for -- I mean 205 for dioxin and one for PCBs. And you can just see as you look along this table at the different percent reductions, the different volumes that are going to be remediated and the cost. So these three are our main active, what we call active alternatives.

We also looked at alternative five. So this alternative leaves a SWAC behind of 125. So, as you can see, that doesn't meet the 85 objective. But because 85, 75 and 65 are pretty similar, we wanted to see something that would show a difference. So although alternative five was looked at, it will not be chosen because it does not meet our 85. But it showed us a difference, and you can see the

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differences here in the SWAC reduction, the cost and the volume. Okay.

We're looking at an interim remedy for source control. So what we do consider source? So sources are these areas of sediment with these high levels of dioxins and PCBs greater than about 200 to 400 parts per trillion of dioxin. That's what we found from our studies. And they have a low potential for recovery. If we do nothing, they're not going to recover on their own. And they get into the surface water and the biota. So the overall system does not recover on its own. And so we think that if EPA addresses these source sediments, we're going to reduce that dioxin and PCBs.

We're also going to reduce the SWACs for other contaminants because where we find these silty areas it's not just PCBs and dioxin. There are other contaminants there as well. They're what we call co-located contaminants. So once we address all these

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silty areas, we're going to be addressing the other contaminants. And we are going to reduce concentrations in the water, the biota, and the surface sediments, and accelerate recovery.

So with all Superfund -- for all proposed plans these alternatives have some common elements that are the same no matter which alternative you choose. So we're looking at dredging and capping for the Upper 9 miles. And dredging is about two to three feet. And we don't know yet, we haven't studied that yet. All this sediment will be dewatered at a processing facility. That's one of the items I talked about earlier, about possibly sharing with the Lower 8. And will be disposed of at an off-site facility. There might even be areas that we can dredge and might not need a cap. It might be cost effective to dredge it all out if it's shallow enough in certain areas. The cap will be followed after dredging, and the different

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types of caps will be determined during design.

There are also institutional controls of fish and crab advisories. And I just want to point out that there are right now fish advisories not to eat the fish from the Passaic River or the crabs. And those are going to stay in place until EPA and New Jersey believe that it's safe enough to lift them.

Another common element for all of the remedies is sampling. So we've begun this pre-remedy sampling program where we've collected, we're collecting surface water, fish and crab and more bathymetry data. You may even see the boats out there this summer, and we've been in there the last few summers. This data is going to feed into what is going on in the river right now so that we know what it looks like before we do the remedy.

The next level of data is what I talked about earlier, it's the pre-design investigation. So we're going to be collecting over 2,000 sediment sample locations at multiple depths on 80 foot grids. So that's a large amount of data so that we can see exactly what our footprint looks like. And then we're going to be going back and doing a second round of sediment sampling to target if there's any areas where we're uncertain, we can collect more data there and see exactly what it looks like. We're also going to be doing performance monitoring, which is sampling during the construction itself.

All right, and then once the remedy, the interim remedy is complete, we are going to collect more data to find out if we meet that SWAC goal of 85, did we, you know, did we -- do we need to do more sampling or more remediation. So we're going to be doing post interim remedy confirmation sampling. Once we install the caps the caps have to be monitored as well. And there will be long

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term monitoring to see how the river recovers following this interim remedy.

Another item that I think is relevant, although we're not quite at this point in our -- and this is more of a design plan, but the community health and safety plan. It shows, this is actually an example from the Lower 8 because they're getting closer to this point than we are in the Upper 9. So we identify sensitive populations like schools and hospitals. We talk about construction schedules, how many times, how many days, how many hours the boats will be on the river. We are going to address lighting for safety but also to minimize impacts to the community. Traffic is another, is a very big concern. We also look at air monitoring and odor and noise control. So these are items that no matter which of these alternatives is chosen we'll have to address once we get to that point.

Okay. And now we're at the final

part of the presentation, EPA's preferred alternative. So for all Superfund sites we look at our alternatives and we evaluate against these nine Superfund evaluation criteria. Is it protective of human health and the environment, that's number one. Do we meet the requirements, the appropriate requirements. Is it long term effective, is it permanent, you know, will it keep us protective of human health into the future. Does it reduce the toxicity mobility, does it keep the contaminants from moving through treatment. Is it short term effective, does it, which is does it, how does it affect the community while we are dredging, does it affect the workers while we're dredging. Is it implementable, can we even do this. We look at different costs. And then finally the state acceptance and the reason I'm here today, we need community acceptance.

Okay. So when we looked at the alternatives, and again, I'll focus on two, three and four since one and five were not chosen. So all three of these yes, they are protective of human health because they're going to remediate these source areas. We are going to -- we are able to meet that 85 because all three of them are going to be designed to either 65, 75 or 85. So they're all less than 85 or at 85. They're all going to recover the sediment in the water column. They all comply with these requirements, such as the Endangered Species Act. They are -- they do reduce the toxicity through treatment. We will be using some probably, I mean we're not at this point yet, but we'll be looking into carbon amendments and design. And they all rely on well-established dredging and capping methods.

Okay. So, let's see. So another, just another way of looking at the different alternatives is that the -- just in comparison to each other. They reduce the SWAC from about 91 to 94 percent for dioxin, 81 to 84 for PCBs. We believe we can achieve those objectives in about seven and a half to eight years after the start of construction. You can see the difference in cost, about 20 million per each different alternative. They also have progressively more short term risks to workers, because of course the longer you're there when you're more -- 7.9 years versus 7.3, it's going to impact the workers in the community. But they all show about similar amounts of contaminant resuspension, which is as you're dredging when the sediment gets resuspended. Okay.

Okay. So how do we compare the three different alternatives when we're choosing our preferred alternative. So this is I think a good visual. On the left side you can see dioxin concentration. It starts at zero and goes up to about 10,000. So what you notice first is the red. So that's from 400 and above. That is definitely source sediment. So those are the high levels of

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sediments that will addressed during this interim remedy. And then you look at the 200 to 400. As I mentioned before, we believe that's the area where source begins, that's the range of dioxin deposited on depositing particles.

So if you look at each of these alternatives, excluding alternative five, starting with alternative two for 85 parts per trillion, what we would need, you know, as I said, that relationship between SWAC and RAL, we would need a remedial action level of about 260 to address alternative two and get to a SWAC of 85. As you can see, that does cover a large part of the source, what would be -- what the beginning of source is. And then you look at alternative three for 75 parts per trillion, and that gets almost to the bottom of what we consider to be source, with a RAL of 205. And then if you look to alternative four, that's 65 parts per trillion, and that goes even beyond what we actually consider to

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be source, because that goes down to 164 of our remedial action level. And that gets into the green area, which has a higher recovery of potential sediments and the larger grain sediments.

Another way that we looked at the different, three different alternatives is this table. So if you, this first half of the table on the top is very similar to what I showed before. It's the three different alternatives, two, three, four, and each column has the, I mean each row has the cost, right, the different costs, 420, this is a million. The dioxin remedial action level required to get to our SWAC goal. The PCB remedial, RAL as well, the volume and construction years, as well as the mass of dioxin and PCBs that are going to removed.

So one thing that we noticed when we were doing the analysis in comparing all three alternatives is the bottom of this chart. So when we -- so alternative two is basically the smallest footprint, right, because it's remediating the smallest amount of material. So we wanted to see how each of the other alternatives compared to that alternative two. So, for instance, if you look at cost, alternative three is five percent more costly than alternative two. And alternative four is 11 percent more costly than alternative two. So that just show you what this table represents. So one thing we did notice when we were looking at this when we were doing all of our many different types of analysis is the volume versus the mass. So if you look at alternative two to three, it's six percent more sediment removed, okay. If you look at four to two, it's 15 percent more sediment removed. And then we look at the mass of dioxin. So the mass of dioxin going from three to two is 3.4 percent. And then if you look at four to two, it's 6.8 percent. So what that shows is that we're removing quite a bit of sediment and not as much dioxin basically. So you can see the difference when we compare the three different alternatives, compare the two alternatives to the one, is that although we are removing quite a bit more dioxin -- more material, we're not quite removing as -- an equal amount of dioxin. So that led EPA to conclude that we think alternative -- that alternative three is the preferred alternative.

So, as I mentioned, alternative one would not achieve the RAOs. Alternative five, same thing. Alternative two, three and four would achieve the RAOs, the remedial action objectives, accelerate the systems recovery, and be compliant with our requirements. However, we think alternative four would include material that's not considered source. It goes beyond the intent of what this interim remedy is. And alternative two, although it does address some source, we think there's a good potential it will leave some source behind. So we think alternative three, by

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looking at the SWAC and the different RAOs, is the preferred alternative. Alternative three is therefore the preferred alternative. And keep in mind that we are going to be monitoring once this is complete and it will end up in a final Record of Decision. Okay.

So just to sum up our remedial alternative and to bring up one more point. So you can see that our dioxin SWAC for this alternative is 75. But if you look at this first line, it says dioxin SWAC reduction to 70 parts per trillion. And I'll explain what that means. So basically we, you know, if you take a crayon and were to draw a circle around everything over 205, because that's our, our remedial action level, and if you were to draw a circle around everything over that on the surface, that's our footprint. Well, then we're going to look at the subsurface, the erosional areas, so then you draw a crayon around that as well. So that becomes a much larger, not much but a bit larger area. Which actually, so the overall SWAC reduction becomes 70 parts per trillion. So because we are going to go after the surface sediment and then the subsurface sediment, we end up with a bigger footprint. So when we did all the calculations, it shows us is we are going to leave more like 70 parts per trillion, which is a 92 percent reduction, and more like 0.27 parts per million for dioxin. So the area is about 96 acres, the volume is 307, 87 cubic yards -- 87,000 cubic yards. It takes about four and a half years and will cost about $441 million. Okay.

Okay, so that sums up my presentation. This is a slide with our contact information, myself and Shereen. We do have an administrative record with the proposed plan and all the supporting documentation at the Newark and Elizabeth Library with all the other Diamond Alkali sites. Also at our Region 2 office in New York. But much easier, it's online at these

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two websites. And that's pretty much it. I just want to note that our public comment period has been extended to June 20 -- June 14th, 2021. And Shereen is going to monitor and facilitate the questions. I think, if it's okay with you, Shereen, I'll probably leave this one up so you can see our contact information?

MS. KANDIL: Yeah, that's perfect. Thank you so much, Diane. And I also added the two websites, our, EPA's website, the OurPassaic.org to the chat box so you can just easily copy and paste from there. So thanks again, Diane.

The presentation portion of our meeting is, we have completed it, and now we're at the Q and A session. So I'm going to go over the instructions once more. We're going to turn to the chat box first. I haven't seen any questions come in just yet during the presentation, I think everyone was focused on your presentation. But we will

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turn to the chat box first, so please go ahead and add your comments or questions in the chat box. As a reminder, we do have a court reporter, so please state your first and last name and your affiliation before your comment or question. After the chat box, after we read through the questions in the chat box and answer questions, we will turn to the phone lines. I will call on you by category, then alphabetically. So elected officials first, then residents, businesses and then the general public. After we go to the phone lines we'll turn to the Spanish conference line, see if anybody has any questions there. And then we will, we will go back to the chat box in case there are additional questions.

So for now I don't see any questions in the chat box, so we can just turn directly to the phone lines. I do see a question, somebody's hand is up. Let me just see whose hand is up.

MR. KORTRIGHT: Yeah, it's Pete

Kortright.

MS. KANDIL: Thank you, Pete. Please go ahead.

MR. KORTRIGHT: Yeah. I'm with Bergen County Planning & Engineering. We had one question. And if the team could examine what is the impacts of the navigation through the navigational routes for boating and dealing with dredging? We didn't really get enough on that. If you could just speak to that matter, we would greatly appreciate it. Thank you.

MS. SALKIE: So I'm -- this is Diane again. Are you talking about the Lower 8, the navigation channel at the mouth of the river that I mentioned?

MR. KORTRIGHT: No, at the upper portions.

MS. SALKIE: Okay. I'm not sure I know --

MR. KORTRIGHT: The proposal, your proposal --

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MS. SALKIE: Yes.
MR. KORTRIGHT: -- of clean -- your proposal, alternative three, right?
MS. SALKIE: Mm-hmm.
MR. KORTRIGHT: What are the impacts to navigation in terms of boating --
MS. SALKIE: Okay.
MR. KORTRIGHT: -- how much dredging, what is the depth, what is the -- what is the -- how will the volumes look in terms of that? I mean you talked about cubic yards, but what is the actual impact to that, will there be enough of -- will the depth be greater now that you're removing so much dredging. I mean --
MS. SALKIE: Okay, I'm sorry, I understand what you're --
MR. KORTRIGHT: Okay.
MS. SALKIE: -- what you're saying now.
MR. KORTRIGHT: Thank you.
MS. SALKIE: Thank you very much.

Yeah, so no, we are not changing the depth. So we are dredging only to install a cap. So we are not going beyond the requirement of remove -- remediating the contaminated sediment to install a cap. So we don't -- we're not going to make it any shallower to exacerbate any flooding or to, you know, impede on any boating. However, we are not going any deeper. Does that answer your question?

(No response)

MS. SALKIE: Hello? Can anybody hear me?

MS. KANDIL: Yeah, we hear you, Diane.

MS. SALKIE: Okay, good.

MS. KANDIL: Okay, so we'll move on. If you have additional questions we'll come back to you, Pete.

So I do want to turn to elected officials if there are any elected officials on the line who have questions with the last names A through G, please unmute your lines either by pressing the microphone button on your Microsoft Teams window or by clicking on star 6 on your phone. So elected officials A through G.

(No response)

MS. KANDIL: Okay, any elected officials last names H through R, please unmute your lines now.

(No response)

MS. KANDIL: Okay, thank you. Any elected officials with last names that start with S through Z, please unmute your line now if you have any questions or comments.

(No response)

MS. KANDIL: Okay. We're going to turn to residents. Any resident that has a last name A through I, please unmute your line by pressing star 6 or the microphone button.

(No response)

MS. KANDIL: Okay. Any resident with the last name, last name that begins with

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J through R, please unmute your line right now.

(No response)

MS. KANDIL: Okay. Any resident with the last name S through Z?

(No response)

MS. KANDIL: Okay. We're going to turn to businesses. Any businesses with the name, with their name that starts with A through I, please unmute your line now.

(No response)

MS. KANDIL: Okay. We'll turn to businesses with J through R.

(No response)

MS. KANDIL: Okay. Any businesses S through Z, please unmute your line by clicking on the microphone button or by pressing star 6.

(No response)

MS. KANDIL: Okay. Finally we'll turn to the general public. Anyone from the general public that has a question or comment, please unmute your line now. Last name A through I.

(No response)

MS. KANDIL: Okay. Anyone from the general public that with the last names J through R that has a question or comment, please unmute your line now.

MR. MEEGODA: Hi, this Jay, Jay Meegoda.

MS. KANDIL: Hi, how are you?

MR. MEEGODA: Pretty good. I have a question. For the upper regions, so yeah, based on the presentation it looks like it's, dredging and capping is what is going to happen in the upper part of the river or is it fixed or do you explore other options?

MS.SALKIE: That is, that is the, what we are planning for this interim remedy, yes, is a dredging and capping remedy.

MR. MEEGODA: Have you closed all the options, other options or you are open to other suggestions?

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MS. SALKIE: We would be open to other options, yes, during design.

Michael, do you want to answer that one?

MR. SIVAC: So there are, many of the technologies -- this is Michael Sivac. I'm the branch chief with EPA who manages the projects in the Passaic, Hackensack and Newark Bay area.

There were other technologies that were evaluated as part of the remedy for the Lower 8 miles for Operable Unit 2. And a lot of those same technologies were initially considered for this interim action. And as a result of that review, this cap with a dredge to accommodate the cap or in areas where it makes sense to do so, just to dredge without a cap, is what was decided on as what is appropriate for this interim remedy at the time.

MS. KANDIL: Jay, do you have any additional questions or did that answer your question?

MR. MEEGODA: So the remedies considered earlier, there may be newer technologies evolving. Would you close the doors for those technologies or --

MR. SIVAC: Again, for the interim remedy we have evaluated the technologies that are out there in an earlier part of the process, Jay. And what was concluded was that for this interim remedy, in order to address these source sediments this dredge with a cap was the most appropriate technology to move forward with.

MS. KANDIL: Okay, thank you, Michael.

Any additional questions or comments from the general public?

MS. REENSTRA: I have, I have one question, if I may.

MS. KANDIL: Sure. Please don't forget to state your first and last name and your affiliation.

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MS. REENSTRA: My name is Robin Reenstra. I am in Rutherford. And I apologize profusely in that I came in a little bit late into this meeting, I probably missed some relevancy. But I, my concerns and questions are related to the fact that I live one block from the Passaic River in Rutherford. And I am, I believe, the only resident in Rutherford that deals with well water. I'm interested to know if any of the initiatives that are being proposed might have any issues and complications for me and my 95 foot deep Artesian well.

MS. SALKIE: Okay, thank you, Robin. This is Diane, I'll start that response. Thank you for your question. So the contamination in the Passaic River has, you know, generally initiated at the Diamond Alkali site, and that's what we follow. So, you know, we are, you know, up to eight miles almost from that site itself. So that's the sediment, the contamination that's been carried through the tidal nature of the river upstream, up the river, and that's the contamination that we're dealing with with this.

MS. REENSTRA: Okay.

MS. SALKIE: So that sediment would not necessarily have an impact on groundwater. I don't know if one of my risk assessors would want to talk about that, but I don't -- I don't see how that sediment would impact, would impact a well, because the contamination initiates at, you know, the Diamond Alkali site and moves throughout the river itself.

MS. REENSTRA: At what depth are you dealing with?

MS. SALKIE: The sediment contamination? It's generally about two to three feet deep. And we don't have much data right now at depth. That's why we're taking so many, you know, of that design sediment samples to learn more of what's going on. But as we know right now the depth is about, you

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know, is only a couple feet deep in the Upper 9 mile.

MS. REENSTRA: And at the high water how deep from the water surface?

MS. SALKIE: At high water how deep from the water surface. It depends on which part of the river you are talking about. Like how deep the water is, is that --

MS. REENSTRA: My questions, I see your maps with the 17 mile.

MS. SALKIE: Okay.

MS. REENSTRA: Which I presume makes it up into the Rutherford area.

MS. SALKIE: Yes.

MS. REENSTRA: And so one question I guess deals with from surface area to the point at which you are deep sediment, which may only be two feet deep, how -- what kind of distance and depth are you dealing with?

MS. SALKIE: I really apologize but you cut out a little bit there. Can you repeat that?

MS. REENSTRA: Yeah. The issue that I am questioning I guess is if you're dealing with a depth that's only two feet deep, that is I presume under the water surface.

MS. SALKIE: Yes.

MS. REENSTRA: And so at high tide how deep would that water be, so that how deep the work is being initiated.

MS. SALKIE: Well, I mean, as I said, it's about two to three feet is, you know, the overall general plan on what we would be remediating. And that would be filled with a cap. So it will be --

MS. REENSTRA: Yeah, I understand.

MS. SALKIE: Okay.

MS. REENSTRA: How far down is that two to three feet from the top of the water surface?

MS. SALKIE: It depends. Again, I'm not sure.

MS. REENSTRA: At high water,

because will it be comparable to land on the river?

MS. SALKIE: Understood.

MS. REENSTRA: And I can calculate how deep my wells are.

MS. SALKIE: Understood.

Ed, I hate to put you on the spot, do you know the depth of the river around the Rutherford area? We may have to get back to you on that, but --

MR. GARLAND: This is Ed Garland.

MS. SALKIE: Thank you.

MR. GARLAND: From HDR.

MS. REENSTRA: Mm-hmm.

MR. GARLAND: The deepest part of the cross-section might be on the order of fifteen feet deep.

MS. REENSTRA: Okay.

MR. GARLAND: But the -- if you don't have salt in your drinking water from your deep Artesian well --

MS. REENSTRA: Yeah.

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MR. GARLAND: -- it's unlikely the remediation would affect the drinking water in your well.

MS. REENSTRA: Okay. I'm not quite sure I understand --

MR. GARLAND: Well, if the --

MS. REENSTRA: -- the relationship.

MR. GARLAND: If the surface water has salt in it, and that doesn't get down into your well --

MS. REENSTRA: No.

MR. GARLAND: -- then the contaminants that are in the sediment would be unlikely to get down into your well.

MS. REENSTRA: All right. I know that my well goes down below bedrock area. But it's never had an issue with the drinking water. And so it's -- I'm always looking out for making sure that it doesn't get affected either.

MR. GARLAND: Yes.

MS. SALKIE: It sounds like it

would be even deeper than the river is what you're saying, right? Do you know the depth of your well?

MS. REENSTRA: As I understand, and this is a property that I grew up in and my parents built the house, so I heard through my life that the well was 95 feet deep.

MS. SALKIE: Okay. That's quite deep.

MR. SIVAC: Yeah.

MS. REENSTRA: Okay. All right. So what I'm hearing you say is about fifteen feet of water at high tide plus two feet or so of sediment that you're dealing with.

MS. SALKIE: Correct.

MS. REENSTRA: Okay. All right, that's fine. My concerns are shared.

MS. SALKIE: Great.

MS. REENSTRA: Okay.

MS. SALKIE: Thank you.

MS. KANDIL: Thank you so much, Robin.

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Is there anyone else from the public that has any question or comment?

(No response)

MS. KANDIL: Okay. We are going to turn to the Spanish conference line and see if there are any questions in the Spanish conference line and then turn back to the chat, there are a few questions in there.

Anyone from the Spanish conference line have any questions?

MR.YAFET: Hello? Hello?

MS. KANDIL: Yes?

MR.YAFET: Oh, yes, thank you. I'm sorry, I didn't -- I forgot to press star 6. I'm from the last cohort. Steven Yafet, I'm a resident.

Yeah, can I follow up? It's sort of a question of follow up on Jay Meegoda's area, and I'm just curious. You know, he has this study that a number of scientists, internationally also, studied this nanobubbles technology that's in use in some remediations.

Not the same as this one necessarily, but wastewater cleanup, algae treatment, there's some uses. And it's, it looks compelling and I think that the EPA scientists have some knowledge of the literature and the papers have been, you know, sent along. And is there anybody who can speak to it and whether there has been a review? There is something going on internally at the EPA to review this technology, especially in this instance it indicates -- it looks like it's a very good application, the spot treatment, treatment in situ would be where, you know, the highlighted areas, if it's not, you know, the complete riverbed, which are the hot spots, then it's very well targeted to this kind of situation. I think that's what the question is. If there's anybody on the call who's familiar with this, I would love to hear some answer. Is that, is that question not clear?

MS. SALKIE: Yes. No, I understand.

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MR. SIVAC: So --

MS. SALKIE: Go ahead, Mike.

MR. SIVAC: So if you would like to submit that study as a comment, we would look at it and we could respond to it in the responsiveness summary. I don't know that -- I know that I am not familiar enough with that study to comment on it now. But, like I said, if you would like to submit that study we would be pleased to look at it and respond to it, like I said, as part of the responsiveness summary for this remedy.

MR.YAFET: Yeah. I think, I think really it should be something the EPA should look at. Because in the, especially, especially in the low carbon future, you know, that's so important, it becomes a low energy solution probably in the wastewater treatment, for instance, which is a big, you know, consumption. But studies show -- okay, I'll shut up, but that sounds good.

MS. KANDIL: Thank you so much.

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I'm going to turn back to the Spanish conference line just to see if there's anybody that had a question or a comment. Donette or one of the interpreters, if you can let us know if there's a question.

THE SPANISH INTERPRETER: At the moment there's no, no questions.

MS. KANDIL: Okay, thank you so much, Donette.

So I'm going to turn to the chat. Sorry, thank you, I was speaking and I didn't realize that I was on mute. So I'm going to turn back to the chat box, we have a couple of questions. The first question comes from George Vallone. "When will the lower Newark Bay portion of this problem be addressed."

MS. SALKIE: Okay, so I assume you're talking about Operable Unit 2, the Lower 8.3. Are you saying the Newark Bay itself, the Newark Bay Operable Unit 3? Are we talking about -- I'm not sure if you're talking about the Lower Passaic or the Newark

Bay itself. But Michael, do you want to address the Newark Bay question, because I don't --

MR. SIVAC: Sure. The Newark Bay study area, which is Operable Unit 3 of the Diamond Alkali Superfund site, is in, still in the remedial investigation and feasibility study stage, where we are still working on defining the nature and extent of contamination and evaluating how, what alternatives, what technologies might be appropriate to address some of the risks that may be present at the site. That operable unit is scheduled to finish the remedial investigation and feasibility study probably sometime in 2023, and then we would go through the same process that we are going through with this operable unit, which is we would then identify a proposed -- release a proposed plan that identifies EPA's preferred alternative, we would memorialize that proposed, that preferred alternative in a

Record of Decision, and then we would go through the remedial design and then implement the remedy for that. So we are still several years out from the Newark Bay being remediated or being cleaned up.

MS. KANDIL: Thank you, Michael.

The next question comes from Carol Ann. Will there be disruptions to highway traffic along the river as a result of the dredging.

MS. SALKIE: Most likely, yes. You know, we're not in the design phase right now, but traffic is one of the things we looked at, as I had mentioned, in our community health and safety plan. You know, we will work as best we can with the community and the townships and all, especially in the Upper 9 we have several different townships and a lot of bridges, and we will work with towns and communities to minimize the traffic that's caused. But, you know, it is going to be a large amount of work. Again, it's for the benefit of the river and for the communities obviously to get this, this material addressed. But yes, I mean there will be some disruption to traffic. But again, we will try and minimize it as much as possible and work with the townships and DoT in how to minimize that. But that would be part of, again, we're not quite as far in the Upper 9. The Lower 8 is a little bit further. But, you know, that is one of the things we do look at and take seriously is traffic issues.

MS. KANDIL: Thank you, Diane.

I don't see any other questions in the chat box. I do want to open up the lines one more time to see if there are any questions or comments.

MS. SALKIE: I think a new message just popped up Shereen, I saw.

MS. KANDIL: Oh, okay. Sorry, I don't see it. So if you see it, Diane, I'm sorry, can you --

MS. SALKIE: Sure. It's from I

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believe Sheldon.

MS. KANDIL: Okay.

MS. SALKIE: I might have to put my glasses on. So it says, "Please explain further the concept of SWAC. Does it mean that there are concentrations both higher and lower than the target value of 75 parts per trillion." And yes, it's an average concentration. So we are trying to get the average concentration in that area to be at 75 parts per trillion or less. So yes, it is an average concentration. You know, it's a concentration that we are planning to leave behind. So, you know, it factors in the nondetects, the -- you know, it's over the entire area. So there's going to be some parts that are lower concentration to nondetects that are going to be average with the rest of the concentrations. But yes, when, you know, like I said, you start at about 1,000 parts per trillion, so to go down 91 percent to get to about 70 to 75 parts per

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trillion, you are remediating a large amount of material.

I hope that answers your question. It's hard with these chats to know if I'm answering your question correctly.

MR. SIVAC: Great.

MS. KANDIL: Thank you, Diane.

MS. SALKIE: Do you want to go further, Michael?

MR. SIVAC: Sure. Shereen, there are two more questions.

MS. KANDIL: Yeah, I see them. Thank you, Michael.

MR. SIVAC: Yup.

MS. KANDIL: So the next question comes from Graham Ansell, GSI, I'm sorry, GSI Environmental. "Thank you for the presentation. What is EPA's plan for all the dredged material? Also, EPA typically has a margin of error in their cost analysis. Wondering who's going to pay up to $660 million for alternative three. Thank you."

MS. SALKIE: Okay. Thank you, Graham. I can address the first half. So the plan is for the dredged material to be processed. Basically, you know, squeeze until the liquid is extracted from it, and then it will be delivered off site to a disposal facility. We aren't even close to being at the design phase right now, so I don't know exactly what we're talking about with processing facilities yet or even disposal areas. You know, when we have a feasibility study we estimate, we estimate the cost of dredged material and, you know, places that would take it. But we don't have anything set right now because we're not in the design phase.

As far as the cost and the cost analysis and who's going to pay, that is not something I can talk about. We are not there. We, you know, we're just at the proposed plan phase right now.

MS. KANDIL: Okay. Thank you,

Diane.

The next question comes from Corey Jones. "Is it possible to completely destroy contaminated material instead of capping it?"

MS. SALKIE: Unfortunately not, for dioxin in particular, no. Dioxin, just treating and disposing of dioxin itself is in fact difficult because of the nature and the toxicity of dioxin itself. So as far as right now I don't know of a method that completely would destroy it, I don't know of a technology that would completely destroy dioxin.

MS. KANDIL: Okay. Thank you, Diane.

I'm going to turn to the Spanish conference line to see if there are any questions there.

(No response)

MS. KANDIL: Donette, would you be able to let us know if there are any questions?

THE SPANISH INTERPRETER: I don't

hear any questions at the moment.

MS. KANDIL: Okay. Thank you.

Anyone on the phone lines?

(No response)

MS. KANDIL: Okay. And I don't see any hands raised or any additional questions in the chat box.

So you do have, as Diane mentioned, until June 14th to submit your comments. The proposed plan and all the site related documents are on the EPA website, as well as the OurPassaic.org website. The best way, Diane, right, to submit comments to you by June 14th is through your email. So salkie.diane@epa.gov.

MS. SALKIE: Yes.

MS. KANDIL: If you have -- thank you. If you have any other questions you can reach out to me or Diane.

Let me just see. I do believe, I just want to see if there's an additional hand because I saw -- no, no, I don't see any other hands. Okay, so that's it. Thank you so much. And we appreciate you coming out and listening, and your comments and questions. I hope you all have a great night.

(Pause in the proceedings)

MS. KANDIL: Okay, everyone, have a great night.

(Time noted: 7:40 p.m.)

C E R T I F I C A T E

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ATTACHMENT D

WRITTEN COMMENTS

From: FHCA07104
To: Salkie, Diane
Subject: Diamond Alkali Superfund Site, NJ
Date: Thursday, May 13, 2021 8:10:20 PM

Please see attachment.

FOREST HILL
COMMUNITY ASSOCIATION
www.fhcanewark.org
Newark New Jersey

May 13, 2021

Diane Salkie
Remedial Project Manager
US Environmental Protection Agency
290 Broadway, 18th Floor, New York, NY 10007-1866

The Forest Hill Community Association (FHCA) is writing to respond to the U.S. Environmental Protection Agency's (EPA) proposed **Plan for Interim Action to Clean Up Contaminated Sediment in the Lower Passaic River Study Area of the Diamond Alkali Superfund Site, New Jersey**. This site raises issues of environmental justice by which the poor and communities of color have already been disproportionately exposed to industrial pollution and now, during remediation, could be exposed to more industrial pollution in the form of air emissions.

The FHCA requires that prior to any site remediation, the EPA provides the FHCA and the public with a written plan for approval that details how the EPA will ensure that, during soil and other remediation, all air emissions from this toxic superfund site will be completely trapped, i.e. cannot escape into the air of the surrounding community.

NOTE: During 2012, FHCA members reported strong chemical odors in the air in Newark and surrounding communities during clean-up of the Diamond Alkali Superfund Site. These odors were so powerful they seeped into residences. Since these emissions weren't being trapped, FHCA members met with NJ DEP Director Edward M. Choromanski and his staff. These air emissions put the Newark and surrounding communities at great risk, possibly equivalent to or exceeding 9/11 ground zero conditions, since they contained Agent Orange chemicals from the Diamond Alkali Company. In response to these horrific conditions, on 5/25/12, NJDEP Field Agent Mark Burghoffer visited Tiffany Blvd. in Newark during a strong chemical smell event. He witnessed the odor and stated that he "might call it a 2 or more out of a possible 5," and that "the air smelled like xylene or toluene or chlorine."

We don't know what impact this exposure will have on the long-term health of Newarkers and surrounding communities. That has yet to be determined. In a community already heavily burdened with air emissions from multiple airports and industry that tax our health, the proposed clean-up shouldn't threaten us further. Thank you for listening to our concerns.

Sincerely,

Paul Agostini

Paul A. Agostini
President
Forest Hill Community Association, Inc.
P.O. Box 9481, Newark, NJ 07104-0481

From: Hillary Alberts
To: Salkie, Diane
Subject: Dredging of the Passaic River
Date: Thursday, April 15, 2021 2:05:37 PM

Hello,

Please clean up the river. Dredge the part outlined in the cleanup plan and more. The Sierra Club says all of the river needs to be dredged. Please clean it up as myself and my 2 small children live blocks from the river.

Thank you,
Hillary Alberts
491 Wilson Avenue
Lyndhurst, NJ 07071

R#9
5.11.21

..... **Resolution of the Township of Belleville, N. J.**

No. 21-124 Date of Adoption ... May 11, 2021 ....

TITLE:

"RESOLUTION ENDORSING THE UNITED STATES ENVIORNMENTAL PROTECTION AGENCY'S PROPOSED PLAN FOR THE UPPER 9 MILES CLEAN-UP PROJECT OF THE UPPER 9 MILES OF THE LOWER PASSAIC RIVER"

Approved as to Form and Legality

.... Township Attorney

Factual contents certified to by

.... Title

Mayor

Council Member Cozzarelli .... Presents the following Resolution

Council Member Cozzarelli .... Moved for the adoption of the Resolution

Seconded by Council Member DePena ....

RESOLVED BY THE MUNICIPAL COUNCIL OF BELLEVILLE, N. J.:

WHEREAS, on April 14, 2021, the United States Environmental Protection Agency's (US EPA) released its proposed plan for the Upper 9 miles of the Lower Passaic (hereinafter referred to as the "Upper 9 miles"), also known as the Diamond Alkali Superfund Site Operable Unit 4; and

WHEREAS, over the last three (3) years the US EPA worked in collaboration with the New Jersey Department of Environmental Protection (NJ DEP) to create a plan for Upper 9 miles; and

WHEREAS, the original schedule would have been inequitable to stakeholders in the Upper 9 miles as it called for performing the lower 8-mile remedy first, followed by the Upper 9 miles of the Passaic River; and

WHEREAS, the Township of Belleville is pleased to see that the proposed plan will expedite remediation of contaminated sediment in the Upper 9 miles of the Passaic River, eliminating at least seven (7) years from the traditional cleanup schedule; and

WHEREAS, the US EPA's Proposed Plan aligns the Lower 8 with the Upper 9 removals and permits project managers to monitor and manage any resuspension and transportation of contaminated sediments between the Lower 8-miles and the Upper 9 miles; and

WHEREAS, while the US EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river; and

WHEREAS, instead of approximately 387,000 cubic yards of contaminated sediment being trucked through the communities along the Passaic River, the contaminated sediment will be removed from the Upper 9 miles via barge to a treatment facility down river; and

WHEREAS, the US EPA and NJ DEP received public input from communities along the Passaic River and took steps to mitigate those concerns in the proposed plan; and

WHEREAS, the EPA and NJDEP proposed plan for the Upper 9 miles will not adversely impact flooding in the region; and

WHEREAS, environmental justice has been and remains a priority for the Township of Belleville and on September 18, 2020 Governor Murphy signed S232/A2212 into law which clearly defines overburdened communities as communities where:

- ✓ At least 35 percent of the households qualify as low-income households; OR
- ✓ At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; OR

Resolution No. 21-124

✓ At least 40 percent of the households have limited English proficiency.

WHEREAS, On October 1 2020, NJ DEP released *"Furthering the Promise: A Guidance Document for Advancing Environmental Justice Across State Government"* which determined that 97.9% of Belleville's population meets the listed criteria as being overburdened, making the environmental justice piece to this project extremely important to our community; and

WHEREAS, the Township of Belleville is uniquely situated midway between the Lower 8 (Newark Bay – River Mile 0 – to Belleville – River Mile 8.3) and the Upper 9 (Belleville – River Mile 8.3 – to Dundee Dam – River Mile 17.2), Belleville is pleased see the Lower 8 and Upper 9 remedies are now aligned; and

WHEREAS, the Township of Belleville would like to thank the USEPA and the NJDEP for their efforts and collaboration in ensuring that the entire river gets addressed all at once.

NOW THEREFORE BE IT RESOLVED as follows:

1. The Mayor of the Township of Belleville, Essex County, State of New Jersey, hereby endorses the EPA's Proposed Plan for the Upper 9 miles clean-up project of the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4, especially as it is now aligned with the Lower 8-mile remedy; and

2. The Mayor of the Township of Belleville directs the Township Clerk to forward a copy of this resolution to the EPA, U.S. Senator Cory Booker, U.S. Senator Bob Menendez, U.S. Congressman Albio Sires, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 29 Legislators, Upper 9 Mayors, and the Passaic River Community Advisory Group (CAG).

Adopted by the Municipal Council of the Township of Belleville, N. J. — Date May 11, 2021

RECORD OF VOTE

COUNCIL MEMBER	YES	NO	N.V.	AB.	COUNCIL MEMBER	YES	NO	N.V.	AB.
COZZARELLI	X				NOTARI				X
DE PEÑA	X				ROVELL	X			
GRAZIANO	X				STRUMOLO BURKE	X			
MELHAM	X								

Sign:

X—Indicates Vote N.V.—Not Voting AB—Absent

Certified to by me this 11th day of May 2021.

Kelly A. C[illegible]
Municipal Clerk

This Resolution when adopted must remain in the custody of the Municipal Clerk. Certified copies are available.

From:	Caminiti, Melissa
To:	Salkie, Diane
Cc:	Botsolas, Peter
Subject:	Letter from CE Tedesco
Date:	Thursday, June 10, 2021 3:05:27 PM
Attachments:	image001.png LOWER PASSAIC RIVER UPPER NINE MILES.docx

---

Good afternoon,

Attached is a letter from Bergen County Executive Tedesco. Feel free to reach out to our office with any questions.

Melissa Caminiti
Executive Assistant to the Bergen County Executive
James J. Tedesco, III
One Bergen County Plaza, 5th Floor
Hackensack, NJ 07601
201-336-7303
mcaminiti@co.bergen.nj.us

COUNTY OF BERGEN
OFFICE OF THE COUNTY EXECUTIVE
One Bergen County Plaza, Room 580, Hackensack, NJ 07601-7076
(201) 336-7300 Fax: (201) 336-7304
countyexecutive@co.bergen.nj.us

James J. Tedesco III
County Executive

June 10, 2021

Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866
Via Email: salkie.diane@epa.gov

RE: LOWER PASSAIC RIVER UPPER NINE MILES

Dear Ms. Salkie:

I am the Bergen County Executive and represent the Bergen County communities located along the Passaic River's upper 9 miles. This letter is to formally express my support for the United States Environmental Protection Agency's (US EPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4.

I have had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, I wholeheartedly offer my support for this project based on the following:

- ***Timeframe*** - I was very pleased to see that the proposal creates a fast track for action in the upper 9 miles of the Passaic River. It's clear to me that the USEPA and the NJDEP, by providing a faster relief track, took the comments received during the Lower 8-mile public comment period very seriously.

- ***Resuspension*** - The original schedule saw many stakeholders in the upper 9 miles of the Passaic River express concerns about resuspension and transport up-river of contaminants from the lower 8 miles. They were concerned that despite the best efforts to contain contaminated sediments, dredging massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. Concern about the resuspension of contaminants remains, however, by aligning the lower 8 mile and upper 9 remedies this will permit project managers to monitor and manage resuspension in real time and adjust their actions accordingly.

- ***Transportation of Sediment*** – I appreciate that the planning process considered the concerns of my constituents, as all indications are that the majority of the work will take place within the river. This includes, an estimated 390,000 cubic yards of sediment which will be removed from the upper 9 miles of the Passaic River being transported via barge down river, to a treatment facility, and not via truck through the communities along the Passaic River.

- ***Lower 8-Mile Remedy Coordination*** - I am delighted to see that the Proposed Plan for the upper 9 miles of the Passaic River is now coordinated with the Lower 8-mile Remedy. The original schedule called for performing the Lower 8-Mile Remedy, and then the upper 9 miles of the Passaic River. That approach did not make sense for this project, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. I am pleased to see that common sense prevailed and I thank the USEPA and the NJDEP for their efforts and collaboration.

- ***Flooding Impact*** **-** Clearly the USEPA and NJDEP understand the concerns of our communities. In addition to the contamination in the Passaic River, flooding is a major concern. I was happy to see that the proposed plan for the upper 9 miles of the Passaic River will not have an adverse impact on flooding in the region.

- ***Environmental Improvement*** - Environmental improvement of this area continues to remain a priority for our communities. Through the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies the project addresses environmental concerns in the region and is a positive step to improving the environment for these communities.

- ***Economic Impact*** – Improving the environment by cleaning the Passaic River, while also positively impact economic development and it is anticipated that private investment will likely grow in these communities.

In addition, I request that the USEPA examine the area above River Mile 15 (Passaic River Bridge) to the Dundee Dam. Several Bergen communities are along the Passaic River in this area. The proposed Interim Remedy indicates that the river bed between River Mile 15 and Dundee Dam will be examined closely and dealt with as needed. I trust that the USEPA will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15, as is being done in the Lower 8-mile and Upper 9 mile areas.

Along with my colleagues in the impacted communities, I look forward to working with you on this remedy for cleaning of the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact my office at (201) 336-7300.

Very truly yours,

James J. Tedesco, III
Bergen County Executive

cc: Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Governor Phil Murphy
Commissioner Shawn LaTourette, NJ DEP
District 28 Legislators
District 29 Legislators
District 34 Legislators
District 35 Legislators
District 36 Legislators
Upper 9 Mayors

From:	maryloutb
To:	Salkie, Diane
Subject:	Response to EPA proposed Plan for Interim Action to Clean Up Contaminated Sediment in the Lower Passaic River Study Area of the Diamond Alkali Superfund Site, NJ
Date:	Monday, May 10, 2021 6:52:56 PM

Dear Diane Salkie, Remedial Project Manager, U.S. Environmental Protection Agency-

We're writing to respond to the U.S. Environmental Protection Agency's (EPA) proposed Plan for Interim Action to Clean Up Contaminated Sediment in the Lower Passaic River Study Area of the Diamond Alkali Superfund Site, New Jersey. This site raises issues of environmental justice by which the poor and communities of color have already been disproportionately exposed to industrial pollution and now, during remediation, could be exposed to more industrial pollution in the form of air emissions.

We require that prior to any site remediation, the EPA provides us and the public with a written
plan for approval that details how the **EPA will ensure that, during soil dredging and other remediation, all air emissions from this toxic superfund site will be completely trapped, i.e.**
cannot escape into the air of the surrounding community.

We are most concerned with this statement in your proposal:
"Dredged materials would be processed at one or more nearby sediment processing facilities for off-site disposal at licensed disposal facilities."

During EPA remediation, off-site removal and management of contaminated soils (or source removal) is the most protective. Plus, this off-site has to be far enough from anyone being affected by it.

NOTE: During many months in 2012, our community reported strong chemical odors in the air
in Newark and surrounding communities during clean up of the Diamond Alkalai superfund site.
These odors were so powerful, they seeped into residences. Community members then met with
NJ Department of Environmental Protection (NJDEP) Director Edward M. Choromanski and staff since these emissions weren't being trapped. These untrapped emissions put the Newark and surroundings NJ and NY communities at great risk, possibly equivalent to or exceeding 9/11 ground zero conditions, since these emissions contained Agent Orange chemicals
from Diamond Alkali Company. The conditions were horrific, for example, on 5/25/12, Mark Burghoffer, a field agent from the NJDEP, visited Tiffany Blvd. in Newark during a strong chemical smell event, witnessed the odor and stated that he "might call it a 2 or more out
of a possible 5, and that the air smelled like xylene or toluene or chlorine."

Another concern is that the EPA remediation may run out of funds and therefore leave the site in
a condition where it now poses more of a hazard than before the EPA started the remediation. So, the EPA has to carefully: set goals, budget with contingency, and explore all

possible derailments, so the process is fully completed and poses no additional environmental threats to the community.

We don't know what impact this exposure will have on the long-term health of Newarkers and surrounding communities. That has yet to be determined. In a community already heavily burdened with air emissions from multiple airports and industry that tax our health, the proposed
clean-up shouldn't threaten us further.

Kindly confirm receipt.

Thank you for your attention to this matter,
-Marylou & Jerome Bongiorno
Forest Hill Newark residents/filmmakers

From: Suarez, Catherine
To: Salkie, Diane
Cc: "Zach_McCue@booker.senate.gov"; "jason_tuber@menendez.senate.gov"; "ben.rich@mail.house.gov"; "Madeleine.Pike@mail.house.gov"; "George.Helmy@nj.gov"; "Shawn.LaTourette@dep.nj.gov"; "rkakoleski@rutherfordboronj.com"; "mayorscarpelli@nutleynj.org"; "councilmancozzarelli@gmail.com"; "dpronti@northarlington.org"; "janzaldi@cliftonnj.org"; "mayorlahullier@eastrutherfordnj.net"; "mdabal@wallingtonnj.org"; "tduch@garfieldnj.org"; "TheresaC@lyndhurstnj.org"; "mayor@cityofpassaicnj.gov"; "JNeals@co.bergen.nj.us"; Sarlo, Sen. D.O.; Ruiz, Sen. D.O.; Rice, Sen. D.O.; Pou, Sen. D.O.; Gill, Sen. D.O.; Schaer, Asm. D.O.; Pintor Marin, Asw. D.O.; Speight, Asw. D.O.; Tucker, Asw. D.O.; Caputo, Asm. D.O.; Sumter, Asw. D.O.; Wimberly, Asm. D.O.; Giblin, Asm. D.O.; Timberlake, Asw. D.O.; "Baptista@newschool.edu"; doug@forumfg.com; michele
Subject: PASSAIC RIVER - US EPA"s Proposed Plan - Upper 9 Miles
Date: Thursday, May 6, 2021 4:46:39 PM
Attachments: Lower_Passaic_River_Upper_9_Miles_050621.pdf

Ms. Salkie,

Attached please find correspondence in support of the Proposed Plan for the Upper 9 Miles of the Passaic River.

Sincerely,

Clinton Calabrese
Assemblyman, 36th District

NEW JERSEY GENERAL ASSEMBLY

CLINTON CALABRESE
ASSEMBLYMAN, 36TH DISTRICT
613 BERGEN BOULEVARD
RIDGEFIELD, NJ 07657
PHONE: (201) 943-0615
FAX: (201) 943-0984
EMAIL: AsmCalabrese@njleg.org

Committees
Telecommunications and Utilities, Vice-Chair
Environmental and Solid Waste
Housing

Commissions
Intergovernmental Relations Commission
Education Commission of the States

May 6, 2021

via email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

RE: Lower Passaic River Upper 9 Miles

Dear Ms. Salkie:

I am one of the fifteen state legislators that represent the communities located along the Passaic River's upper 9 miles. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, I am writing to formally express my support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4.

I am pleased to offer my support for the following reasons:

- ***Schedule*** – USEPA, in conjunction with the New Jersey Department of Environmental Protection (NJDEP), are to be commended for their collaborative efforts over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. I am pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River, while cutting seven (7) plus years off of the traditional schedule. This faster relief makes it clear that the USEPA and the NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

- ***Resuspension*** - The original schedule saw many stakeholders in the upper 9 miles of the Passaic River express concerns about resuspension and transport up-river of contaminants from the lower 8 miles. They were concerned that despite the best efforts to contain contaminated sediments, dredging massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. Concern about the resuspension of contaminants remains; however, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real-time and adjust their actions accordingly.

- ***Transportation of Sediment*** - While we understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD), all indications are that all work will take place in river. This includes, an estimated 387,000 cubic yards of sediment which will be removed from the upper 9 miles of the Passaic River with the vast majority being transported via barge down the river, to a treatment facility, and not via truck through the communities along the Passaic River.

- ***Coordination with Lower 8-Mile Remedy*** - The original schedule called for performing the Lower 8-Mile Remedy first and then - eventually - getting to the upper 9 miles of the Passaic River. That approach never made any sense for this project, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. I am pleased to see that commons sense prevailed and the Proposed Plan for the upper 9 miles is now coordinated with the Lower 8-Mile Remedy. I thank the USEPA and the NJDEP for their efforts and collaboration.

- ***Impact on Flooding*** – Clearly, the USEPA and NJDEP have heard the additional concerns that flooding, in addition to contamination, is a major concern of lower 8-mile stakeholders. While relief to the flooding problem remains a concern, I am happy to see that the proposed plan for the upper 9 miles of the Passaic River will not have an adverse impact on flooding in the region.

- ***Economic Impact*** – By taking these actions to clean the Passaic River, it is expected that economic development and private investment will grow in these communities.

- ***Environmental Improvement*** - Environmental improvement of this area continues to remain a shared priority and commitment for me, Governor Murphy, the USEPA, the NJDEP, and the Passaic River Community Advisory Group (CAO). By advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies, the project addresses environmental concerns in the region and is a positive step forward to improving the environment for these communities.

While thankful for these important steps forward, I also urge the USEPA to take a very close and careful look above River Mile 15 (Passaic River Bridge) to the Dundee Dam. The proposed Interim Remedy indicates known and identifiable areas of sediment between 8.3 and River Mile 15 which will immediately be addressed, while the river bed between River Mile 15 and Dundee Dam will be examined closely and dealt with on an ad hoc basis. I trust that the USEPA will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15.

I look forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please do not hesitate to contact my office.

Sincerely,

Clinton Calabrese
Assemblyman, 36th District

CC/cs

cc: Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Governor Phil Murphy
Commissioner Shawn LaTourette, NJ DEP
Legislators: Districts 28, 29, 34, 35, and 36
Upper 9 Mayors
Passaic River CAO

City of Clifton

OFFICE OF THE CITY MANAGER
900 CLIFTON AVENUE
CLIFTON, NEW JERSEY 07013

DOMINICK VILLANO
CITY MANAGER

973-470-5854
201-303-8749 (cell)
973-470-5265 (fax)
dvillano@cliftonnj.org
www.cliftonnj.org

June 8, 2021

Via Email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

Re: **LOWER PASSAIC RIVER STUDY AREA**
DIAMOND ALKALI SUPERFUND SITE OPERABLE UNIT 4

Dear Ms. Salkie:

This is to formally express the City of Clifton's support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River also known as the Diamond Alkali Superfund Site Operable Unit 4. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, we are pleased to offer our support for the following reasons:

Schedule – USEPA and the New Jersey Department of Environmental Protection (NJDEP) are to be commended for working collaboratively over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. We were very pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River and cuts 7 plus years of what was the traditional schedule. By providing relief quicker, it's very clear to us that the USEPA and the NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

Alignment with Lower 8-Mile Remedy – The original schedule called for performing the Lower 8-Mile Remedy first and then – eventually – getting to the upper 9 miles of the Passaic River. That approach never made any sense of the City of Clifton, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. We are glad to see that the Proposed Plan for the upper 9 miles of the Passaic River is now aligned with the lower 8-mile Remedy. The City of Clifton is pleased to see that common sense prevailed and we thank the USEPA and the NJDEP for their efforts and collaboration.

Resuspension - Again, under the original schedule many stakeholders in the upper 9 miles of the Passaic River expressed concerns about the resuspension and transport up-river of contaminants from the lower 8 miles. The concern was that despite best efforts to contain contaminated sediments, the dredging movement of massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. While resuspension of contaminants remains a concern, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real time and adjust accordingly.

Implementation – While we understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD) is, all indications are that all work will take place in river. In other words, an estimated 387,000 cubic yards of sediment will be removed from the upper 9 miles of the Passaic River and the vast majority will be transported via barge down the river, to a treatment facility, not via truck through the communities along the Passaic River.

No Adverse Impact on Flooding – By now the USEPA and NJDEP have heard loud and clear that in addition to the contamination in the Passaic River, flooding is a major concern of lower 8-mile stakeholders. While relief to our flooding problem remains a concern, we were happy to see that the proposed plan for the upper 9 miles of the Passaic River will not adversely impact flooding in the region.

Environmental Justice – Environmental justice has been and remains a priority for the City of Clifton. Governor Murphy, the Passaic River Community Advisory Group (CAG), the USEPA and the NJDEP share that commitment. Advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies will address environmental justice concerns in the region and is a positive step forward for overburdened communities.

Economic Development – Stated simply, taking action and cleaning up with Passaic River leads to certainty. Certainty leads to economic development and private investment in the City of Clifton

For the record, we urge the USEPA to take a very close and careful look about River Mile 15 (Passaic River Bridge) to the Dundee Dam. The proposed Interim Remedy indicates known and identifiable areas of sediment between 8.3 and River Mile 15 will immediately be addresses, while the river bed between River Mile 15 and Dundee Dam will be examined closely and dealt with on an ad hoc basis. We trust that the USEPA will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15.

The City of Clifton looks forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact me at 973-470-5263.

Sincerely,

Dominick Villano
City Manager

cc: Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Governor Phil Murphy
Commissioner Shawn LaTourette, NJDEP
Senator Nia Gill
Assemblyman Thomas P. Giblin
Assemblywoman Britnee Timberlake
Upper 9 Mayors
Passaic River CAG

City Of Garfield
OFFICE OF THE MAYOR
111 OUTWATER LANE
GARFIELD, NEW JERSEY 07026-2694
www.garfieldnj.org
TEL: (973) 340-2439
FAX: (973) 340-5183

Richard Rigoglioso
Mayor
Cell: (973) 517- 0854
rrigoglioso@garfieldnj.org

April 26, 2021

Via Email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

RE: LOWER PASSAIC RIVER STUDY AREA
DIAMOND ALKALI SUPERFUND SITE OPERABLE UNIT 4

Dear Ms. Salkie:

This is to formally express the City of Garfield's support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, we are pleased to offer our support for the following reasons:

Schedule – USEPA and the New Jersey Department of Environmental Protection (NJDEP) are to be commended for working collaboratively over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. We were very pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River and cuts 7 plus years of what was the traditional schedule. By providing relief quicker, it's very clear to us that the USEPA and the NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

Alignment with Lower 8-Mile Remedy – The original schedule called for performing the Lower 8-Mile Remedy first and then - eventually - getting to the upper 9 miles of the Passaic River. That approach never made any sense of the City of Garfield, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. We are glad to see that the Proposed Plan for the upper 9 miles of the Passaic River is now aligned with the Lower 8-mile Remedy. The City of Garfield is pleased to see that common sense prevailed and we thank the USEPA and the NJDEP for their efforts and collaboration.

Resuspension – Again, under the original schedule many stakeholders in the upper 9 miles of the Passaic River expressed concerns about resuspension and transport up-river of contaminants from the lower 8 miles. The concern was that despite best efforts to contain contaminated sediments, the dredging movement of massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. While resuspension of contaminants remains a concern, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real time and adjust accordingly.

Implementation – While we understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD) is, all indications are that all work will take place in river. In other words, an estimated 387,000 cubic yards of sediment will be removed from the upper 9 miles of the Passaic River and the vast majority will be transported via barge down the river, to a treatment facility, not via truck through the communities along the Passaic River.

No Adverse Impact on Flooding – By now the USEPA and NJDEP have heard loud and clear that in addition to the contamination in the Passaic River, flooding is a major concern of lower 8-mile stakeholders. While relief to our flooding problem remains a concern, we were happy to see that the proposed plan for the upper 9 miles of the Passaic River will not adversely impact flooding in the region.

Environmental Justice - Environmental justice has been and remains a priority for the City of Garfield. Governor Murphy, the Passaic River Community Advisory Group (CAG), the US EPA and the NJDEP share that commitment. Advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies will address environmental justice concerns in the region and is a positive step forward for overburdened communities.

Economic Development – Stated simply, taking action and cleaning up with Passaic River leads to certainty. Certainty leads to economic development and private investment in the City of Garfield.

For the record, we urge the USEPA to take a very close and careful look above River Mile 15 (Passaic River Bridge) to the Dundee Dam. The proposed Interim Remedy indicates known and identifiable areas of sediment between 8.3 and River Mile 15 will immediately be addresses, while the river bed between River Mile 15 and Dundee Dam will be examined closely and dealt with on an ad hoc basis. We trust that the USEPA will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15.

The City of Garfield looks forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact me at 973-340-2000.

Sincerely,

Thomas J. Duch
City Manager

cc: Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Governor Phil Murphy
Commissioner Shawn LaTourette, NJ DEP
District 35 Legislators
Upper 9 Mayors
Passaic River CAG

Correspondence Management System
Control Number: AX-21-000-4128
Printing Date: June 09, 2021

Citizen Information

Citizen/Originator: **Pavlica, Andrew J.**

Organization: City of Garfield
Address: 111 Outwater Lane, Garfield, NJ 07026-2694

Constituent: N/A
Committee: N/A **Sub-Committee:** N/A

Control Information

Control Number:	AX-21-000-4128	**Alternate Number:**	N/A
Status:	For Your Information	**Closed Date:**	N/A
Due Date:	N/A	**# of Extensions:**	0
Letter Date:	May 26, 2021	**Received Date:**	May 26, 2021
Addressee:	AD-Administrator	**Addressee Org:**	EPA
Contact Type:	LTR (Letter)	**Priority Code:**	Normal
Signature:	SNR-Signature Not Required	**Signature Date:**	N/A

File Code: 401_1006_c Administrative Management - Reading files
Subject: Resolution No. 21-176 - Proposed plan for the Upper 9 miles clean-up project of the Upper 9 Miles of the lower Passaic River
Instructions: For Your Information
Instruction Note: N/A
General Notes: N/A
State-Tribal CNTL:
CC: N/A

Lead Information

Lead Author: N/A

Lead Assignments:

Assigner	Office	Assignee	Assigned Date	Due Date	Complete Date
No Record Found.					

Supporting Information

Supporting Author: N/A

Supporting Assignments:

Assigner	Office	Assignee	Assigned Date
Jacqueline Leavy	OEX	R2	Jun 8, 2021
Danla Boykin	R2	R2-PAO	Jun 9, 2021
Danla Boykin	R2	R2-SEMD	Jun 9, 2021

History

Action By	Office	Action	Date
Jacqueline Leavy	OEX	Forward control to R2	Jun 8, 2021
Danla Boykin	R2	Forwarded control to R2-PAO	Jun 9, 2021

Action By	Office	Action	Date
Danla Boykin	R2	Forwarded control to R2-SEMD	Jun 9, 2021
Valencia Johnson	R2-PAO	Finished FYI task	Jun 9, 2021

Comments

Commentator	Comment	Date
No Record Found.		

City of Garfield

111 OUTWATER LANE
GARFIELD, NEW JERSEY 07026-2694
www.garfieldnj.org

ANDREW J. PAVLICA
RMC • CMC • MMC
CITY CLERK / DEPUTY CITY MANAGER

CITY HALL
TELEPHONE: (973) 340-2001
FAX: (973) 340-5183

May 26, 2021

Mr. Michael S. Regan
1200 Pennsylvania Avenue
North West
Washington, D.C. 20460

Dear Mr. Regan:

Enclosed is a CERTIFIED copy of Resolution No. 21-176, adopted by the City Council of the City of Garfield, Bergen County, New Jersey, at a Regular Meeting held Tuesday, May 25, 2021, endorsing the United States Environmental Protection Agency's proposed plan for the Upper 9 Miles Clean-Up Project of the Upper 9 Miles of the lower Passaic River.

Very truly yours,

Andrew J. Pavlica
CITY CLERK

AJP:md
Encl.
c: US Senator Booker
US Senator Menendez
Congressman Pascrell
Governor Phil Murphy
NJ DEP Commissioner LaTourette
Senator Pou
Assemblywoman Sumter
Assemblyman Wimberly
Upper 9 Mayors
Passaic River Community Advisory Group

Resolution No. 21 - 176

WHEREAS, on April 14, 2021, the United States Environmental Protection Agency's (US EPA) released its proposed plan for the Upper 9 miles of the Lower Passaic (hereinafter referred to as the "Upper 9 miles") also known as the Diamond Alkali Superfund Site Operable Unit 4; and

WHEREAS, over the last three (3) years the US EPA worked in collaboration with the New Jersey Department of Environmental Protection (NJ DEP) to create a plan for Upper 9 miles; and

WHEREAS, the original schedule would have been inequitable to stakeholders in the Upper 9 miles as it called for performing the lower 8-mile remedy first, followed by the Upper miles of the Passaic River; and

WHEREAS, the City of Garfield is pleased to see that the proposed plan will expedite remediation of contaminated sediment in the Upper 9 miles of the Passaic River eliminating at least seven (7) years from the traditional cleanup schedule; and

WHEREAS, the US EPA's Proposed Plan aligns the Lower 8 with the Upper 9 removals and permits project managers to monitor and manage any resuspension and transportation of contaminated sediments between the Lower 8-miles and the Upper 9 miles; and

WHEREAS, while the US EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river; and

WHEREAS, instead of approximately 387,000 cubic yards of contaminated sediment being trucked through the communities along the Passaic River, the contaminated sediment will be removed from the Upper 9miles via barge to a treatment facility down river; and

WHEREAS, the US EPA and NJDEP received public input from communities along the Passaic River and took steps to mitigate those concerns in the proposed plan; and

WHEREAS, the EPA and NJDEP proposed plan for the Upper 9 miles will not adversely impact flooding in the region; and

WHEREAS, environmental justice has been and remains a priority for the City of Garfield and on September 18, 2020 Governor Murphy signed S232/A2212 into law which clearly defines overburdened communities as communities where:

At least 35 percent of the households qualify as low-income households; or

At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or

At least 40 percent of the households have limited English proficiency.

WHEREAS, on October 1, 2020, NJDEP released "Furthering the Promise: A Guidance Document for Advancing Environmental Justice Across State Government" which determined that much of Garfield's population meets the listed criteria as being overburdened, making the environmental justice piece to this project extremely important to our community; and

WHEREAS, the City of Garfield would like to thank the USEPA and the NJDEP for their efforts and collaboration in ensuring that the entire river gets addressed all at once.

NOW THEREFORE BE IT RESOLVED as follows:

1. The Mayor and Council of the City of Garfield, Bergen County, State of New Jersey, hereby endorses the EPA's Proposed Plan for the Upper 9 miles clean-up project of the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4, especially as it is now aligned with the Lower 8-mile remedy; and
2. The Mayor and Council of the City of Garfield directs the City Clerk to forward a copy of this resolution to the EPA, U.S. Senator Cory Booker, U.S. Senator Bob Menendez, U.S. Congressman William Pascrell, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 35 Legislators, Upper 9 Mayors and the Passaic River Community Advisory Group (CAG).

	AYE	NAY	ABSTAIN	ABSENT
J. DELANEY	X			
MASLAG	X			
HERRERA	X			

E Delaney

City of Garfield
ANDREW J. PAVLICA
RMC • CMC • MMC
CITY CLERK / DEPUTY CITY MANAGER
111 OUTWATER LANE
GARFIELD, NEW JERSEY 07026

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1101A

Mr. Michael S. Regan
1200 Pennsylvania Avenue
North West
Washington, D.C. 20460

JUN 07 2021

PRINTED ON RECYCLED PAPER

From:	Danielle Lorenc
To:	Salkie, Diane
Cc:	Zach_McCue@booker.senate.gov; jason_tuber@menendez.senate.gov; ben.rich@mail.house.gov; Madeleine.Pike@mail.house.gov; George.Helmy@nj.gov; Shawn.LaTourette@dep.nj.gov; rkakoleski@rutherfordboronj.com; mayorscarpelli@nutleynj.org; councilmancozzarelli@gmail.com; dpronti@northarlington.org; janzaldi@cliftonnj.org; Jeffrey Lahullier; mdabal@wallingtonnj.org; tduch@garfieldnj.org; TheresaC@lyndhurstnj.org; mayor@cityofpassaicnj.gov; JNeals@co.bergen.nj.us; Senator Sarlo; senruiz@njleg.org; senrice@njleg.org; senpou@njleg.org; sengill@njleg.org; Assemblyman Schaer; AswPintorMarin@njleg.org; AswSpeight@njleg.org; Aswtucker@njleg.org; Asmcaputo@njleg.org; Aswsumter@njleg.org; Asmwimberly@njleg.org; Asmgiblin@njleg.org; Aswtimberlake@njleg.org; Baptista@newschool.edu; doug@forumfg.com
Subject:	East Rutherford Resolution #72-2021
Date:	Wednesday, May 19, 2021 12:18:17 PM
Attachments:	RESO #7209682620210519110327.pdf

Please find attached Resolution #72-2021 as adopted by the East Rutherford Governing Body on May 18, 2021

Danielle Lorenc, RMC/CMR
Borough of East Rutherford
One Everett Place
East Rutherford, NJ 07073
(201)933-3444 x260

BOROUGH OF EAST RUTHERFORD
COUNTY OF BERGEN
STATE OF NEW JERSEY
RESOLUTION NO. 72 – 2021

WHEREAS, the United States Environmental Protection Agency's (US EPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4 was released on April 14, 2021; and

WHEREAS, the US EPA and the New Jersey Department of Environmental Protection (NJDEP) have worked collaboratively over the past three (3) years plus to create a plan for the upper 9 miles of the Passaic River. We are pleased to see that the proposed plan will fast track remediation of contaminated sediment in the upper 9 miles of the Passaic River, thereby cutting approximately even (7) years from the traditional cleanup schedule. Through this action both the US EPA and NJDEP have shown that they have taken very seriously the comments received during the Lower 8-Mile public comment period; and

WHEREAS, the original schedule called for performing the Lower 8-mile Remedy first, followed by the Upper 9 miles of the Passaic River. That approach did not appeal to the Borough of East Rutherford given the large scope of the Lower 8-mile removal in a tidal river like the Passaic River and the was not fair to the stakeholders in the Upper 9 miles of the Passaic River ; and

WHEREAS, the US EPA's Proposed Plan aligns the Lower 8 with the Upper 9 removals, thereby permitting project managers to monitor and manage any resuspension and transportation of contaminated sediments from the Lower 8-mile project into the upper 9 mile area and visa versa; and

WHEREAS, while the US EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river, thus indicating approximately 387,000 cubic yards of contaminated sediment will be removed from the Upper 9 mile area via barge to a treatment facility down river, not via truck through the communities along the Passaic River; and

WHEREAS, the USEPA and NJDEP have heard from the communities along the Passaic River, that flooding remains a serious concern, and we are happy to see that the proposed plan for the Upper 9 mile project will not adversely impact flooding in the region; and

WHEREAS, environmental justice remains a priority of the Borough of East Rutherford. This plan demonstrated that Governor Murphy, the Passaic River Community Advisory Group (CAG), the US EPA, and the NJDEP all share in that commitment. The completion of this project will significantly address environmental justice concerns in the region and is a positive step forward for these communities.

WHEREAS, cleaning of the Passaic River will certainty lead to enhanced economic development for the Borough of East Rutherford along the waterfront;

NOW THEREFORE BE IT RESOLVED as follows:

1. The Mayor and Council of the Borough of East Rutherford, Bergen County, State of New Jersey, hereby endorse the US EPA's Proposed Plan for the Upper 9 miles clean-up project of the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4; and

2. The Mayor and Council of the Borough of East Rutherford directs the Borough Clerk to forward a copy of this resolution to the US EPA, US Senator Cory Booker, US Senator Bob Menendez, Congressman Bill Pascrell, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 34 Legislators, Upper 9 Mayors and the Passaic River Community Advisory Group (CAG); and

3. The Mayor and Council also urge the US EPA and NJDEP, while designing and implementing this project, the agencies focus on the erosion that has occurred along the shorelines of East Rutherford and continues during major storm surge events. Anything that can be done to project our shoreline would be a benefit to East Rutherford.

CERTIFICATION

I, Danielle Lorenc, Municipal Clerk, do hereby certify that the foregoing is a true copy of the resolution passed by the Mayor and Council at the meeting held on the 18th day of May, 2021

Danielle Lorenc, RMC

Councilmember	Moved	Second	Ayes	Nays	Absent	Abstain
Stallone	X		X			
Ravettine			X			
Cronk			X			
Alvarez			X			
Lorusso		X	X			
Banca			X			

From:	Summer McCowen
To:	Salkie, Diane
Subject:	ecoSPEARS PCB/dioxin sediment tech for Passaic
Date:	Monday, April 26, 2021 9:42:12 AM

Hello Diane,

I'm looking into the proposed plan for the dredging of the Passaic River. The NJ Today article says that the "dredged materials would be processed at one or more nearby sediment processing facilities for off-site disposal at licensed disposal facilities." What kind of sediment processing facilities are you looking at? Confined disposal facilities?

To give some background, ecoSPEARS is a cleantech solutions company out of NASA's tech-transfer program. We specialize in the extraction and destruction of PCBs and dioxins with original alternatives to capping, dredging, and landfilling. We've been focused on our Additive Desorption System (ADS), which is an improved soil-washing system using an ethanol blend that is more effective on dioxins and PCBs.

ADS is especially useful in large dredging projects because the washed sediment can be either placed back in as clean fill or reduced to safer concentrations to free up space in CDFs, DMMFs, etc. Have you looked into soil-washing for sediment processing? Or are newer solutions outside of the scope of this project?

Best,
Summer McCowen

Summer McCowen | *Market Analyst*
ecoSPEARS
309 Cranes Roost Blvd, Suite 2001
Altamonte Springs, FL 32701
Tel: (407) 792-3400 ext. 104
Mobile: (913) 702-7404
summer@ecospears.com
www.ecoSPEARS.com

From:	bill.cutler@cement-lock.com
To:	Salkie, Diane; Kandil, Shereen; Regan, Michael; "Al Hendricks "
Subject:	Passaic River Cleanup Plan, PUBLIC COMMENT - Disregard for Environmental Justice Mandates and Process by which Cleanup Plans are selected per CERCLA
Date:	Thursday, May 13, 2021 12:21:26 PM
Attachments:	DSalkie Ltr 51321.pdf

Diane:

Attached is a letter from Al Hendricks, in response to the EPA's proposed cleanup plan for the Passaic River.

As noted in the letter, with this proposed cleanup plan, the EPA has disregarded its own Environmental Justice mandates and selection criteria by which cleanup plans are prioritized per CERCLA.

Further, it shows a lack of innovation, as the EPA proceeds along the path of toxic waste management in virtually the same manner as has been done for decades. This Plan shows nearly a total disregard for innovation and acceptance of alternatives that are available right now, that are PERMANENT SOLUTIONS, cost effective, and conform to the EPA's Environmental Justice mandates and CERCLA cleanup plan selection criteria.

Regards,

Bill Cutler
Volcano Partners, LLC
150 Spartan Dr., Suite 100
Maitland, FL 32751

T – (786) 487-4409

www.cementlock.com

Volcano Partners LLC
150 Spartan Drive, Suite 100, Maitland, Fl 32751

May 13th, 2021

Diane Salkie, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor,
New York, NY 10007-1866 Email: salkie.diane@epa.gov

Passaic River Cleanup Plan: A Formula for Failure

Ms. Salkie:

We are writing you in response to the proposed cleanup plan for the Passaic River. As you know, since 2007, there have been numerous plans proposed for the cleanup of the Passaic River, with little to no action of actual cleanup. And now, rather than deal with the real problem, which is contaminants that impact the prolonged health and economic / social vitality of surrounding communities, a plan is proposed to bury harmful pollutants. Burying contaminants means those contaminants remain a health risk for current and future generations. There is no escaping the reality that decisions to build containment storage facilities are toxic "time-bombs". They wear-out and fail. The EPA's files are full of catastrophic failures in the manner of the Kingston and Dan River pond failures, and the flooding of the San Jacinto River Waste Pits in Houston due to Hurricane Harvey, to name only a few. Even more recently, in Florida, the toxic wastewater reservoir nearly collapsed and narrowly caused another "catastrophic event" in Tampa Bay.

The idea that burying contaminated materials/waste, hoping there is not a health crisis, is irresponsible. Anything buried, eventually becomes un-buried. Mitigating health risks today for future health risks tomorrow would ordinarily seem unwise, unless it impacts the parts of our society that are the least able to fight back. For example, the contaminants released upon the community of Kingston, TN, due to a spill, were shipped to the Arrowhead landfill near Uniontown, Alabama, a predominately African-American community. This community, like many other minority communities, face the possibility of health risks due to a contaminated waste storage facility failure, often impacting the groundwater or presenting other health challenges.

And now the EPA wants to bury contaminants again, either in the Passaic River or ship them off-site. This plan is in disregard to the EPAs own Environmental Justice mandates, the April 30th Memorandum on Strengthening Enforcement in Communities with Environmental Justice Concerns(1) and the manner by which cleanup plans are selected, established under the EPA's CERCLA regulations, Clean Up Standards (Sec. 121):

> "*Remedial actions which treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants is a principal element , are to be preferred over remedial actions not involving such treatment. The offsite transport and disposal of hazardous substances or contaminated materials without such treatment would be the least favored alternative remedial action where practical treatment technologies are available.*"

(1) Increase opportunities for community engagement in the development of cleanup and reuse agreements to ensure community concerns are addressed in a meaningful manner.

The storage of contaminants within or near a community, labels that community as not-worthy of the protections granted other, perhaps wealthier communities. The EPA's decision to consistently ignore its own mandates tells America's minority and impoverished communities that America value's you less. Even the EPA concluded in Uniontown, Alabama that after 4 million cubic yards of toxic waste from Tennessee was dumped in their backyard, there was "insufficient evidence" that the resident's Civil Rights were violated.

The Passaic River has been a contaminated waste dump for decades. Plans for a clean-up date back to 2007. And today, the best cleanup solution the EPA can come up with is violating its own mandates and burying the contaminants in the river or hauling them off to likely another minority community where they will be stored as a future health risk.

This would not be so frustrating were it not for the fact that an alternative toxic waste solution does - and has existed. That alternative is a technology developed at the behest of the EPA and the US Army Corps of Engineers. It is a technology that conforms to the EPA's mandates by permanently destroying the toxicity of contaminated materials and convert those materials to a non-hazardous building product, with commercial value called "Ecomelt". This treatment process of contaminants is in compliance with the EPA's Environmental Justice mandates and instead of being a blight on poor communities, this process can be used to rebuild and create value in those same communities.

Of course, you know I am speaking of the **Cement Lock** technology. An innovative technology that has been brought before the EPA many times before and endorsed by reputable 3rd Party organizations. It fulfills the EPA's strategic goals by being a PERMANENT solution that treats toxic materials in our environment because it *significantly reduces the volume, toxicity, or mobility of the hazardous substances.* The Cement Lock technology has been recommended to the EPA as a cleanup solution for the Passaic River by the **National Advisory Council for Environmental Policy and Technology,** NACEPT (February 12, 2012). It was recommended again by the **Passaic River Coalition** (November 14, 2012). Even James Woolford, the EPA Director of Office of Superfund Remediation and Technology Innovation told Volcano Partners that his staff had reviewed the Cement Lock technology and found it to be mature, having completed full-scale demonstrations as well as commercial applications (July 31, 2018).

Carbon Capture

Concrete is the world's most widely used building material. Cement accounts for 7% of all CO_2 emissions. If cement manufacturing were a country, it would be the third-largest carbon emitter in the world, behind the U.S. and China. In the quest for innovation, Volcano Partners and its engineering firm, Wood, have introduced the ability to reduce Greenhouse Gases (GHG) with a new "carbon capture" technology as part of the Cement Lock process. With the production of Ecomelt from Superfund material, CO_2 is captured and commercially re-introduced to industry for food preservation, carbonated drinks, refrigeration, etc. As a result, for every cubic yard of Ecomelt that is manufactured, one cubic yard of cement production is eliminated along with the GHG that would otherwise have been produced.

So why is the EPA leaning towards a cleanup plan that is about as antiquated as might be possible? Why does the EPA have an Office of Technology Innovation when in 2021 the EPA wants to bury toxic material, as it was similarly done 50-years ago? It would seem the calls for "*innovation in the field of hazardous waste management have fallen upon deaf ears*".

The polluters, per CERCLA, are liable for the full and total costs of response and damages. And as long as there is buried toxic material, there is liability and health risks to many minority neighborhoods in New Jersey from future exposure. Perhaps it is time that those responsible for the pollution of the Passaic River are held accountable. There are also "Orphan" sites under the control of government agencies that have liability and must be addressed at the tax-payers expense.

It should be noted that besides permanently extinguishing the risk of future health risks, the Cement Lock process is also an economical alternative since toxic substances are converted to building materials and available in commerce at a lower cost than similar products, thereby reducing treatment costs.

As always, I remain available to meet with you and others responsible for the enactment of the Passaic River Cleanup Plan. We would hope that the EPA would consider their own cleanup mandates with a focus on how adhering to such mandates would benefit minority communities and put an end to the environmental racism that has been allowed to flourish under past waste management practices.

Regards.

By: ________________________

Al Hendricks, President and CEO
Phone: 407-492-9731
Email: al.hendricks@cement-lock.com

C: Michael Regan, Administrator - regan.michael@epa.gov
Shereen Kandil - kandil.shereen@epa.gov

From:	bill.cutler@cement-lock.com
To:	Salkie, Diane; Regan, Michael; Kandil, Shereen; "Al Hendricks "
Subject:	Passaic River Cleanup Plan, PUBLIC COMMENT - Environmental Justice Mandates and CERCLA Compliance
Date:	Monday, June 14, 2021 4:25:45 PM
Attachments:	DSalkie Ltr 61421.pdf Passaic River Coalition Report.pdf NACEPT.pdf

Diane:

As a follow up to your request for Public Comments, attached are reports that confirm a practical Toxic Waste Management Solution developed for the EPA with the sole purpose of permanently cleaning up the Passaic River Superfund site.

This technology is in compliance with President Biden's Environmental Justice Executive Order and the mandates established by the EPA.

It is an innovative technology that creates non-hazardous marketable products with consumer demand from what would otherwise be toxic waste that will be either buried in the bottom of the Passaic River or most likely hauled to a landfill near another minority community where it will remain as a future health risk.

Please call me with any questions.

Regards,

Bill Cutler
Volcano Partners, LLC
150 Spartan Dr., Suite 100
Maitland, FL 32751

T – (786) 487-4409

www.cementlock.com

VOLCANO PARTNERS LLC
150 Spartan Drive, Suite 100, Maitland, Fl 32751

June 14th, 2021

Diane Salkie, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor,
New York, NY 10007-1866 Email: salkie.diane@epa.gov

Passaic River Cleanup Plan: A Solution Compliant with President Biden's Environmental Justice Executive Order and EPA's Directives

Ms. Salkie:

With this letter is information about the Cement Lock technology, developed for the EPA for the cleanup of the Passaic River.

This technology is a preferred waste management solution in compliance with CERCLA regulations and President Biden's Environmental Justice Executive Order.

The reports prepared by the Passaic River Coalition (Page 24) and the National Advisory Council for Environmental Policy and Technology (Page 33) confirm the Cement Lock process as a preferred toxic waste management solution. It seems what should be required now is for the EPA to follow its April 7th directive that all Regions and Staff are to integrate Environmental Justice into their plans and actions.

As always, I remain available to meet with you and others responsible for the enactment of the Passaic River Cleanup Plan.

Regards.

By: ______________________

Al Hendricks, President and CEO
Phone: 407-492-9731
Email: al.hendricks@cement-lock.com

Attachments:

Passaic River Clean Up Report
NACEPT Report

C: Michael Regan, Administrator - regan.michael@epa.gov
Shereen Kandil - kandil.shereen@epa.gov

From:	Robert Law
To:	Salkie, Diane
Cc:	Sivak, Michael; Zizila, Frances; dawn.Lamparello@klgates.com
Subject:	OU4 Proposed Plan - LPRSA Comments
Date:	Friday, June 11, 2021 1:15:52 PM
Attachments:	20210611 CPG Comment Letter OU4 Proposed Plan to EPA.pdf

Diane:

Attached are the CPG's comments on the OU4 Proposed Plan for the Upper 9-miles of the LPRSA for EPA's consideration.

Thank you.

R/
Rob

Robert Law, Ph.D.
de maximis, inc.
rlaw@demaximis.com

de maximis, inc.
186 Center Street
Suite 290
Clinton, NJ 08809
(908) 735-9315
FAX (908) 735-2132

June 11, 2021

Diane Salkie
Remedial Project Manager
U.S. Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1866

Via Electronic Mail

Re: Diamond Alkali Superfund Site – Operable Unit 4 (OU4) April 2021 Proposed Plan (Proposed Plan): Lower Passaic River Study Area (LPRSA) Cooperating Parties Group (CPG) Comments

Dear Ms. Salkie:

This is a comment letter submitted to the U.S. Environmental Protection Agency (EPA) on behalf of the CPG pursuant to 40 C.F.R. 300.430(f)(3)(i)(C) of the National Oil and Hazardous Substances Pollution Contingency Plan regarding EPA's Proposed Plan.

Factual Background:

The CPG is a group of parties who have performed a Remedial Investigation/Feasibility Study (RI/FS) for OU4 under oversight of the EPA pursuant to the May 2007 Administrative Order on Consent, CERCLA Docket No. 02-2007-2009 (RI/FS AOC). As you know, the EPA, New Jersey Department of Environmental Protection (NJDEP), the CPG and certain other parties to the RI/FS AOC have worked cooperatively to complete the OU4 RI/FS for over a decade, and the CPG appreciates the collaboration among all the stakeholders.

The RI/FS work culminated in the conditional approval of the Draft Final RI Report (RI Report) by EPA in July 2019, followed by EPA's conditional approval of the Draft Final Interim Remedy FS Report (IR FS Report)[1] in December 2020. The RI Report conditionally approved by EPA found that the primary risk driver for human health and a number of ecologic receptors was 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCCD), as a result of chemical manufacturing operations at the former Diamond Alkali property located on Lister Ave in Newark, New Jersey to produce products like pesticides and phenoxy herbicides, including the primary components used to make the military defoliant Agent Orange.[2]

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[1] EPA's conditional approval of the IR FS Report fulfilled EPA's October 10, 2018, directive under the RI/FS AOC to "*prepare a streamlined [FS] for OU4 evaluating interim remedy alternatives*." The adoption of an interim remedy, versus a final remedy, is rooted in EPA's 2005 Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, which recognizes that interim actions and adaptive management may be appropriate before deciding on a final remedy.

[2] *See* RI Report, p. 3-4. As noted in the Proposed Plan, "the Diamond Alkali Company [was] later purchased by and merged into Occidental Chemical Corporation…" Proposed Plan, p. 6. Occidental Chemical Corporation is a

de maximis

Comments:

The CPG supports the overall Proposed Plan because it is consistent with the RI and IR FS Reports that have been conditionally approved by EPA. The CPG encourages EPA to issue a Record of Decision (ROD) consistent with these documents and the following comments:

Preferred Alternative – The Proposed Plan's preferred Alternative 3 with a surface weighted average concentration (SWAC) of 75 ppt for 2,3,7,8-TCDD illustrates that both the EPA Headquarters' and Region 2's senior officials and career technical staffs have concluded that this alternative will provide sufficient source control to eliminate the potential mobilization of contaminants to other areas of the LPRSA, accelerate recovery, and reduce exposure to biota. Alternatives 2, 3, and 4 "*are all protective of human health and the environment, comply with ARARs, are cost-effective, and would not be incompatible with nor preclude a final remedy, thus satisfying the requirements of CERCLA*".[3] EPA's selection of Alternative 3 represents a conservative selection, but consistent with EPA's presentation during the April 27, 2021 public meeting, demonstrates the Agency's commitment to implementing an adaptive management strategy for OU4. As the Proposed Plan states on Pages 27 and 33, implementing an alternative with a larger footprint would remove non-source sediments, and therefore, would not provide further enhancement of the ongoing recovery of the entire LPRSA and progress toward protection of human health and the environment.

Remedial Action Limit, Percent Reduction and Other FS Cited Values – The Proposed Plan cites values from the IR FS Report, including but not limited to, the Remedial Action Levels (RAL) and percent reduction for each of the alternatives that were developed in the IR FS Report based on the RI Report for the purposes of comparing remedial alternatives. However, the final surface RAL for the preferred alternative will be determined based on the results of the IR predesign investigation (PDI) and remedial design to achieve a 2,3,7,8-TCDD SWAC of 75 ppt. This is consistent with the Proposed Plan, which states on page 3: "*[t]he PDI sediment sampling results would also be used to determine the final RALs to be adhered to during the IR*." The Proposed Plan further states on page 10: "*[i]n the design and implementation of the IR, sediments to be targeted as source would be specifically defined by final RALs*". The EPA should consider strengthening language in the ROD that final RALs and anticipated percent reductions will be established based on the results of the IR PDI.

Remedial Action Objective (RAO) – On Page 15, the Proposed Plan states: "*[t]he RAO 1 footprint will be remediated first followed by the RAO 2 footprint*". Based on the IR FS Report, the CPG understands that the intent of this statement is: (1) areas above the final surface RAL will be identified to meet RAO 1 and the design SWAC of 75 ppt 2,3,7,8-TCDD; and (2) the final surface RAL and the subsurface RAL multiplier will be

signatory to the RI/FS AOC, but has failed to satisfy its obligations under that agreement since 2012. Occidental Chemical Corporation is not a current CPG member.

[3] *See* Page 16 of the Proposed Plan.

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used to identify areas to address RAO 2. Both RAO 1 and 2 areas will be combined to create the IR footprint to be remediated.[4]

Thank you in advance for your consideration of the foregoing comments. Please include this letter in the Diamond Alkali Superfund Site OU4 Administrative Record.

Very Truly Yours,

de maximis, inc.

Robert H. Law, Ph.D.
CPG Project Coordinator

cc:
Michael Sivak, USEPA
Frances Zizila, USEPA
Dawn Lamparello, CPG Coordinating Counsel
CPG Members

[4] See Section 3.1.3 and Appendix B Section 4 of the IR FS Report.

From:	Amelia Jarvis
To:	Stanton, Matt
Cc:	Salkie, Diane
Subject:	Resolution/ Lyndhurst
Date:	Monday, June 14, 2021 10:06:33 AM
Attachments:	ATT00001.txt doc02272220210614085138EPA.pdf

Good Morning Matt,

Please see the attached.

Thank you,

Amelia Jarvis
Administrative Executive Assistant
201.804.2457 ext 2684/85

Mayor Robert Giangeruso
Carmine Alampi, Esq.
Township of Lyndhurst
367 Valley Brook Avenue
Lyndhurst, New Jersey
07071

"Whosoever desires constant success must change his conduct with the times".
-Niccolo Machiavelli

21451-21

Resolution by Commissioner Montillo, Jr., seconded by Commissioner Jarvis, Sr.

WHEREAS, on April 14, 2021 the United States Environmental Protection Agency's (EPA) released a proposed plan for the upper 9 miles of the Lower Passaic (hereinafter referred to as the "Upper 9 miles"), also known as the Diamon Alkali Superfund Site Operable Unit 4; and

WHEREAS, over the last three (3) years the EPA worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to create a plan for Upper 9 miles; and

WHEREAS, the original schedule was inequitable to stakeholders in the Upper 9 miles as it called for performing the lower 8-mile remedy first, followed by the Upper 9 miles of the Passaic River; and

WHEREAS, the Township of Lyndhurst is pleased to see that the proposed plan expedites the remediation of contaminated sediment in the Upper 9 miles of the Passaic River, aligns the Lower 8 remedy with the Upper 9 remedy and fast tracks the traditional cleanup schedule by seven (7) years; and

WHEREAS, aligning the Lower 8 and Upper 9 remedies permits project managers to monitor and manage any resuspension and transportation of contaminated sediments between the Lower 8 miles and the Upper 9 miles; and

WHEREAS, while the EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river; and

WHEREAS, instead of approximately 387,000 cubic yards of contaminated sediment being trucked through the communities along the Passaic River, the vast majority of contaminated sediment will be removed from the Upper 9 miles via barge to treatment facility down river; and

WHEREAS, the EPA and NJDEP received public input from communities along the Passaic River during the Lower 8 mile public comment period in 2016 and took steps to mitigate those concerns in the Upper 9 proposed plan; and

WHEREAS, the EPA an NJDEP proposed plan for the Upper 9 miles will not adversely impact flooding in the region; and

WHEREAS, this plan demonstrates Governor Murphy, the Passaic River Community Advisory Group (CAG), the EPA and the NJDEP's shared commitment to environmental justice; and

WHEREAS, the competition of this project will significantly address environmental justice concerns in the region and signifies progress for overburdened communities; and

WHEREAS, environmental justice remains a priority of the Township of Lyndhurst.

NOW, THEREFORE BE IT RESOLVED as follows:

1. The Mayor and Board of Commissioners of the Township of Lyndhurst in the County of Bergen, State of New Jersey, hereby endorse the EPA's Proposed Plan for the Upper 9 miles clean-up project of the Lower Passaic River; and

2. The Mayor and Board of Commissioners of the Township of Lyndhurst directs the Township Clerk to forward a copy of this resolution to the EPA, U.S. Senator Cory Booker, U.S. Senator Bob Menendez, Congressman Bill Pascrell, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 36 Legislators, Upper 9 Mayors and the Passaic River Community Advisory Group (CAG).

Adopted: June 10, 2021

Certified to be a true and correct copy of a resolution adopted by Board of Commissioners at a meeting held on the 10th day of June 2021

Township Clerk

From:	Mauro G. Tucci
To:	Salkie, Diane
Cc:	Alan Genitempo
Subject:	Re: Lower Passaic River Study Area Diamond Alkali Superfund Site Operable Unit 4
Date:	Friday, June 11, 2021 9:29:00 AM
Attachments:	DOC061121.pdf
Importance:	High

Please see the attached letter of support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River also known as the Diamond Alkali Superfund Site Operable Unit 4.

Thank you
Mayor Mauro G. Tucci

TOWNSHIP OF NUTLEY

DEPARTMENT OF PARKS & PUBLIC PROPERTY
44 PARK AVENUE
NUTLEY, NEW JERSEY 07110
MAYORTUCCI@NUTLEYNJ.ORG
PHONE: (973) 284-4966
FAX: (973) 661-0972

MAURO G. TUCCI
Mayor

June 10, 2021

Via Email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

Re: Lower Passaic River Study Area Diamond Alkali Superfund Site Operable Unit 4

Dear Ms. Salkie:

This is to formally express the Township of Nutley's support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River also known as the Diamond Alkali Superfund Site Operable Unit 4. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, we are pleased to offer our support for the following reasons:

Schedule - USEPA and the New Jersey Department of Environmental Protection (NJDEP) are to be commended for working collaboratively over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. We were very pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River and cuts 7 plus years of what was the traditional schedule. By providing relief quicker, ifs very clear to us that the USEPA and the NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

Alignment with Lower 8-Mile Remedy - The original schedule called for performing the Lower 8-Mile Remedy first and then eventually getting to the upper 9 miles of the Passaic River. That approach never made any sense of the Township of Nutley, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. We are glad to see that the Proposed Plan for the upper 9 miles of the Passaic River is now aligned with the lower 8-mile Remedy. The Township of Nutley is pleased to see that common sense prevailed and we thank the USEPA and the NJDEP for their efforts and collaboration.

Resuspension - Again, under the original schedule many stakeholders in the upper 9 miles of the Passaic River expressed concerns about the resuspension and transport up-river of contaminants from the lower 8 miles. The concern was that despite best efforts to contain contaminated sediments, the dredging movement of massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. While resuspension of contaminants remains a concern, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real time and adjust accordingly.

Implementation - While we understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD) is, all indications are that all work will take place in river. In other words, an estimated 387,000 cubic yards of sediment will be removed from the upper 9 miles of the Passaic River and the vast majority will be transported via barge down the river, to a treatment facility, not via truck through the communities along the Passaic River.

No Adverse Impact on Flooding - By now the USEPA and NJDEP have heard loud and clear that in addition to the contamination in the Passaic River, flooding is a major concern of lower 8-mile stakeholders. While relief to our flooding problem remains a concern, we were happy to see that the proposed plan for the upper 9 miles of the Passaic River will not adversely impact flooding in the region.

Environmental Justice - Environmental justice has been and remains a priority for the Township of Nutley. Governor Murphy, the Passaic River Community Advisory Group (CAG), the USEPA and the NJDEP share that commitment. Advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower

8-Mile remedies will address environmental justice concerns in the region and is a positive step forward for overburdened communities.

Economic Development - Stated simply, taking action and cleaning up with Passaic River leads to certainty. Certainty leads to economic development and private investment in the Township of Nutley. For the record, we urge the USEPA to take a very close and careful look about River Mile 15 (Passaic River Bridge) to the Dundee Dam. The proposed Interim Remedy indicates known and identifiable areas of sediment between 8.3 and River Mile 15 will immediately be addresses, while the riverbed between River Mile 15 and Dundee Dam will be examined closely and dealt with on an ad hoc basis. We trust that the USEP A will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15.

The Township of Nutley looks forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact me at 973-274-4969.

Thank you for your consideration in this matter.

Respectfully submitted,

Mayor Mauro G. Tucci

AG/lc

cc: Governor Phil Murphy
Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Commissioner Shawn LaTourette, NJDEP
Senator Nia Gill
Assemblyman Thomas P. Giblin
Assemblywoman Britnee Timberlake
Upper 9 Mayors
Passaic River CAG

From:	Meegoda, Jay N.
To:	Salkie, Diane
Subject:	Written comments on the Proposed Plan
Date:	Monday, June 14, 2021 4:23:38 PM
Attachments:	NJIT Letter .pdf

Diane,
Please see the enclosed. Please confirm the receipt.
Thanks
Jay

NJIT
New Jersey's Science & Technology University

NEWARK COLLEGE OF ENGINEERING

Department of Civil and
Environmental Engineering
New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982
Phone: 973.596.2464
Fax: 973.596.5790
Email: Meegoda@njit.edu
http://www-ec.njit.edu/~meegoda

June 14, 2021

Ms. Diane Salkie, Remedial Project Manager,
U.S. Environmental Protection Agency,
290 Broadway, 18th Floor, New York, New York 10007-1866

Dear Ms. Salkie:
I am a faculty member at the New Jersey Institute of Technology (NJIT), a public research university in Newark, New Jersey. I am providing my input regarding the interim action of the Lower Passaic River. As proposed the interim action of the Lower Passaic River includes the following:

- Additional capping and dredging in areas with the potential for erosion and high concentrations of contaminants in the subsurface.
- Areas identified for remediation would be evaluated to determine if sediments at depth in each area can be dredged so that capping would not be needed.
- Dredged materials would be processed at one or more nearby sediment processing facilities for off-site disposal at licensed disposal facilities.
- Institutional controls such as restrictions on activities in the river would be implemented to protect the cap, and New Jersey's existing prohibitions on fish and crab consumption would remain in place.
- Monitoring and maintenance of the cap would be required to ensure its stability and integrity in the long term.

I have carefully studied the technical approaches, concerns and issues related to the interim action of the Lower Passaic River. I understand that the proposed the interim action of the Lower Passaic River is tightly coupled the remedial action OU2, the lower 8.3 miles of the Lower Passaic River, from Newark Bay to river mile 8.3, for which EPA selected a remedy in 2016. The estimated $1.38 billion cleanup plan is currently in remedial design under EPA oversight.

I am writing to you in response to the proposed interim action of the Lower Passaic River. I would like to bring to your attention the following shortcoming of the proposed interim action of the Lower Passaic River:

- We believe that the proposed interim action of the Lower Passaic River would be significantly impacted by weather due to high water velocity.
- The high water velocity would also cause higher dispersion of sediments during dredging.
- Also, the proposed interim action of the Lower Passaic River would impact fish migration.
- During high tides, barges carrying contaminated dredged sediments will not be able to passthrough low clearance bridges crossing the river.
- The USEPA decided not to cover the proposed cap with a geomembrane, hence low density activated carbon will be lost over time due to buoyancy.
- In addition USEPA has yet to identify the dewatering facility which is not in a flood zone and does not have an impact on Environmental Justice (EJ) Communities.
- With high fines content such as silt and clay, we anticipate frequent clogging of the dewatering facility.

NJIT
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NEWARK COLLEGE OF ENGINEERING

Department of Civil and Environmental Engineering
New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982
Phone: 973.596.2464
Fax: 973.596.5790
Email: Meegoda@njit.edu
http://www-ec.njit.edu/~meegoda

- USEPA has not identified a final disposal facility for the dewatered sediments. This site should be fully secure against climate change and should not fail as those did in TN and SC during high intensity storms. Also this site should be far away from Environmental Justice (EJ) Communities.
- The proposed secure disposal of those contaminated sediments means if compromised those contaminants remain a health risk for current and future generations.

I was quite concerned with the shortcomings of the Lower Passaic River Restoration Project and proposed an innovative solution. To validate this idea, I submitted a proposal to the US National Science Foundation, and I received $ 460,577 from NSF to investigate the idea (NSF Award Abstract # 1634857 Remediation of Contaminated Sediments with Ultrasound and Ozone Nano-bubbles). Over the past five years our research group actively worked on proposed an innovative solution and found that it is fully feasible and can avoid all the above concerns. Also, the implementation cost will be much lower than the cost estimate given by the USEPA. <u>Hence USEPA should decouple the technology to be used for Lower Passaic River Restoration Project for the OU2 and proposed the interim action of the Lower Passaic River and should consider the solution proposed by Professor Jay N. Meegoda for the interim action of the Lower Passaic River.</u>

The technical details of proposed in-situ treatment method is explained in several publications (Hewage et al., 2021; Hewage et al., 2020; Batagoda et al., 2019; Meegoda et al., 2017). This technology will be implemented from a barge, and the sediment treatment chamber will be lowered to the river bottom using a crane, as shown in Figure 1. The treatment chamber is designed so that the generated wastewater does not contaminate the surrounding environment and is directly extracted to the wastewater treatment facility on the barge. The extracted wastewater is treated utilizing nanofiltration and subsequent precipitation before releasing back to the chamber with fresh nano ozone. In addition to the wastewater treatment facility, the barge contains the ozone generator and nano-ozone bubble generator. Once the barge treatment system with all the above is installed, the system will only need chemicals to treat wastewater, power, and oxygen obtained from the air. The power for the system will be generated using solar panels. Hence there is no additional operation cost to treat the river sediments other than chemicals used for wastewater treatment. The proposed in-situ treatment chamber depicted in Figure 1 for field implementation is 10'×10'×5' size and details are described in previous publications (Hewage et al., 2020; Batagoda et al., 2019; Meegoda et al., 2017a). This technology can be easily used for the proposed USEPA spot treatment of upstream of the 9-mile marker of the Passaic River. Deploying more than one system as shown in Figure 1 will expedite the remediation correspondingly. Meegoda and Perera, 2001 and Meegoda and Veerawat, 2002 showed that ultrasound could desorb both organic and inorganic contaminants attached to sediments. Ozone is applied to prevent re-adsorption of organics by mineralization and to prevent re-adsorption of inorganics by oxidizing and solubilization. Treated and solubilized inorganics are removed by the wastewater treatment unit on the barge.

New Jersey's Science & Technology University

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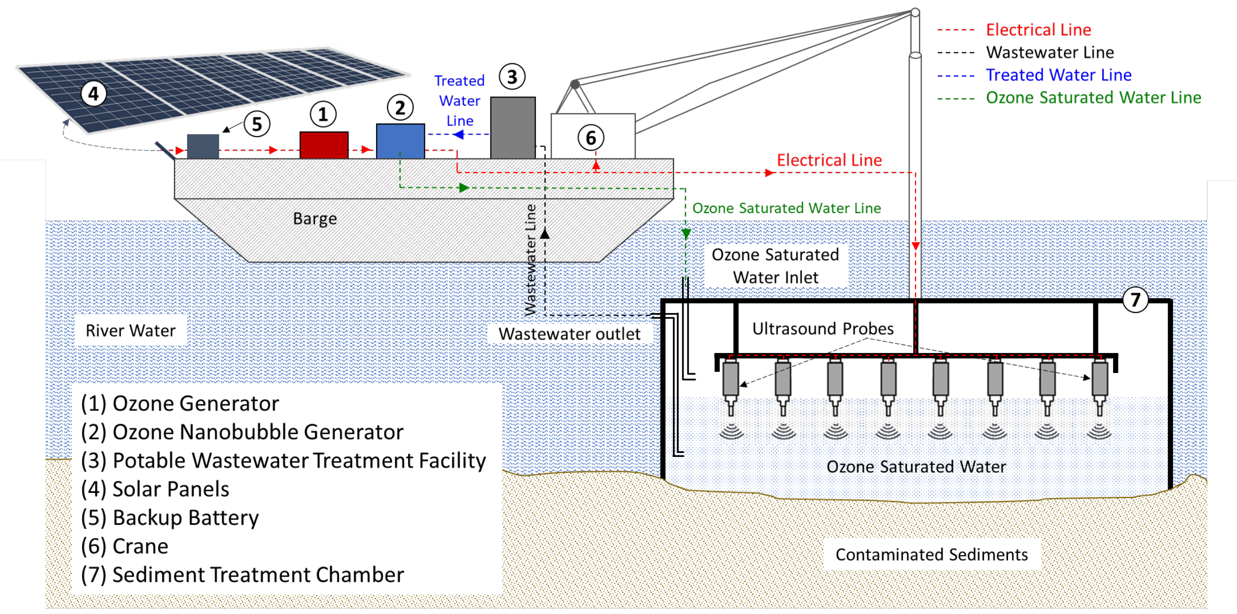

Figure 1. The systematic diagram of the proposed treatment method for field implementation.

Highlights of the technology:

- A method to remediate contaminated sediments with both orgaic and inorganic contaminants
- Ultrasound breaks bonds between soils and contaminants and desorbed chemicals.
- Ozone oxidizes contaminants by direct oxidation and radical reactions.
- Long-term ozone concentration is enhanced by nanobubbles due to increased solubility and long life of ozone nano-bubbles.
- Insoluble Cr(III) oxidized to soluble Cr(VI) and eventual removal by nanofiltration.
- P-terphenyl degrades by the combined effect of ozone and ultrasound.
- Results show adequate removal efficiency for both organic and inorganic contaminants.

Summary

With the proposed in-situ method with no dredging, transporting, dewatering, transporting and secure disposal would not be impacted by weather, has no dispersion of sediments, no impact on fish migration, no loss of activated carbon, no barges passthrough low clearance bridges, no need of a dewatering facility, no need of a final disposal facility for the dewatered sediments, no health risk for current and future generations and a much lower cost. Hence the USEPA should consider this federally funded in-situ method as the method for the interim action of the Lower Passaic River.

References

Hewage, S. A, Batagoda, J. H., and **Meegoda, J. N.,** (2021), "Remediation of Contaminated Sediments containing both Organic and Inorganic Chemicals Using Ultrasound and Ozone Nanobubbles," Journal of Env. Pollution https://authors.elsevier.com/sd/article/S0269-7491(21)00116-0

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Department of Civil and
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Hewage, S., Batagoda, J.H., Meegoda, J.N., 2020. In situ remediation of sediments contaminated with organic pollutants using ultrasound and ozone nanobubbles. Environ. Eng. Sci. 37, 521–534. https://doi.org/10.1089/ees.2019.0497

Batagoda, J.H., Hewage, S.D.A., Meegoda, J.N., 2019. Remediation of heavy-metal-contaminated sediments in USA using ultrasound and ozone nanobubbles. J. Environ. Eng. Sci. 14, 130–138. https://doi.org/10.1680/jenes.18.00012

Meegoda, J.N., Batagoda, J.H., Aluthgun-Hewage, S., 2017a. Briefing: In situ decontamination of sediments using ozone nanobubbles and ultrasound. J. Environ. Eng. Sci. 12, 1–3. https://doi.org/10.1680/jenes.17.00006

Meegoda, J. N., Veerawat, K., 2002, "Ultrasound to Decontaminate Organic Compounds in Dredged Sediments" Soil & Sediment Contamination: An International Journal, Vol. 11 #1, pp. 91-116.

Meegoda, J.N., Perera, R., 2001. Ultrasound to decontaminate heavy metals in dredged sediments. J. Hazard. Mater. 85, 73–89. https://doi.org/10.1016/S0304-3894(01)00222-9

Thank you.

Sincerely Yours,

Jay N. Meegoda, Ph. D., P. E., FASCE
Professor of Civil and Environmental Engineering

****
Dr. Jay N. Meegoda, P.E.,
Professor of Civil and Env. Engineering
New Jersey Institute of Technology
University Heights
Newark, NJ 07102, USA
Phone 973-596-2464 Fax 973-596-5790
E-mail Meegoda@NJIT.edu
Home http://www-ec.njit.edu/~meegoda
****

From:	Peggy Burns
To:	Salkie, Diane
Subject:	LOWER PASSAIC RIVER STUY AREA
Date:	Thursday, May 27, 2021 11:25:43 AM
Attachments:	20210527113356003.pdf

Good Morning Ms. Salkie,

Attached is a letter regarding the Lower Passaic River Study Area from Steve Lo Iacono, the Borough Administrator of the Borough of North Arlington.

Peggie Burns
Clerk Typist
Office of the Municipal Clerk
Administration Department
Borough of North Arlington
(P) 201-991-6060 x108
(F) 201-991-0140
www.northarlington.org

BOROUGH OF NORTH ARLINGTON

Daniel H. Pronti
Mayor

214 Ridge Road
North Arlington, New Jersey 07031

(201) 991-6060
Fax (201) 991-0140
northarlington.org

May 27, 2021

Via Email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project manager
United States Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007-1866

RE: LOWER PASSAIC RIVER STUDY AREA
DIAMOND ALKALI SUPERFUND SITE OPERABLE UNIT 4

Dear Ms. Salkie:

This is to formally express the Borough of North Arlington's support for the United States Environmental Protection Agency's (USEPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, we are pleased to offer our support for the following reasons:

Schedule – USEPA and the New Jersey Department of Environmental Protection (NJDEP) are to be commended for working collaboratively over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. We were very pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River and cuts 7 plus years of what was the traditional schedule. By providing relief quicker, it's very clear to us that the USEPA and NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

Alignment with Lower 8-Mile Remedy – The original schedule called for performing the Lower 8-Mile Remedy first and then – eventually – getting to the upper 9 miles of the Passaic River. That approach never made any sense of the Borough of North Arlington, particularly given the scale of the Lower 8-mile Remedy in a tidal river like the Passaic River. We are glad to see that the Proposed Plan for the upper 9 miles of the Passaic River is now aligned with the Lower 8-mile Remedy. The Borough of North Arlington is pleased to see that common sense prevailed and we thank the USEPA and the NJDEP for their efforts and collaboration.

Resuspension – Again, under the original schedule many stakeholders in the upper 9 miles of the Passaic River expressed concerns about resuspension and transport up-river of contaminants from the lower 8 miles. The concern was that despite best efforts to contain contaminated sediments, the dredging movement of massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. While resuspension of contaminants remains a concern, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real time and adjust accordingly.

Implementation – While we understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD) is, all indications are that all work will take place in river. In other words, an estimated 387,000 cubic yards of sediment will be removed from the upper 9 miles of the Passaic River and the vast majority will be transported via barge down the river, to a treatment facility, not via truck through the communities along the Passaic River.

No Adverse Impact on Flooding – By now the USEPA and NJDEP have heard loud and clear that in addition to the contamination in the Passaic River, flooding is a major concern of lower 8-mle stakeholders. While relief to our flooding problem remains a concern, we were happy to see that the proposed plan for the upper 9 miles of the Passaic Rover will not adversely impact flooding in the region.

Environmental Justice – Environmental justice has been and remains a priority for the Borough of North Arlington. Governor Murphy, the Passaic River Community Advisory Group (CAG), the US EPA and the NJDEP share that commitment. Advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies will address environmental justice concerns in the region and is a positive step forward for overburdened communities.

Economic Development – States simply, taking action and cleaning up with Passaic River leads to certainty. Certainty leads to economic development and private investment in the Borough of North Arlington.

The Borough of North Arlington looks forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact me at 201-991-6060 ext. 107.

Sincerely,

Stephen Lo Iacono
Borough Administrator

cc: Senator Cory Booker
Senator Bob Menendez
Congressman Bill Pascrell
Governor Phil Murphy
Commissioner Shawn LaTourette, NJ DEP
District 36 Legislators
Upper 9 Mayors
Passaic River CAG
Mayor & Council

From: Tarek Saba
To: Salkie, Diane
Subject: Comments on the OU4 Proposed Plan
Date: Monday, June 14, 2021 11:51:57 AM
Attachments: Comments on OU4 PP-6.14.2021.pdf

Dear Ms. Salkie:

Attached please find comments on the "Superfund Proposed Plan, Diamond Alkali Superfund Site Operable Unit 4," dated April 2021 ("OU4 PP"). The comments are submitted on behalf of Occidental Chemical Corporation. We appreciate the opportunity to comment on the OU4 PP, and would be happy to discuss further, if requested

Regards -

Tarek Saba, Ph. D. | Principal Scientist & Office Director
E^{x}ponent®, Inc
1 Mill and Main Place, Suite 150, Maynard, MA 01754
tel: 978.461.4605 | Bio and V-Card
NASDAQ:EXPO

Exponent
1 Mill and Main Place
Suite 150
Maynard, MA 01754

telephone 978-461-4600
www.exponent.com

June 14, 2021

Ms. Diane Salkie
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007 – 1866
Email: salkie.diane@epa.gov

Subject: Proposed Plan – Diamond Alkali Superfund Site, Operable Unit 4 Draft for Public Review and Comment

Dear Ms. Salkie:

Please see comments below on the "Superfund Proposed Plan, Diamond Alkali Superfund Site Operable Unit 4," dated April 2021 ("OU4 PP"). The comments are submitted on behalf of Occidental Chemical Corporation.

<u>Comment 1</u>: The OU4 Proposed Plan should describe the contaminants of concern consistently with the 2016 Record of Decision and the OU4 Feasibility Study.

In its opening statement, the OU4 PP implies that 2,3,7,8-TCDD is the only chemical of concern for the Lower Passaic River (Lower 8.3 miles). The OU4 PP states:

> *The ROD for the lower 8.3 miles requires bank-to-bank remediation with a sediment remediation goal (RG) of 8.3 parts per trillion (ppt) for dioxin (specifically 2,3,7,8-tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD], the most toxic form of dioxin).*

OU4 PP, at 1. This statement conflicts with both the Lower 8.3-mile Record of Decision ("2016 ROD") and the OU4 Feasibility Study ("OU4 FS"). The 2016 ROD states:

> *EPA has identified many hazardous substances in the lower 8.3-mile sediments. The following eight COCs pose the greatest potential risks to human health and the environment in the lower 8.3 miles of the Lower Passaic River [dioxins and furans; PCBs; mercury; DDT and its primary breakdown products; copper; dieldrin; PAHs; lead].*

2016 ROD at 14-16. Similarly, the OU4 Feasibility Study states:

> *The lower 8.3-mile remedy addresses* ***eight chemicals of concern*** *(COCs): dioxins and furans (2,3,7,8-TCDD and TCDD toxicity equivalence (TEQ), total PCBs, total dichlorodiphenyltrichloroethane (DDT), dieldrin, total polycyclic aromatic hydrocarbons (PAHs), mercury, copper, and lead.*

OU4 FS, p. 1-4 (emphasis added).

EPA should revise the descriptions of the COCs throughout the OU4 PP to ensure those descriptions are consistent with the 2016 ROD and the OU4 Feasibility Study.

Comment 2: The OU4 PP should describe the "salt wedge" consistently with the 2016 ROD.

The description of the "salt wedge" in the OU4 PP conflicts with the 2016 ROD. The OU4 PP appears to imply that the salt wedge can extend beyond River Mile 14 (RM 14):

> *The interface between fresh and brackish waters in the LPR, referred to as the salt front (at the upstream extent of the salt wedge), moves several miles during each tidal cycle and typically resides within the lower 10 miles,* ***but it can extend upstream beyond approximately RM 14 under extreme low-flow conditions****.*

OU4 PP at 8 (emphasis added). However, the 2016 ROD describes the salt wedge as extending to RM 12:

> *During low flow conditions, the salt front and ETM can reach* ***as far upstream as approximately RM 12****, while during storm events they may be pushed out to Newark Bay. Under typical flow conditions, the salt front and ETM are located* ***between RM 2 and RM 10*** *and move back and forth along about four miles of the river each tidal cycle (twice a day). The movement of the salt wedge, as reflected by the movements of the salt front and ETM, causes surface sediments in the river to resuspend and redeposit on each tidal cycle, resulting in longitudinal mixing of the surface sediments. This results in median surface sediment concentrations of COCs that do not vary significantly with river mile from* ***RM 2 to RM 12****.*

2016 ROD at 16-17 (emphasis added).

EPA should revise the description of the salt wedge in the OU4 PP to be consistent with the description of the salt wedge in the 2016 ROD.

<u>Comment 3</u>: The OU4 PP should acknowledge that sources of 2,3,7,8-TCDD are under investigation.

The OU4 PP describes the former Diamond Alkali Company plant at Lister Avenue as a source of dioxin to the lower 8.3 miles, and in turn describes the sediments of the lower 8.3 miles as "a major source of contamination to the overall LPR."

As noted above, the 2016 ROD describes the salt wedge as extending to RM 12. However, the OU4 Feasibility Study demonstrates that the dredging and capping footprint for 2,3,7,8-TCDD includes river segments up to RM 15. *See* OU4 FS, Figure 7-2 (inserted below). Accordingly, there are dioxin sources to the river—other than the Lister Avenue Site and other than the sediments of the lower 8.3 miles—that should be acknowledged in the OU4 interim remedy ROD and identified where known.[1]

[1] While not discussed in the OU4 PP, there are other sources of dioxin to the Passaic River in addition to the Lister Avenue Site. *See*, *e.g.*, July 13, 2017 Memorandum from HDR to US EPA Region 2 titled, "Congener Analysis." The HDR (2017) memo states, "The analysis described in this memorandum indicates that mixtures of fourteen 2,3,7,8- substituted dioxin and furan congeners measured in sediment of the LPR can be determined from blending the concentrations of the same 14 congeners measured in three sources: 1) the Lister Avenue cell of the former Diamond Alkali facility, 2) the Clifton cell of the former Givaudan facility, and 3) background concentrations measured in sediments upstream of Dundee Dam." Also, *see*, *e.g.*, Bock, *et al*., 2020.

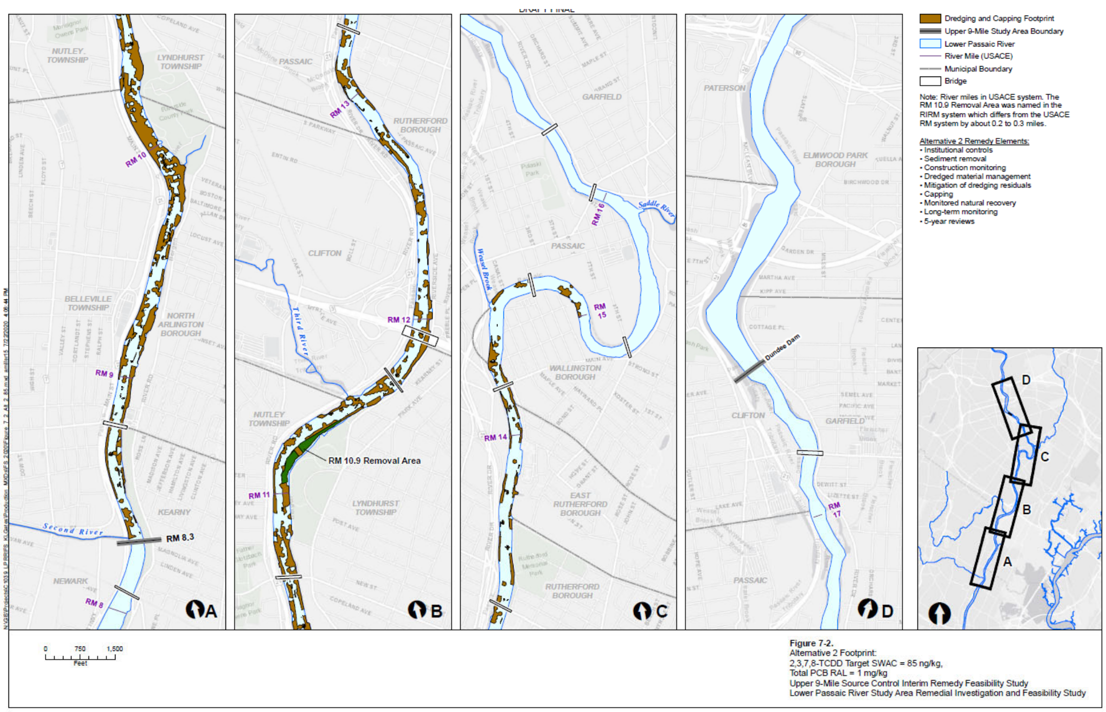

Figure 7-2 from the OU4 FS.

Comment 4: The target SWAC concentration in the OU4 PP should be changed from 2,3,7,8-TCDD to 2,3,7,8-TCDD-TEQ.

The OU4 PP targets a surface area-weighted average concentration (SWAC) of 75 ng/kg for 2,3,7,8-TCDD (EPA's preferred alternative, Alternative 3). This is inconsistent with the 2019 Remedial Investigation Report (Anchor 2019), in which the risk analysis was based on "TCDD-**TEQ**." For example, *see* RI report pages 163, 165, 168, 170, 171.

The target SWAC concentration in the OU4 PP should be changed from 2,3,7,8-TCDD to 2,3,7,8-TCDD-TEQ.

<u>Comment 5</u>: The OU4 PP should select Alternative 2 as the preferred remedy.

In the OU4 PP, EPA's identifies its objective for a sediment source control interim remedy:

> *EPA, in consultation with NJDEP [New Jersey Department of Environmental Protection], determined that the 85 ppt not to exceed SWAC [i.e., Alternative 2] is an appropriate objective for a sediment source control IR for the upper 9 miles of the LPRSA that would be followed by longer-term monitoring and selection and implementation of a final remedy in an adaptive approach. Final cleanup levels will be determined in the final ROD for the LPRSA.*

OU4 PP at 15. To achieve EPA's and NJDEP's objectives, the OU4 PP selects Alternative 3, which targets a 2,3,7,8-TCDD SWAC of 75 ppt.

However, Alternative 2—targeting a 2,3,7,8-TCDD SWAC of 85 ppt—also meets all of EPA's and NJDEP's objectives. And Alternative 2 would achieve these objectives within a shorter timeframe (7.3 years instead of 7.6 years) and at a lower cost ($420 million instead of $441 million, saving $21 million). *See* OU4 PP at 21-22.

Despite these savings in time and cost, EPA selected Alternative 3 over Alternative 2 because, as explained during the April 27, 2021 public hearing, "Alternative 2 would have a reasonable potential to leave behind source sediments…Alternative 3 is therefore the preferred Alternative." *See* Slide 47. But the OU4 PP is following an "*adaptive approach*" and states there will be a "*longer-term monitoring and selection and implementation of a final remedy in an adaptive approach.*" *See* OU4 PP, at 15. Therefore, there is no reason to preemptively select Alternative 3 (which targets a lower SWAC value of 75 ng/kg and requires a longer implementation time frame and a higher cost), when Alternative 2 satisfies all remediation goals, with future opportunity to address any additional residual source sediments not addressed by Alternative 2, as appropriate.

The OU4 PP should be modified to select Alternative 2 as the preferred remedy.

We appreciate the opportunity to comment on the OU4 PP, and would be happy to discuss further, if requested.

Sincerely,

Tarek Saba, Ph.D.
Principal Scientist

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Comments on the USEPA Proposed Plan for Interim Action to Clean Up Contaminated Sediment in the Lower Passaic River Study Area of the Diamond Alkali Superfund Site, New Jersey

June, 2021

The Passaic River Community Advisory Group (CAG) appreciates the opportunity to provide comments to the USEPA on this proposed plan. The CAG has been tracking this project for a number of years, and has provided informal comment on many of its components as well as formal comment at two USEPA CSTAG meetings. These previous formal comments are still relevant and are attached here rather than to be repeated in full.

Overall, The CAG supports the conceptual approach to the interim remedy and recognizes the value, efficiency, and expedience of accelerating cleanup and coordinating this effort with the lower 8 miles of the Passaic. However, it is important that we continue to stress the importance of reaching a level of cleanup that ensures long-term protection of human health and the environment. As such, we repeat the following concern from our November 14, 2019 CSTAG comments.

> ***The interim action if not properly approached, could undermine the long-term achievement of cleanup levels that are necessary to protect human health and the environment. Specifically, how effectiveness of the interim action and evaluation of ultimate cleanup levels are determined, evaluated, and ultimately implemented are the primary concern of the CAG. We strongly believe that there will be strong long-term inertia to rely on any interim action as ultimately "good enough." The cost and opportunity of remobilization a decade or more from now to clean up a few spots or even more work that may be needed will be another challenge for another set of scientists and stakeholders. We are not confident that it will be done. As such, we feel strongly that this interim remedy be planned and implemented as robustly as reasonably possible.***

All of the CAG's comments outlined in the six key paragraphs from the November 2019 CSTAG letter are still highly relevant and we include both CSTAG letters in full as part of these recommendations.

Particular attention needs to be focused on ensuring sufficient and accurate data and properly using modelling not just to determine the Surface Weighted Average Concentrations (SWAC) but to also consider implications for the final remediation. We particularly want to stress our concern about the reliance on capping for this part of the river given its faster moving currents, and also reinforce the importance to identify and coordinate the implementation of natural resource restoration in conjunction with cleanup activities.

The proposed plan proposes to conduct hot spot removals using SWAC. We want to stress again that while this makes sense for the interim action, we believe that it is extremely important to reach robust health-based standards for the long-term remedy. We strongly encourage EPA to create an in-field assessment process that provides the opportunity to conduct additional removal actions to remove additional hotspots that might be allowed to remain under the SWAC but could likely require future action under a more stringent risk-based approach for the final remedy. Relatively small amounts of additional dredging now is much more efficient and cost-effective than having to redo the effort a decade from now.

As we noted in our comments on the lower 8 mile remedy, boating is an important consideration to the CAG, as there are numerous clubs and teams that use the river. Access and ability to use the river in all phases of the cleanup process and as a priority outcome of the cleanup itself are important. Significant restrictions on boat use following remediation significantly negates the value of restoring the river.

- It is important that the project coordinate with crew teams and boating clubs on cleanup plans and how they might impact major boating events.
- EPA should consider using the fish window as an opportunity for boating clubs to coordinate their more intensive activities.
- Permanent no wake zones would prevent much of the boating that a healthy river should provide and should be avoided to the maximum extent possible.
- Widespread restrictions on anchoring also need to be avoided. Boats need to anchor.
- It is important that the design minimize impacts to rowing shells from the use of armor stone and other possibly harmful materials. Where possible, consideration should be given to increasing the water depths of the River. Input from the boating community should be sought in designing any final smoothing layer. The armor stone can ruin a shell, and significant stone was left at the surface of RM10.9 creating a boating hazard.

Final Disposal is also a critical consideration of the CAG, we encourage EPA to consider the environmental justice impacts of all transportation and disposal choices, and encourages ongoing coordination with the community as these critical choices are made.

The CAG supports EPA's plans to coordinate the Upper Nine Mile and the Lower Nine Mile remedial actions. However, the EPA is nearing completion of the design for the Lower Nine Mile remediation and may have limited flexibility for deviation from their plan of action. As such, the CAG is concerned about the ability to fully capture the desired benefits of connecting these two projects. In particular, the location and functionality of the ultimate sediment processing facility will be essential to achieving the desired results. To fully endorse this proposed plan, we would require additional information that is not currently available as it is tied to elements of the lower nine mile design that we have yet to see. These items include:

- The location the sediment processing facility, during Hurricane Sandy most of the available land for the dewatering sites were flooded. If such lands are to be used, they should be raised by approximately 16' to comply with FEMA requirements.
- The process for transporting sediments to the facility and the impacts that this transport will have on the river and surrounding communities,
- The capacity and through-put of the dewatering processes used and the plans for interim storage of contaminated sediments at the site,
- The ultimate disposal location and transportation methods for moving contaminated sediments to final secure disposal.

The CAG looks forward to the continuing conversation and opportunities to provide community input and highlight key concerns as we all move forward to returning these 17 miles of the Passaic River to a healthy and productive part of our community and ecosystem.

Attachment 1.
Comments to the EPA CSTAG
November 14, 2019

The Passaic River Community Advisory Group (CAG) appreciates the opportunity to provide comments to the CSTAG regarding the Remedial Investigation/Feasibility Study for the Proposed Interim Remedy for the Upper Nine Miles of the Lower Passaic River Superfund cleanup project.

The Passaic River CAG has been working to understand and provide community input on the Superfund Cleanup since 2009. We represent a broad spectrum of stakeholders from throughout the region. Our core values (attached) center on the protection of public health and the environment and the restoration of the Passaic River to its full environmental, community, economic, and recreational potential. We have always worked with EPA with a spirit of respect and collaboration and approach this input accordingly.

In preparation of these comments, the CAG was provided a brief presentation and a 13-page written summary of the RI/FS report. As was also the case in 2018, the CAG would need more detailed information about, and access to the data inputs and modeling assumptions and results developed by the EPA, before we can develop a fully informed set of recommendations on the RI/FS, or provided unqualified support to the proposed approach.

The CAG appreciates the work of the CSTAG in 2018 and the improvements that have resulted to the proposed interim remedy since the 2018 CSTAG meeting. We continue to support the concept of early action and removal of the major contamination in the river to accelerate the recovery of the river sediments, flora, and fauna.

However, we continue to have concern that interim action if not properly approached, could undermine the long-term achievement of cleanup levels that are necessary to protect human health and the environment. Specifically, how effectiveness of interim action and evaluation of ultimate cleanup levels are determined, evaluated, and ultimately implemented are the primary concern of the CAG. We strongly believe that there will be strong long-term inertia to rely on any interim action as ultimately “good enough.” The cost and opportunity of remobilization a decade or more from now to clean up a few spots or even more work that may be needed will be another challenge for another set of scientists and stakeholders. We are not confident that it will be done. As such, we feel strongly that this interim remedy be planned and implemented as robustly as reasonably possible.

The CAG appreciates the opportunity to share the community’s observations, concerns, and questions based on what we know and understand to date. Frankly, this understanding has not changed much from our 2018 analysis. Ultimately, there must be a robust and transparent process for evaluating the performance of any interim remedy and the identification of any final actions needed to achieve full protection of human health and the environment. The available information still does sufficiently not make this case.

Many of the issues and topics that frame our comments remain the same as we presented in 2018. Specific concerns are outlined below.

1. Data and Modeling

Beyond some additional bathymetry data, little new data has been collected in the past 18 months. The entire interim remedy concept is dependent on identifying and confining the pockets of contamination that are present. We do recognize that more sampling is planned and will be necessary to prepare a full design. The CAG would like to better understand the approach and level of sampling to be conducted and how this new data will be used in final decision making. We believe it is essential that a reasonable grid-based sampling is conducted to fully define the nature and extent of contamination and make appropriate cleanup decisions. No reasonable support for the final decision can be provided before we gain this understanding. The CAG strongly feels that any final decisions must be dependent on the sampling results and modelling that is conducted based on those results, and would like to have the opportunity to discuss and comment on this enhanced understanding of the river and the resulting decisions.

2. SWAC and Remedial Alternatives

Overall, the CAG supports the SWAC concept that EPA has identified. However, as noted above, it is essential that we identify and address the right areas of contamination. The FS summary we have reviewed, shows little incremental value as SWACs move from 85 ppt to 65 ppt. However, we do feel strongly that even though this is an interim remedy, long-term effectiveness needs to be a more significant consideration in evaluating the SWAC. Overall, there is a lack of data and modeling to fully support the evaluation of the proposed remedial alternatives. The CAG would like to see a more robust evaluation to understand how different SWACs will impact the areas requiring source removal.

3. Effectiveness of Capping in the Upper Nine Miles

We understand the potential and challenges of the bank-to-bank capping in the lower eight miles and providing support for this approach was not without some reservations. We believe that the hot spot capping in the upper nine miles will be even more challenging. The CAG and the community will require much more detailed information on the engineering and installation of hot spot caps before we are confident that they present a long-term solution to this contamination.

4. Natural Resource Restoration
The restoration of the river is of paramount concern to the community. We want to make sure that an interim approach does not result in limited attention to species recovery and natural resource restoration. Conversely, an interim remedy creates the opportunity to accelerate these goals as well. Full attention must be paid to all important species in bringing the Passaic River back to a more natural state and the remedy needs to protect marine mammals and species listed under the Endangered Species Act. We strongly encourage EPA to work with its natural resource partners to explore ways to include restoration work in conjunction with the interim remedy to accelerate restoration along with an expedited cleanup approach.

5. Monitoring and Final Decision
Monitoring of an interim remedy takes on added significance as it is essential to determining if interim actions are sufficient or more action must be taken. The CAG and the community continue to require a more detailed understanding of how such monitoring will be designed, how final effectiveness of the interim remedy will be evaluated, and how the final ROD will be structured to ensure that this evaluation will be robust and followed through.

6. Ongoing Community Involvement
The CAG has always appreciated the level of interaction EPA has had with the community on this cleanup. We believe that the scope and uncertainty of this interim remedy present a bigger challenge to decision-making than the more permanent approach of the lower eight. As such, some of the key decision points will possibly occur post-ROD and even well into the future. It is important that a long-term community engagement process is considered as part of this process.

Attachment 1.
Comments to the CSTAG
February 21, 2018

The Passaic River Community Advisory Group (CAG) appreciates the opportunity to provide comments to the CSTAG regarding the potential interim remedy for the upper nine miles of the Passaic River Superfund cleanup. The CAG has been working on the cleanup since 2009 and consists of a broad spectrum of stakeholders from throughout the region. Our core values center on the protection of public health and the environment and the restoration of the Passaic River to its full environmental, community, economic, and recreational potential. Our full core values are included at the end of this.

We have always worked with EPA to achieve these goals with a spirit of respect and collaboration and approach this input accordingly.

The CAG supports the concept of early action and removal of the major contamination in the river to accelerate the recovery of the river sediments, flora, and fauna. However, we will not support any plan that could undermine the long-term achievement of cleanup levels that are necessary to protect human health and the environment. In 2014, we generally supported EPA's bank-to-bank remedy, though recognized key challenges in the long-term monitoring and maintenance of such a remedy and the impacts of a cap on important community interests such as boating and development. We also strongly rejected any sort of hot spot remedy of the lower eight miles, particularly the one being proposed by the CPG at that time.

The CAG discussed this proposed interim remedy approach for the first time at our February 8th meeting. We still have many questions, but have seen enough from EPA to suggest that an interim/expedited approach to cleanup warrants further investigation and discussion. However, it is far too early in the process for the CAG to provide any substantive comments or endorsement of such an approach.

In fact, we believe that this CSTAG process is being conducted far too early in the decision-making process. The endorsement of an interim remedy and the extent and exact approach of such a remedy go hand in hand. The CAG requires more detailed information about, and access to the data inputs and modeling assumptions and results developed by the EPA, before we can develop an informed set of recommendations on the interim remedy proposal. In this case, we've had less than three weeks to review limited data with respect to the proposal, and no time at all to deliberate fully as a CAG.

The CAG looks forward to engaging in a full feasibility study process and being able to weigh in on a range of alternatives including a proposed plan developed independently by EPA. We hope that the CSTAG is also able to re-engage in the process at such time as they can evaluate EPA's actual proposed plan.

In the meantime, the CAG appreciates the opportunity to share the community's observations, concerns, and questions based on what we know and understand to date. Key issues and topics that frame our comments are as follows:

- We have not yet seen the full set of data that is being used to support this approach, and need more time to truly understand if the rationale for this approach is supported by the data
- It is extremely important that EPA conduct a full decision process and perform due diligence in fully vetting the CPG proposal--in the absence of any other proposals, we are concerned that far too much of this evaluation is built on the specifics of the CPG proposal
- Any RALs must support the full protection of human health and the environment using the most current and up to date information on toxicity of all COPCs
- There must be a robust and transparent process for evaluating the performance of any interim remedy and the identification of any final actions needed to achieve full protection of human health and the environment
- Even with an expedited remedy, final cleanup is a decade or more away and it is important not to rush to an early conclusion on the efficacy of an interim remedy
- Full attention must be paid to all important species in bringing the Passaic River back to a more natural state and the remedy needs to protect marine mammals and species listed under the Endangered Species Act
- The CAG would like to understand NJDEP comments and concerns on the concept of an interim remedy
- EPA needs to work cooperatively with Natural Resource Trustees to explore how natural resource restoration projects can be accelerated along with an expedited cleanup approach.

Key topics and some of our fundamental questions and informational needs are outlined below.

Data and Modeling

The CAG has not yet seen the full set of data or obtained a full understanding of the contamination present in the upper nine miles. EPA has noted that sufficient sediment sampling has been conducted to support an interim remedy decision but that more modeling is necessary to fully understand this part of the river. The conceptual site model we saw was a fairly high level concept, and the CAG would like to have more time to see and explore the details.

- How and when will modelling ultimately be completed?
- Will the interim remedy include additional or enhanced modelling to understand river conditions in its altered state?
- How will modelling results be used in the determination of the performance of the hot spot removal and decision making with regard to the final remedy?

Definition of Hot Spots
The entire premise for identifying hot spots appears to be built on the concept of fines. This may well be accurate, but we have not had access to enough of the evidence to date to fully understand this condition in the upper nine miles.

- Has the EPA done any new sediment core sampling [beyond the 2008 and 2013] in areas, for example, of fine and course sediment or in predicted areas of high erosion to corroborate or refute the assumptions of the conceptual model or to confirm the location of assumed hot spots in the river?
- Will any additional conformational sampling occur to support the interim ROD?
- How many total sediment samples do you have for the entire upper 9 miles of the river [used as the basis for extrapolating in the model] in relation to the total number of samples that were collected to characterize the lower 8 miles before coming to a proposed remedy?

RALs
We recognize that there will be an opportunity to evaluate and adjust the interim cleanup. In reality however, something that gets us "close enough" will certainly garner little support for additional action or expense. Therefore, the determination of the RALs at this juncture are extremely important to the community.

- How will varying RAL levels be determined based on human health risk?
- How are RAL levels typically selected for these types of sites?
- Are RALs typically used in interim remedies?
- Is there a precedent for selecting RALs in this manner?

Environmental Monitoring and Restoration
The restoration of the river is of paramount concern to the community. We want to make sure that an interim approach does not result in limited attention to species recovery and natural resource restoration. Conversely, an interim remedy creates the opportunity to accelerate these goals as well.

- Will EPA work with its natural resource partners to explore ways to include restoration work in conjunction with the interim remedy?

Monitoring and Final Decision
Monitoring of an interim remedy takes on added significance as it is essential to determining if interim actions are sufficient or more action must be taken. The CAG will need a more detailed understanding of how such monitoring will be designed and how the final ROD will be approached.

- For example, how was the proposed ten year "natural recovery" period determined?

National Advisory Council for
Environmental Policy and Technology

February 15, 2012

The Honorable Lisa P. Jackson
Administrator
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

RE: Technologies for Environmental Justice Communities and Other Vulnerable Populations

Dear Administrator Jackson:

In May 2010 you asked us to identify the needs for technologies that can help address environmental problems experienced by environmental justice communities and other vulnerable populations (which we refer to as EJ/VP communities). Your charge was straightforward: to provide "advice … on the identification and use of existing, or needed, technologies … to better protect vulnerable populations", including "game-changing technologies" that have "potential to deliver relevant, actionable information" to all parties.

We studied the topic in detail, discussed needs for technologies in a dozen diverse communities, and prepared six community case studies that illustrate the needs for deployment of effective technologies in EJ/VP communities across the country.

Clearly most environmental justice communities and other vulnerable populations face unusually high risks to human health and the environment. We offer two broad recommendations and a number of specific suggestions to address this situation:

1. **EJ/VP communities need three kinds of technologies**:

    - **Detection, monitoring, and assessment technologies**—from portable sensors that can be used by community members to complex monitoring systems operated by specially trained personnel—are the most important technology needs at this time in most EJ/VP communities and can be true game-changers.

    - **Communication technologies** are needed to assure that residents, local agencies, and industry are fully informed about risks to the community, such as:

- real-time information about ambient pollution that may peak at dangerous levels and about steps that residents can take to reduce risks when peaks occur;
- real-time information needed by first responders and local hospitals when accidents or other factors cause spikes in pollution; and
- information that residents can use to protect themselves from localized environmental exposures in their homes, backyards, parks, and neighborhoods. This information could come from sensors of contaminated air and contaminated soils—as well as easily- understandable written, electronic, and face-to-face verbal information about what residents can do to understand and protect themselves from localized environmental threats.

- **Solution technologies,** that is, technological solutions to correct environmental problems, are also vitally important and need attention because they can be costly and difficult to identify and deploy at a particular clean-up site. There is a need to develop rapid, less expensive solution technologies that can be used to clean sites more effectively.

2. **EPA's Office of Research and Development should enter into partnerships with EJ/VP communities to develop and deploy these technologies**.

   - ORD and EPA's regional offices should work with one or two communities in each region to develop needed technologies and become a national model for deployment of technologies in other communities;

   - ORD should establish a public-private task force to engage EJ/VP leaders from around the country, technology companies, investors, and other experts to inform and guide this national partnership.

This letter includes:

A. A review of the distinctive nature of the problems facing EJ/VP communities and other vulnerable populations;

B. A discussion of needs for technologies to detect and monitor, communicate, and solve environmental problems in EJ/VP communities, including six case studies and lists of specific needed technologies. Full case studies of all six communities are available at http://www.epa.gov/ofacmo/nacept/reports/index.html.

C. Additional, detailed recommendations for a "game-changing" effort by ORD and other parts of EPA to work with EJ/VP communities, the private sector, and others to identify, develop, and deploy needed technologies.

A. PROBLEMS FACED BY ENVIRONMENTAL JUSTICE COMMUNITIES AND OTHER VULNERABLE POPULATIONS

Vulnerable populations—including children, the elderly, people in poor health, and people living in environmental justice communities—experience health effects from environmental pollutants directly and profoundly. Vulnerable populations are often exposed to more pollutants, through more environmental pathways and at higher concentrations, than populations generally. Vulnerable populations are more susceptible to being harmed, are less prepared to withstand exposure, and are less able to recover.[1] Environmental justice communities also suffer from the additional stress of living in poverty, experiencing racism, or both; and they often lack influence and institutional strengths to organize effectively for change. They often feel, and, in fact are, disempowered.

The three distinctive threats to vulnerable populations generally and environmental justice communities in particular—multiple and cumulative exposures, additional stressors, and disempowerment—often make it hard for residents, governments, and businesses to understand and address the full scope and nature of environmental problems, even when human-health risks are significant. In many cases, problems persist until residents organize to become effective advocates for change.

This letter focuses on the technology needs of environmental justice communities and other vulnerable populations (EJ/VP communities). We have identified these needs through case studies of environmental justice communities, and we highlight these case studies throughout the letter. Some of the case study communities are facing problems that have only recently been identified and are still not fully understood. Others face environmental conditions that have been causing severe damage to the health of local residents and to the economic and social vitality of the local community for far too long. In all parts of the country, there are too many communities where EJ/VP communities have been experiencing severe environmental problems for far too long.

Whether their problems are new or long-standing, EJ/VP communities need technologies to effectively detect, monitor, and assess pollutants. They also need technologies to communicate risks. And they need technologies that can solve environmental problems. The first need is particularly pressing. Data gathered by residents can start a powerful, constructive process of community-driven environmental change. (See Table 1) The most persuasive detection, monitoring, and assessment data would track pollutants to their sources, link pollution to health outcomes, and provide timely, understandable information to local communities—residents, public-health and environmental regulatory agencies, first responders, businesses, and others—about what they can do to reduce human-health and environmental risks.

Although adequate detection, monitoring, and assessment; communications; and solutions technologies may be costly, that cost is small in comparison to healthcare and other costs paid by residents and by taxpayers.[2]

B. NEEDS FOR TECHNOLOGIES

1. **The most important technology need in EJ/VP communities at this time is for better technologies to detect, monitor, and help residents and others understand ongoing environmental contamination—and for these technologies to be deployed effectively so that they can inform and drive near-term decisions about how to reduce risks on an individual as well as a community-wide basis.**

Residents of EJ/VP communities want to know:

> How much hazardous and toxic stuff is in the air my children breathe, the water they drink, the soils in the backyards and school playgrounds, the food grown in our garden, and the fish we catch in local streams? Is my family safe?

EJ/VP communities confront multiple stressors, including sources of pollution and multiple pollutants, resulting in human-health and economic impacts. "Bucket samplers" have been useful to residents of EJ communities to detect and demonstrate the presence of plumes passing through fenceline neighborhoods.[3,4] But in most cases, existing monitoring technologies typically specified and deployed do not provide robust real-time and historic data on pollution levels. They provide insufficient bases for risk analysis and response, preventing assessment of cumulative and synergistic effects of multiple pollutants in combination with other stressors. New, effectively deployed technologies to adequately detect environmental contamination could be "game-changers" for environmental justice communities and other vulnerable populations, even if the technologies don't contain all of these desired capabilities. Some such technologies are available and being deployed in a few locations.[5,6,7,8,9,10]

Two case studies illustrate the needs for credible and effectively deployed detection, monitoring, and assessment technologies.

Hartford, CT: The Need for Continuous Monitoring

Hartford, Connecticut, is home to 125,000 people, 80% of whom are African American, Latino, or mixed race. Average income is very low. A large trash-to-energy incinerator handles waste from 70 towns around the state and, previously, from other states as well. Some of the trash contains large quantities of metals or toxics, and there are more than 10 fires or explosions each year. But local emissions of air toxics are measured only once a year. Local residents have asked for both detection and communication technologies:

1. Continuous emissions monitoring of air toxics on the stack of the incinerator.
2. Communications technologies connected to the emissions monitors so that at appropriately high levels of toxic emissions it will automatically alert the public, managers of the incinerator, and local emergency response and regulatory agencies by voice or text messages on cellular telephones of monitoring readings with or without suggestions on how they should respond.
3. Hand-held sensors that local residents could use to measure and send data about ambient air quality to the local agency, managers of the incinerator, and to local residents.

Rubbertown, KY: The Need for Detection and Communication Technologies

Rubbertown is a large industrial section of west Louisville, Kentucky**,** that is home to 19 large plastics and petrochemical facilities, with low-income African American neighbors on the east and low-income whites to the south. Forty-five percent of the 3,000 people living within a half-mile of these facilities have a household income less than $25,000. This is a typical "chemical corridor" community.

Some technologies are already in place, although arguably not being used enough: warning sirens, reverse 911 calling systems, and a 24-hour complaint hotline. Communities and residents are already using Tedlar® bag grab sample "bucket brigade" technology, but it is not sensitive or quick enough and is still somewhat expensive to the community residents.

Residents of Rubbertown want improved technologies to solve the environmental problems they encounter on a daily basis, plus:

1. Handheld monitors, operated by community members, to measure VOCs at health-threatening levels during short periods of time.
2. Real-time monitoring of air toxics at the stack or fenceline, accessible on the Internet and sent to regulators.
3. Phone and text-message alerts to local residents when emissions exceed limits and may cause health problems.

The greatest need in EJ/VP communities is for technologies that residents and community groups can use to detect and monitor environmental threats, because they can spark community-driven environmental change.

The technologies that are needed extend along a continuum from relatively simple citizen-operated sensors that are geo-located and sometimes hand-held to more powerful monitoring systems that are deployed and maintained by specialists. The continuum of technology needs has multiple dimensions including:

- Low-cost to expensive
- Single-observation to continuous
- Single-parameter to multi-parameter
- Point to area
- Fixed location to mobile
- Medium-sensitivity to high-sensitivity
- Volunteer-contributed to professionally collected data

New monitoring technologies that are embedded within sensor networks—using fixed as well as portable sensors—are especially important

More complex monitoring technologies are necessary as well. Complex technologies, operated and maintained by specially trained personnel, generate technically credible data that are particularly meaningful to regulators, emitters, and elected officials at all levels. These technologies can credibly document not only the background concentrations in plumes crossing fence-lines and passing through neighborhoods but also the frequency, magnitude (or concentration), and duration of excursions, accidents, and unscheduled releases. Some such cutting-edge technologies exist[11,12,13,14] and are available for deployment, and others need to be developed. Community organizations and local residents can and should participate in the use of the full continuum of technologies. They will learn and be empowered by doing so.

Many of these needed technologies for detection and monitoring are already in use in commercial settings. For example, the construction industry is developing “smart buildings” with sensor systems that measure heat, light, and energy use and use these data to fine-tune operating systems to reduce costs. Automobile manufacturers have developed “smart cars” that sense traffic lights, other cars, and other obstacles and can steer around them. The first “smart cities” in Spain, the Middle East, and China have “smart pipes” that sense water pressure as well as the contents of the pipes, so that pipes can be repaired before they spring big leaks. Some manufacturers of aircraft engines have stopped selling them; instead they lease engines equipped with sensors that send data to the manufacturers about the need for repairs.[15]

Sensor systems are also being constructed for environmental monitoring. For example, in October 2011, the National Science Foundation (NSF) awarded $3 million to Clemson University to design, develop and deploy a basin-wide network of computerized sensors to monitor water quality along the length of the 312-mile Savannah River. The sensors will be attached to a system of buoys anchored to the river floor and will collect data on water temperature, flow rate, turbidity, oxygen levels and the presence of pollutants.[16]

Dense network observing systems are also developing rapidly for air emissions, including air toxics. Air emission inventories built from emissions factors have consistently underestimated emissions, because they often leave out small sources and leaks. New technologies might help fill some of these gaps. Also, high quality emissions data might be obtained from third party, private sector sources to supplement government observing practices.[17]

EPA should assure that all EJ/VP communities have access to and use similar smart, cost-effective state-of-practice sensor technologies to measure indoor air quality, water quality, and emissions from industrial facilities in their communities in real time.

Detection and monitoring technologies can be used very effectively in tandem with sophisticated assessment technologies, which can document the multiple, synergistic risks that EJ/VP communities face. Assessment technologies can also help identify solutions that advance health and environmental quality, economic opportunity, and social benefits. The assessment technologies that are needed in EJ/VP communities include risk assessment, life cycle assessment, environmental footprint assessment, resilience analysis, integrated assessment models, and sustainability impact assessment.[18]

Examples of Needs for Detection, Monitoring, and Assessment Technologies in EJ/VP Communities

- Simple sensors, analogous to carbon monoxide or smoke detectors, that are connected to cellular data networks that may be loaned to or permanently installed in community homes, schools, or other locations of interest.
- Fixed sensors installed at multiple locations along the property fenceline around industrial facilities.
- Geo-located, personal sensors that may be carried by persons for continuous monitoring of both ambient conditions and individual exposure.
- Monitoring and warning systems of air pollution in "fenceline" communities.
- Advanced assessment technologies that can be used in tandem with geo-coded detection and monitoring data to monitor multiple sources of pollution and multiple pathways of exposure.

2. **EJ/VP communities need effective communication technologies for both data access and information sharing.**

In addition to technologies to detect, monitor and assess pollution, EJ/VP communities need technologies to communicate information about pollution. In Hartford and Rubbertown, residents have asked for relatively simple communication technologies – email and cell phone systems to alert residents to high levels of pollution. Two additional case studies suggest other communication technologies that are needed in EJ/VP communities.

Toledo, OH: The Need for Effective Communication Technologies

The Dorr-Smead Brownfields in Toledo, Ohio is an old, inner-city industrialized area with large acreages of contaminated soils located close to housing in this low-income, predominantly minority community. Local residents and environmental agencies are concerned about exposure to contaminated soils from gardening and children playing in backyards and about the possibility that gases from contaminated soils may leak into basements.

Dorr-Smead is also a leader in urban revitalization, with many abandoned lands being used for urban agriculture. Often the crops grow in "clean" soils that are trucked in, but there is always the risk that contaminants may leak from the local soils into the pots and bins where vegetables and fruits are growing. One need in Dorr-Smead is for easy-to-use soil test sensors, with clear instructions on soil test sampling, and information about crops that can be grown safely.

In addition, there is a need for communication technologies in Dorr-Smead to educate residents who are raising crops about how to construct their gardens so that pollutants in contaminated soils do not pass into the "clean" soil where the crops are growing. EPA and state and local environmental agencies should develop and deploy communication technologies in partnership with non-governmental organizations, who may be met with greater trust than government, and tailor communication to specific audiences. Even though EPA's mission is quite different from the US Census Bureau's, EPA might look to the Census Bureau's experience communicating with diverse communities. The Census Bureau has established partnerships with cell phone companies for effective messaging, used social media extensively, partnered with community-based organizations, and undertaken market segmentation research to tailor messaging to specific communities. In partnership with local professionals and lay experts and organizations, and working collaboratively with state and local environmental agencies, EPA should customize toolkits for use by residents in specific EJ/VP communities.

Graniteville, SC: The Need for Effective Communication Technologies

Graniteville, South Carolina, is a low-to-middle-income community adjacent to several old abandoned textile mills—brownfields. A major rail line runs through Graniteville which facilitated picking up products from the textile mills before they closed. In January 2005, two trains collided, five cars carrying chlorine and other toxic chemicals went off the rails, and the tanks ruptured. The result was a full-scale emergency response situation, and it did not go well because of inadequate technologies and inadequate arrangements for analyzing and communicating information about the chemicals released.

Railroads and shippers generally keep close track of rail shipments of chemicals and can check to see where rail cars with chemicals are at any given time. But this information was not available to local government agencies in Graniteville on a real-time basis. Emergency teams rushed to the scene but had no information about the gases and fluids leaking from the railcars. Local residents were overcome by the gases, but when the rescuers took them to local hospitals, the doctors did not have information about the gases.

When federal responders arrived to assess damages, most victims had already been taken to hospitals, so the responders focused most of their attention on fish in a stream that had been contaminated by liquids spilled from the rail cars. Nine people died – eight immediately – and many homes were ruined by the cloud of chlorine gas.

If there had been appropriate sensors in place in Graniteville,[19,20,21] some of the deaths and illness might have been prevented. But local sensors would not have been enough. What was needed was an information system on the railcars themselves to communicate information about the location, types, and condition of the chemicals, the rail cars, the train, and the accident to officials, rescue teams, hospitals, and community residents. The technologies needed were not just electronic. Also needed were management systems to assure that information available to the railroad and the shippers would be made available to the community immediately after the accident.

Communications technologies must be accessible and provide information that local residents and agencies – as well as businesses and other entities that are sources of pollution – can obtain at very low cost and can use effectively. This means that communications technologies may need to provide information in other languages besides English in some communities and must be easily understandable by ordinary citizens in all communities. Communications technologies must also provide opportunities for local residents to get more information about the nature of specific problems, about how these problems relate to other potential exposure, and about how to deal with these problems in specific locations. In some cases, communications technologies should also enable local residents to ask questions and get information from agency staff or other trained personnel.

Local residents, agency staff and others may also need training and education in how to use communication technologies.

Communications technologies will often be more effective when they provide geo-coded information that can be mapped. Social media may be very useful in providing opportunities for residents and small businesses that are sources of pollution to understand and learn how to manage risks. Cellular telephones are often a useful platform for such communication, as many residents of EJ/VP use them as a comparatively inexpensive way to gain access to the web and to receive text and voice messages.

The development of communications technologies must go hand-in-hand with the development of monitoring and assessment technologies. Measurements of local conditions are meaningful only when they can be compared with thresholds that are built on scientific evaluation and that take multiple causes of risk into account. Experts at EPA and elsewhere are continuing to develop a sophisticated suite of analytic tools that should be accessible to EJ/VP communities through communications technologies, such as risk assessment, cumulative exposure assessment, life-cycle analysis, environmental footprint, ecosystem evaluation, decision support tools like cost-benefit and resilience analysis, and sustainability analytics.

Examples of Needs for Communications Technologies in EJ/VP Communities

- Residents need real-time information about concentrations of localized pollution that can peak at dangerous levels and about the steps they can take to reduce risks.
- Residents need technologies that can help them to avoid exposures and to protect themselves in their homes, backyards, parks, and neighborhoods—such as information from hand-held sensors of contaminated air and contaminated soils—as well as easily-understandable written, electronic, and face-to-face verbal information about how to protect themselves from environmental threats. With geo-coded sensors, residents could download information about the steps that they could take to reduce risks from indoor and outdoor air pollution.
- Community groups and agencies need reliable, actionable data to provide real-time human-health warnings to residents about local environmental conditions and possibly notices to industry about any need for adjustments in emissions.
- First responders and local hospitals need complete, real-time information in the event of a train derailment, major highway accident, or similar emergency release or spill event – both to protect local residents and to ensure that first responders do not rush in without proper information and become contaminated themselves.

3. EJ/VP communities need solution technologies.

What all communities want is technologies that solve problems resulting from releases of hazardous and toxic pollutants that impact human health and the environment at low costs and in short periods of time.

In some cases, adequate monitoring and communication technologies can lead directly to the implementation of not-so-difficult solutions. Monitoring and communication may provide sufficient understanding of local problems and bring enough public as well as official attention to these problems to convince industry to take voluntary action to clean up or to persuade regulators to require cleanup to reduce human-health and environmental impacts in EJ/VP communities. Simply asking engineers to invest more energy in adjusting and managing manufacturing systems to reduce leaks and operate more efficiently can lead to big reductions in pollution emissions and operating costs. And the process of mobilizing the community to gather data and attract attention can empower residents, teaching them skills that may open doors to economic and social opportunities.

But in many communities, there are no easy answers. Many EJ/VP communities are located in brownfields where the soils, groundwater, and streams are seriously contaminated by decades of pollution. The contamination causes problems of indoor air quality in basements, backyards, parks where it is unsafe for children to play, and rivers where residents cannot safely fish or swim. Other EJ/VP communities have serious indoor air quality problems arising from substandard construction of homes and community buildings. In some communities, rising levels of groundwater cause mold and indoor air quality problems, or mobilize toxic pollution in contaminated soils. The direct dollar cost of clean-up of these properties and groundwater to safe levels is often very high. Clean-up approaching pristine levels is often unattainable. The economic and other costs to residents of EJ/VP communities and other vulnerable populations—and to state and federal taxpayers—from human-health impacts is great and should be considered by decision makers.

Some EJ communities across America are so contaminated, or so close to multiple sources of pollution, that they are not livable.[22] For example, the best permanent solution for the Norco community in the chemical corridor of Louisiana along the lower Mississippi River was determined to be for industry to finance the relocation of residents to different, safer locations. EPA can play an essential role in sites like these, both in effectively deploying monitoring and communication technologies so that local problems are fully documented and understood, and by using its regulatory authority to ensure that appropriate action is taken to protect human health in these communities.

But in other communities the challenge is to find solution technologies that are low cost and permanent. Too often, agencies and communities adopt policies that are not solutions at all - such as moving wastes from one contaminated site to another, often to another EJ/VP community.

Two of our case studies suggest ways that EPA can help develop and deploy effective solution technologies.

Indoor air quality in Pablo, MT

Salish Kootenai College (SKC) is a Tribal College located in the unincorporated community of Pablo, on the Flathead Indian Reservation in northwest Montana. SKC has about 1,100 students. About 76% of the students are Native American. The students come from 66 tribes and 20 states. SKC has a mix of traditional and non-traditional students so many of the students are older students and low income. Also, many of the Tribal students often have a family who has moved with them as they attend SKC so family members include children and sometimes elder members of the family.

The major environmental problem of focus is the mold in school buildings and student housing units on the SKC campus. One contributing factor to the mold problem is groundwater. In the summer of 2011 the staff at SKC began to notice mold conditions in a few buildings. They begin an evaluation of the severity of the mold condition. Samples of mold were sent to a lab for testing. The staff decided to have the student housing units tested at the same time. It was then that they discovered that there was a significant mold problem in the student housing units. Once the officials at SKC learned of the mold severity they moved the students out of the housing units and placed them in alternative housing.

In all technology categories it is recommended that community based resources be made available. Technical resources at the Tribal, County or City level would be ideal. In the absence of community based resources personal use technology is recommended. Technology needs include: Monitoring and Analysis (humidity sensors, test kits), Data Management and Communication (sending and receiving information once a problem is detected is critical. Who do you contact? How reliable is the information? Do I have to pay for it? What can I do to fix it? These are some questions a household may have. One suggestion made was a hotline. Such a hotline could be useful for a variety of indoor air quality issues.) Mitigation and Remediation (Simple inexpensive methods for fixing problems are needed as well as good reliable resources for contractors when a simple fix is not the answer.)

Lower Passaic River, NJ: The Need for Solution Technologies

The lower Passaic River flows through dozens of municipalities into Newark Bay. The residents of these communities are generally working class or low income, 80% are of various minority groups, and many are recent immigrants. The sediments of the lower Passaic include dioxins, mercury, lead, PAHs, and many other toxic industrial pollutants. Most of the fish in the river are too contaminated to be eaten.

EPA, the state of New Jersey, and the New York Academy of Sciences have been studying the river for more than 20 years; but technologies to remediate the pollution are quite expensive, and no action has been taken to clean up the river and the bay. Several years ago, a study suggested that the river should be dredged and that the sediments could be converted into a substance that would be a safe building material. The toxics in the blended "cement" would be immobilized, using a technology ready for commercialization. This technology is being reviewed by experts in the US, with the hope that it will finally open the door to cleaning up the river.

EPA can contribute to finding solution technologies in five ways.

One is to develop standards for the identification and cleanup of contamination by mold. Tribal, public, institutional, and rental housing is often not cleaned of mold that is causing health problems because there is no standard for when this should be done.

A second is to conduct research and work with industry to develop new solution technologies for different kinds of pollution—e.g. mold-resistant paints and coatings, ventilation systems and air purifiers that can capture and bind mold spores so that they are no longer airborne, and remediation technologies for older buildings as well as different construction technologies for inexpensive new homes and community facilities. EPA's Office of Research and Development (ORD) could work with EPA program offices in systematic, on-going efforts to monitor efforts to address the typical problems that EJ/VP communities face and to support the most promising ideas. For example, it might be worth focusing ORD research on technologies to manage rising levels of groundwater in contaminated soils or in places where groundwater could damage buildings or cause mold to grow and create problems of indoor air quality. (Indeed, ORD and media offices may already do things like this.)

Third, in addition to working with EPA media offices to develop new solution technologies, ORD should also work with other countries that are facing similar problems. ORD could play an active role in ensuring that technologies developed overseas are readily available to American communities by testing, publishing information about, and perhaps certifying technologies as cost-effective.

A fourth way that EPA can contribute to finding solutions is to work directly with state, local, and tribal agencies that have responsibilities for building and construction or for making decisions about the proper use of contaminated land or on wetlands. This could be done in partnership with other federal agencies that have the responsibility and legal authority for housing, construction standards, and related matters. EPA is already working with the Department of Housing and Urban Development and with the Department of Transportation, as well as with state and local governments, to encourage the development of "smart," compact, energy-efficient communities. EPA could take the same approach to finding solution technologies for EJ/VP communities. The Federal Emergency Management Agency, HUD and DOT would be important partners in such an effort.

Fifth, EJ/VP communities will benefit not only from technologies that are targeted to meet their special needs but also from technologies that are needed by all communities, for example, cars with low (perhaps zero) emissions, healthier houses, inexpensive green infrastructure, and less polluting sources of electricity. EPA is already working on many of these technologies.

In all cases EPA should seek permanent solutions through a transparent process with a defined timeline for installation of industrial solution technologies, so that confidence can be established between the agency and the EJ community. It is not acceptable to say that the environmental problems facing EJ/VP communities cannot be solved. The search for permanent solutions technologies should continue until solutions have been developed and deployed.

Examples of Solution Technologies Needed by EJ/VP Communities

- Closed-loop sustainable solution technologies.
- Community/Soils: Technologies that can detect and confine hazardous chemicals so that edible crops can be grown on properly-designed urban farms in brownfields.
- Chemistry/Indoor Air: Technologies to ensure high standards of indoor air quality in public and institutional housing in Native American communities and generally in low-income communities across the country.
- Mold resistant and mold binding paints and coatings.

C. RECOMMENDATIONS FOR GAME-CHANGING NEXT STEPS

NACEPT was asked to develop a list of needs for technologies to address problems in environmental justice communities and other vulnerable populations. Our report can provide initial answers, but to fully understand the needs and how EPA can meet them, ORD would have to work closely with EJ/VP communities themselves.

ORD should also reach out to the business community, researchers in the private and public sector, and to other federal agencies. EPA-ORD recognizes that such an effort would be a departure from past practice. In September, 2011, ORD published an implementation plan for developing and deploying "science tools" as part of EPA's Plan EJ 14. This report says that:

> "presently, ORD lacks any mechanism for public input into its research agenda."
> (p. 16)

The September plan proposes greater efforts by ORD to work with EPA regional offices, the National Environmental Justice Advisory Committee, and others to reach out to EJ communities, both to inform ORD about conditions and needs in communities and to build capacity at the community level. Specifically, it says that ORD will:

- work with OSWER's Community Engagement Initiative and similar efforts that other media offices develop to engage community stakeholders in ways that will help them participate in EPA decisions on topics of special concern to EJ communities;
- establish a workgroup within the National Environmental Justice Advisory Committee to advise the administrator and ORD about scientific research and health impacts related to environmental justice;
- support community-based participatory research;
- engage EJ stakeholders in efforts like its Regionally Applied Research Effort program. (pp. 16-17)

Our recommendations are consistent with this approach and are designed to reinforce these efforts.

1. ORD should enter into partnerships with EJ/VP communities to develop and deploy these new technologies.

Working with EPA regional offices and media offices, ORD should identify one or two "pilot communities" in each region to be test beds for effective detection, monitoring, and assessment technologies that are the highest priority for "game-changing" action. (EPA's EJ Showcase Communities and Community Action for a Renewed Environment – "CARE" – communities might be possible sites.) These communities should become models for deployment of technologies in other communities. The regional offices and state agencies should assist communities in identifying needed technologies.

2. ORD should also establish a public-private task force to provide strategic advice and supplement ORD's technical expertise.

This task force should:

- Compile an inventory of specific existing, cutting-edge, available-for-deployment technologies that could effectively address the needs of EJ/VP communities and human-health and environmental regulatory agencies.
- Identify specific technologies that are ready to enter the market as well as any legal, financial, or other barriers to the deployment of these technologies.
- Provide advice on incentives to encourage private development of needed technologies.

Members of the task force might be drawn from:

- Leading technology companies with experience in R&D, commercialization, production, and deployment.
- Companies in the regulated community, as well as research institutes, academia, and state and federal human-health and environmental regulators with successful experience in effectively and transparently monitoring releases.
- NGOs with experience in effective monitoring and communication technologies.
- Staff in key EPA offices.
- Experienced leaders from EJ/VP communities.

EPA might wish to work with the National Academies to participate in or lead this effort.

3. **EPA should reach out to other federal agencies to mobilize a multi-agency federal initiative to develop and deploy needed solution technologies, similar to EPA's work with the Department of Transportation and Department of Housing and Urban Development in support of state and local efforts to build "smart communities".**
    - Several agencies in DHHS could be essential partners.

4. **ORD should publish a biennial update to EJ/VP communities about the progress of these activities.**
    - This would include providing information about the needs for technologies and the pros and cons of newly emerging technologies to EJ/VP communities, EPA regional offices, state environmental agencies, interested partners in the private sector, and others.

5. **EPA must also strengthen its own IT capabilities in order to support monitoring, reporting, and mitigation activities in EJ/VP communities.**

    A separate paper explaining these requirements in some detail is available at http://www.epa.gov/ofacmo/nacept/reports/index.html. These requirements relate to the use of open interoperability standards to streamline both collection of measurements being generated by monitoring systems, and dissemination of data products derived from those systems. These standards range from general-purpose web services based upon the REST web service model (which in turn is based upon the HTTP standard protocol), to the suite of more specific open standards from the Open Geospatial Consortium (OGC) relating to data visualization (Web Map Service - WMS), data access (Web Feature and Web Coverage Services - WFS and WCS respectively), and sensor control and communication (Sensor Web Enablement - SWE).

These services are the key components in the development of a services oriented architecture (SOA) that

- Lowers the barriers to data acquisition - decreasing the time required for collected data to be entered into the core management systems;
- Provides a logical separation between internal data management systems and the clients that consume products that are based upon the contents of that system;
- Enables publication of standards-based services that may be both used by EPA developers to provide specialized data access and visualization tools, but *also* may be used by external developers to provide custom *mashups* in support of specific user communities - particularly vulnerable populations.

EPA has initiated a number of programs that are developing these capabilities: EPA's "Apps for the Environment Challenge", "Environmental Dataset Gateway", "Geospatial Data Download Service", and the "National Geospatial Program" are all examples of programs that are making use of this SOA approach. What is needed within EPA's IT planning is a routine consideration and assessment of where interoperable services may be integrated into the development of new capabilities or updates to existing ones.

CONCLUSION

EJ/VP communities are directly impacted by multiple environmental assaults, are more likely to suffer adverse health impacts from these exposures, and lack the power to change their situations. The technologies that we have identified as needed could help these communities begin a process of community-driven environmental change. With EPA's support, that process could result in solutions that could "change the game" of environmental degradation and adverse health impacts that EJ/VP communities continue to face every day. We thank you for the opportunity to work with ORD and other EPA offices toward that end. We also wish to thank ORD, the Office of Environmental Justice, and the Office of Children's Health Protection for their assistance with this advice letter.

Sincerely,

/Signed/

James H. Johnson, Jr., Ph.D.
Chair

/Signed/

DeWitt John, Ph.D.
Workgroup Co-Chair

/Signed/

Mark A. Mitchell, MD, MPH, FACPM
Workgroup Co-Chair

Attachments: Table 1: Steps in the Community-Driven Environmental Change Process
NACEPT Vulnerable Populations Workgroup Member List
Endnotes
NACEPT EJ and Vulnerable Populations Case Studies

cc: Lek Kadeli, Acting Assistant Administrator, Office of Research and Development
Fred S. Hauchman, Director, Office of Science Policy, Office of Research and Development
Cynthia D. Jones-Jackson, Acting Director, Office of Federal Advisory Committee Management and Outreach
NACEPT Members

NOTICE

This letter is the product of the National Advisory Council for Environmental Policy and Technology (NACEPT), an advisory committee created under the Federal Advisory Committee Act. NACEPT provides independent advice and recommendations on environmental policy, technology, and management issues to the Administrator and other officials of the U.S. Environmental Protection Agency (EPA). The recommendations in this letter reflect the opinions and views of NACEPT, and not necessarily the views or opinions of the U.S. EPA.

NACEPT's reports and advice letters are posted on the EPA website at http://www.epa.gov/ofacmo/nacept.

Table 1: Steps in the Community-Driven Environmental Change Process

Phase I: Problem Identification		
First Step	**Second Step**	**Third Step**
Triggers Fire, explosion, etc Smoke Odor Proposed new or expanding facility Regulatory processes with public input Unexpected releases of pollution Public notice of potential hazard	**Demonstrate Need for Change** Community test results Government or academic testing Emergency response Release of report Expert advice	**Consciousness Raising** News media coverage Leaflet/flyers Word of mouth Social structures schools/churches Social media/computer networks Public meetings

Phase II: Actions		Phase III: Results
Fourth Step	**Fifth Step**	**Sixth Step**
Developing strategy Information gathering Convening Planning Resource development Consensus building Communications Coalition building Logistics Publicity	**Actions/Tactics to build power** Petition Rally/protest/demonstration Meeting with public officials Letters to Editor Press Releases Give demands to polluter's reps Community forums Community learning sessions Lawsuits/legal interventions	**Responsive outcome** Negotiated change Regulatory change Legislative change Other responsive process or policy change

Note: The items that are highlighted are places where better detection, monitoring, and assessment technologies are needed and can be effective.

NACEPT Vulnerable Populations Workgroup

Dr. Karl Benedict
Director
Earth Data Analysis Center
University of New Mexico
Albuquerque, New Mexico

Dr. Ben Dysart
Principal
Dysart and Associates, Inc.
Nashville, Tennessee

Mr. Kurt Erichsen
Vice President
Environmental Planning
Toledo Metropolitan Area
Council of Governments
633 Woodbine Road
Toledo, Ohio

Ms. Ella Filippone
Executive Director
Passaic River Coalition
Morristown, New Jersey

Dr. DeWitt John
Workgroup Co-Chair
Thomas F Shannon
Distinguished Lecturer in
Environmental Studies
Bowdoin College
Brunswick, Maine

Dr. James H. Johnson, Jr.
NACEPT Chair
Professor and Dean Emeritus
College of Engineering,
Architecture and Computer
Sciences
Howard University
Washington, DC

Dr. Daniel Kammen
Professor of Energy
Energy Resources Group
University of California
Berkeley, California

Ms. Vivian Loftness
Professor of Architecture
Carnegie Mellon University
Pittsburgh, Pennsylvania

Mr. Clayton Matt
Director of Tribal Services
Confederated Salish and
Kootenai Tribes
Pablo, Montana

Dr. Mark A. Mitchell
Workgroup Co-Chair
President
Mitchell Environmental Health
Associates
Hartford, Connecticut

Ms. Jennifer Nash
Executive Director
Regulatory Policy Program
Harvard Kennedy School
Harvard University
Cambridge, MA

Ms. Arleen O'Donnell
Vice President
Eastern Research Group, Inc.
Lexington, Massachusetts

Ms. Kristie Orosco
Director of Environmental
Protection and Compliance
San Pasqual Band of Mission
Indians
Valley Center, California

Dr. Edith A. Parker
Professor and Head
Department of Community and
Behavioral Health
College of Public Health
University of Iowa
Iowa City, IA

Mr. John T. Preston
Managing Partner
C Change Investments, LLC
Cambridge, Massachusetts

Acting Designated Federal
Officer

Mr. Mark Joyce
U.S. Environmental Protection
Agency
Office of Federal Advisory
Committee Management and
Outreach
Washington, DC

ENDNOTES

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Shaping the Nation's Environmental Policy

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CASE STUDIES

Environmental Justice and Vulnerable Populations

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1. **Graniteville Train Wreck**
   Ben Dysart
   Dysart & Associates, Inc.
   Jennifer Nash
   Executive Director, Regulatory Policy Program
   Harvard Kennedy School

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   Mark Mitchell, M.D.
   President, Mitchell Environmental Health Associates

3. **Louisville Rubbertown Air Toxics**
   Mark Mitchell, M.D.
   President, Mitchell Environmental Health Associates

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   Ella Filippone
   Executive Director, Passaic River Coalition

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   Kurt Erichsen, P.E.
   Vice President of Environmental Planning, Toledo Metropolitan Area Council of Governments

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   Clayton Matt
   Director of Tribal Services
   Confederated Salish and Kootenai Tribes

GRANITEVILLE TRAIN WRECK, AIKEN COUNTY, SC

A HUMAN HEALTH TRAGEDY IN GRANITEVILLE

Early on the morning of January 6, 2005, two trains collided in unincorporated Graniteville, SC. Five tank cars containing hazardous material were derailed: three car loads of chlorine—each containing 180,000 pounds of chlorine, one car load of sodium hydroxide, and one car load of rosin residue. One tank car exploded, releasing some 60 tons of chlorine gas. No warnings were given to sleeping residents living as close as 100 feet from the collision point except to shelter in place, which left the entire neighborhood subject to dangerous exposures. The accident would result in nine deaths and 554 residents sent to the hospital for chlorine inhalation treatment.[1] Residents would be evacuated, but their homes would be ruined from the gas cloud that hovered over the community. The immediate illness would later be determined to be a permanent debilitating condition for workers. Since the textile industry had already left for lower-wage countries, there was little reason to repair or reopen the mill once the explosion occurred.

The case illustrates the inadequacies of currently deployed sensing and communication technologies for community protection and regulatory response. It also points to several immediate and actionable recommendations for the US EPA. Adequate information, communications, and low-cost, on-site, ambient monitoring would have greatly improved the Graniteville response, reduced exposure, decreased long-term health effects, and saved lives.

GRANITEVILLE AS AN EXAMPLE

Graniteville is one of three (Graniteville, Vauclause, and Warrenville) textile mill villages, collectively known as "Graniteville," abandoned by industry due to various political and economic circumstances which typify many small, rural communities throughout the Southeast and other areas of the US. These communities are typical of early industrial sites built along fall-line waterways. Six Graniteville mills in these three communities are now being assessed or cleaned up via the EPA Brownfields Program and have additional local Special Option Local Sales Tax (SPLOST) funding to supplement these federal resources. However, the consequential impacts of the train wreck left behind in Graniteville—which include devastating health, social, and economic impacts—are only partially solved by these resources.

The Graniteville, Vauclause, and Warrenville communities are examples of historic EJ and textile communities: located outside traditional community boundaries, they are left with minimal services compared with traditional communities such as police and fire protection, garbage pickup, schools, hospitals, and water and sewer service. They are isolated from shopping, schools, and the larger community. In operating mill communities, now a thing of the past, the mill itself provided most services; but as mills closed, these services disappeared. The history of disenfranchisement led to continuing isolation, as nearby communities, North Augusta and Aiken, never connected with these now-disconnected and disadvantaged neighbors. Now Graniteville is an area which can absorb suburban sprawl—which requires new infrastructure for

[1] Railroad Accident Report: Collision of Norfolk Southern Freight Train 192 With Standing Norfolk Southern Local Train P22 With Subsequent Hazardous Materials Release at Graniteville, South Carolina, January 6, 2005, NTSB/RAR-05/04, PB2005-916304, Notation 7710A, Adopted November 29, 2005, National Transportation Safety Board (http://www.ntsb.gov/publictn/2005/rar0504.pdf)

new populations—while continuing to ignore the needs of the original community. With the risk of substantial transportation-corridor exposure and substantial active or brownfield manufacturing hazardous or toxic releases, Graniteville is illustrative of thousands of other struggling, underserved, disproportionately impacted American communities and neighborhoods attempting to recover from their manufacturing history in the face of ongoing political and economic constraints.

PROBLEM OF NO, INADEQUATE, AND NON-ACTIONABLE INFORMATION

Relevant, high-quality, and accessible data are the holy grail of environmental and human-health assessment. In Graniteville, no such data were available to indicate the timing, duration, areal extent, and magnitude of the toxic release. As a result, there was no reliable basis for estimating exposure of the nearby sleeping and sheltering-in-place humans. Eight immediate deaths that resulted from the chlorine gas cloud that early morning in January 2005 were just the beginning of the continuing human-health disaster that was to come. Formal inquiries determined that the well-meaning first responders from the local volunteer fire department had protective gear but failed to use it, which delayed evacuation of residents and victims and caused additional exposure.

When federal responders arrived to assess damages to public health and environment, victims had been transported to hospitals in most cases. So regulators focused on next-available organisms: fish in the creek. The EPA utilized broad Comprehensive Environmental Response and Compensation Liability Act of 1980 (CERCLA) Emergency Response Authorities to address the environmental aspects of the spill only, concentrating on a spill to Horse Creek which caused a fish kill, rather than focusing on worker and community human exposure. Latent pollution from decades of mill operation was ignored in the EPA response, which could have created additional requirements for the past operators to clean up the facilities rather than leave it for the EJ community to figure out. The responsible party, Norfolk Southern railroad, was required to complete the necessary responses under federal law for the spill: at that point, Norfolk Southern had addressed the fish kill by providing 3,000 replacement fish in the Horse Creek and providing $100,000 worth of landscaping to address erosion problems along the stream bank as well as agreeing to some $4-million in Clean Water Act (CWA) fines and $32,500 in federal CERCLA response costs.

TECHNOLOGY THAT COULD IMPROVE OUTCOMES FOR HUMAN HEALTH

Technology should immediately *warn and advise* the adjacent or downwind community, first responders, and local hospital emergency rooms, and *document* environmental releases for residents and local governments, state environmental and health regulatory agencies, the source's local and corporate senior management. Such technology provides the basis for (a) effective first-responder emergency response or—in the case of chronic, cumulative releases—informed responses by community leaders, (b) immediate evacuation or sheltering and effective treatment of exposed humans, (c) proper long-term medical treatment, (d) immediate threat and human exposure estimates as well as post-immediate-response modeling and characterization of the release, and (e) regulatory response as appropriate.

Like flood damage due to elevated flows in a stream, risk to human health from permitted and un-permitted hazardous or toxic releases from mobile sources, regulated facilities, and other stationary sources is a function of magnitude, duration, and frequency. Inexpensive, credible, easy-to-operate, easily deployed technologies are required: technologies capable of providing solid, transparent data on the timing, frequency, severity, and duration of all unsafe and unpermitted air releases—even for only a few of EPA's top-priority hazardous or toxic air pollutants—to which communities are regularly exposed.

SENSORS AND SYSTEMS

Required are appropriate (a) sensors and (b) systems to interpret data gathered by sensors that take into account chronic long-term exposures and pre-existing health conditions common to vulnerable populations. Sensors should be reliable, cost-effective, easy to deploy, and suitable for local community residents to use and maintain.

Three levels of technology are necessary:

1. Sensors, including devices able to detect releases of local sources—e.g., VOCs or benzene—as well as sensor arrays that can sufficiently characterize releases real-time to protect human health. Sensors should be located on mobile sources and in communities of vulnerable populations.
2. Continuous monitors utilizing sensors to detect any hazardous or toxic air release above permitted and safe levels. Continuous monitors should be located with the bulk hazardous or toxic material in transit as well as between EJ communities and transportation corridors and loading, unloading (including inter-modal), and storage facilities.
3. Communication systems to share real-time air hazardous or toxic release detection, quantification, and timing information with EJ community leaders and first responders, local hospitals, and environmental and health regulatory agencies as well as, if above an acceptable level, trigger timely deployment of more sophisticated sensor arrays and monitors to thoroughly document unsafe and unpermitted hazardous or toxic air releases reaching EJ communities.

SOLUTION TECHNOLOGY

While we are emphasizing sensing and systems, we aren't ignoring the importance of solution technologies in achieving EPA's mission of "protect[ing] human health" and "ensur[ing] that … all Americans are protected from significant risks to human health … where they live, learn and work." Technically effective control technologies—in the sense of producing any specified output including air releases—have existed, now exist, and are being improved. But they must be deployed and then operated as intended. And someone—a regulator or someone else—must and does specify the expected and required level of performance which, in turn, determines the hazardous and toxic air releases and resulting human exposure.

Regulatory Issues related to EJ exposures Illustrated by Graniteville

Lack of available, reliable, timely data—at the time of an incident—creates inherent weaknesses in regulatory response on the ground. These inherent weaknesses then manifest themselves throughout the aftermath of the incident—particularly as it relates to both the environmental and human-health impacts and remedy requirements—even until more detailed environmental and human-health studies are completed.

As remedy requirements must be translated into an enforcement process, the initial inherent weaknesses due to lack of appropriate environmental and/or human-health data collection methods continue to plague the ability of the regulatory system to complete its own statutory requirements to impose duties on the responsible parties. This situation details why some agency officials are surprised when EJ communities (or other communities) attack EPA for leaving their community with continuing exposure and human-health problems.

Through its Brownfield Program, EPA has had a role in addressing contamination issues that were not addressed appropriately during the regulatory phase. It was likely not intentional that they were not addressed: EPA just did not understand what should be addressed. On the dark side of the moon where EJ communities tend to be co-located with sources of hazardous or toxic air releases, if there are no data, there is no problem.

There are three areas that need closer examination to illustrate both the long-standing problem and the solution: (a) how the lack of data weakens the technical human-health and environmental impact assessment, (b) how a weakened technical assessment then further weakens the regulatory response, and (c) how data improvements and procedural improvements eliminate weaknesses and create a more scientific, rational, and fair approach for all communities—especially citizens who live in EJ and other disenfranchised communities.

Conclusion

An important challenge for EPA is the lack of low-cost, reliable, easily deployable technologies capable of providing real-time data about accidental and other non-permitted hazardous or toxic air releases to residents, first responders, and local governments in EJ communities. In Graniteville, the direct consequences of the lack of timely, actionable data included deaths of nine people, long-term health effects on many citizens, and severe economic dislocation resulting from the last operating mill's closure. Those consequences underscore the vulnerability of disenfranchised EJ communities that have experienced decades of environmental exposures. Adequate real-time monitoring resulting from low-cost, simple, easily deployed sensors and systems will reduce the severity of the impacts of accidents and other non-permitted hazardous or toxic air releases when they occur and make possible more appropriate legal and regulatory remedies.

While the technologies described here are indeed critical, the will to effectively deploy these technologies and act on the information they generate is even more important.

HARTFORD TRASH-TO-ENERGY INCINERATOR

ENVIRONMENTAL PROBLEMS

There are variable emissions of toxins, including metals from burning of household trash, depending on what is being burned at a given moment, as well as how well the facility is operating. In addition, there are 10 or more fires and explosions each year. Even though peak emissions are the greatest health threats, emissions testing is only conducted once annually at the stack, presumably at times of ideal steady state conditions, and averaged over a period of several hours. These measurements are projected to be the same year-round to get annual emissions rates. Emissions variability with possible permit violations are not identified and communicated to the public or to regulators. There is no community monitoring of the emissions. The monitoring process and emissions results are suspect.

EJ/VPS AFFECTED

Hartford, Connecticut is a city of 125,000 people, about 80% of whom are Black or Latino. It is one of the lowest income cities over 100,000 in the U.S. It is only 18.4 square miles in size and is the capital of Connecticut, the wealthiest state in the Union. The trash-to-energy facility, the Connecticut Resources Recovery Authority's Mid-Connecticut facility, ranks in the top five largest facilities in the country, burning 2,850 tons per day of municipal solid waste. This waste is brought to Hartford from 70 municipalities to burn.

NEEDED TECHNOLOGIES

Technologies for problem identification; technologies for problem assessment, analysis and communication; and/or solution technologies)

- The community would like to have continuous emissions monitoring installed on the stacks of the incinerator that would have continuous readings of toxins including metals and dioxins over the internet and would indicate when permit standards are exceeded and provide text alerts to those who request it when there are major violations that may be an immediate threat to health.
- They are looking for low cost soil testing of dioxins surrounding the incinerator,
- They want portable ambient air monitoring devices for emissions tests that can be carried out by community residents and give immediate results.
- There could be a way to email or text information and photos of complaints and potential violations to regulators and other community members where they can be stored on public databases.
- They are looking for human biomonitoring testing of neighborhood residents of these metals and dioxins that is cost effective.

- There is a need for the ability to test for the potential health effects of the multiple and cumulative mixture of chemicals to which people are exposed who live near this facility, the sewage sludge incinerator, oil fired power plants, highways, and other sources of air toxins.

RELEVANT CROSS-CUTTING ISSUES

- Communications technologies that could send alerts to email subscribers may be new applications of technology that would be useful in the other cases. Low cost monitoring of dioxins in soil could be used in other Brownfields situations.

LOUISVILLE RUBBERTOWN AIR TOXICS

EJ/VPs Affected

Rubbertown is an industrial zone in west Louisville, KY along the Ohio River composed of 19 large plastics and petrochemical facilities in close proximity to low-income African American neighbors on the east and low-income whites to the south. 45% of the 3000 people living within a half-mile of these facilities have a household income less than $25,000. These facilities have a large number of accidental releases and mishaps with various colored smoke plumes, fires, odors, and explosions. The releases are of 35 or so mostly VOC's, but also inorganic chemicals, metals, acids and bases.

Needed Technologies

The companies and the City/County have a system of responses to releases. These include warning sirens, reverse 911 calling systems, and a 24 hour complaint hotline. Residents complain that these systems are often times not used or are used too late to be of use to the public.

Residents want handheld monitors to measure their neighborhood's VOCs at low levels for short periods, i.e. over a few seconds in order to identify the chemical being released, identify the level of chemical exposure, interpret the health threat from each chemical release, be able to know what kind of health protective actions to take, and have information to hold government and industry accountable for any health threats.

The technologies needed are:

- Real time air monitoring of air toxics - either at the fenceline or stack monitoring, that can be accessible on the internet and sent to regulators
- Communications - allow alerts to be sent by phone and by text message to people at various levels and durations of releases to allow people to know when there are potential air toxics violations and when there are potential health threats.
- Pollution control technology - need improved technologies for process management and end-of-stack controls to reduce toxics.
- Biomonitoring to identify pollutants from local source exposure
- Handheld low-cost monitors for VOC's that can be operated by community members

Possible Technology Solutions

Develop new technologies; adapt technologies to address situations in EJ/VP communities; address barriers to the deployment of needed technologies.

There is a need to develop low-cost portable immediate sensing devices that can be used by the community. Current tedlar bag grab sample "bucket Brigade" technology is not sensitive enough, is not immediate with its results, and is still a bit expensive, although the price has declined recently.

RELEVANT CROSS-CUTTING ISSUES

Cross cutting issues include needs for portable air toxics monitors, communications technologies, and biomonitoring

LOWER PASSAIC RIVER & NEWARK BAY RESTORATION PROJECTS

LOCATION

Densely populated urban area in northeastern New Jersey

SPECIFIC ISSUE AND POLLUTANTS OF CONCERN

Northeastern New Jersey has been at the epicenter of economic activity since the start of the Industrial Revolution over two centuries ago because its waters provide shipping access to the world. However, these activities have left a legacy of contaminants in the sediments of the Lower Passaic River and Newark Bay, which persist today. The most hazardous are dioxin, PCBs, and mercury. Dioxin has gotten into the shellfish and fish, and eating these fish can be very hazardous. Furthermore, most of the Lower Passaic River has not been dredged since the 1950s, and dredging Newark Bay has become very expensive because of problems with disposing of the contaminated sediments. This means that many recreational, ecological, and economic benefits of the river and bay have been lost. Also, the river and bay have been filling up with more sediment, and flooding is worsening, and will get even more hazardous in coming years as sea level rises due to global warming.

KEY PLAYERS INVOLVED

The following agencies are directly involved in carrying out these projects: US Environmental Protection Agency, US Army Corps of Engineers, US National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service, NJ Department of Transportation, NJ Department of Environmental Protection, and Tierra Solutions, Inc. The residents and workers in sixteen or more municipalities in Bergen, Essex, Hudson, Passaic and Union Counties are being impacted by this pollution. Large percentages of this vulnerable population have low incomes, are African Americans or Hispanic, and are uninformed about how to protect them from the pollution. Some even eat crabs and fish from the river and bay.

TECHNOLOGY APPLIED

In 1984, a quarter century ago, the "Diamond Alkali" site, which includes the properties at 80-120 Lister Avenue in Newark as well as the contaminated Lower Passaic River and Newark Bay, was declared a Superfund Site. Although contaminants on the land side of the site have been partially contained, the sediments in the river and bay are still badly contaminated. Part of the Lower Passaic River Restoration Project (LPRRP), planning for an Early Action program for cleaning up the contaminated sediments in the lower eight miles of the Passaic River, has been ongoing since 2003.[2] (See <www.OurPassaic.org> and <www.OurNewarkBay.org>.) Many

[2] Malcolm Pirnie, Inc. 2007. Lower Passaic River Restoration Project, Draft Source Control Early Action Focused Feasibility Study. Prepared for US Environmental Protection Agency, US Army Corps of Engineers, New Jersey Department of Transportation. June 2007. Executive Summary, page x.

studies have been conducted and more are ongoing. Currently, the data collected in recent years is being modeled to estimate the distribution of dioxins and PCBs in sediments and biota in the river, bay and harbor under alternative clean up scenarios. In June 2009 a revised list of alternative scenarios for the Early Action program was suggested.

The highest levels of dioxin are found in the sediments immediately adjacent to the shore of the old Diamond Alkali site. Occidental Chemical Corporation and Tierra Solutions, Inc., which have taken responsibility for the Diamond Alkali site, reached an agreement with EPA in June 2008 to remove about 200,000 cubic yards of dioxin-laden sediment from the river in the vicinity of the site.[3]

For ten years the New York Academy of Sciences Harbor Consortium had studied contaminants in the New York/New Jersey Harbor. Four years ago the Consortium's recommendations include the following statement:[4]

> Cleanup of PCB-contaminated sites – particularly along the Passaic River – as well as the dioxin-contaminated Diamond Alkali Superfund site and its effects on the nearby Harbor, remains a (if not the) major priority. The Consortium has urged all litigating parties to focus their efforts on achieving early and effective action.

TRANSFERABLE TOOLS/STRATEGIES

Actions to clean up the contaminated sediments in the Lower Passaic River and Newark Bay have long been delayed for lack of a publically acceptable technology for dredged material management. However, today there is the Cement-Lock tool. Cement-Lock is a virtually odorless thermal-chemical technology that converts contaminated sediment and hazardous waste to Ecomelt®, a non-leachable, harmless beneficial-use product. When combined with cement it exceeds the ASTM requirements for Portland cement and concrete. Air pollution equipment for Cement-Lock facilities can meet or exceed the EPA's 2014 compulsory air quality regulations. Demonstration of the effectiveness of this technology for these sediments could lead to cleaning up other sites in the US. An added high benefit is that the facility will also supply energy to the grid, establishing a significant beneficial use.

CHALLENGE

The Lower Passaic River and Newark Bay are critical parts of the New York/New Jersey Harbor Estuary, a hub of economic activity on the east coast of the United States. By dredging contaminated sediment from the river and harbor, and treating it on land so it can be used beneficially, both the ecologic and economic vitality of the region can be reinvigorated. A Regional Sediment Management (RSM) Plan, prepared under the auspices of the New York/New

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[3] Kluesner, David, U.S. EPA, Region 2, Public Affairs Division. June 2008. EPA Signs Agreement with Companies to Remove Major Source of Passaic River Contamination.

[4] New York Academy of Sciences Harbor Consortium. January 2008. "Safe Harbor: Bringing People and Sciences Together to Improve the New York/New Jersey Harbor. Page 47.

Jersey Harbor Estuary Program, was released in October 2008, and makes the following observations:[5]

> The RSM Plan is a long-term Plan with anticipated near-term economic returns. The Dredged Material Management Plan for the Port of New York and New Jersey estimates that achieving the goal of clean sediments throughout the harbor can save at least $25,000,000 per year in costs of maintaining our water transportation infrastructure. Other economic drivers for implementing the RSM Plan also include increased and improved opportunities for recreation, tourism, and fisheries – industries valued at over $20 billion per year that depend on a clean Harbor Estuary.

These expectations are justified by the observation that elsewhere in the United States and in Europe significant cost savings and other benefits have resulted from RSM efforts. The implementation of projects to restore the ecologic vitality of the Lower Passaic River and Newark Bay is critical for restoring economic prosperity to this region!

STATUS

Studies after study after study confirm earlier findings, but no action has been taken to "restore" the Lower Passaic River and Newark Bay. The technologies are available to dredge most of the most hazardous legacy pollutants from the river and bay, and to decontaminate these sediments so they can be used beneficially. A land based treatment facility within the region would significantly lower costs and establish beneficial uses from the contaminated sediments. While this recommendation has been made frequently, the opportunity to pursue such a facility as a priority disposal project requires EPA's attention now. The demonstration of the efficacy of the Cement-Lock process in New Jersey would encourage clean-ups in several parts of the United States where toxic pollutants are challenging the nation. The Corps of Engineers, Engineer Research and Development Center, published a report on dredging and environmental research entitled Mass Balance, Beneficial Use Products, and Cost Comparisons of Four Sediment Treatment Technologies Near Commercialization by Trudy J. Estes, Victor S. Magar, Daniel E. Averett, Nestor D. Soler, Tommy E. Myers, Eric J. Glisch and Damarys A. Acevedo., March 2011. I strongly suggest that EPA take over where the Corps left off and contact the Cement-Lock people to examine the commercial viability of their process. (W.A. Hendricks, 407-492-9731) This case study should be brought to the attention of Administrator Jackson.

[5] New York/New Jersey Harbor Estuary Program. 2008. Regional Sediment Management Plan, October 2008, page iv.

TOLEDO’S DORR-SMEAD BROWNFIELDS

DESCRIPTION

Toledo has had a strong industrial base for the past century. The city grew rapidly due to its Lake Erie port, industrial resources, and proximity to Detroit. Toledo’s economy was based on manufacturing, especially automotive.

Toledo’s population peaked at 383,818 in 1970. By then the city was losing industrial jobs, a process that has since continued. By 2010 the population had dropped to 287,208. With departing jobs, the factories were abandoned. The remaining inner city is lower income with a high proportion of minority residents.

Many of the abandoned factories are now brownfields. The City of Toledo identifies 410 brownfield sites covering a total of 1,927 acres, the majority which are concentrated in the inner-city area.

The subject of this case study is a group of three brownfield sites located near Dorr Street and Detroit Avenue. The largest brownfield was the Doehler-Jarvis Plant #1, a producer of die-cast automotive parts. The others are Craft House and Fernwood, which we identify as the Dorr-Smead brownfields. The abandoned buildings at several of the sites have been razed; other nearby abandoned or underutilitized buildings remain.

EJ/VP STATUS

A third of Toledo’s population resides in brownfield-impacted area, representing half of the impoverished population, and an unemployment rate 50% higher than the rest of the city. From 1970 to 2000, 94% of the city’s population decline was in this area.

Several vulnerable populations are affected by the Dorr-Smead brownfields.

- Lower income and/or minority neighborhood residents are vulnerable to exposure by hazardous materials. House fire sites are often contaminated by metals and PAHs, posing neighborhood exposure risks.
- Children may have been particularly vulnerable to physical hazard at the sites.
- Homeless persons: before demolition, abandoned buildings were occupied as shelter. Homeless persons taking refuge were subject to exposure to hazardous materials, to physical hazards from unsafe structures, and fires set for warmth.
- Building material thieves: abandoned buildings and properties are subject to stripping for hardware and other salvageable materials. Those undertaking this activity are subject to the site’s hazards.
- Food Deserts, which lack access foods necessary for a healthy diet, form in areas of low income households; households without cars; and without access to grocery stores. Urban agriculture can create a “Food Hub” in that desert.

POLLUTANTS

Asbestos, arsenic, TCE, VOCs, lead, and PAHs on brownfield sites pose risks to vulnerable populations. In Toledo, ambient arsenic levels often exceed soil standards for residential use. Asbestos containing building materials were utilized when the factories were constructed. PAHs are associated with heavy end petroleum products, such as diesel fuel and oils, and are even components of asphalt. On some sites there were abandoned drums, which once contained undetermined materials.

Potential human health exposure pathways include direct exposure to materials or soils; through ingestion of vegetables or fruit grown in contaminated soils (see discussion below), through site runoff into streams; or through groundwater. A building constructed on a contaminated site could have indoor air contamination.

Indirect pollutants include: nonpoint source pollution, increasing phosphorus in streams, leading to Lake Erie harmful algal blooms. The difficulties of redeveloping brownfield sites creates an economic incentive to develop greenfield sites instead. Failure to redevelop brownfields encourages urban sprawl and nonpoint source stormwater pollution.

KEY PLAYERS

City of Toledo, the Lucas County Improvement Corporation (LCIC), Toledo Community Development Corporation (CDC), US EPA Region V, HUD, Ohio EPA, the Ohio Department of Development Clean Ohio Fund, the Center for Innovative Food Technology, the University of Toledo (UT), Toledo Grows, and Kansas State University.

Of the Dorr-Smead brownfields, Toledo CDC owns Fernwood, LCIC owns Doehler-Jarvis, and the City of Toledo owns Craft House. Toledo and LCIC coordinate site remediation and beneficial redevelopment with EPA and HUD; the Center for Innovative Food Technology, the University of Toledo (UT), and Toledo Grows are partners in developing urban agriculture for the site.

MECHANISMS

Brownfield assessment and remediation: conduct property assessments and remedial activities, including excavation and off-site disposal of contaminated materials.

Ohio VAP: Ohio's Voluntary Action Program (VAP) sets risk-based cleanup standards. While the VAP has not been fully utilized for Dorr-Smead, the program facilitates many cleanup agreements between property owners and Ohio regulatory agencies. Cleanup standards based on the end use: commercial/industrial, residential, or construction. The residential standard, based on physical contact with the soil, is the most protective.

Beneficial Redevelopment – Urban Agriculture: The industrial jobs in the area are not likely to return. Doehler-Jarvis had good rail access, but today freeway access is more important. The land must be used to benefit a changing community. EPA provides resources for agriculture projects through brownfield. The agency website offers numerous resources.

The Toledo CDC is redeveloping a brownfield as an urban agriculture business called the Fernwood Growing Center:

- Promotes community revitalization and eliminates the attractive nuisance of abandoned buildings.
- Provides the community with access to, and foster understanding of, healthy food.
- Promotes stewardship for the environment and neighborhood.
- Provides 25 jobs for community residents, in addition to supporting local businesses.
- Makes the neighborhood a more attractive setting for additional redevelopment and new job creation.

Foster communications with lower-income and minority communities. There are wide gaps in understanding environmental issues between the federal level, state and local governments and their consultants, and the impacted EJ communities. Bridging these gaps of understanding is a challenge for any agency, but EPA may benefit from the experience of the US Census Bureau. The common thread is similarity in communities EPA and the Census Bureau strive to reach. Low income, minority, homeless, non-English speaking, or disenfranchised communities that are a challenge for the Census Bureau to enumerate may often be the same communities impacted by EJ issues. The Census Bureau found that outside partners could communicate more effectively than the agency. Examples include partnerships with cell phone companies for effective messaging; extensive and easy-to-understand use of social media, partnership with community-based organizations, and market segmentation research to tailor messaging to various communities. The Census Bureau has conducted extensive audience research[6] and developed toolkits with materials culturally and linguistically targeted to specific audiences.[7]

TECHNOLOGIES

Identification Technologies

- Develop brownfield data tools as cell phone apps to streamline and standardize data management site assessments. This tool could take better advantage of local knowledge for brownfields whose assessments call for neighbor interviews.
- Develop risk-based cleanup standards of soils for urban agriculture
- Develop and deploy community-based programs for soil and groundwater contaminant testing. Emphasize low-cost and broad-capability mobile monitors. Use the results to empower residents to protect themselves.

[6] http://2010.census.gov/partners/research/

[7] http://2010.census.gov/partners/toolkits/toolkits-take10.php

Communication Technologies

- Promote effective communication between the community and local / state / federal agencies on safe urban agricultural practices.
- EPA offers toolboxes throughout its website to provide resources and information on a wide variety of environmental issues. While they are useful, they are passive, depending on the community find out that they exist and use them. They tend to be top-down: they promote EPA goals and recommendations, and provide information EPA thinks the affected community needs. Interactive approaches could improve the effectiveness of providing information the affected community wants, and encourage broader use.
- Inventory groups that have equipment and experience with these issues on the local level and among similar grassroots organizations nationwide. Facilitate training opportunities through video conferencing with two-way communication, and developing and deploying visually-oriented phone apps.
- Focus training on community capacity building to help residents use technologies and run the small business urban agriculture
- Establish overarching urban area brownfield / agricultural plans, identifying potential sites and community leadership.

Solution Technologies

- Promote redevelopment of the community
- Develop urban agriculture to provide safe and nutritious food to the community and establish a beneficial use for contaminated properties
- Develop phytoremediation for remediation. Vegetation may be grown to uptake contaminants from soil; when harvested, the plant material removes contaminants from the site.
- Multipurpose environmental benefit of remediation: clean surface and ground water, clean air, recycling neighborhood compost, and proving safe and healthful food.

STATUS

Successful with challenges for continued implementation.

- The City of Toledo and LCIC have used a $2 million brownfield revolving loan fund and other grants to remediate sites in Toledo.
- Abandoned structures have been razed at all three of the Dorr-Smead Brownfields; remediation at Fernwood is complete. Numerous urban agriculture programs are benefiting Toledo neighborhoods; construction of the Fernwood Growing Center is planned.

- Planned food production includes aquaponics farming, where tilapia and an assortment of greens and herbs year-around will be produced in raised beds and vertical growing systems.
- Studies are planned for the Craft House site to test the soil for contaminants, and whether vegetables take up any legacy chemicals. The study will aid understanding of conditions under which these soils might be used for food production. Remediation standards exist for residential, commercial, and construction reuse, but not for urban agriculture. Urban agriculture standards are needed; such use may involve lower risk than residential. Safe levels of contamination for soils used for urban agriculture could be developed through a risk assessment.
- Another outstanding question urban agriculture centers and brownfields sites is whether plants can absorb contaminants that may be in shallow perched groundwater. Groundwater may be deep enough that plants with shallow root systems — including most vegetables — would not be affected. However, plants such as fruit trees and some fruit bushes, which have deeper root systems.
- Under an EPA grant, Vita Nuova is developing an Urban Farming Planning Tool. Its purpose is to provide a business planning framework for distressed communities that surround brownfield sites, and provide TCDC with a business model.

CONCLUSIONS

Beneficial land redevelopment provides the driving force for brownfield remediation. EPA can set standards for cleanups, but economic factors make it happen. Redevelopment provides the economic incentive for remediation. Redevelopment creates jobs by putting property back into productive use. Job growth raises residents' income, directly addressing the main cause of its being an Environmental Justice community.

Partner with communications experts. EPA's mission is to protect the environment, and should use strategic partnerships with state and federal agencies, local communities, and private companies who have closer ties to EJ populations or greater communications expertise. For example, EPA may benefit from the experience of the Census Bureau. The census faces obstacles communicating with disenfranchised communities; EPA faces similar obstacles communicating with EJ communities.

Communication is two-way. EPA should communicate with EJ communities to help these populations understand how the environment impacts them, and how citizens can protect themselves. But EPA should also use communication to understand EJ communities better, and fashion environmental programs and policies to meet those needs.

Programmatic cross cutting strategies with outside agencies can support EPA goals.

Residents may perceive that they belong to an EJ community, but not view environmental issues as key problems. Chronic environmental contamination that causes harm over a period of years is a lower priority than immediate, acute problems like crime, drugs, and unemployment. This case study illustrates the use of urban agriculture to address acute concerns by revitalizing the community while raising awareness of chronic environmental issues, and ultimately supporting brownfield remediation. Interagency agreements and coordination, and interagency staff assignments between EPA, CDC, and USDA can extend the effectiveness of EPA programs.

TRIBAL ENVIRONMENTAL HEALTH
INDOOR AIR QUALITY WITH AN EMPHASIS ON MOLD

INTRODUCTION

This case study is an example of a problem that can be extrapolated to many Tribal settings and could easily be extended to many low income and minority housing environments. Additionally, while the emphasis is on mold, there are potentially several other issues that could follow from this example that are sometimes characterized as indoor air quality issues including lead, radon, CO_2, pesticides and asbestos. Consequently, the National-EPA Tribal Science Council (TSC) has identified mold as a priority (http://www.epa.gov/osp/tribes/key.htm) and further links mold to health problems associates with asthma, also one of the TSC priorities.

LOCATION

Salish Kootenai College (SKC) is a Tribal College located in the un-incorporated community of Pablo, on the Flathead Indian Reservation in North West Montana. The census area for Pablo shows a population of about 2,000. The surrounding area has more people and is generally considered to be the "Pablo" area of the reservation. Pablo is the location of the headquarters of Tribal Government of the Confederated Salish and Kootenai Tribes. There are also two other schools, one elementary school that is part of the Ronan School District, and one Tribal high school that also has a small middle school component. Also in Pablo, are two Early Childhood (head start and daycare) facilities, one located on or near the SKC campus, very near the location of the mold problems at SKC.

SKC has about 1,100 students. About 76% of the students are Native American. The students come from 66 tribes and 20 states. SKC has a mix of traditional and non-traditional students so many of the students are older students. Also, many of the Tribal students often have a family who has moved with them as they attend SKC so family members include children and sometimes elder members of the family.

ENVIRONMENTAL PROBLEM

The major environmental problem of focus in this example is the mold in school buildings and student housing units on the Salish Kootenai College campus. As will be discussed below, one contributing factor to the mold problem in this example is groundwater.

For years officials at SKC have been aware of and have dealt with the problem of a groundwater table that is on the average 10 – 20 feet below ground level. They are also aware, and have monitored the seasonal fluctuation of the groundwater level. It comes up in August and September each year. However the winter of 2010 brought more snow and it snowed longer into the season than has been usual for the past decade or more and it also brought more spring moisture. This condition caused the water table to rise higher than recorded levels and it stayed up for a longer period. The higher than normal groundwater table flooded basements and crawl spaces in buildings at SKC and in homes around the Pablo area.

Prior to the flooding conditions SKC had also been noticing high moisture conditions in some of the building on campus. In the summer of 2011 the staff at SKC began to notice mold conditions in a few buildings. They begin an evaluation of the severity of the mold condition. Samples of mold were sent to a lab for testing. The staff decided to have the student housing units tested at the same time. It was then that they discovered that there was a significant mold problem in the student housing units. Once the officials at SKC learned of the mold severity they moved the students out of the housing units and placed them in alternative housing. At the same time that the mold condition was being discovered by the staff a few students were getting sick.

The SKC student housing units were built in about 1994/1995. The units were built as energy efficient units. However during the mold investigations it was discovered that the wood walls of the units were built on the inside of the cement "foundation" walls, which apparently are not foundation walls at all. This fact coupled with the high water table has, over the years, caused significant mold conditions and rotting of some of the wood walls that are in the ground, not on top of a cement foundation wall. During the assessment process SKC learned that for their situation the humidity levels in the housing units should be no more than 10 times the surrounding outside air. The actual humidity levels in some of the housing units were 30–50 times the recommended levels.

Testing led to further analysis and a determination that the mold condition had to be cleaned up. SKC had to engage a contractor to help with remediation. The process is costing the school thousands of dollars and at the same time the school is being hit with an even larger expense associated with the remediation of the groundwater from campus buildings. At least one building has had groundwater in its basement most of the summer. In this building it was discovered that, when built, only part of the basement floor, the center part, was finished with cement. The ends were left exposed to the dirt. When the ground water levels came up this summer, continuing into the fall, the basement began to fill with water. The school has been pumping water at great expense since the start of the problem in August. This building also houses the school's IT operations and many of the electrical units for this building are located in the basement. This has caused severe stress on the staff and the budget.

EJ/VPs Affected

Salish Kootenai College student housing has low income, Native American students, many with families. The families include children and in some cases elder members of the family. A facility like SKC, which is one of the best Tribal Colleges in the nation, attracts Indian and non-Indian students from all around the country. Because it is a Tribal College, it is relatively low-cost, attracting relatively low-income students.

NEEDED TECHNOLOGIES

An SKC official who is working to resolve the problems gave a good assessment of the processes that they have had to go through, that they are going through, and that they anticipate.

Monitoring and Analysis

One suggestion that came out of this process was the need for humidity sensors. With the potential for mold in campus building and student housing, in an environment that may be conducive to mold, monitoring could be beneficial. If it is made simple and inexpensive it could be useful in households with similar potential problems.

SKC has had to pay for expensive and time-consuming testing. The school is considering how they may use their on-campus environmental lab to assist with the testing in the future. They believe that they will need to do ongoing monitoring and testing as long as there is a potential problem. The problem is the expense of such testing. A normal household will not have the ability to afford it. One suggestion is a community-based approach to such testing such that a Tribe, county, city, state or federal program provides testing at the local level. Alternatively, it was suggested that a simple and inexpensive (or free) test kit might be useful at the school and in households to assist in identifying the problem. Maybe a test kit could be coupled with some kind if humidity sensor calibrated to a specific setting would provide the monitoring and analysis tools needed at the household scale.

Data Management and Communication

Gathering data was critical to people living in student housing and students and staff in the class rooms. Data analysis gave SKC the ability to provide accurate information to students, staff and the public who might be concerned. Part of the process included learning about the various kinds of mold and how some are harmful and how some are not and how to communicate that information. At the household scale, a family may not have the ability to fully interpret such information and will need fast, reliable and accurate sources. This again should be localized. National-level data made available on the internet may be useful for some people but it will not be useful for most people who perceive a serious, possibly health-threatening situation. They will want to rely on local sources of information. In the absence of a community based solution, one suggestion that came out of this discussion was a hotline that someone can call to get fast, accurate and reliable information or suggestions for what to do, much like a poison hotline. Of course this could be applied to a variety of indoor air quality problems.

Mitigation and Remediation

Mitigation and remediation begins with proper analysis. If the problem is properly and accurately identified then the proper techniques and methods can be identified. If the analysis shows that the particular mold is not a threat then, quite possibly, little or no mitigation or remediation would be needed. On the other hand if the analysis shows a more dangerous mold then more specific methods can be used.

In this example SKC hired a contractor to clean the mold that had grown in the housing units and in the other campus buildings. They also have installed or they are planning on installing ventilation fans and air purifiers in the housing units. They are looking at replacing some of the material that the mold is growing on because some of the material is found to be a good source of food for mold. Humidity and food sources are key elements that must be considered.

In a household setting, most families in an EJ/VP community will not be able to afford expensive contractors. Education about how to avoid mold growth and how to deal with it once it is found will be critical. There is information, for example, on EPA web sites but a community based approach could be more affective in addressing local issues. Also in the absence of a community based approach, households will need to have access to inexpensive methods to mitigate or remediate for mold, and at the very least they need access to accurate and reliable information that can be easily applied to their particular circumstance.

LESSONS LEARNED

SKC has learned that proper construction techniques are critical in helping to avoid the conditions for mold growth. Prevention should be added to the list of categorical conditions. Building contractors should be concerned with such conditions and advise clients on proper construction techniques to avoid the problem.

All activities associated with managing mold or other indoor air quality scenario begins with accurate data and the ability to understand it. Detection and analysis contribute to a final solution. Proper solution methods depend on knowing exactly what kind of problem is at hand. For most EJ/VP communities, much of the process is cost prohibitive. These communities need access to local sources for monitoring, analysis, mitigation, and remediation. In the absence of local assistance each household needs access to inexpensive tools and information that can assist them in all phases.

From:	Laurie Howard
To:	Salkie, Diane
Subject:	Comments for Proposed Plan for Diamond Alkali Superfund Site Operable Unit 4 Lower Passaic River Restoration Project
Date:	Monday, June 14, 2021 4:58:11 PM
Attachments:	Passaic River Coalition Comments for Proposed Plan of Diamon Alkali Superfund Site 6.14.21`-1-1.docx Addendum to PRC letter to USEPA 6.13.21-1-1.docx NACEPT Report-3-1.pdf

To: Diane Salkie

From: Laurie Howard, Executive Director, Passaic River Coalition

Attached please find our comments for the Proposed Plan for Diamond Alkali Superfund Site Operable Unit 4 Lower Passaic River Restoration Project.

PASSAIC RIVER COALITION
at Willow Hall
330 Speedwell Avenue, Morristown, NJ 07960
Phone: (973) 532-9830
Fax: (973) 889-9172

June 14, 2021

Via Email: salkie.diane@epa.gov

Ms. Diane Salkie, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

Re: Comments for Proposed Plan for Diamond Alkali Superfund Site Operable Unit 4
Lower Passaic River Restoration Project

Dear Ms. Salkie:

We, the Passaic River Coalition (PRC), are providing our input regarding the interim action of the Lower Passaic River for River Mile 8.3 to the Dundee Dam. As proposed the interim action of the Lower Passaic River includes the following:

- Additional capping and dredging in areas with the potential for erosion and high concentrations of contaminants in the subsurface.
- Areas identified for remediation would be evaluated to determine if sediments at depth in each area can be dredged so that capping would not be needed.
- Dredged materials would be processed at one or more nearby sediment processing facilities for off-site disposal at licensed disposal facilities.
- Institutional controls such as restrictions on activities in the river would be implemented to protect the cap, and New Jersey's existing prohibitions on fish and crab consumption would remain in place.
- Monitoring and maintenance of the cap would be required to ensure its stability and integrity in the long term.

We have carefully studied the technical approaches, concerns and issues related to the interim action of the Lower Passaic River. We understand that the proposed the interim action of the Lower Passaic River is tightly coupled with the remedial action OU2, the lower 8.3 miles of the Lower Passaic River, from Newark Bay to river mile 8.3, for which EPA selected a remedy in 2016. The estimated $1.38 billion cleanup plan for that segment is currently in remedial design under EPA oversight.

The PRC has representation from and is engaged with a broad cross section of stakeholders that care about the future of this river. Throughout this process, we have remained committed to our core values we developed as group and have stayed focus on a full review of all the possible avenues to achieve a clean and healthy river. We are writing you in response to the proposed interim action of the Lower Passaic River. We would like to bring to your attention the following shortcomings of the proposed interim action of the Lower Passaic River:

- We believe that success of the proposed interim action of the Lower Passaic River would be significantly constrained by high water velocity during flood periods and intense weather events.
- The high-water velocity would also cause higher dispersion of sediments during dredging.

PASSAIC RIVER COALITION
at Willow Hall
330 Speedwell Avenue, Morristown, NJ 07960
Phone: (973) 532-9830
Fax: (973) 889-9172

- Also, the proposed interim action of the Lower Passaic River would harm fish migration.
- During high tides, barges carrying contaminated dredged sediments will not be able to pass through low clearance bridges crossing the river.
- The USEPA decided not to cover the proposed cap with a geomembrane, hence low density activated carbon will be lost over time due to buoyancy.
- In addition, USEPA has yet to identify a dewatering facility site that is not in a flood zone and does not have an impact on Environmental Justice (EJ) Communities.
- With high fines content such as silt and clay, we anticipate frequent clogging of the dewatering facility.
- USEPA has not identified a final disposal facility for the dewatered sediments. This site should be fully secure against climate change and should not fail as those did in Tennessee and South Carolina during high intensity storms. Also, this site should not be located in, near or affecting Environmental Justice (EJ) Communities.
- The proposed secure disposal of those contaminated sediments means if compromised those contaminants remain a health risk for current and future generations.
- Boat users have expressed concerns about the impact of capping in areas where anchors may be used in the river, specifically for fishing or for regattas.

Given new Federal and State mandates to prioritize Environmental Justice and Climate Resiliency, now is a fitting time to seek out new technological resources that may prove to be far more equitable, efficient and effective with permanent contamination solutions rather than the current status quo project that has not fully considered or incorporated these new directives. At this juncture, why not consider and evaluate other technologies that conform to CERCLA's Cleanup criteria, to zero carb emissions standards and perhaps fulfill a critical need for forthcoming infrastructure projects. Environmental justice communities have a right to comprehensive contamination removal as well as economic benefits in the form of jobs and continued natural restoration of the riverfront. Our changing climate demands that we consider the consequences of weather events on remediation Superfund sites.

EPA must still consider alternative technologies that address climate concerns such as excessive flooding and tidal impacts upon remediation of the Lower Passaic River. For example, one of the PRC Board members, Professor Jay N. Meegoda, was quite concerned with the shortcomings of the Lower Passaic River Restoration Project and he proposed an innovative solution. To validate his idea, he submitted a proposal to the US National Science Foundation and received $460,577 from NSF to investigate his idea (NSF Award Abstract # 1634857 Remediation of Contaminated Sediments with Ultrasound and Ozone Nano-bubbles). Over the past five years his research group actively worked on his proposed innovative solution, finding that it is fully feasible and can avoid all of the above concerns. Also, the implementation cost for this technology will be much lower than the cost estimate given in the USEPA proposal. Hence USEPA should <u>decouple</u> the technology to be used for Lower Passaic River Restoration Project for the OU2 and proposed interim action of the Lower Passaic River and should consider the solution proposed by Professor Jay N. Meegoda for the interim action of the Lower Passaic River. (Summary of remediation of contaminated sediments with Ultrasound and Ozone nano-bubbles attached).

Or consider other technologies such as Ecomelt from Cement Lock that conforms to CERCLA's cleanup criteria and to zero carbon emission standards while offering economic benefits in the form of jobs and

PASSAIC RIVER COALITION
at Willow Hall
330 Speedwell Avenue, Morristown, NJ 07960
Phone: (973) 532-9830
Fax: (973) 889-9172

more comprehensive and permanent remediation for environmental justice communities. Or review new solutions from the EPA's Office of Technology Innovation or experiences from other Superfund sites. (See National Advisory Council for Environmental Policy and Technology (NACEPT) report on Technologies for Environmental Justice Communities attached). PRC does not want to impede forward movement in cleanup of the Lower Passaic River, but we recognize that government agencies must now rectify and advance environmental justice with ongoing and future projects. We do understand that these new directives from the State of New Jersey and the Federal government challenge all to pause the process and immediately re-evaluate decisions regarding the Lower Passaic River cleanup with new criteria. In summary, accountability remains steadfast for the polluting parties to optimize contamination removal for environmental justice communities and to consider the impact of climate change on cleanup sites. Due diligence with these new initiatives on the federal and state levels and a review of current shortcomings warrant a re-evaluation of technologies.

Sincerely,

Laurie Howard
Executive Director
The Passaic River Coalition
lhoward.passaicriver@gmail.com

Attachments:
Remediation of Contaminated Sediments with Ultrasound and Ozone Nano-bubbles
NACEPT Report on Technologies for Environmental Justice Communities (section on Lower Passaic Restoration page 33)

PASSAIC RIVER COALITION
at Willow Hall

330 Speedwell Avenue, Morristown, NJ 07960
Phone: (973) 532-9830
Fax: (973) 889-9172

Addendum to Commentary Letter to USEPA

Remediation of Contaminated Sediments with Ultrasound and Ozone Nano-bubbles
NUS National Science Foundation Abstract #163487

The technical details of proposed in-situ treatment method is explained in several publications (Hewage et al., 2021; Hewage et al., 2020; Batagoda et al., 2019; Meegoda et al., 2017). This technology will be implemented from a barge, and the sediment treatment chamber will be lowered to the river bottom using a crane, as shown in Figure 1. The treatment chamber is designed so that the generated wastewater does not contaminate the surrounding environment and is directly extracted to the wastewater treatment facility on the barge. The extracted wastewater is treated utilizing nanofiltration and subsequent precipitation before releasing back to the chamber with fresh nano ozone. In addition to the wastewater treatment facility, the barge contains the ozone generator and nano-ozone bubble generator. Once the barge treatment system with all the above is installed, the system will only need chemicals to treat wastewater, power, and oxygen obtained from the air. The power for the system will be generated using solar panels. Hence there is no additional operation cost to treat the river sediments other than chemicals used for wastewater treatment. The proposed in-situ treatment chamber depicted in Figure 1 for field implementation is 10'×10'×5' size and details are described in previous publications (Hewage et al., 2020; Batagoda et al., 2019; Meegoda et al., 2017a). This technology can be easily used for the proposed USEPA spot treatment of upstream of the 9-mile marker of the Passaic River. Deploying more than one system as shown in Figure 1 will expedite the Passaic River remediation correspondingly. Meegoda and Perera, 2001 and Meegoda and Veerawat, 2002 showed that ultrasound could desorb both organic and inorganic contaminants attached to sediments. Ozone is applied to prevent re-adsorption of organics by mineralization and to prevent re-adsorption of inorganics by oxidizing and solubilization. Treated and solubilized inorganics are removed by the wastewater treatment unit on the barge.

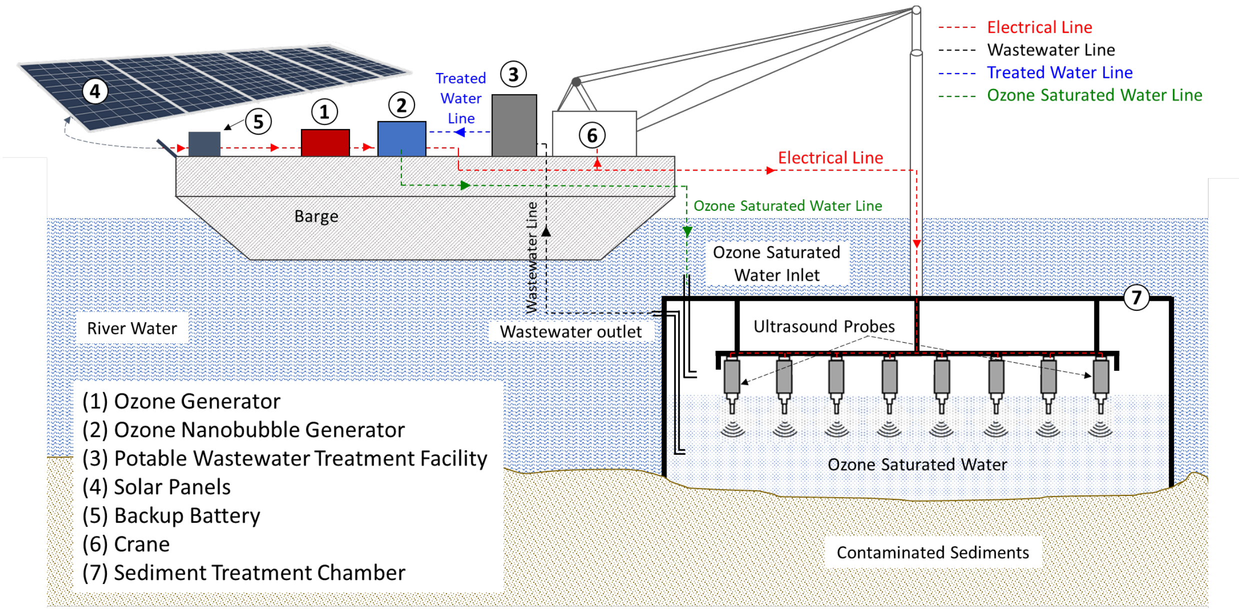

Figure 1. The systematic diagram of the proposed treatment method for field implementation.

Highlights of the technology:

- A method to remediate contaminated sediments with both orgaic and inorganic contaminants
- Ultrasound breaks bonds between soils and contaminants and desorbed chemicals.
- Ozone oxidizes contaminants by direct oxidation and radical reactions.
- Long-term ozone concentration is enhanced by nanobubbles due to increased solubility and long life of ozone nano-bubbles.
- Insoluble Cr(III) oxidized to soluble Cr(VI) and eventual removal by nanofiltration.
- P-terphenyl degrades by the combined effect of ozone and ultrasound.
- Results show adequate removal efficiency for both organic and inorganic contaminants.

Summary

With the proposed in-situ method with no dredging, transporting, dewatering, transporting and secure disposal would not be impacted by weather, has no dispersion of sediments, no impact on fish migration, no loss of activated carbon, no barges passthrough low clearance bridges, no need of a dewatering facility, no need of a final disposal facility for the dewatered sediments, no health risk for current and future generations and a much lower cost. Hence the USEPA should consider this federally funded in-situ method as a possible method for the interim action of the Lower Passaic River.

References

Hewage, S. A, Batagoda, J. H., and **Meegoda, J. N.**, (2021), "Remediation of Contaminated Sediments containing both Organic and Inorganic Chemicals Using Ultrasound and Ozone Nanobubbles," Journal of Env. Pollution https://authors.elsevier.com/sd/article/S0269-7491(21)00116-0

Hewage, S., Batagoda, J.H., Meegoda, J.N., 2020. In situ remediation of sediments contaminated with organic pollutants using ultrasound and ozone nanobubbles. Environ. Eng. Sci. 37, 521–534. https://doi.org/10.1089/ees.2019.0497

Batagoda, J.H., Hewage, S.D.A., Meegoda, J.N., 2019. Remediation of heavy-metal-contaminated sediments in USA using ultrasound and ozone nanobubbles. J. Environ. Eng. Sci. 14, 130–138. https://doi.org/10.1680/jenes.18.00012

Meegoda, J.N., Batagoda, J.H., Aluthgun-Hewage, S., 2017a. Briefing: In situ decontamination of sediments using ozone nanobubbles and ultrasound. J. Environ. Eng. Sci. 12, 1–3. https://doi.org/10.1680/jenes.17.00006

Meegoda, J. N., Veerawat, K., 2002, "Ultrasound to Decontaminate Organic Compounds in Dredged Sediments" Soil & Sediment Contamination: An International Journal, Vol. 11 #1, pp. 91-116.

Meegoda, J.N., Perera, R., 2001. Ultrasound to decontaminate heavy metals in dredged sediments. J. Hazard. Mater. 85, 73–89. https://doi.org/10.1016/S0304-3894(01)00222-9

PASSAIC RIVER COALITION
At Willow Hall, Circa 1848
330 Speedwell Ave, Morristown, NJ 07960, www.passaicriver.org
(973) 532-9830 / (973) 889–9170 (fax) / prcwater@aol.com

Recommendations to U.S. Environmental Protection Agency, National Remedy Review Board (NRRB), Regarding the Lower Passaic River Restoration Project (LPRRP)

Prepared by
Anne L. Kruger, Ph.D., Technical Advisor, Diamond Alkali Superfund Site
Ella F. Filippone, Executive Administrator
Michael Reinhart, Environmental Specialist
14 November 2012

Recommended Actions

The time has come to take definitive action to begin the cleanup of the Lower Passaic River. Countless studies, models, and discussions have reviewed the seriousness of the contamination. Our effort in this report is to show the need to take action now and to provide recommendations for a successful program.

The sediments in the Lower Passaic River are very highly contaminated with PCBs and ***dioxins***. These chemicals are among the most toxic substances known to man and are a major public health concern. Since being founded in 1969, the Passaic River Coalition (PRC) has been actively involved in efforts to clean up the Passaic River, historically considered one of the most polluted rivers in the United States. The Superfund program was established in 1980 to address abandoned hazardous waste sites under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).[1] "This law was enacted in the wake of the discovery of toxic waste dumps such as Love Canal and Times Beach in the 1970s."[2] At both these sites ***dioxin*** contamination was the principal problem. The Diamond Alkali Superfund Site has been on the Superfund National Priorities List since 1984. This Superfund Site includes the Lower Passaic River, which is definitely an "abandoned hazardous waste site" that needs to be cleaned up soon!

Representatives of the PRC have been active public participants in this Superfund case, Harbor Estuary programs, and other efforts to reinvigorate life in and besides the waters of the Lower Passaic River and the New York – New Jersey Harbor Region, shown in Figure 1.[3] We have been providing Technical Assistance regarding the Lower Passaic River Restoration Project (LPRRP) to the local communities since 2006.[4] In our 2008 comments to the NRRB regarding

[1] U.S. Environmental Protection Agency. 2012. Web-site: www.epa.gov/superfund/about
[2] *Ibid.*
[3] Tierra Solutions, Inc. 2008. Phase I and Phase II Field and Data Report, Newark Bay Study Area Remedial Investigation. Phase I and Phase II Sediment Investigation Field and Data Report, Figure 1-1.
[4] U.S. Environmental Protection Agency, Region 2, Technical Assistance Grant (TAG), Diamond Alkali Site, Agreement No. 1-97298303.

the LPRRP "Early Action" proposals we documented some of the many studies which concluded that PCBs and ***dioxins*** are the contaminants of greatest concern.[5] The New York Academy of Sciences Harbor Consortium had studied five contaminants (Mercury, Cadmium, PCBs, Dioxins, and PAHs) in the NY/NJ Harbor for ten years. The Consortium reported that "dioxins were selected for study … because of their impacts on fish and shellfish in the NY/NJ Harbor Watershed, their relatively high toxicity even at low concentrations, their ubiquity in sediments in the Harbor …, and, thus, their potential impact on the economy of the region, especially the Port of NY & NJ."[6] The Consortium's recommendations include the following statement:

> Cleanup of PCB-contaminated sites – particularly along the Passaic River – as well as the dioxin-contaminated Diamond Alkali Superfund site and its effects on the nearby Harbor, remains a (if not the) major priority. The Consortium has urged all litigating parties to focus their efforts on achieving early and effective action.

Given the chemical nature of PCBs and ***dioxins***, the most effective actions to take in the LPRRP would be –

- **Precision Hydraulic Dredging** for "substantial" removal of the sediments that are contaminated with PCBs and ***dioxins*** and other legacy COPCs and COPECs in the lower 17 miles of the Passaic River starting at Dundee Dam, and not refilling the river with "backfill".
- **Local Decontamination and Beneficial Use** of dredged materials by dewatering, and then decontaminating the dredged materials by destroying the PCBs and ***dioxins*** using thermal-chemical treatment (Cement-Lock®) to produce a cement admixture (Ecomelt®) at site(s) within the Diamond Alkali Superfund Site.

Our recommendations will --

- **Improve water quality;**
- **Lead to more fishable waters;**
- **Restore navigability;**
- **Encourage revitalization of the waterfront;**
- **Reduce flooding.**

These actions would --

- Protect Human Health and the Environment
- Comply with Applicable or Relevant and Appropriate Requirements (ARARs)
- Have long-term effectiveness and permanence
- Reduce the toxicity, mobility, and volume of contaminated sediments through treatment resulting in a beneficial use
- Be implementable
- Be cost-effective

The evidence leading to these conclusions is discussed herein.

The alternative actions to be proposed in the "Remedial Investigation and Focused Feasibility Study" (RI/FFS) for the "Lower 8 Miles of the Lower Passaic River" would not be nearly as effective at achieving the objectives listed above as the actions we propose. By taking the actions we propose, a new paradigm for environmental remediation can be demonstrated using cutting-edge technology. For decades the standard operating procedures for cleaning up sediments

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5 Passaic River Coalition. September 2008. Comments to U.S. Environmental Protection Agency, National Remedy Review Board (NRRB), Re Lower Passaic River Restoration Project Early Action Proposals.

6 New York Academy of Sciences Harbor Consortium. January 2008. "Safe Harbor: Bringing People and Sciences Together to Improve the New York/New Jersey Harbor. Pages 46-47.

contaminated with PCBs, ***dioxins***, and other toxic solid substances which aren't soluble in water has been to transport them to a landfill, dump them in another water body, or do nothing. But now we have an alternative. Today the appropriate technology for managing these sediments, Cement-Lock®, is available and a group (Volcano Partners LLC) is ready to develop facilities for full scale operations. This process has been endorsed by the National Advisory Council for Environmental Policy and Technology (NACEPT) and was specifically recommended for managing dredged materials from the Lower Passaic River.[7] This new process will destroy the ***dioxins*** and PCBs, eliminating any future liability. Holistic, morally responsible, and long-term solutions for the river's contamination are now attainable and can be cost-effective.

The interconnected issues revolving around the Passaic River can make planning and funding for the LPRRP difficult:

> A major impediment to a sustainable approach to restoration of contaminated sediment impacted waterways, particularly in urban environments, is the fragmented, non-integrated nature of various regulatory processes and agency programs which often overlap and have competing objectives. Remediation, economic development, port maintenance, source control, and habitat restoration are typically assessed, planned, and managed separately.[8]

The Lower Passaic River has not been dredged since the 1950s, likely because of management issues associated with the disposal of the dredged material, which has become very expensive due to contamination and is outside the role of the United State Army Corps of Engineers (USACE). As a result, recreational, ecological, and economic benefits provided by the river have been lost. "Also, the river and bay have been filling up with more sediment, and flooding is worsening, and it will get even more hazardous in coming years as sea level rises due to global warming."[9] Clearly the actions taken to restore the river will affect a wide range of stakeholders, all of whom have the capability of system-wide effects on the river's region.

In order to avoid interagency conflict and properly address all of the issues we face, particularly contamination, navigation, flooding, and habitat restoration, an effective solution must integrate the goals and responsibilities of all stakeholders through a Regional Sediment Management (RSM) Plan. This Plan is already in place under the New York - New Jersey Harbor & Estuary Program, which includes the Lower Passaic River.[10] "Rather than a localized issue, sediment management in the Harbor Estuary is a regional issue that can only be successfully implemented as a joint effort between federal, state, and local entities and the public."[11] The foundation of this RSM Plan should be implemented for the remediation of the Lower Passaic River. In doing so, a cost sharing strategy drawing upon funding from many parties will encourage participation by all stakeholders, address a full spectrum of significant issues through a single multi-faceted action

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[7] National Advisory Council for Environmental Policy and Technology. February 2012. Letter to USEPA Administrator Lisa P. Jackson, Re Technologies for Environmental Justice Communities and Other Valuable Populations.

[8] Stern, E.A. and E. Peck. 2012. Integrated Approaches to Sustainable Sediment Management – The Paradox of Having it All. Keynote Presentation at NORDROCS 2012, Olso, Norway.

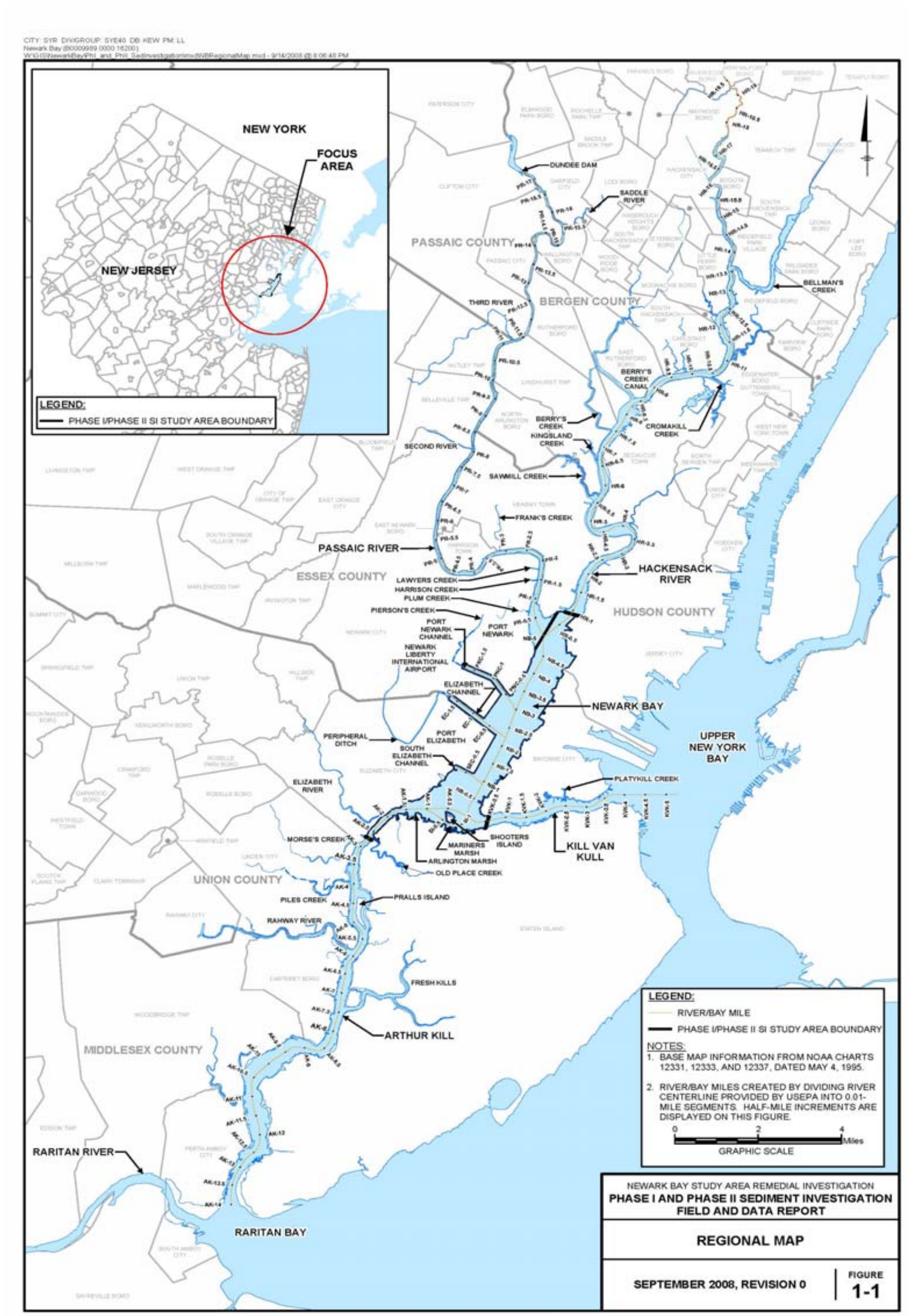
[9] National Advisory Council for Environmental Policy and Technology. February 2012. Letter to USEPA Administrator Lisa P. Jackson, Re Technologies for Environmental Justice Communities and Other Valuable Populations.

[10] New York – New Jersey Harbor Estuary Program. October 2008. Regional Sediment Management Plan.

[11] *Ibid*. Executive Summary, Page ii.

plan, and build the foundation for a long-term sustainable solution that significantly reduces the need for future projects.

Figure 1 – NY/NJ Harbor Region[12]

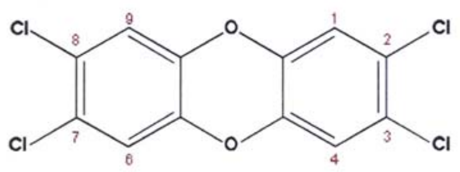


[12] Tierra Solutions, Inc. 2008. Phase I and Phase II Field and Data Report, Newark Bay Study Area Remedial Investigation. Phase I and Phase II Sediment Investigation Field and Data Report, Figure 1-1.

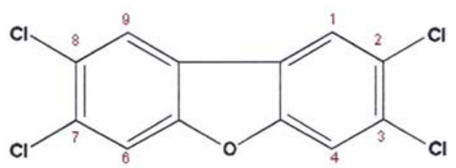
Dioxin Contaminated Sediments: A Major Public Health Concern

The World Health Organization has declared that exposure to ***dioxins*** and dioxin-like substances is a major public health concern.[13] ***Dioxins***, as described by the U.S. Environmental Protection Agency (USEPA), are 30 polychlorinated organic compounds with similar chemical structures and similar modes of toxic action. They include CDDs (chlorinated dibenzo-*p*-dioxins), CDFs (chlorinated dibenzofurans), and certain PCBs (polychlorinated biphenyls).[14] Their chemical structures are depicted in Figure 2. The most toxic ***dioxin*** is 2,3,7,8-TCDD (2,3,7,8-tetrachlorodibenzo-*p*-dioxin).

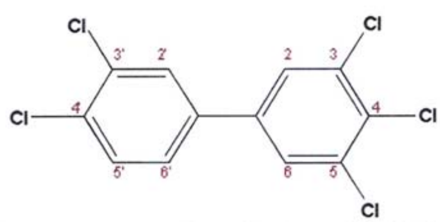
Figure 2 -- Chemical Structures of *Dioxins*



2,3,7,8-Tetrachlorodibenzo-p-dioxin



2,3,7,8-Tetrachlorodibenzofuran



3,3',4,4',5-Pentachlorobiphenyl (PCB126)

Dioxins are potent animal toxicants which can alter the fundamental growth and development of cells.[15] Toxic effects of human exposure to ***dioxins*** can include developmental and neurodevelopmental effects on fetuses and children, and changes in thyroid and steroid hormones and reproductive function.[16] Children are the population most at risk. ***Dioxins*** are also "likely human carcinogens".[17] Human exposure occurs mainly through consumption of meat, dairy products, fish and shellfish food containing contaminated animal fats.[18] Nowhere in the world is one more likely to find such food than by fishing and consuming the fish caught in the Lower Passaic River and Newark Bay.

Dioxins persist in natural environments because microbes and other biota can't change them chemically. They are taken up by plants and eaten by animals on which they have harmful effects, and as they go up the food chain they accumulate in fatty tissues and become more and more toxic.

Other ***dioxins***, CDDs and CDFs have never been manufactured deliberately, but are by-products of industrial processes. They include the manufacture of plastics made from polyvinyl chloride (PVC), some herbicides and pesticides that contain chlorine, chlorine bleaching of paper pulp, and smelting. The ***dioxin***, 2,3,7,8-TCDD, was a by-product in the manufacture of Agent Orange, which was made at the Diamond Alkali plant at 80 Lister Avenue in Newark in the 1960s and used in Vietnam to defoliate plants. This ***dioxin*** is

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13 World Health Organization, Public Health and Environment. 2010. Preventing Disease through Healthy Environments, Exposure to Dioxins and Dioxin-like Substances: A Major Public Health Concern. WHO Document Production Services, Geneva, Switzerland.

14 U.S. Environmental Protection Agency, Office of Research and Development. 2001. Dioxin: Summary of the Dioxin Reassessment Science.

15 *Ibid*.

16 WHO, 2010.

17 U.S. Environmental Protection Agency, Office of Research and Development. 2001. Dioxin: Summary of the Dioxin Reassessment Science.

18 WHO, 2010.

about the most toxic substance known to man. The incineration of municipal and medical wastes at low to moderate temperatures (1,400°F to 1,800°F) and backyard trash burning can create ***dioxins*** (CDDs and CDFs), which are emitted to the air or in ash and then can contaminate soil and aquatic sediments.[19] ***Dioxins*** can also be generated by natural events, such as volcanic eruptions and forest fires.[20]

Dioxins are definitely POPs (Persistent Organic Pollutants). Today, over a third of a century since PCBs were last manufactured, the New Jersey Department of Environmental Protection (NJDEP) is still advising people not to eat fish and shellfish from the Lower Passaic River.[21] Catching and eating crabs from the Newark Bay Region has been banned since 1984. According to a NJDEP study, the estimated lifetime excess risk of cancer from consumption of crabs from the Newark Bay Complex ranges from a low of 0.5% to a high of >100%.[22] In 2011 the NJDEP launched another public awareness campaign regarding its "Blue Claw Crab Alert" in the Newark Bay Region (see Figure 3.[23]) But some people in the Newark Bay Region are still going crabbing and fishing. The impacts that ***dioxin*** pollution has had on the health of people in the Newark Bay Region and beyond over many past decades may never be known, but ways to reduce the health risks from ***dioxins*** in the future are known. Action should be undertaken as soon as possible!

The "Risk Based Remedial Goal" for the ***dioxin*** 2,3,7,8-TCDD in river sediments has been 0.3 parts per trillion (ppt).[24] Near the Diamond Alkali site in the Lower Passaic River sediments, ***dioxin*** levels were as high as 5,300,000 ppt.[25] In 2005 and 2007 sediments that had become contaminated with dioxin produced in the 1960s at the Diamond Alkali site and were washed into Newark Bay still had levels over 666 ppt.[26]

PCBs are man-made substances that were specifically designed to be non-flammable and chemically stable under very hot conditions so they could replace mineral oils that burn, be used for their lubricating and electrical insulating capacities, and in many other ways. PCBs were manufactured for many uses from 1927 until they were banned in 1979 because of their toxicity. They were released into the environment from many sources, and continue to be released from sources such as the disposal of large-scale electrical equipment and waste.[27]

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[19] WHO, 2010.
[20] *Ibid.*
[21] New Jersey Department of Environmental Protection, Office of Science. 2011. Fish Advisories. <www.state.nj.us/dep/dsr/fishadvisories/ >
[22] New Jersey Department of Environmental Protection, Division of Science, Research and Technology. 2002. Estimate of Cancer Risk to Consumers of Crabs Caught in the Area of the Diamond Alkali Site and other Areas of the Newark Bay Complex from 2,3,7,8-TCDD and 2,3,7,8-TCDD Equivalents.
[23] New Jersey Department of Environmental Protection, Office of Science. 2011. Blue Claw Crab Alert, Newark Bay Region: DO NOT CATCH! DO NOT EAT!
[24] Malcolm Pirnie, Inc. 2007. Lower Passaic River Restoration Project, Draft Source Control Early Action Focused Feasibility Study. Prepared for US Environmental Protection Agency, US Army Corps of Engineers, New Jersey Department of Transportation. June 2007. (FFS). , Sections 2.4.1 & 2.4.2, pages 2-11 to 2-14, Tables 2-3 and 2-4.
[25] U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.
[26] Tierra Solutions, Inc. 2008. Phase I and Phase II Field and Data Report, Newark Bay Study Area Remedial Investigation. Phase I and Phase II Sediment Investigation Field and Data Report, Figure 4-13.
[27] WHO, 2010.

The “Risk Based Remedial Goal” for total PCBs in non-residential soils and river sediments has been 14 parts per billion (ppb).[28] In the Lower Passaic River sediments, PCB levels as high as 130,000 ppb have been found.[29] In many sediment samples taken from Newark Bay in 2005 and 2007 levels of PCBs exceeded 4,810 ppb.

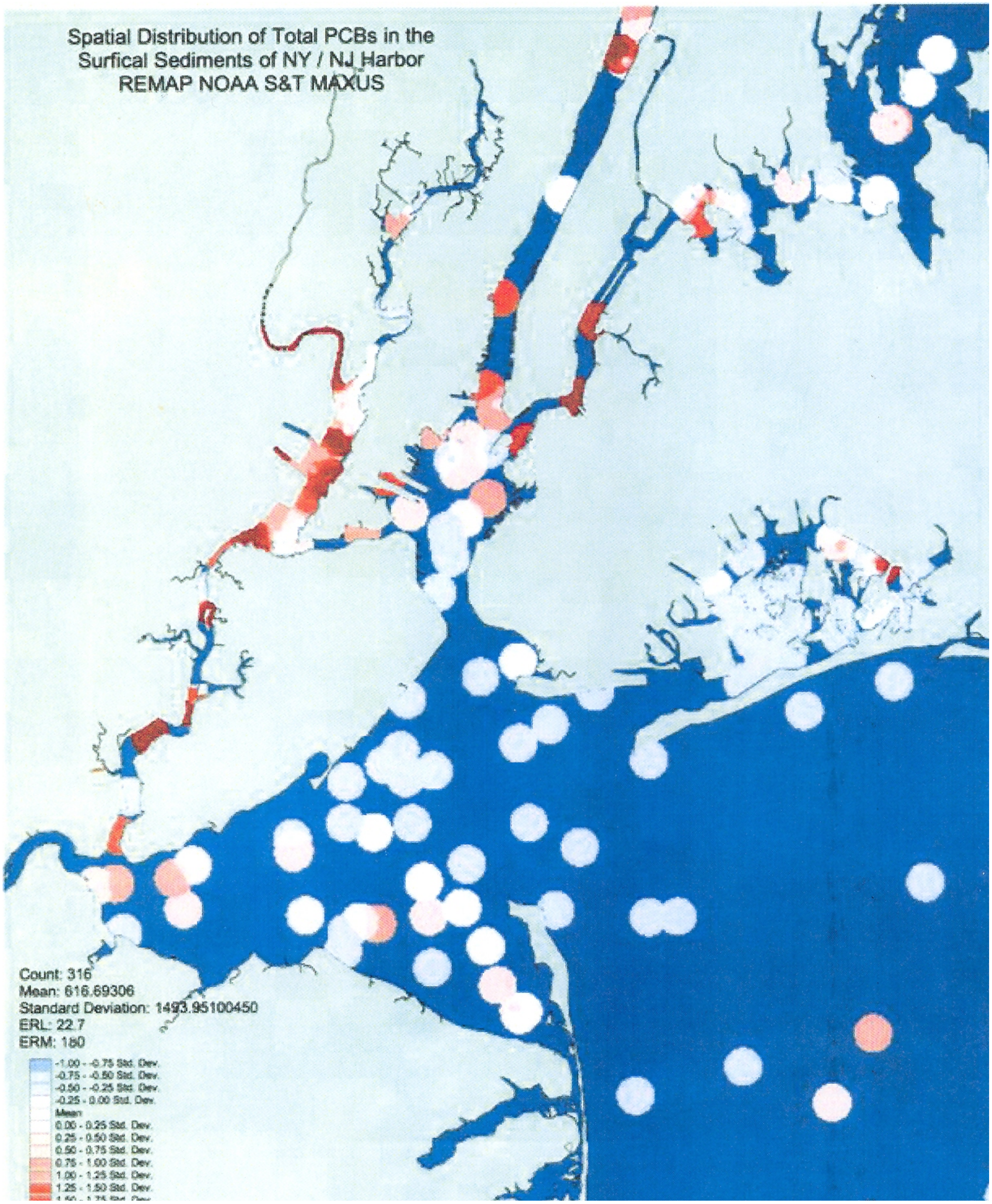
Levels of PCBs in the surficial sediments of NY/NJ Harbor are shown in Figure 4. Only the areas with the darker blue dots have sediments containing levels of PCBs that might be considered tolerable.

Figure 3 – Blue Claw Crab Alert, Newark Bay Region

28 Malcolm Pirnie, Inc. 2007. FFS, Sections 2.4.1 & 2.4.2, pages 2-11 to 2-14, Tables 2-3 and 2-4.

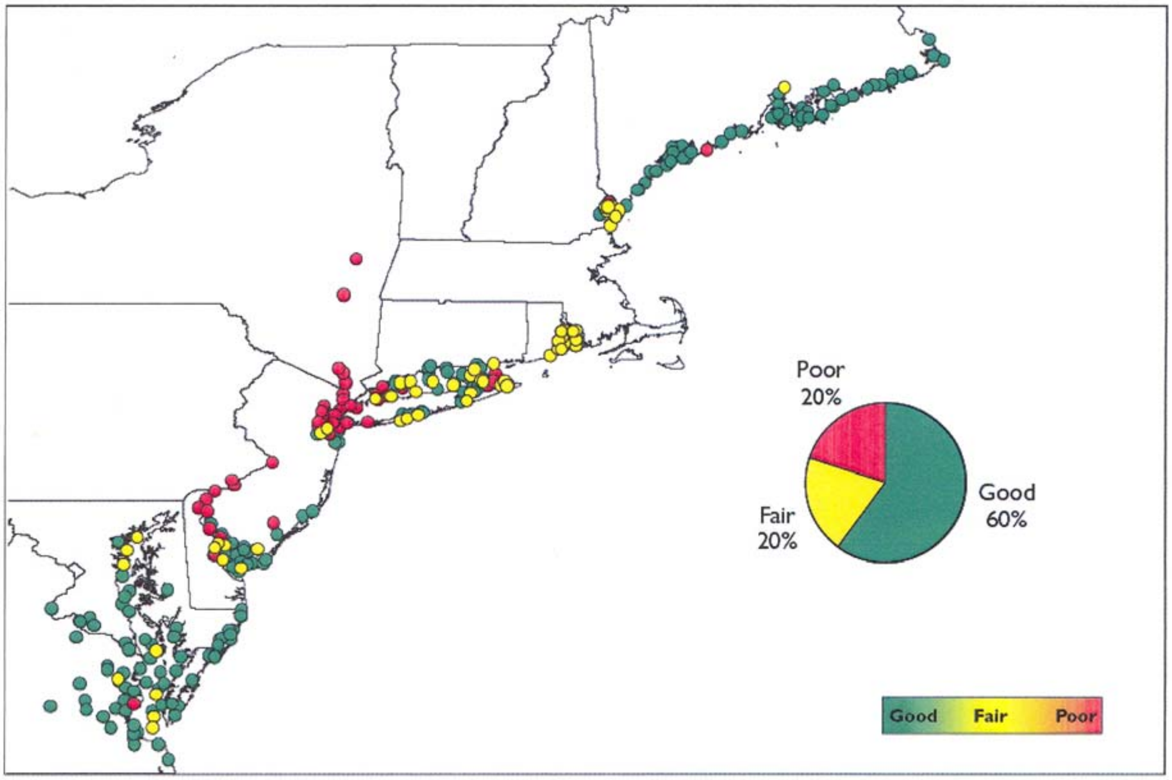
29 U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.

Figure 4 –Total PCBs in the Surficial Sediments of NY/NJ Harbor[30]



[30] Passaic River Coalition. April 2012. Lower Passaic River, Newark Bay and NY/NJ Harbor: Dredged Material Management (DMM) of *Dioxin* Contaminated Sediments.

Figure 5 – Fish Tissue Contaminants Index Data for Northeast Coastal Waters[31]



The USEPA has developed a Fish Tissue Contaminants Index based on data from concentrations of chemical contaminants found in composites of whole-body fish, lobster and fish fillet samples.[32] Sites in Northeast Coastal Waters where fish were sampled prior to 2007 are shown in Figure 5. A "Poor" rating indicates that the health of the fish is poor and that the fish are probably not safe to eat. "Elevated concentrations of PCBs were responsible for the impaired ratings for a large majority of the sites."[33]

The removal of sediments highly contaminated with ***dioxins***, including PCBs, from the waters of the Newark Bay region and throughout the NY/NJ Harbor will gradually help these waters to become "fishable" again, but only if the removal of ***dioxins*** is sustainable. ***Dioxins*** persist today as legacies of the past. Because of their abilities to harm many types of biota, and to resist chemical changes even under incineration temperatures, it is vital to reduce this legacy of environmental harm. The carbon, hydrogen and chlorine atoms in these compounds should be split apart to form more benevolent compounds, such as carbon dioxide, water, and hydrogen chloride. The technology to do this is available today.

[31] U.S. Environmental Protection Agency, Office of Research and Development/Office of Water. April 2012. National Coastal Condition Report IV, Northeast Coast Coastal Condition, page 3-11.
[32] *Ibid.* Page 3-10.
[33] *Ibid.* Page 3-10.

Remediation Requirements and Objectives

The remedial action alternatives in question are assessed based on their compliance with regulatory requirements and evaluation criteria. Applicable requirements and criteria are listed below.

CERCLA - Section 9621. Cleanup Standards:

Section 9621(b) “General Rules” establishes several broad guidelines that need to be taken into consideration:

- “Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants is a principal element, are to be preferred over remedial actions not involving such treatment.”
- “The offsite transport and disposal of hazardous substances or contaminated materials without such treatment should be the least favored alternative remedial action where practicable treatment technologies are available.”
- “The President shall conduct an assessment of permanent solutions and alternative treatment technologies or resource recovery technologies that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility, or volume of the hazardous substance, pollutant, or contaminant. In making such an assessment, the President shall specifically address the long-term effectiveness of various alternatives.”
- “In assessing alternative remedial actions, the President shall, at a minimum, take into account:
  - (A) the long-term uncertainties associated with land disposal;
  - (B) the goals, objectives, and requirements of the Solid Waste Disposal Act [42 U.S.C. 6901 et seq.];
  - (C) the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous substances and their constituents;
  - (D) short- and long-term potential for adverse health effects from human exposure;
  - (E) long-term maintenance costs;
  - (F) the potential for future remedial action costs if the alternative remedial action in question were to fail; and
  - (G) the potential threat to human health and the environment associated with excavation, transportation, and redisposal, or containment.”
- “The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies that maximum extent practicable.”

Clean Water Act:

One of the primary directives of the USEPA is to enforce the Clean Water Act. Applicable and noteworthy sections of the Clean Water Act include:

- Section 116(a), which refers to the Hudson River PCB Reclamation Demonstration Project. Here, dredged sediments were treated “as required” then buried in secure, monitored landfills. This demonstration project was done to determine “the feasibility of indefinite storage in secure landfills of toxic substances.” It then states: “No pollutants removed pursuant to this paragraph shall be placed in any landfill unless the Administrator first determines that disposal of the pollutants in such landfill would provide a higher standard of protection of the public health, safety, and welfare than disposal of such pollutants by any other method including, but not limited to, incineration or a chemical destruction process.” This restriction applies to the Lower Passaic River; therefore landfills should only be used for the disposal of sediments if there are no other better methods for protecting human health.

- Section 302(a): "Whenever, in the judgment of the Administrator or as identified under section 304(l), discharges of pollutants from a point source or group of point sources, with the application of effluent limitations required under the section 301(b)(2) of this Act, would interfere with the attainment or maintenance of that water quality in a specific portion of the navigable water which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of the balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water, effluent limitations (including alternative effluent control strategies) for such point source or sources shall be established which can reasonably be expected to contribute to the attainment or maintenance of such water quality."

Remedial Action Objectives:

The EPA has established three Remedial Action Objectives (RAOs):

1. Reduce cancer risks and non-cancer health hazards for people eating fish and shellfish by reducing the concentrations of contaminants of potential concern (COPCs) in the sediments of the FFS Study Area.
2. Reduce the risks to ecological receptors by reducing the concentration of contaminants of potential ecological concern (COPECs) in the sediments of the FFS Study Area.
3. Reduce the migration of COPC- and COPEC-contaminated river sediments from the FFS Study Area to upstream portions of the Lower Passaic River and to Newark Bay and the New York-New Jersey Harbor Estuary.

Evaluation Criteria set forth in the National Contingency Plan:

The criteria used to evaluate remedial alternatives in the FFS are as follows:

- Threshold Criteria – All active alternatives must first meet threshold criteria in order to be considered a viable solution
  - Overall protection of human health and the environment
  - Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Balancing Criteria – Balancing criteria are used to compare the viability and effectiveness of active alternatives under consideration
  - Long-term effectiveness and permanence
  - Reduction in toxicity, mobility, and volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying Criteria – Modifying criteria are generally considered after an active alternative has been selected based on other criteria, however the selected alternative may be modified to meet these criteria
  - State Acceptance
  - Community Acceptance

Only the actions which we recommend would be as effective at meeting the objectives of these regulations and requirements for the reasons discussed hereinafter.

Lower 8 Miles of the Lower Passaic River, Focused Feasibility Study (FFS) Detailed Analysis of Alternative Actions Proposed

No Action:
As noted in the 2007 FFS, "Active remediation of the Area of Focus followed by monitored natural recovery will achieve any threshold for 2,3,7,8-TCDD, which is responsible for about 65 percent of the risk, 40 years faster than it would be achieved by the No Action alternative."[34] The No Action alternative will not reduce the risks to human health and the environment in a reasonable amount of time, will increase the risks from flooding, and will decrease navigability due to increased sediment build up in the Lower Passaic River. Because of climate change, it is predicted that the ocean could rise by as much as two feet by the end of the century and the frequency and severity of flooding events will increase.[35] These effects would have significant impacts on the areas flooded along the Lower Passaic River, Newark Bay, and the New York-New Jersey Harbor Estuary. Effects of the recent Hurricane Sandy are now being assessed and will demonstrate the severity of the "no action" alternative.

Focused Capping with Dredging:
Only 840,000 yd^3 of sediment would be dredged under this alternative, which is designed to address areas with the highest net flux of contaminants. It is best to ensure that unacceptable levels of contaminants are not capped in place. Sediments would be dredged "to a depth of 2.5 feet so that an engineered cap can be placed over those portions dredged without causing additional flooding."[36] Confirmation sampling would be performed to document the capture of the contaminant mass. Even though these measures are designed to cap contamination without contributing to additional flooding, it is likely that flooding would continue to worsen under this alternative. "Armoring along the channel bed increases bed friction and, consequently, may increase water depths during floods."[37] Friction caused by the engineered armor cap, combined with rising sea levels and an increased frequency of major flooding events due to climate change, will exacerbate an existing flooding issue.[38] This alternative does not involve reconstructing the navigational channel, either. In fact, by applying shallow caps over highly contaminated sediment, this action would ensure future dredging for navigational purposes will never happen, permanently restricting usage of the river. Furthermore, USEPA has determined that focused capping with dredging is not adequately protective of human health and the environment, a threshold criterion of the National Contingency Plan. As a result, this alternative is no longer being evaluated for consideration.

Capping with Dredging for Flooding and Navigation:
Under this alternative, 4.9 million yd^3 of contaminated sediment would be removed from the river, enabling the use of an engineered cap or backfill where appropriate, while also mitigating flooding and restoring the navigational channel from Newark Bay up to RM2.2.[39] First, RM0 –

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34 Malcolm Pirnie, Inc. 2007. FFS, Section 5.2.1, page 5-16.
35 Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.
36 U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.
37 Malcolm Pirnie, Inc. 2007. FFS, Section 3.3.4.1, page 3-9.
38 Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.
39 U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.

RM2.2 would be dredged and capped, followed by RM8.3 – RM2.2, then finally the Kearny Point mudflats.

Long-term Effectiveness and Permanence: An engineered cap is only a physical barrier between the contaminated sediment and the active environment. If a section of the cap were to fail or erode over time, high concentrations of toxins would be immediately bioavailable. This threat will not dissipate over time, as most of the COPCs and COPECs, especially the ***dioxins***, PCBs and heavy metals, do not break down biologically and will persist. The permanence of this solution, therefore, is completely reliant upon the monitoring and maintenance of the engineered cap ***in perpetuity*** – a costly, long term investment with undesirable risk. Ensuring the maintenance of a cap can be a burden on any river, but the tidal action of the Lower Passaic River raises additional concerns. River flow reverses when the tide rises, driving a salt wedge upstream an average of 4 miles each tidal cycle.[40] This dynamic flow will apply powerful and unpredictable forces upon the cap. As recently as 2007, it was reported that "The effects of wind/wave action on cap stability have not been evaluated."[41]

Additionally, the Passaic River Valley is subject to severe flooding which has increased in frequency in recent years.[42] The high flow rates created by these storms will also apply considerable force to the cap. Armored caps are also known to increase bed friction[43], which should increase the rate of the caps erosion during periods of high flow as well. All of these factors create concerning levels of uncertainty related to the long-term effectiveness and permanence of the cap.

While this alternative does propose removing 4.9 million yd^3 of contaminated sediment, roughly 6.1 million yd^3 would remain in the river. The shallowest sediment in the Lower Passaic River has the lowest concentrations of COPCs and COPECs, with concentrations increasing with depth. Therefore, the sediment that remains after dredging, which would then be located directly below the cap, has higher concentrations of contaminants than the removed material. If any issues would compromise the engineered cap, these highly toxic sediments would become bioavailable, and distributed widely throughout the environment due to tidal flows.

As stated in CERCLA, "Remedial actions using permanent solutions… that, in whole or in part, will result in a permanent and significant decrease in toxicity, mobility or volume of a hazardous substance are preferred." Partial dredging with capping does not permanently or significantly decrease the toxicity or volume of contaminated sediment; it acts as a temporary restriction of the contaminants' mobility. "Capping does not satisfy the CERCLA Statutory Preferences for treatment."[44] A far more protective and permanent solution would be to remove the contaminated sediments entirely over time. If, as an interim, capping is to be used, USEPA must provide a timeline for when their sites will be treated and where the capping is permanent.

Environmental Implications: Addressing RM2.2 – RM0, then RM8.3 – RM2.2, then the Kearny mudflats is a fundamentally flawed approach to remediating the Lower Passaic River. Instead of working downstream, efforts should begin upstream and shift downstream in a systematic approach. The severely contaminated Diamond Alkali Site has been the focal point of the river's

[40] *Ibid*.
[41] Malcolm Pirnie, Inc. 2007. FFS, Section 4.3.1.4, page 4-16.
[42] Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.
[43] Malcolm Pirnie, Inc. 2007. FFS, Section 3.3.4.1, page 3-9.
[44] Malcolm Pirnie, Inc. 2007. FFS, Section 5.1.2.2, page 5-9.

restoration, resulting in a concentrated focus on the lower 8 miles. Now that the Diamond Alkali Site has been addressed, efforts should focus on restoring the entire lower 17 miles systemically. It would be a fundamental error to view this river as a collection of individual sites which can be addressed using a piecemeal approach.

When individual sites are dredged via a piecemeal approach, they must be refilled with backfill to level the river bottom. This backfill would create an artificial substrate which is harmful to ecological redevelopment. Backfill is convenient for piecemeal remediation, but it is unnecessary if dredging is done systematically from RM17 – RM0. The general downstream flow of the river will transport re-suspended materials to areas not yet dredged. By beginning as far upstream as possible, the likelihood that residual contamination will be removed during future dredging is maximized, resulting in greater total capture of COPCs and COPECs. In addition, eliminating backfill will result in a deeper river channel and cost savings. Concentrations of COPCs and COPECs in the sediments exposed by deep dredging are likely to be very low or negligible because their depth extends below the reach of legacy contamination. Backfilling with two feet of sand is therefore unnecessary and will only expedite the refilling of the navigational channel.

If this river is to be truly cleaned up and returned to a more natural state, then the abiotic materials biological communities will develop upon is a crucial consideration. Capping will require at least 6 inches of sand in all locations, with between twelve and eighteen inches of gravel or stone to armor the cap in many areas. These materials will create an artificial environment which can hinder ecological development.

The ultimate goal of these remedial efforts should be to establish a healthy, fishable river. In order to do so, we must not look solely at the fish, but at the entire ecosystem upon which they rely. Considering the vast extent of the current remedial effort, this is likely our only chance to properly facilitate the restoration of a healthy ecosystem.

The LPRRP Restoration Goals[45] are:

- To create, enhance, and restore habitat.
- To enhance plant and animal communities.
- To improve water quality and sediment quality.
- To support human use of the river.

To have a chance at achieving these goals, sand caps cannot become the dominant substrate – it must primarily be the native fine sediment to which these biological communities are adapted. However, capping could be integrated with habitat restoration to create a mosaic landscape. The future make-up of the river's bottom, the intertidal zones, and the surrounding landscape are the critical consideration for restoration. Biological communities have adapted to fine sediment, and they are dependent upon it. For instance, beds of eelgrass create habitat for fish, benthic organisms, and other wildlife. The eelgrass needs sediment for nutrient uptake and as an anchor for their root structures. Another keystone species, the oyster, requires a hard substrate for colonization and the formation of oyster reefs. Armored, stone caps could serve this purpose. Rocky shores engineered for bank stabilization would also provide the necessary substrate for oyster reefs. Facilitating the return of these two keystone species should be a primary consideration during restoration.

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[45] http://www.ourpassaic.org/Restoration.aspx

Navigable Channel: A navigation channel is authorized for the Lower Passaic River from RM0 to RM15.4, originally dredged and constructed near the end of the 19th century.[46] The last significant river-wide dredging happened in the 1940s, but RM0 to RM2 was dredged last in 1983. Since that time, large amounts of sediment have been deposited in the Lower Passaic River and navigation has been restricted. This remediation alternative would create a 300-foot wide navigational channel from RM0 – RM2.2, but it would not restore the navigational channel for the remaining 13.2 miles of river. Conversely, the engineered capping upstream from RM2.2 would prevent any channel maintenance from ever occurring and the navigational channel could never return, limiting a vast array of future uses for the river.

"According to *Land Use in the CERCLA Remedy Selection Process* (USEPA 1995), remedial alternatives developed during the RI/FFS should reflect reasonably anticipated future land use(s)."[47] Constructing a navigational channel in the Lower Passaic River played a crucial part in the economic development of this region in the past. Considering this history, re-establishing the navigational channel could play an integral part in modern redevelopment and restoration of the riverside municipalities as well. Access for larger ships, as well as smaller recreational craft, to the shores of the Lower Passaic River should be an anticipated future use of the land and the river. Several municipalities have already stated their desire for depths that will at least allow recreational boating and water taxis.[48]

The economic impact of permanently ending the authorized navigational channel upstream of RM2.2 is significant and immeasurable. "The State of New Jersey has reaffirmed its need for the river's navigational infrastructure, as its communities develop plans for use of a restored river in its future."[49] This should be addressed as part of the river's remediation and restoration, not forbidden. Remedial actions enacted upon the Lower Passaic River should be facilitating economic redevelopment. Instead, under this alternative, monitoring the cap will cost millions of dollars.

Finally, while ships are directed to follow navigational channels, it is not uncommon for them to veer slightly off course. The rocky surface of armored caps can damage the hulls of ships if a ship were to strike a cap.[50] This can also destroy the protective nature of the cap, instantly re-exposing the environment to contaminants.

Flooding: This alternative calls for dredging to at least 10 feet below mean low water (MLW) across a width of 200 feet from RM2.3 to RM8.1. From RM8.1 to RM 8.3, the width would be 150 feet. This dredge depth is not meant to mitigate the effects of regional flooding; instead it "includes dredging of enough fine-grained sediment (4.3 million yd^3) to ensure that an engineered cap can be placed without causing additional flooding."[51] Essentially, it is dredging just enough to install an engineered cap and, according to the USEPA's modeling, mitigate the

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[46] U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.
[47] Malcolm Pirnie, Inc. 2007. FFS, Section 4.1.3, page 4-2.
[48] Malcolm Pirnie, Inc. 2007. FFS, Appendix F, pages 5-8.
[49] Malcolm Pirnie, Inc. 2007. FFS, Executive Summary: Description of the River, page iii.
[50] Malcolm Pirnie, Inc. 2007. FFS, Section 3.3.4.1, page 3-9.
[51] U.S. Environmental Protection Agency. 2012. Lower Eight Miles of the Lower Passaic River Remedial Investigation and Focused Feasibility Study Summary for Community Advisory Group. Alice Yeh, Project Manager.

effects the cap has on flooding. In view of recent events from Hurricane Sandy, a more protective alternative must be designed. Climate change is predicted to raise sea levels by as much as two feet by the end of the century and increase the frequency of major flooding events.[52] Engineered capping may not increase flooding today, but negligence of future conditions will cause us to miss our only opportunity to mitigate the effects of future flooding.

Implementability: In the 2007 FFS, it was stated that "the coring data…show a high degree of local spatial heterogeneity, indicating that localized areas of relatively higher concentrations typically described as 'hot spots' may not exist. Instead, 'hot zones' of the river seem to exist on a scale of more than a mile or more, nearly bank to bank (i.e., the width of the navigational channel plus historical berth areas) in lateral extent." Capping is most effective when there are localized "hot spots" of contamination – distinct areas of significantly elevated contamination. However, the tidal action of the Passaic River has created large areas of uniformity which the quote above describes as "hot zones." Given this spatial distribution, a determination must be made regarding the treatment of these surface areas. It is not wise to cap entire "hot zones" from bank-to-bank for stretches of the river over a mile long. Furthermore, capping on the banks of the river will affect the intertidal zone, a sensitive part of the ecology of the river's system. Covering such large areas of the river is a costly, massive habitat altering reconstruction. The fiscal and ecological costs appear to discourage this course of action as a permanent solution.

Deep Dredging with Backfill in Lower 8 Miles:

Deep Dredging would remove contaminated sediment from the lower 8 miles of the Passaic River, a total volume of 9.6 million yd^3. Dredging would begin upstream at RM8.3 and move downstream until reaching RM0. The resulting channel dimensions would be:

- RM8.3 – 8.1: 10 feet over a 150 foot width
- RM8.1 – 7.1: 16 feet over a 200 foot width
- RM7.1 – 4.6: 16 feet over a 300 foot width
- RM4.6 – 2.6: 23 feet over a 300 foot width
- RM2.6 – 0.0: 33 feet over a 300 foot width

The dredge depth from RM8.3 – 0 is three feet deeper than the target channel depth to account for historical dredging accuracy and over-dredging.[53]

Long-term Effectiveness and Permanence: Removing all of the contaminated sediments is one way to ensure a high degree of long-term effectiveness and permanence. Similar to the FFS Proposal "Capping with Dredging for Flooding and Navigation", however, it does not address contamination from RM17 to RM8. Contaminated sediments in this upstream region will migrate downstream, re-contaminating portions of the Lower 8 miles.

Environmental Implications: Deep Dredging removes the largest possible volume of contaminated sediment, which can make environmental restoration difficult. Restoring natural hydrology and creating lost habitats are important considerations, both of which require some sediment to remain along shores. Specifically, the NY/NJ Harbor Estuary Program's Target Ecosystem Characteristics include shorelines and shallows as a goal.[54] Deep Dredging is a

[52] Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.
[53] Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.
[54] Bain, M., J. Lodge, D.J. Suszkowski, D. Botkin, R. Diaz, k. Farley, J.S. Levinton, F. Steimle and P. Wilber. 2007. Target Ecosystem Characteristics for the Hudson Raritan Estuary: Technical Guidance for Developing a

widespread and disruptive action, counterbalancing the benefits of completely removing contaminants.

Flooding: Deep dredging will mitigate regional flooding better than any other alternative. Removing 9.6 million yd^3 of contaminated sediment increases space in the river for flood waters' additional volume. This increase in volume enhances the river's ability to move large amounts of water downstream during periods of high flow. Addressing flooding will also alleviate some concerns during the economic redevelopment of the region. Similar to addressing the navigational channel, mitigating the effects of flooding while addressing historic contamination is a cost effective way of solving regional issues. However, the Passaic River Coalition is concerned substantial habitat restoration would be very difficult after such extensive dredging.

Lower Passaic River Restoration Project
Preferred Action -- Precision Hydraulic Dredging

Precision Hydraulic Dredging for "substantial" removal of the sediments that are contaminated with PCBs and ***dioxins*** and other legacy COPCs and COPECs in the lower 17 miles of the Passaic River starting at Dundee Dam, and not refilling the river with backfill is recommended.

Long-term Effectiveness and Permanence: Precision Hydraulic Dredging for substantial removal of contaminated sediments has a similar long-term effectiveness and permanence of removing all contaminated sediments under the FFS Proposal "Deep Dredging with Backfill in Lower 8 Miles." However, our preferred action includes removing contaminated sediments from RM17 to RM8 as well. Once removed from the river, the toxic contaminants attached to these sediments can no longer be moved upstream or into Newark Bay and the New York/New Jersey Harbor Estuary. This alternative would maximize the reduction in risks to human health and the environment by ensuring COPCs and COPECs are permanently no longer bioavailable, thus allowing institutional controls like NJDEP's fish and shellfish consumption advisories to be lifted within a reasonable timeframe.

Environmental Implications: Our preferred alternative is appropriate because A) we feel it is very important to permanently remove contaminants from the river so they cannot ever become bioavailable again, and B) this remedial action best satisfies the objectives of all the stakeholders involved, concurrent with the goals of a RSM Plan. However, the Passaic River Coalition recognizes that, in an effort to restore habitats which have disappeared, it is best for sediment to remain in some areas. It is critical that an appropriate balance between removing contaminants and creating new habitats is reached.

The need to create and restore habitat in the Lower Passaic River has been extensively described in documents created for the NY/NJ Harbor & Estuary Program. These efforts should be incorporated into the evaluations by the USEPA and the NRRB. Specifically, suggestions from "Target Ecosystem Characteristics for the Hudson Raritan Estuary" and the "Hudson-Raritan Estuary Comprehensive Restoration Plan" should be implemented.

Comprehensive Ecosystem Restoration Plan. A report to the Port Authority of NY/NJ. Hudson River Foundation, New York, NY. 106 pp.

The Target Ecosystem Characteristics (TECs) were developed by a team of estuarine scientists for the NY/NJ Port Authority under the NY/NJ Harbor Estuary Program.[55] They identified eleven total characteristics:

1. Oysters and Oyster Reefs
2. Eelgrass Beds
3. Coastal Wetlands
4. Shorelines and Shallows
5. Habitat for Fish, Crabs, and Lobsters
6. Enclosed and Confined Waters
7. Reduction in Toxic Contaminants in Hudson Raritan Estuary Sediments
8. Tributary Connections
9. Waterbirds
10. Maritime Forests
11. Public Access

While these recommendations span the entire estuary, many of these goals can be addressed on the LPRRP. In fact, the USACE has already identified 35 habitat restoration opportunities on the Lower Passaic River and the applicable TECs that can be incorporated into each opportunity.[56] While we consider all of these TECs as critical efforts, the Passaic River Coalition is particularly concerned about the restoration of oyster reefs and eelgrass beds. Both keystone species have almost entirely disappeared from the Passaic River and the Hudson-Raritan Harbor & Estuary, but the critical habitats necessary for ecosystem restoration can be reestablished.

Oyster reefs were once very common in this estuary. In the late 1880s, oysters were New York's most profitable fishery, providing jobs for thousands and food to many more. They also create complex habitat promoting a healthy and biodiverse river, protect shorelines from erosion by absorbing wave energy, provide a spawning habitat for fish, and filter large amounts of water resulting in increased water clarity.[57] Oysters require a hard surface located in the top 5 meters of water for colonization. For these purposes, capping contaminated sediments with an armored (gravel) cap could provide an appropriate substrate if this approach were included in the design. The New York and New Jersey Baykeeper has been successfully engaging in oyster re-colonization activities for the past 7 years within the estuary, giving hope that efforts can be successful on the Lower Passaic River as well.[58]

By clarifying the water, oyster reefs will improve conditions for the return of eelgrass. Like oyster reefs, beds of eelgrass were once a prominent keystone species of our estuary, but they

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[55] Bain, M., J. Lodge, D.J. Suszkowski, D. Botkin, R. Diaz, k. Farley, J.S. Levinton, F. Steimle and P. Wilber. 2007. Target Ecosystem Characteristics for the Hudson Raritan Estuary: Technical Guidance for Developing a Comprehensive Ecosystem Restoration Plan. A report to the Port Authority of NY/NJ. Hudson River Foundation, New York, NY. 106 pp.
[56] Hudson-Raritan Estuary Comprehensive Restoration Plan. March 2009. Draft Volume 1: Lower Passaic River Restoration Planning: Summary of Restoration Opportunities.
[57] *Ibid*.
[58] Bain, M., J. Lodge, D.J. Suszkowski, D. Botkin, R. Diaz, k. Farley, J.S. Levinton, F. Steimle and P. Wilber. 2007. Target Ecosystem Characteristics for the Hudson Raritan Estuary: Technical Guidance for Developing a Comprehensive Ecosystem Restoration Plan. A report to the Port Authority of NY/NJ. Hudson River Foundation, New York, NY. 106 pp.

have severely declined due to increased water turbidity and habitat degradation.[59] When the eelgrass beds were lost, significant changes in the river's biological and physical processes likely took place. It serves as a food source for birds, a nursery for fish and shellfish, reduces erosion by trapping sediments and stabilizing coastal zones, and increases biodiversity.[60] Bringing eelgrass back to the Lower Passaic River will have a lasting positive effect contributing to the return of a more natural river system.

Navigational Channel: Our recommended action includes re-establishing the entire authorized navigational channel. The use of this channel could play a substantial role in the economic redevelopment of the region, which would otherwise be limited by all other alternatives. Restoration of the authorized navigational channel by the USACE while simultaneously addressing the legacy of contamination throughout the river is a cost effective opportunity to reduce future inquiries**.**

Flooding: Similar to "Deep Dredging with Backfill in the Lower 8 Miles", our preferred alternative would remove a substantial volume of contaminated material. This would increase the river's ability to move flood waters downstream quickly.

Lower Passaic River Restoration Project
Dredged Material Management (DMM) Alternatives

In 1984 the "Diamond Alkali" site, which includes the property at 80 Lister Avenue in Newark as well as the contaminated Lower Passaic River, was declared a Superfund Site. The Diamond Alkali Superfund Site project became part of the LPRRP in 2000 and studies were extended into Newark Bay.[61] In the LPRRP Draft Focused Feasibility Study (FFS) of 2007, "sediments in the lower eight miles of the river were identified as a major source of contamination to the 17-mile" tidal portion of the river and to Newark Bay.[62] According to the USACE, one of the goals of the LPRRP is to provide a plan that will result in "a significant cost savings to the navigational dredging program related to dredged material management in the NY/NJ Harbor."[63] Thus, the "Phase 1 Removal Action" project, which removed about 40,000 yd^3 of the sediments most highly contaminated with ***dioxins*** from an area of the Lower Passaic River directly next to the land side of the Diamond Alkali site, and the "Lower 8 Miles of the Lower Passaic River" project are NY/NJ Harbor dredging projects. The NY/NJ Harbor Region is depicted in Figure 1.[64] Navigation channels that need to be dredged are shown in Figure 6.[65] The dredged material management (DMM) plans for these projects will greatly influence future DMM in Newark Bay, the harbor and far beyond. DMM alternatives that are being considered for the "Lower 8 Miles

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[59] New York – New Jersey Harbor & Estuary Program. 2012. The State of the Estuary 2012: Environmental Health and Trends of the New York – New Jersey Harbor Estuary.

[60] *Ibid*.

[61] U.S. Army Corps of Engineers, New York District; U.S. Environmental Protection Agency, Region II; New Jersey Department of Transportation, Office of Maritime Resources. April 2003. Project Management Plan, Lower Passaic River, New Jersey, Investigation and Feasibility Study for Remediation and Ecosystem Restoration.

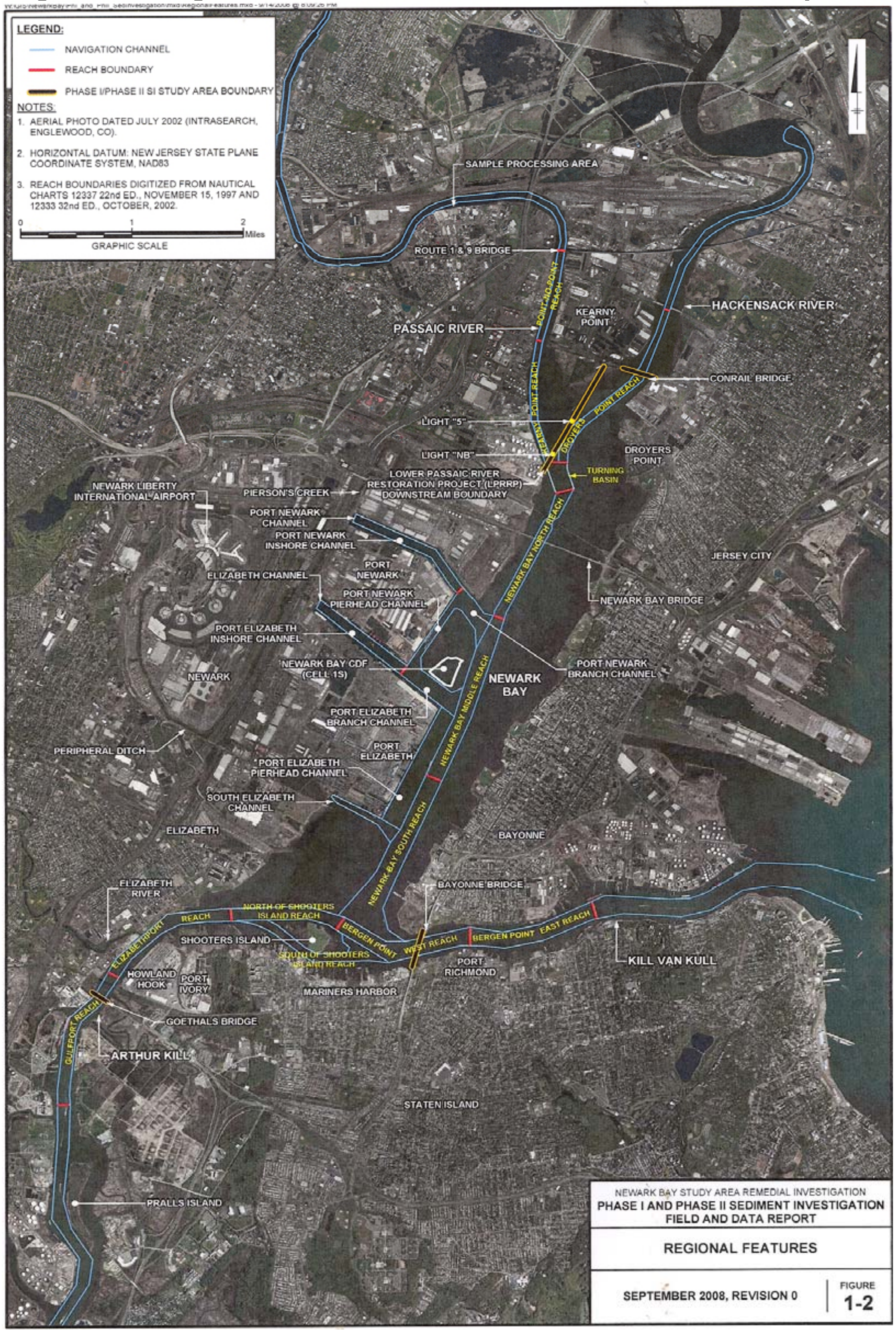
[62] Malcom Pirnie, Inc. 2007. FFS, Executive Summary, page i.

[63] U.S. Army Corps of Engineers, New York District. 2011. Lower Passaic River Restoration Project, NJ. Lisa Baron, Chief, Harbor Programs Branch. Web-site: www.nan.usace.army.mil.

[64] Tierra Solutions, Inc. 2008. Phase I and Phase II Field and Data Report, Newark Bay Study Area Remedial Investigation. Phase I and Phase II Sediment Investigation Field and Data Report, Figure 1-1.

[65] *Ibid*. Figure 4-13.

Figure 6 – Navigation Channels in Lower Passaic River, Newark Bay Area



of the Lower Passaic River" project are evaluated here for use with sediments contaminated with PCBs, ***dioxins*** and other pollutants.

CAD (Confined Aquatic Disposal):

It has been proposed that up to 9.6 million yd^3 of the contaminated sediments to be dredged from the "Lower 8 Miles" stretch of the Passaic River be placed in deep holes dug into the clean clay in Newark Bay between the shipping channel and the City of Bayonne, as shown in Figure 7. The estimated cost of this DMM Option is about $0.8 billion, and is about $1.6 billion less than that for "Decontamination/Beneficial Use".[66] The Corps has described CAD or CDF (Confined Disposal Facility) cells in Newark Bay as "an affordable and environmentally safe method … to dispose of contaminated dredged materials".[67] But given the chemical nature of these sediments to be dredged, which are highly contaminated with POPs, especially ***dioxins***, PCBs and heavy metals, putting them into a CAD is just moving them down river into the bay. This DMM Option would not make these sediments environmentally safer, and it would be costly. The Corps describes CAD cells as "potential contingency options" for DMM of harbor dredging.[68] USEPA Region 2 had previously ruled out a CAD as a DDM alternative in the 2007 Draft FFS. They cited potential difficultly controlling effluent, precisely placing materials in the CAD unit, sediment re-suspension, and the permanent nature of this questionable alternative. In addition, CADs are typically used for navigational projects where severe amounts of contamination are <u>not</u> a consideration. They are also viewed harshly by the regulatory and environmental communities, including local community representatives and environmental organizations.[69] The Passaic River Coalition concurs with USEPA's findings relating to a CAD. In addition, we are concerned that a created CAD would significantly destroy the current benthic community in the bay.

If using CAD cells for these highly contaminated sediments is still considered a viable option, then the following concerns must be addressed: Given the likelihood of the release of ***dioxins*** and other contaminants from a CAD site by a boat straying from the navigational channel or other type of accident, a process must be established ***in perpetuity*** for preventing such accidents and identifying the responsible party. Payment for the long term costs of monitoring and maintaining the CAD cells must be clearly identified. The complications of allowing CADs to be built close to berths 4, 6 and 8 at the Port Newark Marine Terminal and the navigational channels from which contaminated sediments need to be dredged soon should be included in a DMM plan.

Off-site Treatment and Disposal:

In the "Phase 1 Removal Action" project the dewatered contaminated sediments are being shipped by rail to facilities in Oklahoma and Utah. The economic costs of shipping wastes across the country are high, and so are the ecologic costs from greenhouse gas emissions. We do not know what the ecologic costs will be at these "Off-site" disposal facilities at this time because information about them has not been made available. However, past studies lead us to conclude that dumping such contaminated sediments anywhere in the U.S., Canada or elsewhere without appropriate pretreatment of the dredged material will cause high ecologic costs that lead to high

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[66] Malcolm Pirnie, Inc. 2007. FFS, Appendix J, page J-3.

[67] U.S. Army Corps of Engineers, New York District, JoAnne Costagna. 10/19/2012. Port's dredged material management method keeps economy afloat. Web-site: www.nan.usace.army.mil.

[68] U.S. Army Corps of Engineers, New York District. 2011. Dredged Material Management Plan for the Port of New York and New Jersey. Michael Millard, Project Manager. Web-site: www.nan.usace.army.mil.

[69] Malcolm Pirnie, Inc. 2007. FFS, Page 3-20.

Figure 7 – CAD Cells Proposed for Newark Bay

economic costs. In any case this would not be a "Beneficial Use" of these sediments. In addition to our concerns, CERCLA Section 112(b) identifies the statutory preference that "off-site transport and disposal of hazardous substances or contaminated materials without treatment is considered the least favorable remedial alternative when practicable treatment technologies are available." Overall, we view this alternative as being outdated and morally wrong in light of modern technology which can permanently destroy or decontaminate highly toxic materials.

Sediment Washing:

Sediments dredged from the Lower Passaic River near the Diamond Alkali site in 2005 were used in the BioGenesis^{SM} sediment washing demonstration project to "produce high-end topsoil", a beneficial use product.[70] "The BioGenesis^{SM} Sediment Decontamination Technology is a physical/chemical process that uses impact forces (cavitation/collision) and chemical forces (oxidation with hydrogen peroxide) to strip contaminants from the surface of sediment particles and suspend them in the water phase where they can be separated from the sediment."[71] The sediments are then mixed with clean organic matter to make manufactured soil. The wash water is piped to the nearest sewage treatment plant. For some sediments dredged from the NY/NJ Harbor Region this treatment may be appropriate, but not for those contaminated with PCBs or ***dioxins***. The "chemical forces" used do not change these compounds. Some of the PCB/***dioxin*** contaminants would be carried attached to very small particles of dirt in the wash water to the sewage treatment plant where they would contaminate the sludge. The ***dioxins*** would also end up in the manufactured soil where they could do harm.

In September 2012 a bench scale test report became available detailing the results of two soil washing vendors' attempts to wash sediment from the RM10.9 hot spot. Both vendors were unable to treat soils to levels remotely acceptable, achieving decontamination efficiencies of 3.75% and 27.2%. Levels of PCB reduction were also reported to be insufficient and the technology will likely not reach pilot-scale testing for Lower Passaic River sediments.

A disposal option under consideration, thermal-chemical manufacturing, produces a byproduct with a beneficial use. Thermally treated materials can be used to produce cement. In light of the failed bench scale sediment washing, the materials which would be used for a beneficial use are no longer available because they cannot be sufficiently decontaminated. Considering the thermal-chemical alternative, which is capable of achieving decontamination efficiencies over 99.99%, sediment washing should not be considered a viable option.

Thermal Oxidation (Incineration):

Incineration is effective at reducing the mass of solid waste because much of the organic matter burns up and goes into the air as carbon dioxide, water and other compounds. Incinerator feedstock must be able to burn under its own calorific value, but the dredged materials from the NY/NJ Harbor will not burn because they are mostly mineral matter which has no calorific value. Incinerators can produce ***dioxins***, and do produce ash which may contain leachable heavy metals. Disposal of the ash poses both ecologic and economic problems. Consequently, thermal destruction by oxidation at temperatures in the range of 1,400°F to 1,800°F should not even be

[70] Malcolm Pirnie, Inc. 2007. FFS, Pages 3-15 & 3-16. & Appendix H, BioGenesis Sediment Washing Demonstration Project, pages H-15 to H-86.

[71] BioGenesis Washing BGW, LLC. 2009. Demonstration Testing and Full Operation of the BioGenesis^{SM} Sediment Decontamination Process, Keasbey, New Jersey. Page ES-11.

considered as an option for the decontamination of sediments dredged from the Lower Passaic River and Newark Bay.

"Thermal Destruction" and Vitrification:
In the 2007 FFS for the LPRRP various *ex situ* treatment processes to decontaminate the dredged materials were assessed. One of these processes was "thermal destruction" which "uses high temperatures (typically between 1,400°F and 2,200°F) to volatize and combust organic chemicals."[72] What was evaluated in the FFS as a "thermal destruction" process was the thermal-chemical (Cement-Lock®) process, which operates at higher temperatures in the range of 2,400°F to 2,600°F.[73] The FFS describes vitrification as "a process in which higher temperatures (2,500°F to 3,000°F) are used to destroy organic chemicals by melting the contaminated dredged material to form a glass aggregate product".[74] The vitrification technology was to be considered for further evaluation for the LPRRP. The FFS states that "the thermal treatment process options, thermal destruction and vitrification, meet the criteria of permanently treating the sediments while achieving the highest treatment efficiencies."[75] The vitrification process developed by the Minergy Corporation is being used to treat sewage treatment plant wastewater sludge, and pulp and paper plant wastewater solids. It was considered for treatment of the PCB contaminated sediments dredged from the Lower Fox River in Wisconsin, but these dredged materials are going to a landfill instead because this DMM is cheaper. The thermal "destruction" (Cement-Lock®) process was selected for further study in the LPRRP because "it produces a beneficial use product that offsets a significant portion of the treatment costs, and because it has been shown to achieve a high treatment efficiency for Passaic River sediments based on the results of a pilot demonstration project in which 16.5 tons of Passaic River sediment were treated."[76] The 2007 FFS also states that the thermal-chemical (Cement-Lock®) process "is one of the only technologies proven as effective in treating… (***dioxins***, PCBs and PAHs) detected in the sediment" of the lower 8 miles of the Passaic River.[77] Overall, Cement-Lock® is the only DMM alternative that meets the requirements of CERCLA, the Clean Water Act, EPA's RAOs, and the National Contingency Plan's evaluation criteria.

Preferred Dredged Material Management (DMM) Option
Thermal-Chemical (Cement-Lock®) Treatment

Development of Thermal-Chemical Technology:
The thermal-chemical (Cement-Lock®) technology uses a rotary kiln that is fueled by natural gas to melt multi-contaminated sediments. The process is similar to what happens in an active volcano. In a rotary kiln operating at ~2,500°F the organic contaminants are disassociated or destroyed, and the non-volatile heavy metals are encapsulated into the siliceous matrix that forms from the sediments to produce Ecomelt®, which can be used as a 40% replacement for Portland cement in concrete, a beneficial use product. Rotary kilns have been used to produce Portland cement for more than a hundred years. For over 65 years the Gas Technology Institute (GTI) has been a world leader in the research and development of energy technologies using gas. This

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[72] Malcolm Pirnie, Inc. 2007. FFS, Page 3-17.
[73] *Ibid.*
[74] *Ibid.*
[75] Malcolm Pirnie, Inc. 2007. FFS, Page 4-8.
[76] *Ibid.*
[77] *Ibid*, Page 3-17.

technology for remediating contaminated sediments was conceived at GTI in 1994, and developed from bench-scale to pilot-scale in 1994 to 2005. EPA Region 2, the US Department of Energy, and Brookhaven National Laboratory have worked with GTI on this project since 1995. In 2000 the NJ Department of Transportation, Office of Maritime Resources, selected this technology "to be evaluated for its applicability to the treatment of sediment dredged from navigational channels."[78]

Pilot-Scale and Demonstration-Scale Testing of Thermal-Chemical Technology:
In 2005 sediments dredged from the Stratus Petroleum site in Newark Bay and then dewatered were used in a pilot test of the Cement-Lock® technology at a demonstration plant in Bayonne, NJ.[79] This test led to equipment modifications that needed to be retested.[80] The retesting occurred in November 2006, but was halted early for several reasons. In December 2006 and May 2007 demonstration-scale tests of longer duration were conducted using more contaminated sediments dredged from the Passaic River near the Diamond Alkali site. The results from these tests show that the Cement-Lock® technology "can achieve high destruction and removal efficiencies for contaminants of concern, specifically ***dioxins*** and furans and PCBs" (treatment efficiency of >99.9%).[81] Some of the Ecomelt® produced was mixed with Portland cement to make high quality concrete paving at Montclair State University. Much was learned from the pilot and demonstration test projects. When the Passaic River Coalition considered the technical problems that occurred during these tests, we concluded that they could be corrected if appropriately addressed as discussed below.

Technologies Involved in the Thermal-Chemical Treatment of Dredged Materials:
Since 2008 the partners in Volcano Partners, LLC, have brought together several different business entities with their own expertise that would cooperate in the development and operation of facilities for the manufacture of a cement extender (Ecomelt®) from contaminated sediments dredged from the NY/NJ Harbor and elsewhere. These entities include Tetra Tech, Foster Wheeler Corporation, ABB, and ADA/NORIT Americas JV. As with most manufacturing businesses, there are at least four different processes that would be involved in the thermal-chemical treatment of dredged materials. Each of these processes involves different technologies. Each process requires different types of operational expertise. The technological modifications and expertise that Volcano Partners suggest be used in each of these four processes are evaluated here.

Front End Materials Handling Process -- Debris Removal, De-watering of Dredged Materials:
In the test runs the dewatered sediments fed into the rotary kiln should have been drier. This problem and other problems encountered with feed handling are correctable. Tetra Tech is helping to design the systems to offload the dredged sediments from barges, to remove debris, and dewater the sediments to 50% solids content, to deliver the dewatered sediments to the treatment factory, and to blend Cement-Lock® technology additives with the sediment to reduce the moisture content to 40% or below.

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[78] Endesco Clean Harbors, LLC, prepared by Michael C. Mensinger, Gas Technology Institute. July 2008. Sediment Decontamination Demonstration Program – Cement-Lock® Technology, Final Report: Phase II Demonstration Tests with Stratus Petroleum and Passaic River Sediments. Submitted to: NJ Department of Transportation, Office of Maritime Resources; US Department of Energy, Brookhaven Science Associates, LLC. Page iii.
[79] *Ibid.*
[80] *Op. cit. #22.* Page iv.
[81] *Op. cit. #22.* Pages 103, vii.

Manufacturing Process -- Design/Build/Operate Thermal-Chemical Treatment Factory:
The demonstration tests proved that a cement extender (Ecomelt®) can be manufactured from contaminated sediments. In the Passaic River Coalition's judgment the improvements in the design of the system being proposed to correct problems encountered in the demonstration tests make sense. Tetra Tech, Foster Wheeler Corporation (FWC), design engineers in rotary kiln technology, and ABB, an industrial leader in cement plant planning, are helping in planning the design, construction and operation of a Cement-Lock® facility using a rotary kiln thermal-chemical processing technology. In this system dewatered sediments that have been mixed with feed additives (slag modifiers) are fed through a kiln on a double screw feeder conveyor. The heat for processing the sediments comes from burning natural gas with air. The amount of air and oxygen (O_2) used is controlled by a combustion air fan so that the gas, which is mostly methane (CH_4), is used efficiently to form carbon dioxide (CO_2) and water (H_2O), and so that nitrogen oxide (NO_x) formation is minimal. Air contains about 78% nitrogen (N_2) and 21% oxygen (O_2). As the dredged sediments are rolled through a kiln and heated to high temperatures of ~2,500^{o}F most of the sedimentary material is melted into a molten slag, and the organic matter is converted to gases, especially CO_2 and water. The temperatures used are even hot enough to convert PCBs and ***dioxins*** to CO_2, water, hydrogen chloride (HCl), and chlorine gas (Cl_2). The molten slag drops from the kiln and the walls of the secondary combustion chamber into a pool of water where it is quenched and cooled. The slag is then conveyed from the pool to a grinder/pulverizer/blender to become Ecomelt®. The rotary kiln thermal-chemical treatment technology being proposed by FWC has already been used to treat a variety of heterogeneous waste streams, including contaminated soils, sediments, and sludges. In fact, FWC's rotary kiln projects include the Clean Harbors Aragonite facility in Grantsville, Utah, which has been in operation since 1991 and has received an EPA permit for PCB Disposal.[82] The Destruction and Removal Efficiency (DRE) for PCBs at this plant have at times exceeded 99.999999%. However, that facility produces an ash, which can produce leachable heavy metals such as lead and mercury when deposited in a landfill. The Cement-Lock® facility proposed for this area will be a cradle to grave solution and the first plant in the U.S. and Canada to be designed for the treatment of sediments contaminated with both legacy pollutants and heavy metals.

Waste Management Process -- Air Pollution Control and Monitoring:
This thermal-chemical treatment process uses lots of energy by burning natural gas with air to heat the rotary kiln system (Ecomelt® generator). Energy wastage would be minimized by using the superheated flue gases to produce steam to generate electricity, an additional beneficial product, at an estimated rate of 10,000MWh per year.[83] The Volcano Partners, including ADA/NORIT Americas JV, are now proposing to build and operate a Cement-Lock® plant with "state-of-the-art" air pollution controls. This process forms acidic gases, NO_x (nitrogen oxides), SO_x (sulfur oxides), and HCl (hydrogen chloride), which can cause acid rain if released to the air and are known greenhouse gases contributing to climate change.[84] Before being emitted the flue gases would be cooled with direct water injection. NO_x emissions would be reduced by selective non-catalytic reduction, which would convert the NO_x to the nitrogen and oxygen gases that fill the air. Injection of lime into the flue gases would convert SO_x and HCl gases to solid particles, which would then be captured in fabric filter bag houses. Mercury (Hg) becomes a gas in this

[82] U.S. Environmental Protection Agency. 2011. Web-site: www.epa.gov/hazard/tsd/pcbs/pubs/stordisp.htm
[83] Appendix 1 – Robert Fabricant Esq., Volcano Partners LLC. 2012. Cement-Lock 2012: A Proposed Minimum Volume Program AND Integrated, Sustainable Sediment Management.
[84] Union of Concerned Scientists. 2007. Confronting Climate Change in the U.S. Northeast – New Jersey.

treatment process and must be captured. Absorbing gaseous mercury on impregnated powdered activated solid carbon particles which are caught in filter bags is proposed for mercury removal. Powdered activated carbon would also be used to remove any ***dioxins*** or furans that may be formed in the system. The proposed Cement-Lock® treatment process would not produce any waste water. The solid fine particulates caught in bag houses can be effectively managed and might even be useful. The cleaned, odorless flue gases will be lifted through a gas stack tall enough to allow for proper dispersion into the atmosphere. It is the Passaic River Coalition's judgment that the air pollution control systems proposed by the Volcano Partners are designed to be operated so as to exceed mandated air emissions standards.

Disposition of Manufactured Product -- Beneficial Use of Cement Extender (Ecomelt®):
It has been demonstrated that contaminated sediments, even those from the Lower Passaic River, can be melted to make Ecomelt®, mixed with Portland cement, and then used to make high grade concrete. There are many benefits to be gained from using contaminated sediments to make Ecomelt®. Tests by Accutest Laboratory using the EPA's Toxicity Characteristic Leaching Procedure (TCLP) have proven Ecomelt® is a harmless product which does not leach metals immobilized within its crystalline, glassy-like matrix (see Table 1).[85] The organic contaminants, including PCBs and ***dioxins***, that adhere to the sediments are destroyed in the Cement-Lock® rotary kiln process, which also generates electricity. Although some parts of the processes needed in the manufacture of Ecomelt® are more expensive than those in the manufacture of Portland cement, the values to be gained in cleaning up the contamination should offset these costs. Volcano Partners has also entered a letter of intent with U.S. Concrete, demonstrating that a market does exist for the Ecomelt® product.[86] In any case, the production of this product would certainly be a beneficial use of contaminated sediments.

Table 1: Results of TCLP Tests for Metals on 6 Ecomelt® Samples from Cement-Lock® Demo Plant Campaign with Passaic River Sediment

Metal	TCLP Limit	Ecom-1	Ecom-2	Ecom-3	Ecom-4	Ecom-5	Ecom-6	Average Ecomelt
	mg/L							
As	5	0.5U**	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Ba	100	1U	1U	1U	1U	1U	1U	1U
Cd	1	0.0092	0.005U	0.005U	0.005U	0.005U	0.005U	0.0057
Cr	5	0.01	0.01U	0.01U	0.01U	0.014	0.011	0.0108
Co	--*	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U
Cu	--	0.15	0.025U	0.025	0.025U	0.034	0.026	0.0475
Pb	5	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Mn	--	0.21	0.071	0.037	0.032	0.037	0.034	0.070
Hg	0.2	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U
Ni	--	0.12	0.04	0.04	0.04	0.04U	0.04	0.0533
Se	1	0.5	0.5	0.5	0.5U	0.5U	0.5U	0.5U
Ag	5	0.01	0.01	0.01	0.01U	0.01	0.01U	0.01U
Zn	--	0.7	0.31	0.16	0.13	0.22	0.17	0.282

* Not a TCLP priority metal.
** U = below the analytical detection limit.

[85] Volcano Partners, LLC. Volcano Partners: Manufacturers of Non-Hazardous Cement and Electricity from Hazardous Materials. On-line Brochure.
[86] Personal communication with Al Hendricks, Volcano Partners, LLC.

Cement-Lock® Feasibility

Site for Thermal-Chemical Treatment Facility:
Finding an appropriate site for the development of a thermal-chemical treatment facility for DMM of contaminated sediments is critical for implementing these dredging projects. The site must be easily accessible by ship, and there should also be good rail and highway facilities nearby. The site must be large enough to accommodate all the necessary facilities. It would be necessary to obtain all the permits needed to develop and operate a thermal-chemical treatment facility for DMM and other contaminated sediments at the site. There are sites in the region that meet these criteria. The use of such a site for the decontamination of materials dredged from the Lower Passaic River and Newark Bay should be considered "Local Decontamination". Without such a facility within the NY/NJ Harbor area these contaminated dredged materials would have to be shipped elsewhere. The site should become an "active upland dredged material placement site" that is permitted by the Corps to receive contaminated sediment from the bay and harbor.

Evaluation of Thermal-Chemical Treatment for DMM:
As in the development of most new technologies, there were problems encountered in the demonstration-scale testing of the Cement-Lock® technology in Bayonne in 2006 and 2007. Since then Volcano Partners and their associates have addressed these issues by incorporating ways to design and operate facilities for each of the four processes involved in cleaning contaminated dredged materials to produce a product for beneficial use (Ecomelt®). In our judgment these problems are being well addressed in the current phase of planning for a treatment facility. After considering the options available for the management of materials that should be dredged from the Lower Passaic River, Newark Bay, NY/NJ Harbor and elsewhere we find that the thermal-chemical treatment option being proposed by the Volcano Partners is the best alternative for DMM. Concurrently, NACEPT reports:

> While this recommendation has been made frequently, the opportunity to pursue such a facility as a priority disposal project requires EPA's attention now. The demonstration of the efficacy of the Cement-Lock® process in New Jersey would encourage clean-ups in several parts of the United States where toxic pollutants are challenging the nation.[87]

Cement-Lock® also meets the CERCLA preference for permanent treatment. "By dredging contaminated sediment from the river and harbor, and treating it on land so it can be used beneficially, both the ecologic and economic vitality of the region can be reinvigorated."[88] Attached as Appendix 1 is a PowerPoint presentation by Robert Fabricant, Esq. that expands on the benefits of using this process.

Effects of Hurricane Sandy

Hurricane Sandy imposed record storm surges across the greater NY/NJ area. The distribution of contaminated sediments has likely changed due to these forces. New technology exists which can effectively scan sediments without taking core samples. Prior to any dredging, this new technology should be employed to reassess the dispersal of contaminants for precise removal.

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[87] National Advisory Council for Environmental Policy and Technology. February 2012. Letter to USEPA Administrator Lisa P. Jackson, Re Technologies for Environmental Justice Communities and Other Valuable Populations.
[88] *Ibid*.

Cost Evaluation

Implementation of a LPRRP would be the responsibility of the USEPA under the Superfund Program, the USACE and New Jersey Department of Transportation (NJDOT) under the Water Resources Development Act, and by the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), and NJDEP as Natural Resource Trustees.[89] Funding should also be available from federal and state governments in order to restore the navigational capacity of the New York-New Jersey Harbor, which includes the Lower Passaic River. The issue of how the costs of an Early Action project might be apportioned needs to be addressed as soon as possible. The following table was presented in our report of 2008 and received considerable interest by a wide variety of stakeholders.

Potential Sources of Funding to Implement Preferred Early Action Project: Table 2 lists suggestions for potential sources of funding for the preferred Early Action project. The suggestions for potential sources of funding and the percentages that each might pay are intended to start stimulating a discussion among involved parties so that we can find mutually acceptable ways to fund and implement this project as soon as practicable. The National Remedy Review Board could be extremely helpful by establishing a process whereby the recommendations in this chart may be enacted.

Table 2 – Potential Sources of Funding for Preferred Early Action Project Alternative, Dredging with Full Decontamination of Dredged Material

Cost	*Source of Funding*	*% of Funding*
Capital Costs for Dredging Navigational Channel	USACE, Federal Government	100%
Capital Costs for Dredging beyond Navigational Channel	WRDA, USACE	65%
	Superfund, PRPs	35%
Development of Dredged Material Processing Facility	Private investors	100%
Decontamination of Dredged Material	Superfund, PRPs	100%
Operations & Maintenance Costs	NJDEP, PRPs	100%

Funding under the Superfund Program: The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted in 1980.[90] This law created a tax on the chemical and petroleum industries, which went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites when no responsible party could be identified. Over five years $1.6 billion was collected, but the tax was discontinued. The Lower Passaic River is part of the Superfund Site which was listed on the National Priorities List in 1984. As of today there are 71 corporations that are listed as "Potentially Responsible Parties"

[89] Malcolm Pirnie, Inc. 2007. FFS, Executive Summary, page i.
[90] USEPA. 2007. CERCLA Overview. Website: <http://www.epa.gov/superfund/policy/cercla,htm>

(PRPs) in this Superfund case.[91] Furthermore, there are many unidentified responsible parties, most of whom are no longer in business. The Lower Passaic River watershed was "one of the major centers of the American industrial revolution."[92] For more than two centuries industrial and municipal waste streams have discharged many contaminants, including ***dioxins***, petroleum hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, and metals to the Lower Passaic River. Furthermore, industries along the Lower Passaic River were major contributors to war efforts, including the Spanish-American War, World War I, World War II, the Korean War, and the Vietnam Conflict, when the US Defense Department used Agent Orange. The role of the Federal government in degrading the environment at this Superfund site is well documented in a paper entitled "Wartime Mobilization and the Newark Bay Home Front Environment: A Case Study Revealing Opportunity for Federal Leadership in Resolving Mega Site Problems."[93] In two judicial cases that have been heard by the United States Court of Appeals, the courts have ruled that under CERCLA the Federal government is liable for some portion of response costs based on government's role in operation of facilities during war.[94] The responsible parties in this Superfund case should include the Federal government, which instituted these wars and commanded that war supplies be produced by companies along the Lower Passaic River and others. The National Remedy Review Board shall do all in its power to include the Department of Defense and its responsibilities in the cleanup of the Lower Passaic River.

Funding under the Water Resources Development Act: The U.S. Army Corps of Engineers (Corps) lists the mission priorities of their civil works program as follows:[95]

- Navigation (Deep draft)
- Ecosystem Restoration
- Flood Damage Reduction (Coastal and Riverine)
- Bank Stabilization
- Debris Removal

A project that dredges and restores navigational capacity to the Lower Passaic River, that develops a dredged materials processing facility that would treat and use the dredged materials beneficially, and that would reduce flooding would meet all these mission priorities. In the Water Resources Development Act of 1999, the Passaic River is listed as one of eight priority sites. Funding up to $50 million per year may be used to "remove and remediate contaminated sediments from the navigable waters of the United States for the purpose of environmental enhancement and water quality improvement if such removal and remediation is requested by a non-Federal sponsor and the sponsor agrees to pay 35 percent of the cost of such removal and remediation."[96] This may be a source of funding that can be used to remove and remediate the

---

[91] Kluesner, David, US EPA, Region 2. 2007. Proposed Amendment to Administrative Settlement for the Lower Passaic River Study Area. Website: www.ourpassaic.org.

[92] Malcolm Pirnie, Inc. 2007. FFS, Executive Summary, Description of the River, page ii.

[93] Reis, Michael. 2006. Wartime Mobilization and the Newark Bay Home Front Environment: A Case Study Revealing Opportunity for Federal Leadership in Resolving Mega Site Problems. Environmental Claims Journal, 18(4/Fall):293-320 (2006), pages 293-320.

[94] United States Court of Appeals, Third Circuit. 1994. FMC Corporation vs. United States Department of Commerce. & United States Court of Appeals, Ninth Circuit. 2002. Cadillac Fairview/California, Inc., vs. Dow Chemical Company vs. United States of America.

[95] U.S. Army Corps of Engineers. 2007. Passaic River Basin, New Jersey, Congressional Staff and Stakeholders Briefing, April 5, 2007.

[96] Water Resources Development Act of 1999, Section 224.

contaminated sediments that are outside of the navigational channel. The State of New Jersey should be the non-Federal sponsor, and should request that the Corps bear at least 65% of the costs of removing the contaminated sediments from outside of the navigational channel.

In 1986 the New York District of the USACE completed a Bank Stabilization Project and also included the Lower Passaic River in the Debris Removal Program for the Greater New York – New Jersey Area. These two studies should become part of the multifaceted integrated management plan for the Lower Passaic.

Funding to Restore Navigational Channels: "The Federal interest in navigation derives from the Commerce Clause of the Constitution."[97] The Corps is the Federal agency responsible for maintaining the navigational channels of the New York-New Jersey Harbor, including the channels in the Lower Passaic River. Most of the Lower Passaic River has not been dredged since the 1940s.[98] The authorized navigational channels have been filled in with contaminated sediments. Therefore, in our judgment, Congress should demand that the Corps fulfill its responsibilities to dredge and restore the navigational channels of the Lower Passaic River to the authorized depth that was dredged to in the 1940s. The Federal government should fully fund this aspect of the Dredging alternative.

Funding to Develop a Dredged Materials Processing Facility: **The development of a dredged materials processing facility, which would treat the dredged materials so that they could be used beneficially, and which would eliminate the need for ocean disposal or in-water confined disposal facilities (CAD or CDF), would facilitate future dredging to improve the navigational capacities of the harbor, to restore ecosystems, and to reduce flood damage.** Such a facility could also be designed to treat contaminated materials from Brownfield sites and industrial wastewater plants. Such a facility could provide far reaching environmental benefits. It also could provide many economic benefits for the region. Since this facility would be selling Ecomelt® and generating electricity it would have an income. Now is the time to design, build, and use a facility that will turn contaminated sediments and materials into useful products. Agencies involved in implementing this part of the project, which is of paramount importance, should include the USEPA, the USACE, the NJDOT, the Port Authority of New York and New Jersey, the NJDEP, the New Jersey Environmental Infrastructure Trust, and private investment concerns.

Decontamination of Dredged Materials: Currently the cost is $350 per in-situ ton, which will substantially, if not completely, eliminate future liability of the contaminants entering the environment as they will be destroyed or immobilized.

Operations and Maintenance Costs: Under CERCLA, the costs of operation and maintenance can be delegated to the NJDEP to carry out the responsibilities assigned to the PRPs forever. Therefore, all cost effective measures must be considered in the development of the operations and maintenance component of this project.

Clearly in order for a complicated project, such as the cleanup of the Lower Passaic River, to be implemented, calls for an integrated, comprehensive management program. All such elements have been developed by their respective agencies and reviewed. A need exists to bring all parties

97 U.S. Army Corps of Engineers. 2000. ER1105-2-100, 22 April 2000. Appendix E, Civil Works Missions and Evaluation Procedures, Section II-Navigation, page E-18.

98 Malcolm Pirnie, Inc. 2007. FFS, Executive Summary, pages ii-iii.

together in a cooperative manor so that a parallel course may be taken on the elements listed in the chart above. Integrated, comprehensive management programs, such as the one we have outlined here, have the proven ability to save costs in the present and long-term. NACEPT reports:

> … elsewhere in the United States and in Europe significant cost savings and other benefits have resulted from (Regional Sediment Management) efforts. The implementation of projects to restore the ecologic vitality of the Lower Passaic River and Newark Bay is critical for restoring economic prosperity to this region![99]

Now is the time for all stakeholders to work together in a cooperative manor to maximize the cleanup of the Passaic River in the next seven years.

Conclusions

The Passaic River Coalition agrees with the recommendations of New York – New Jersey Harbor Estuary Program, which states:

> The Regional Sediment Management Plan is a long-term Plan with anticipated near-term economic returns. The Dredged Material Management Plan for the Port of New York and New Jersey estimates that achieving the goal of clean sediments throughout the harbor can save at least $25,000,000 per year in costs of maintaining our water transportation infrastructure. Other economic drivers for implementing the Regional Sediment Management Plan also include increased and improved opportunities for recreation, tourism, and fisheries – industries valued at over $20 billion per year that depend on a clean Harbor Estuary.[100]

Leading academics also endorse this type of management.[101] Considering the high economic and ecological values of a clean Passaic River in the New York – New Jersey Harbor Region, the NRRB should recommend that immediate actions be taken to demonstrate the effectiveness of an integrated management program as outlined by the New York – New Jersey Harbor Estuary Program and detailed by the Passaic River Coalition within this report.

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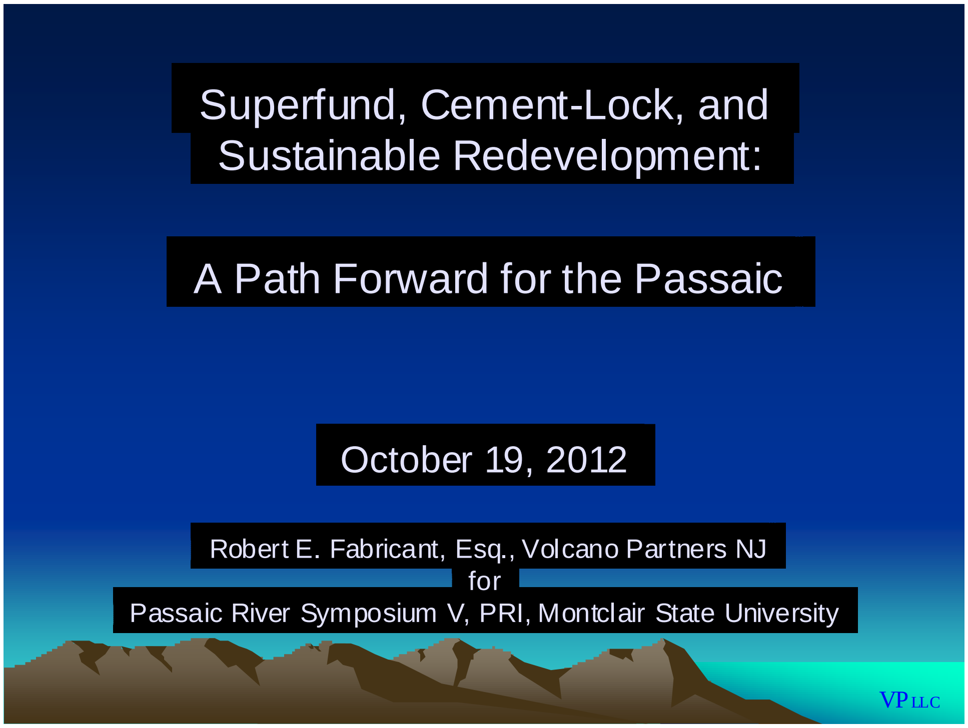
[99] National Advisory Council for Environmental Policy and Technology. February 2012. Letter to USEPA Administrator Lisa P. Jackson, Re Technologies for Environmental Justice Communities and Other Valuable Populations

[100] New York – New Jersey Harbor Estuary Program. October 2008. Regional Sediment Management Plan. Executive Summary, Page iv.

[101] Stern, E.A. and E. Peck. 2012. Integrated Approaches to Sustainable Sediment Management – The Paradox of Having it All. Keynote Presentation at NORDROCS 2012, Olso, Norway.

Appendix 1 - PowerPoint Presentation Provided by Robert E. Fabricant, Esq., Volcano Partners LLC



Adaptive Management

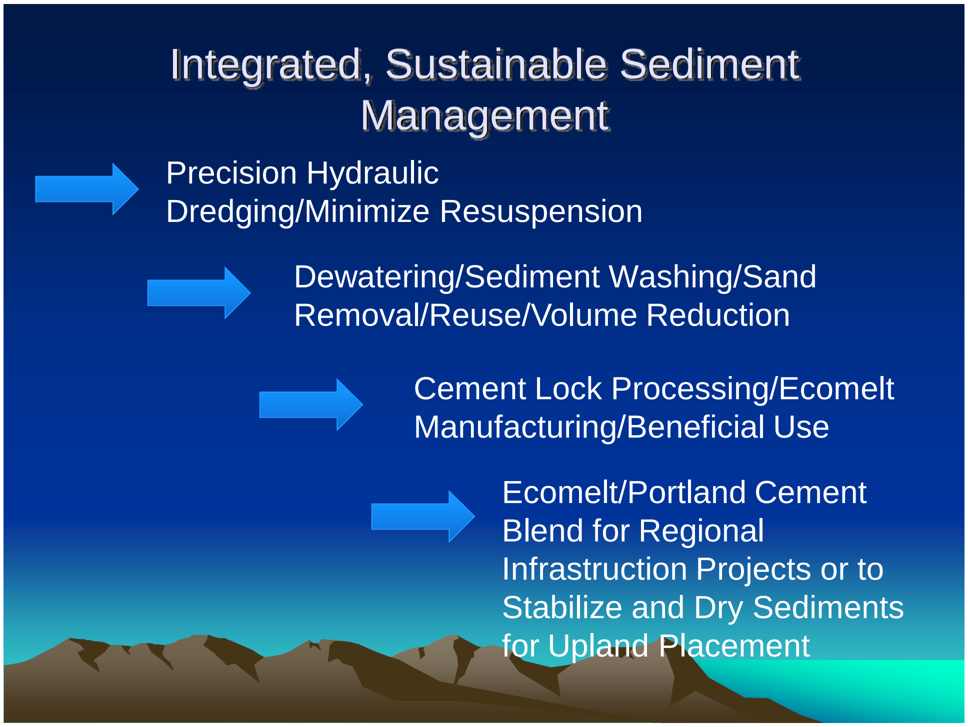
- 2007 NAS Report Recommendation:

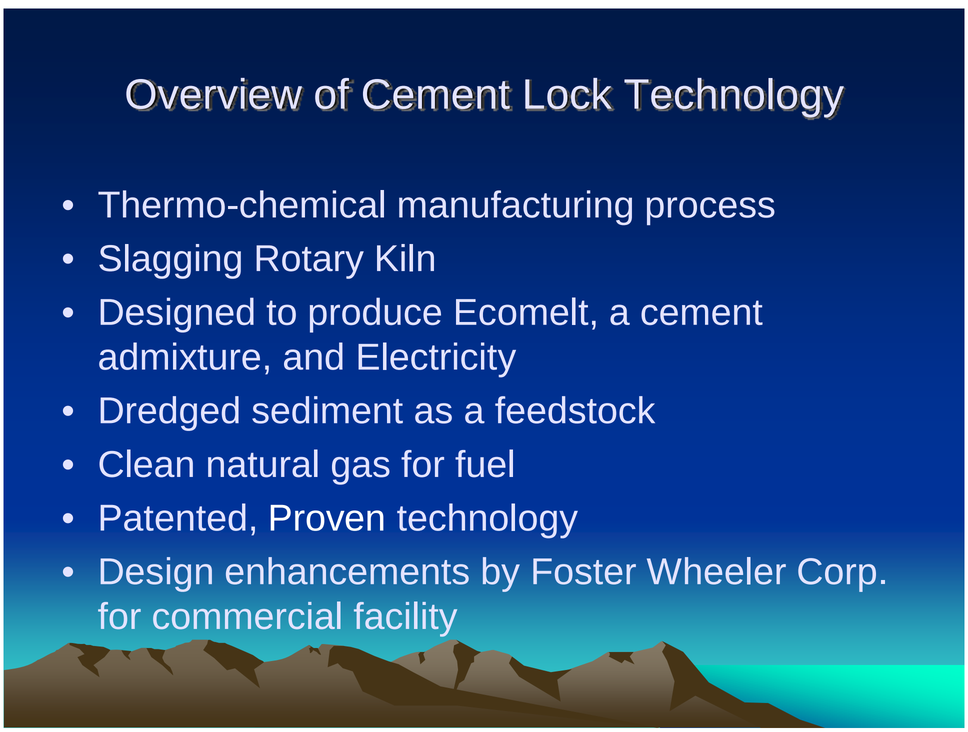
  “An adaptive-management approach is essential to the selection and implementation of remedies at contaminated sediment megasites where there is a high degree of uncertainty about the effectiveness of dredging.”

Interim Remedial Measure

- “Substantial” Removal
- Full 17 Miles (Not Just Lower 8 Miles)
- Faster Risk Reduction

- Examples:
- Tierra Solutions: 200,000 cy IRM
- CPG: 20,000 cy Removal RM 10.9


Integrated, Sustainable Sediment Management
Precision Hydraulic Dredging/Minimize Resuspension
Dewatering/Sediment Washing/Sand Removal/Reuse/Volume Reduction
Cement Lock Processing/Ecomelt Manufacturing/Beneficial Use
Ecomelt/Portland Cement Blend for Regional Infrastruction Projects or to Stabilize and Dry Sediments for Upland Placement


Overview of Cement Lock Technology
• Thermo-chemical manufacturing process
• Slagging Rotary Kiln
• Designed to produce Ecomelt, a cement admixture, and Electricity
• Dredged sediment as a feedstock
• Clean natural gas for fuel
• Patented, Proven technology
• Design enhancements by Foster Wheeler Corp. for commercial facility

Proven Design and Process

2008 WRDA Pilot

Bayonne, New Jersey

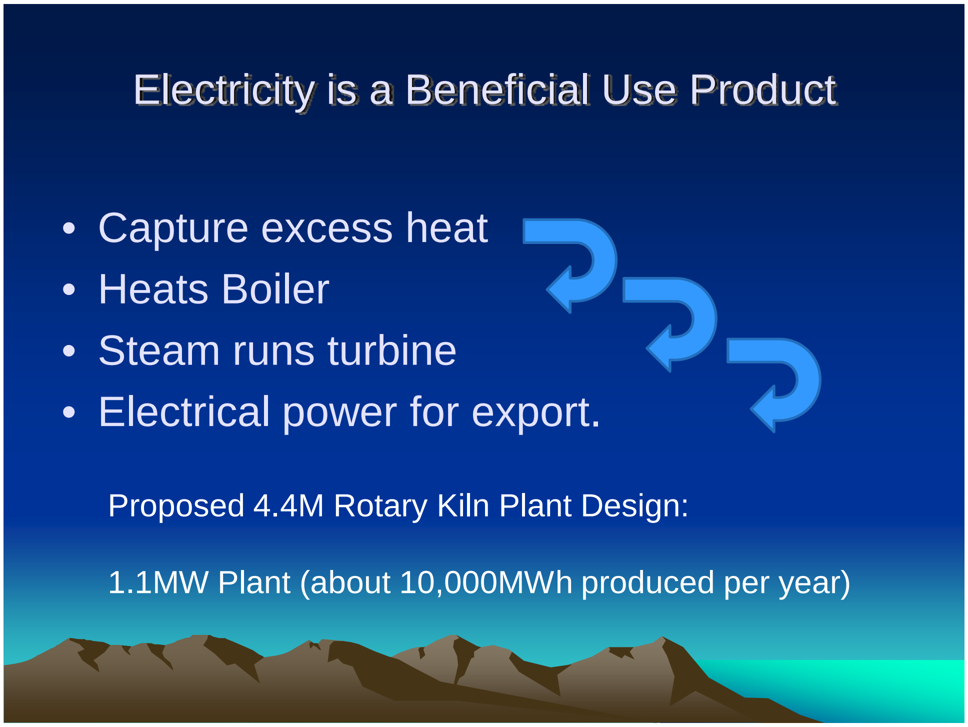
Ecomelt Replaces 40% of Portland Cement in Concrete

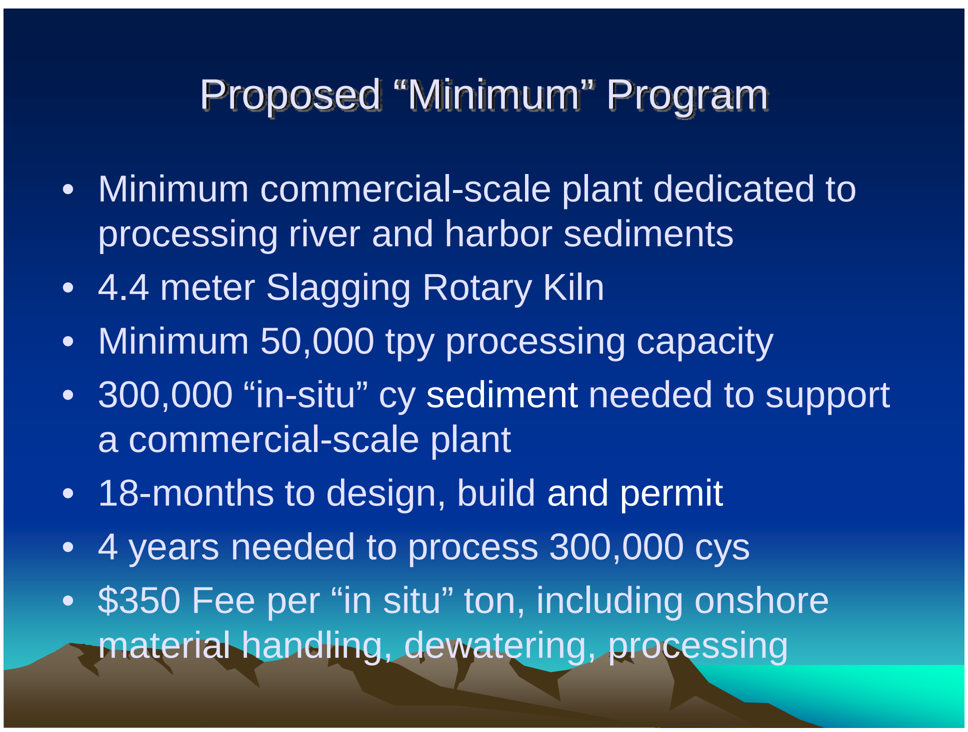
Milled Ecomelt

ASTM Tested

Montclair State Pour

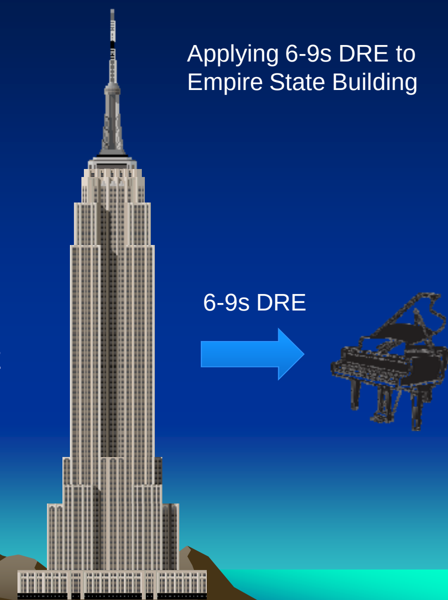
- Letter of Intent with Concrete Manufacturer
- Initiated NJDOT approval process
- Potential stabilizer for sediment placement at upland disposal sites


Electricity is a Beneficial Use Product
• Capture excess heat
• Heats Boiler
• Steam runs turbine
• Electrical power for export.
Proposed 4.4M Rotary Kiln Plant Design:
1.1MW Plant (about 10,000MWh produced per year)


Proposed "Minimum" Program
• Minimum commercial-scale plant dedicated to processing river and harbor sediments
• 4.4 meter Slagging Rotary Kiln
• Minimum 50,000 tpy processing capacity
• 300,000 "in-situ" cy sediment needed to support a commercial-scale plant
• 18-months to design, build and permit
• 4 years needed to process 300,000 cys
• $350 Fee per "in situ" ton, including onshore material handling, dewatering, processing

CERCLA Section 121 Prefers Treatment

- CERCLA Section 121 “prefers” treatment that “reduces volume, toxicity or mobility … of contaminants”
- 6-9s dioxin destruction (99.9999% DRE)
- Dramatically reduces contaminants in environment
- Dramatically reduces liability



Beneficial Use and Treatment Offsets Deliver Significant Net Emissions Benefits

- 99.9999% DRE
- Cement Offset
- Electricity Offset
- Transportation Offset

Cement-Lock Creates Local/Regional Jobs and Sustainable Redevelopment

2012	2013	2014	2015	2016	2017
Construction Phase		Operation Phase			
100 FTEs per year		400 Direct FTEs per year 2500 Indirect FTEs per year			

Example of Riverfront Project:

Anacostia River in Washington D.C

2012 CRID Report projects (20 years):

- $2.28 billion in tax revenue
- 21,000 permanent jobs
- 585 construction jobs each year

Conclusion

A Path Forward for the Passaic:

- A Substantial IRM
- Sustainable "Cement Lock" Sediments Management Program
- Sustainable Redevelopment Program

The Program Delivers:

- Process a substantial IRM starting in 2014
- Reduce contaminants and liability, don't just move it
- More cost effective than other out-of-state remedial options
- Technology available for future projects
- AND …
- Local/Regional Jobs
- Clean Passaic River

From: Kandil, Shereen
To: Salkie, Diane
Cc: Sivak, Michael
Subject: FW: Followup on CAG Meeting
Date: Monday, June 14, 2021 12:04:01 PM
Attachments: CAG Comments Letter.pdf
image002.png
image003.png
image004.png
image005.png
image006.png

Hey – Passaic Rowing Association sent Doug comments to the PRAP late but Doug wanted to forward it anyway.

Shereen Kandil
Team Leader, Community Affairs
Public Affairs Office
212-637-4333
Kandil.shereen@epa.gov

U.S. Environmental Protection Agency, Region 2
290 Broadway, 26th Floor
New York, NY 10007

From: Doug Sarno <doug@forumfg.com>
Sent: Monday, June 14, 2021 11:29 AM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Subject: Fwd: Followup on CAG Meeting

> Hi, I received the attached letter from the Passaic River Rowing Association a bit late but thought I would pass it along anyway as it is more questions about operations then response to the proposed plan.
>
> thanks
> Doug

PASSAIC RIVER ROWING ASSOCIATION
P.O. BOX 440
LYNDHURST, NJ 07071

Re: Upper Nine Proposed Plan

To Whom It May Concern:

Thank you for the opportunity to comment on the proposed Passaic River cleanup initiative. The Passaic River Rowing Association is located at 799 Riverside Ave, Lyndhurst NJ 07071.

We would like to draw attention to concerns regarding the proposed clean up and how it will affect the boat clubs using the river to function.

Will there be a time when we would be unable to access the river from our facilities?

Is there a time when we would be completely unable to access the river from our dock? Would there be certain times of the day when we could row or would there be a stretch of time where we couldn't access the river at any time of the day?

If so, how long would it be before we regain access?

If we must go a while without use of our facilities, we would need advance notice on when this work would begin and end so that we may find proper accommodations elsewhere.

If not, will we be able to utilize all of our equipment (e.g. coach's launch boats)?

What effect will motorized equipment have on the project? Would we be able to anchor anything (buoys for races, etc.)

In summary, we are thrilled that the CAG and EPA have taken such a vested interest in cleaning the river for all of us. Please don't hesitate to let us know how we can help!

Sincerely,

Thomas Apicella

President, PRRA

president@prra.org

BOROUGH OF RUTHERFORD
County of Bergen

RESOLUTION NO. 112-2021

Dated: 5/24/2021

ENDORSING THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S PROPOSED PLAN FOR THE UPPER 9 MILES CLEAN-UP PROJECT OF THE UPPER 9 MILES OF THE LOWER PASSAIC RIVER

WHEREAS, the United States Environmental Protection Agency's (US EPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4 was released on April 14, 2021; and

WHEREAS, the US EPA and the New Jersey Department of Environmental Protection (NJDEP) have worked collaboratively over the past three (3) years plus to create a plan for the upper 9 miles of the Passaic River. We are pleased to see that the proposed plan will fast track remediation of contaminated sediment in the upper 9 miles of the Passaic River, thereby cutting approximately even (7) years from the traditional cleanup schedule. Through this action both the US EPA and NJDEP have shown that they have taken very seriously the comments received during the Lower 8-Mile public comment period; and

WHEREAS, the original schedule called for performing the Lower 8-mile Remedy first, followed by the Upper 9 miles of the Passaic River. That approach did not appeal to the Borough of Rutherford given the large scope of the Lower 8-mile removal in a tidal river like the Passaic River which was not fair to the stakeholders in the Upper 9 miles of the Passaic River; and

WHEREAS, the US EPA's Proposed Plan aligns the Lower 8 with the Upper 9 removals, thereby permitting project managers to monitor and manage any resuspension and transportation of contaminated sediments from the Lower 8-mile project into the upper 9 mile area and vice versa; and

WHEREAS, while the US EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river, thus indicating approximately 387,000 cubic yards of contaminated sediment will be removed from the Upper 9-mile area via barge to a treatment facility down river, not via truck through the communities along the Passaic River; and

WHEREAS, the USEPA and NJDEP have heard from the communities along the Passaic River, that flooding remains a serious concern, and we are happy to see that the proposed plan for the Upper 9 mile project will not adversely impact flooding in the region; and

WHEREAS, environmental justice remains a priority of the Borough of Rutherford. This plan demonstrates that Governor Murphy, the Passaic River Community Advisory Group (CAG), the US EPA, and the NJDEP all share in that commitment. The completion of this project will significantly address environmental justice concerns in the region and is a positive step forward for these communities.

WHEREAS, cleaning of the Passaic River will certainty lead to enhanced economic development for the Borough of Rutherford along the waterfront;

NOW, THEREFORE, BE IT RESOLVED as follows:

1. The Mayor and Council of the Borough of Rutherford, Bergen County, State of New Jersey, hereby endorse the US EPA's Proposed Plan for the Upper 9 miles clean-up project of the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4; and

2. The Mayor and Council of the Borough of Rutherford directs the Borough Clerk to forward a copy of this resolution to the US EPA, US Senator Cory Booker, US Senator Bob Menendez, Congressman Bill Pascrell, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 36 Legislators, Upper 9 Mayors and the Passaic River Community Advisory Group (CAG); and

3. The Mayor and Council also urge the US EPA and NJDEP, while designing and implementing this project, the agencies focus on the erosion that has occurred along the shorelines of Rutherford and continues during major storm surge events. Anything that can be done to protect our shoreline would be a benefit to the Borough of Rutherford.

Vote Record – Resolution No. 112-2021					
		Yes/Aye	No/Nay	Abstain	Absent
Begg-Roberson		☒	☐	☐	☐
Guzman		☒	☐	☐	☐
Mullahey		☐	☐	☐	☒
Cokeley		☒	☐	☐	☐
McGowan		☒	☐	☐	☐
Acting Mayor Goldsack – tie only		☐	☐	☐	☐

I hereby certify that this is a true and exact copy
of the resolution adopted by the Mayor and Council of the
Borough of Rutherford on the **24th day of May 2021**

Margaret M. Scanlon, Borough Clerk

NEW JERSEY SENATE

PAUL A. SARLO
DEPUTY MAJORITY LEADER
36TH LEGISLATIVE DISTRICT
496 COLUMBIA BOULEVARD, 1ST FLOOR
WOOD-RIDGE, NEW JERSEY 07075
PHONE: (201) 804-8118
FAX: (201) 804-8644

COMMITTEES
CHAIRMAN
BUDGET & APPROPRIATIONS
JUDICIARY

May 14, 2021

Via Email: salkie.diane@epa.gov
Ms. Diane Salkie
Remedial Project Manager
United States Environmental Protection Agency 290 Broadway, 18th Floor
New York, New York 10007-1866

Re: LOWER PASSAIC RIVER STUDY AREA
DIAMOND ALKALI SUPERFUND SITE OPERABLE UNIT 4

Dear Ms. Salkie:

I am a State Senator that represents communities located along the Passaic River. This letter is to formally express my support for the United States Environmental Protection Agency's (US EPA) proposed plan for the upper 9 miles of the Lower Passaic River, also known as the Diamond Alkali Superfund Site Operable Unit 4. Having had the opportunity to review the Proposed Plan for the Upper 9 Miles of the Passaic River released on April 14, 2021, I am pleased to offer my support for the following reasons:

Schedule - USEPA and the New Jersey Department of Environmental Protection (NJDEP) are to be commended for working collaboratively over the past three (3) plus years to create a plan for the upper 9 miles of the Passaic River. I was very pleased to see that the proposed plan fast tracks action in the upper 9 miles of the Passaic River and cuts 7 plus years of what was the traditional schedule. By providing relief quicker, it's very clear to me that the USEPA and the NJDEP took the comments received during the Lower 8-mile public comment period very seriously.

Alignment with Lower 8-Mile Remedy - The original schedule called for performing the Lower 8-Mile Remedy first and then - eventually - getting to the upper 9 miles of the Passaic River. I am glad to see that the Proposed Plan for the upper 9 miles of the Passaic River is now aligned with the Lower 8-mile Remedy. I am pleased to see that common sense prevailed and we thank the USEPA and the NJDEP for their efforts and collaboration.

Resuspension - Again, under the original schedule many stakeholders in the upper 9 miles of the Passaic River expressed concerns about resuspension and transport up-river of contaminants from the lower 8 miles. The concern was that despite best efforts to contain contaminated sediments, the dredging movement of massive amounts of sediment in a tidal river like the Passaic River would result in an unacceptable amount of contaminants moving from the lower 8 miles and depositing in the upper 9 miles of the Passaic. While resuspension of contaminants remains a concern, aligning the lower 8 mile and upper 9 remedies will permit project managers to monitor and manage resuspension in real time and adjust accordingly.

Implementation - While I understand the design phase will follow the public comment period and the issuance of the Record of Decision (ROD) is, all indications are that all work will take place in river. In other words, an estimated 387,000 cubic yards of sediment will be removed from the upper 9 miles of the Passaic River and the vast majority will be transported via barge down the river, to a treatment facility, not via truck through the communities along the Passaic River.

No Adverse Impact on Flooding - By now the USEPA and NJDEP have heard loud and clear that in addition to the contamination in the Passaic River, flooding is a major concern of lower 8-mile stakeholders. While relief to our flooding problem remains a concern, I was happy to see that the proposed plan for the upper 9 miles of the Passaic River will not adversely impact flooding in the region.
Environmental Justice - Environmental justice has been and remains a priority for out State. Governor Murphy, the Passaic River Community Advisory Group (CAO), the US EPA and the NJDEP share that commitment. Advancing the removal of contaminated sediments in the upper 9 miles of the Passaic River and aligning the Upper 9-Mile and the Lower 8-Mile remedies will address environmental justice concerns in the region and is a positive step forward for overburdened communities.

Economic Development - Stated simply, taking action and cleaning up with Passaic River leads to certainty. Certainty leads to economic development and private investment in the State.

For the record, we urge the USEPA to take a very close and careful look above River Mile 15 (Passaic River Bridge) to the Dundee Dam. The proposed Interim Remedy indicates known and identifiable areas of sediment between 8.3 and River Mile 15 will immediately be addresses, while the river bed between River Mile 15 and Dundee Dam will be examined closely and dealt with on an ad hoc basis. We trust that the USEPA will ensure that the performing parties spend the necessary time and effort to protect human health and safety above River Mile 15.

I look forward to working with you on the design and implementation of the remedy for the upper 9 miles of the Passaic River. If you have any questions or require additional information, please contact my office at 201-804-8118.

Sincerely,

Paul A. Sarlo
Senator, District 36

From:	Kandil, Shereen
To:	Salkie, Diane
Cc:	Sivak, Michael
Subject:	FW: Upper 9 Comments
Date:	Monday, June 14, 2021 4:41:09 PM
Attachments:	BK-HRI Upper 9 Comments.pdf image002.png image003.png image004.png image005.png image006.png

Comments from Baykeeper/Riverkeeper

Shereen Kandil
Team Leader, Community Affairs
Public Affairs Office
212-637-4333
Kandil.shereen@epa.gov

U.S. Environmental Protection Agency, Region 2
290 Broadway, 26th Floor
New York, NY 10007

From: Michele Langa <michele@nynjbaykeeper.org>
Sent: Monday, June 14, 2021 4:35 PM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Subject: Upper 9 Comments

Hi Shereen,

Attached are comments from Baykeeper/Riverkeeper on the Upper 9 Interim plan.

Thank you!
Michele

Michele Langa
Staff Attorney

NY/NJ Baykeeper
1222 Route 36, Suite #4
Hazlet, NJ 07730
Office: (732) 888-9870

Mobile: (201) 396-0073
michele@nynjbaykeeper.org
www.nynjbaykeeper.org

June 14, 2021

U.S. Environmental Protection Agency, Region 2
290 Broadway, 26th Floor
New York, NY 10007

Re: Comments on the USEPA Proposed Plan for Interim Action to Clean Up Contaminated Sediment in the Lower Passaic River Study Area of the Diamond Alkali Superfund Site, New Jersey

To the Remedial Project Team:

NY/NJ Baykeeper and Hackensack Riverkeeper appreciate the opportunity to provide comments to EPA on the proposed plan for an interim remedy on the Upper 9 Miles of the Passaic River Superfund. Both organizations have long tracked the progress of this project and have provided comments on many of its various interim and final actions.

Overall, we support the conceptual approach to this interim remedy and recognize the value, efficiency, and expedience of accelerating cleanup and coordinating this effort with the lower 8 miles of the Passaic. However, it is vital that we continue to stress the importance of reaching a level of cleanup that ensures long-term protection of human health and the environment. Echoing our colleagues in the Passaic River CAG, we share their concerns here:

> *The interim action if not properly approached, could undermine the long-term achievement of cleanup levels that are necessary to protect human health and the environment. Specifically, how effectiveness of the interim action and evaluation of ultimate cleanup levels are determined, evaluated, and ultimately implemented are the primary concern of the CAG. We strongly believe that there will be strong long-term inertia to rely on any interim action as ultimately "good enough." The cost and opportunity of remobilization a decade or more from now to clean up a few spots or even more work that may be needed will be another challenge for another set of scientists and stakeholders. We are not confident that it will be done. As such, we feel strongly that this interim remedy be planned and implemented as robustly as reasonably possible.*
>
> *- November 14, 2019 CSTAG comments from Passaic River CAG*

The Passaic River CAG has submitted excellent and thorough comments on this proposal, and rather than repeating their concerns here, we wholeheartedly concur with them. The initial importance of utilizing shared resources to make the Upper 9 Interim plan possible should not overshadow any potential future work to ensure a complete and total cleanup as the result. We will not abide by an interim remedy that functions as a final remedy and will monitor the recovery closely to ensure any additional work necessary to meet final remedy criteria is done.

Our support extends to the need to continue the ground-level community engagement that the Passaic River Superfund team is known for through its work on the River. Planning that incorporates community involvement, Green Infrastructure projects, and an eye toward the future that explores Natural Resource Restoration projects now are all beneficial to the communities along the Passaic River and the health and recovery of the River. Communities along the River have suffered from the effects of the Superfund for decades and deserve and are owed the best possible cleanup plan that allowed them to reconnect to the Passaic River in meaningful ways, both visually and physically.

Sincerely,

Captain Bill Sheehan
Riverkeeper & Executive Director

Gregory Remaud
Baykeeper & CEO

BOROUGH OF WALLINGTON
COUNTY OF BERGEN
RESOLUTION NO. 2021-097

WHEREAS, on April 14, 2021 the United States Environmental Protection Agency's (EPA) released a proposed plan for the upper 9 miles of the Lower Passaic (hereinafter referred to as the "Upper 9 miles"), also known as the Diamond Alkali Superfund Site Operable Unit 4; and

WHEREAS, over the last three (3) years the EPA worked in collaboration with the New Jersey Department of Environmental Protection (NJDEP) to create a plan for Upper 9 miles; and

WHEREAS, the original schedule was inequitable to stakeholders in the Upper 9 miles as it called for performing the lower 8-mile remedy first, followed by the Upper 9 miles of the Passaic River; and

WHEREAS, the Borough of Wallington is pleased to see that the proposed plan expedites the remediation of contaminated sediment in the Upper 9 miles of the Passaic River, aligns the Lower 8 remedy with the Upper 9 remedy and fast tracks the traditional cleanup schedule by seven (7) years; and

WHEREAS, aligning the Lower 8 and Upper 9 remedies permits project managers to monitor and manage any resuspension and transportation of contaminated sediments between the Lower 8-miles and the Upper 9 miles; and

WHEREAS, while the EPA's Proposed Plan is subject to public comment before a Record of Decision (ROD) is issued, all indications are that vast majority of the work will take place in the river; and

WHEREAS, instead of approximately 387,000 cubic yards of contaminated sediment being trucked through the communities along the Passaic River, the vast majority of contaminated sediment will be removed from the Upper 9 miles via barge to a treatment facility down river; and

WHEREAS, the EPA and NJDEP received public input from communities along the Passaic River during the Lower 8-mile public comment period in 2016 and took steps to mitigate those concerns in the Upper 9 proposed plan; and

WHEREAS, the EPA and NJDEP proposed plan for the Upper 9 miles will not adversely impact flooding in the region; and

WHEREAS, this plan demonstrates Governor Murphy, the Passaic River Community Advisory Group (CAG), the EPA, and the NJDEP's shared commitment to environmental justice; and

WHEREAS, the completion of this project will significantly address environmental justice concerns in the region and signifies progress for overburdened communities; and

WHEREAS, environmental justice remains a priority of the Borough of Wallington.

NOW THEREFORE BE IT RESOLVED as follows:

1. The Mayor and Council of the Borough of Wallington in the County of Bergen, State of New Jersey, hereby endorse the EPA's Proposed Plan for the Upper 9 miles clean-up project of the Lower Passaic River; and

2. The Mayor and Council of the Borough of Wallington directs the Borough Clerk to forward a copy of this resolution to the EPA, U.S. Senator Cory Booker, U.S. Senator Bob Menendez, Congressman Bill Pascrell, Governor Phil Murphy, NJ DEP Commissioner Shawn LaTourette, District 34 Legislators, Upper 9 Mayors, and the Passaic River Community Advisory Group (CAG).

Member	Motion	Second	Aye	Nay	Abstain	Certified as a true copy of a Resolution adopted by the Borough Wallington at a below date meeting.
Rachelski			X			
Ivanicki			X			
Preinfalk			X			
Androwis	X		X			
Orzechowski		X	X			Greg Zagaja
Sadecki			X			Act. Deputy Borough Clerk

Approved: April 29, 2021

BOROUGH OF WALLINGTON

By: Melissa Dabal

Mayor Melissa Dabal

From: Edward Zielanski
To: Salkie, Diane
Subject: Passiac Dredging Project
Date: Monday, April 19, 2021 10:54:22 AM
Attachments: ATT00001.txt

Good morning! I've been reading about the planned project for dredging in the lower Passaic River basin. As a remediation contractor performing sediment removal and stabilization, this type of work greatly interests me.

Was curious what is the anticipated timeline for RFP release for the construction contracts? Just trying to a get a sense as to how far off the project is from going to construction.

Any estimate is greatly appreciated. Thanks!

Ed Zielanski, PE
Vice President – Northeast Operations

A 4 West Park Street, Suite 130, Bordentown, NJ 08505
P 732.530.1800 **M** 858.336.1800
E EZielanski@odinconstruction.com