RECORD OF DECISION

Harbor at Hastings
Operable Unit Number 02: Hudson River Sediments
State Superfund Project
Hastings-on-Hudson, Westchester County
Site No. 360022
March 2012

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION

Harbor at Hastings
Operable Unit Number: 02
State Superfund Project
Hastings-on-Hudson, Westchester County
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Statement of Purpose and Basis

This document presents the remedy for Operable Unit Number: 02: Hudson River Sediments of the Harbor at Hastings site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Number: 02 of the Harbor at Hastings site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;

- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. Installation of a sheet pile wall within the Hudson River to provide containment and allow for the recovery of liquid PCB DNAPL offshore of the northwest corner of the site. The location and alignment of the northwest extension area (NEA) sheet pile wall will be verified during the remedial design to minimize filling into the Hudson River while enabling effective DNAPL containment and recovery and maintaining stability of the site. It is estimated that this area of fill will encompass 0.88 acres. The area behind the sheet pile wall will be filled with soil and/or lightweight aggregate as approved by the Department. The sheet pile wall will include sealed joints, installation of tie-rods, upland anchors, and cathodic protection. The wall system will also include groundwater filtration units to adsorb contaminants that may be present in groundwater before discharge to the river.

3. Mitigation of fill placed into the Hudson River to replace the aquatic habitat that will be lost as a result of the NEA. Mitigation will involve the creation and/or restoration of river habitat in accordance with a Department-approved plan.

4. Development and implementation of a plan for further delineation and recovery of PCB DNAPL from beneath the northwest corner of the site and the NEA.

5. Removal of sediment and fill that contains PCB concentrations greater than 1 ppm and/or copper, zinc and lead concentrations above the background concentrations listed in Table 2 of Exhibit A, to a maximum excavation depth of 6 feet within the area where sediment resuspension controls, such as a fixed silt curtain, are feasible. This area generally corresponds to a water depth of 15 feet and a distance from the shoreline into the river of approximately 60 to 80 feet and along approximately 2000 feet of shoreline.

6. The specific area where fixed sediment resuspension controls can be feasibly deployed will be evaluated during design based on the water depth and velocity conditions at the site. Alternative designs for fixed resuspension controls will be evaluated to increase the depth of feasible resuspension controls. Designs for mobile resuspension controls will also be evaluated and developed for dredging in deeper water, if necessary.

7. Removal of sediment from a targeted area outside the northwest extension area in deeper than 15 feet of water that is defined by PCB concentrations greater than 50 ppm, to a maximum depth of 6 feet. During the design, sampling will be performed to determine whether additional areas of PCBs greater than 50 ppm exist. Based upon an evaluation of the significance of the distribution of contaminants and the feasibility of removal, additional areas of sediment may be targeted for dredging.

8. On-site dewatering of dredged and excavated sediments for off-site transportation and disposal or onsite reuse, as appropriate. On-site reuse of sediments will be evaluated during

design. Water removed from the sediment will be treated and discharged back to the river in compliance with regulatory requirements.

9. Backfill of dredged areas with Department-approved material. Dredged areas within the resuspension controls will be backfilled with clean material to isolate remaining contamination, prevent erosion of cap materials, restore bathymetry, and provide a habitat layer. In nearshore areas which have contamination remaining above background concentrations, isolation capping will be placed following dredging. The isolation cap will consist of a sand isolation layer; armoring layer; and a minimum of a 24 inch habitat layer. The isolation and armoring layer thicknesses and materials of the cap will be established in the remedial design. As part of the design, a river flow and deposition study will be conducted to determine approximate sedimentation rates and the acceptability that up to 12 inches of the habitat layer may fill in by natural deposition within a reasonable duration of time after installation of the remainder of the isolation cap. Additional backfill needed to reach bathymetry requirements will be placed between the erosion protection layer and habitat layer. The habitat layer will be designed to restore aquatic habitat. Dredged areas that are outside the near shore area will be backfilled with appropriate river substrate to within 12 inches of the pre-dredge elevation provided that the sedimentation study demonstrates that sufficient deposition will occur within a reasonable time frame. All activities associated with the excavation and restoration of Hudson River sediments will meet the requirements of 6NYCRR Part 608.

10. Imposition of an institutional control in the form of an environmental easement for the NEA which will be included with the environmental easement for OU1 that will:

a. require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

b. allow the use and development of the controlled property for restricted residential uses as defined by Part 375-1.8(g), consistent with the OU1 ROD, as amended,, although land use is subject to local zoning laws;

c. restrict the use of groundwater and/or surface water as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or Westchester County DOH;

d. prohibit agriculture or vegetable gardens on the controlled property; and

e. require compliance with the Department approved Site Management Plan.

11. A Site Management Plan is required, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 10 above.
Engineering Controls: The sediment containment system and cover discussed in Paragraphs 2 and 9.

This plan includes, but may not be limited to:

i. Excavation and Sediment Management Plan which details the provisions for management of future excavations in areas of remaining contamination and includes a prohibition on the construction of pile-supported structures within the Northwest Extension Area;

ii. descriptions of the provisions of the environmental easement including any land use, groundwater, and surface water use restrictions;

iii. provisions for the management and inspection of the identified engineering controls;

iv. maintaining site access controls and Department notification; and

v. the steps necessary for the periodic reviews and certification of the institutional and engineering controls.

b. a monitoring plan to assess the performance and effectiveness of the remedy. The plan will be designed to measure PCB and metals concentrations and evaluate the long-term contaminant trends in the affected media (biota, sediment, water). One goal of the monitoring program will be to determine if the remedy is successful in reducing the local contribution to PCB tissue concentrations in biota. This program will monitor the performance and effectiveness of the remedy in achieving the remedial goals established for the project and will be a component of the monitoring and maintenance of the site. The plan includes, but may not be limited to:

i. baseline sampling of biota; surficial sediment sampling; biota sampling in the vicinity of the site and at reference locations; porewater and surface water sampling in the vicinity of the site and at reference locations; shoreline and nearshore bathymetry; and habitat characterization;

ii. long-term sampling of biota; surficial sediment sampling; biota sampling in the vicinity of the site and at reference locations; porewater and surface water sampling in the vicinity of the site and at reference locations; shoreline and nearshore bathymetry; and restoration success to assess the performance and effectiveness of the remedy; and

iii. a schedule of monitoring and frequency of submittals to the Department.

c. an Operation and Maintenance Plan to ensure continued operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

i. compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

ii. providing the Department with required notifications and access to the site and O&M records.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 30, 2012

Date

Robert W. Schick, P.E., Acting Director
Division of Environmental Remediation

RECORD OF DECISION

Harbor at Hastings
Hastings-on-Hudson, Westchester County
Site No. 360022
March 2012

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

Hastings Public Library
Attn: Susan Feir
7 Maple Avenue
Hastings-on-Hudson, NY 10706
Phone: 914-478-3307

NYSDEC Region 3
Attn: Call for Appointment

21 South Putt Corners Road Phone: 845-256-3154
New Paltz, NY 12561
Village Clerk
Municipal Offices
7 Maple Avenue
Hastings on Hudson, NY 10706
Mon - Fri: 8:30 - 4:00
Phone (914) 478-3400

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) were presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The site is located on approximately 28 acres along the Hastings-on-Hudson waterfront, separated from the village commercial district by railroad tracks. The site is bounded on the north and west by the Hudson River and to the south by the Tappan Terminal site. A former marina borders the site to the north.

Site Features: Most of the site is covered by pavement or concrete building slabs. One building remains at the site (Building 52). The shoreline consists of areas of loosely-placed rip rap and concrete rubble in the north and decaying wooden bulkheads, docks and piers in the central area. Two former boat slips are present along the waterfront, both of which have filled in to a shallow depth with naturally-deposited sediment. The shoreline south of the South Boat Slip consists of modern steel sheeting.

Current Zoning and Uses: The site is zoned general industrial, and is the subject of planning studies by the Village of Hastings-on-Hudson. Several temporary trailers are in use for security and remedial activities.

Historic Uses: The site is the former Anaconda Wire and Cable Company, which ceased operations in 1974. Wire manufacturing operations during a portion of the operating period caused the release of PCBs and metals to site soil, groundwater and sediments. A site investigation was performed in 1986-87 in connection with a potential real estate development. This investigation led to the discovery of high levels of PCBs beneath the northwest corner of the site.

Operable Units: The site is divided into two operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Operable Unit 1 (OU1) is the on-site soils area west of the railroad tracks. OU2 is the off-site impacts to the Hudson River.

Site Geology and Hydrogeology: The landmass of the property was constructed by placement of fill material into the Hudson River until the early 1900s. This fill material is approximately 10-20 feet thick along the railroad tracks, and 20-40 feet thick along the river. Beneath the fill layer lies the Marine Silt, which is a structurally weak clayey silt material that is approximately 40 feet thick along the shoreline. Beneath the Marine Silt lies the Basal Sand unit, a very dense sand and gravel material, into which all structural piles for site buildings were placed. Groundwater is approximately 2 to 8 feet below ground surface in the fill material, and is influenced by tidal variation. Groundwater in the Basal Sand unit is confined by the Marine Silt unit and is present in an artesian condition. The shoreline shows signs of historical erosion due to storm events and wave action. Low-lying parts of the site have been flooded during larger storms.

Operable Unit (OU) Number 02 is the subject of this document.

A Record of Decision was issued previously for OU 01.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the RI to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

Atlantic Richfield Company (ARCO)

The Department and ARCO entered into Consent Orders in 1995 and March 2005. These Orders obligate ARCO to implement a RI/FS and RD/RA for OU1.

The PRPs for the site declined to implement the remedial investigation and feasibility study portion of the remedial program for OU2 when first requested by the Department. Since 2003 the PRPs have voluntarily performed additional investigations and submitted work plans and reports which include a feasibility study to advance the remedial program. After the remedy is selected, the PRPs will again be contacted to execute an order on consent for the OU2 remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- surface water

- soil
- sediment

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified for this Operable Unit at this site is/are:

Polychlorinated Biphenyls (PCB)	Lead
Copper	Zinc

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- surface water
- sediment

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The Fish and Wildlife Resources Impact Analysis (FWRIA) for OU 02, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

The primary contaminants of concern for the site are PCBs (Aroclors 1260 and 1262) and metals, including copper, lead and zinc from historic wire manufacturing operations. For OU1, soil and groundwater beneath the site are contaminated with PCBs and metals, including beryllium, above standards, criteria and guidance values. For OU2, PCBs and metals have also contaminated Hudson River surface water and sediments, and site-related PCBs have been detected in resident fish.

The site presents a significant environmental threat due to ongoing releases from contaminated soils and/or sediments to groundwater, surface water and the Hudson River ecosystem. Metals in sediment pose a toxicity threat to benthic organisms, and PCBs in sediment pose a toxicity and bioaccumulation threat to fish and wildlife.

6.4: <u>Summary of Human Exposure Pathways</u>

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

For OU-1: The site is completely fenced, which restricts public access. Some contaminated soils remain at the site below concrete and/or clean fill, therefore, people will not come in contact with contaminated soil unless they dig below the surface materials. Contaminated groundwater at the site is not used for drinking or other purposes as the site is served by a public water supply that obtains water from a different source not affected by this contamination. For OU-2: People using the river for recreational purposes such as swimming and boating may come into direct contact with site related contaminants. The river is not a source of potable water in this area. People may come in contact with contaminants present in shallow sediment while entering and exiting the river. Fish in the river are likely to contain the same contaminants that are present in surface water and sediment; therefore, people who consume fish from the river are likely to be consuming these contaminants as well. For specific advisories on fish consumption in this area please refer to NYSDOH's Health Advise on Eating Sportfish and Game. http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/docs/advisory_booklet_2011.pdf

6.5: <u>Summary of the Remediation Objectives</u>

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

<u>**Surface Water**</u>

RAOs for Public Health Protection

- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Restore surface water to ambient water quality criteria for the contaminant of concern.
- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

<u>**Sediment**</u>

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

SECTION 7: <u>SUMMARY OF THE SELECTED REMEDY</u>

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.

The selected remedy is referred to as the Nearshore Dredge to 6 feet, Limited Deepwater Dredge and Northwest Extension remedy.

The estimated present worth cost to implement the remedy is $105,000,000. The cost to construct the remedy is estimated to be $95,200,000 and the estimated average annual cost is $454,000.

The elements of the selected remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. Installation of a sheet pile wall within the Hudson River to provide containment and allow for the recovery of liquid PCB DNAPL offshore of the northwest corner of the site. The location and alignment of the northwest extension area (NEA) sheet pile wall will be verified during the remedial design to minimize filling into the Hudson River while enabling effective DNAPL containment and recovery and maintaining stability of the site. It is estimated that this area of fill will encompass 0.88 acres. The area behind the sheet pile wall will be filled with soil and/or lightweight aggregate as approved by the Department. The sheet pile wall will include sealed joints, installation of tie-rods, upland anchors, and cathodic protection. The wall system will also include groundwater filtration units to adsorb contaminants that may be present in groundwater before discharge to the river.

3. Mitigation of fill placed into the Hudson River to replace the aquatic habitat that will be lost as a result of the NEA. Mitigation will involve the creation and/or restoration of river habitat in accordance with a Department-approved plan.

4. Development and implementation of a plan for further delineation and recovery of PCB DNAPL from beneath the northwest corner of the site and the NEA.

5. Removal of sediment and fill that contains PCB concentrations greater than 1 ppm and/or copper, zinc and lead concentrations above the background concentrations listed in Table 2 of Exhibit A, to a maximum excavation depth of 6 feet within the area where sediment resuspension controls, such as a fixed silt curtain, are feasible. This area generally corresponds to a water depth of 15 feet and a distance from the shoreline into the river of approximately 60 to 80 feet and along approximately 2000 feet of shoreline.

6. The specific area where fixed sediment resuspension controls can be feasibly deployed will be evaluated during design based on the water depth and velocity conditions at the site. Alternative designs for fixed resuspension controls will be evaluated to increase the depth of feasible resuspension controls. Designs for mobile resuspension controls will also be evaluated and developed for dredging in deeper water, if necessary.

7. Removal of sediment from a targeted area outside the northwest extension area in deeper than 15 feet of water that is defined by PCB concentrations greater than 50 ppm, to a maximum depth of 6 feet. During the design, sampling will be performed to determine whether additional areas of PCBs greater than 50 ppm exist. Based upon an evaluation of the significance of the distribution of contaminants and the feasibility of removal, additional areas of sediment may be targeted for dredging.

8. On-site dewatering of dredged and excavated sediments for off-site transportation and disposal or onsite reuse, as appropriate. On-site reuse of sediments will be evaluated during design. Water removed from the sediment will be treated and discharged back to the river in compliance with regulatory requirements.

9. Backfill of dredged areas with Department-approved material. Dredged areas within the resuspension controls will be backfilled with clean material to isolate remaining contamination, prevent erosion of cap materials, restore bathymetry, and provide a habitat layer. In nearshore areas which have contamination remaining above background concentrations, isolation capping will be placed following dredging. The isolation cap will consist of a sand isolation layer; armoring layer; and a minimum of a 24 inch habitat layer. The isolation and armoring layer thicknesses and materials of the cap will be established in the remedial design. As part of the design, a river flow and deposition study will be conducted to determine approximate sedimentation rates and the acceptability that up to 12 inches of the habitat layer may fill in by natural deposition within a reasonable duration of time after installation of the remainder of the isolation cap. Additional backfill needed to reach bathymetry requirements will be placed between the erosion protection layer and habitat layer. The habitat layer will be designed to restore aquatic habitat. Dredged areas that are outside the near shore area will be backfilled with

appropriate river substrate to within 12 inches of the pre-dredge elevation provided that the sedimentation study demonstrates that sufficient deposition will occur within a reasonable time frame. All activities associated with the excavation and restoration of Hudson River sediments will meet the requirements of 6NYCRR Part 608.

10. Imposition of an institutional control in the form of an environmental easement for the NEA which will be included with the environmental easement for OU1 that will:

a. require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

b. allow the use and development of the controlled property for restricted residential uses as defined by Part 375-1.8(g), consistent with the OU1 ROD, as amended,, although land use is subject to local zoning laws;

c. restrict the use of groundwater and/or surface water as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or Westchester County DOH;

d. prohibit agriculture or vegetable gardens on the controlled property; and

e. require compliance with the Department approved Site Management Plan.

11. A Site Management Plan is required, which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
Institutional Controls: The Environmental Easement discussed in Paragraph 10 above.
Engineering Controls: The sediment containment system and cover discussed in Paragraphs 2 and 9.

This plan includes, but may not be limited to:

i. Excavation and Sediment Management Plan which details the provisions for management of future excavations in areas of remaining contamination and includes a prohibition on the construction of pile-supported structures within the Northwest Extension Area;

ii. descriptions of the provisions of the environmental easement including any land use, groundwater, and surface water use restrictions;

iii. provisions for the management and inspection of the identified engineering controls;

iv. maintaining site access controls and Department notification; and

v. the steps necessary for the periodic reviews and certification of the institutional and engineering controls.

b. a monitoring plan to assess the performance and effectiveness of the remedy. The plan will be designed to measure PCB and metals concentrations and evaluate the long-term contaminant trends in the affected media (biota, sediment, water). One goal of the monitoring program will be to determine if the remedy is successful in reducing the local contribution to PCB tissue concentrations in biota. This program will monitor the performance and effectiveness of the remedy in achieving the remedial goals established for the project and will be a component of the monitoring and maintenance of the site. The plan includes, but may not be limited to:

i. baseline sampling of biota; surficial sediment sampling; biota sampling in the vicinity of the site and at reference locations; porewater and surface water sampling in the vicinity of the site and at reference locations; shoreline and nearshore bathymetry; and habitat characterization;

ii. long-term sampling of biota; surficial sediment sampling; biota sampling in the vicinity of the site and at reference locations; porewater and surface water sampling in the vicinity of the site and at reference locations; shoreline and nearshore bathymetry; and restoration success to assess the performance and effectiveness of the remedy; and

iii. a schedule of monitoring and frequency of submittals to the Department.

c. an Operation and Maintenance Plan to ensure continued operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

i. compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;

ii. providing the Department with required notifications and access to the site and O&M records.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into two categories: pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). For comparison purposes, the SCGs are provided for each medium.

The former manufacturing operations within OU 1 caused the release of PCBs and metals to site soil, groundwater and sediments at the Harbor at Hastings Site. The nature and extent of contamination found in OU 1 is important to understanding the contamination found in the sediments of OU 2. The areas of concern include the Northwest Corner On-Shore Area, Building 52 outfalls, Building 15 Outfall, and Sluice Area have been identified as areas which have caused the release and discharge of contaminants from portions of OU 1 to the OU 2 sediments. These areas are shown on Figure 2.

The OU 2 portion of the site is divided into different areas which has been useful to define the nature and extent of contamination and evaluate alternatives. These areas are described below and are labeled on Figure 2.

Near Shore Area: The area of sediments along the shore defined by the feasible limit of resuspension controls on the west and the existing bulkhead between OU1/OU2 boundary on the east. This area is generally within 60 to 80 feet from the shoreline. This area does not include the Backwater Area or the Northwest Corner Off-Shore Area.

Backwater Areas: These sediment areas include the Old Marina, North Boat Slip, and South Boat Slip and are areas with lower river velocities and have been identified with increased sediment deposition.

Deepwater Area: Sediment areas beyond the feasible deployment of resuspension controls. The furthest extent of contamination is approximately 400 feet west of the OU 1 shoreline and 300 feet north, and adjacent to the OU1 southern boundary.

Northwest Corner Off-Shore Area: The area of rip rap that is offshore of the Northwest Corner On-Shore Area of OU1. This area extends approximately 100 feet from the shoreline and represents an area of approximately 0.88 acres.

The Northwest Corner On-Shore Area: The area of OU1 where PCB DNAPL has been found and current PCB DNAPL recovery is occurring.

Waste/Source Areas

As described in the RI and Feasibility Study reports, waste/source materials were identified at the site and are impacting sediment.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site in sediment areas in close proximity to outfalls and manufacturing buildings.

The highest levels of PCB in sediments at the site were found in the Northwest Corner Off- Shore Area and were associated with separate phase PCB material that varies in consistency from a fluid dense non-aqueous phase liquid (DNAPL) to an elastic material that resembles rubber cement. This PCB material is the Aroclor wire insulating mixture that was formulated in the Northwest Corner On-Shore Area of the property in Building 56. This material apparently migrated through the soil beneath the property in its fluid form and was also discharged into the Hudson River through outfalls; by runoff; and eroded surface soil from areas where wire reels were dried or stored on the site.

The PCB Material has been classified in three different physical states, the variation in the physical state of the material represents weathering changes since the material was released:

> Liquid PCB (LPCB) Material or Dense Non-aqueous Phase Liquid was observed to be amber in color, is less viscous than the Semi-Solid or Trace PCB Material and is highly to moderately mobile, readily flowing into monitoring wells when it is encountered.
>
> Semi-Solid PCB (SSPCB) Material was generally observed to be more viscous than Liquid PCB Material and appeared grayish-brown in color. Based on visual observations, SSPCB has a sticky, string-like consistency. Although not as fluid or capable of migration, large deposits of semi-solid PCBM have been identified.
>
> Trace PCB (TPCB) Material, when observed, consists of small quantities of TPCB Material intermingled with the soil and was more difficult to visually observe. Like the Semi-Solid PCB Material, the Trace PCB Material had a string-like consistency (small strings and hair-like filaments) and appeared grayer in color.

Samples containing PCB Material were found in sediments adjacent to the northwest corner of the property, as indicated on Figure 3. Samples outside this area generally contained lower levels of PCBs, indicating that the contamination is sorbed onto the sediment particles. The precise locations in the subsurface and boundaries between the different forms of PCB material is not currently known, due to the limitations to perform investigation borings to the targeted depth in the area of rip rap immediately off-shore of the site.

With limited exceptions, the depth of PCB migration in both OU1 and OU2 is controlled by the marine silt layer, which is present between 30 and 42 feet beneath the site. The surface of the marine silt, which generally tilts towards the Hudson River, is also characterized by troughs and ridges. These features may be directing the migration of the Liquid PCB Material beneath the site, creating preferential pathways and depressions where the material may pool.

Investigations beginning in 2006 and continuing into 2011 identified locations at which Liquid PCB Material is present beneath the Northwest Corner On-Shore Area shoreline in both monitoring wells and DNAPL recovery wells. Soil and sediment sampling has generally identified the PCB nature and distribution in the shoreline and sediment area. The location where PCB DNAPL was identified in monitoring and recovery wells is shown on Figure 3.

The waste/source areas identified will be addressed in the remedy selection process.

Surface Water

Surface water samples were collected during the RI from upstream and on-site locations in the Hudson River. The samples were collected to assess the surface water conditions on and off-site. The results indicate that polychlorinated biphenyls (PCBs) and lead in surface water at the site exceed the Department's Surface Water Quality Standards. Levels of PCB in Hudson River surface water were higher than the 0.001 parts per trillion (ppt) standard in all of the 5 samples taken. The highest level, 62.4 ppt, was found in the North Boat Slip area of the site. Elevated levels were also found in samples taken offshore of Dobbs Ferry, the background location (57.0 ppt), in the former marina area (52.7 ppt), and offshore of the northwest corner (46.6 ppt). The sample taken offshore of Dobbs Ferry was significantly more turbid than the others, and elevated levels seen there may have resulted from suspended material in the sample. A much lower level (18.0 ppt) was found in the south boat slip.

The PCB analysis for these samples was congener-specific, so an evaluation of Aroclor patterns was not performed. However, the highest degree of chlorination, which is consistent with the higher numbered Aroclors (eg. Aroclor 1260) found at the site, was found in the sample collected from the old marina. The lowest degree of chlorination was found in the sample collected from Dobbs Ferry, the upstream location. These results suggest that the site is a source of dissolved PCBs in the Hudson River.

Table 1 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb) or (ppt)	Frequency Exceeding SCG
Metals			
Lead	6.3 to 23.1 ppb	8.0 ppb	2 of 4
Pesticides/PCBs			
PCBs, total	18.0 to 57.0 ppt	0.001 ppt	4 of 4

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b-SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.

The primary surface water contaminants are polychlorinated biphenyls (PCBs) and lead associated with historical manufacturing and disposal at the site. The primary surface water contamination is found where high levels of PCBs were found in soils and sediments near the Northwest Corner Off-Shore Area.

Based on the findings of the Remedial Investigation, the presence of PCB in soils and sediment has resulted in the contamination of surface water. The site contaminants that are considered to be the primary contaminants of concern in surface water which will be addressed by the remedy selection process are PCBs and lead.

Sediments

Sediment samples were collected during the RI and during additional investigations from the Hudson River and at locations upstream, adjacent and downstream of the site along the Hudson River. The samples were collected to assess the potential for impacts to river sediment from the site related contaminants. The results indicate that sediment in the Hudson River exceed the Department's sediment SCGs for PCBs, copper, lead, mercury, nickel, silver and zinc. The following is a summary of the SCGs and patterns of detection for these metals and PCBs.

The highest PCB concentrations in shallow and deeper sediment were found offshore of the northwest corner of the property. The samples included PCB material identified as semisolid PCB material. Movement of PCB Material as DNAPL through the fill in OU-1 has historically occurred vertically and, to a limited extent, horizontally along the interface with the Marine Silt. It appears that there has been some historical movement of DNAPL along the Marine Silt interface near the boundary between OU-1 and OU-2. However, there are also other transport mechanisms by which PCBs were likely deposited in OU-2. For example, PCB Material was likely associated with the outfalls of pipes associated with Building 52 and other manufacturing operations on OU-1. In addition, historic activities such as the mixing of PCB manufacturing ingredients along the Northwest Corner may have resulted in the overland transport of PCBs to the River, and other historic activities along the old dock and pier structures may also have resulted in PCB deposition in river sediments. Finally, prior to the installation of the IRM in the northwest corner, PCB contaminated soils may have washed or eroded from the upland surface soils. It appears that the PCB Material moved through the more permeable fill unit and into the sediments. A conceptual model of PCB migration showing the PCB migration pathways is shown in Figure 4.

Screening Criteria for PCBs

For PCBs and other organic contaminants, the "Technical Guidance for Screening Contaminated Sediments" lists four screening values that correspond to different levels of protection. The values for these criteria were calculated using the site-specific values of organic carbon content, as directed by the guidance, and are listed in Table 3.

Remediation Goals That Account for Background Contamination

Because sediments in the lower Hudson River are widely contaminated with low levels of PCBs that exceed some of these screening criteria, background levels were factored into the development of site-specific remediation goals. Background levels of PCBs in the 10 samples taken upstream and across the river from the site ranged from non-detectable to 7.0 ppm. The sediment containing the 7.0 ppm value was re-sampled and determined to contain 1.2 ppm PCB based on re-sampling. As a result, the Feasibility Study considered 1 ppm as a remedial goal based on background conditions. It should be noted that where background concentrations that exceed risk-based criteria for toxicity and/or bioaccumulation are used as remediation goals, some ecological risk is anticipated to remain in the unremediated sediments.

Screening Criteria for Metals

New York State sediment criteria for metals are based on their toxicity to sediment-dwelling (benthic) organisms. For each metal, the following criteria were considered. Specific values are listed in Table 2.

The following effects-based values are based on observed toxicity from field studies, as reported in the literature:

Effects Range - Low (ER-L) - The level of sediment contamination that can be tolerated by most benthic organisms, but still causes toxicity to a few species.

Effects Range - Median (ER-M) - The level at which significant harm to benthic aquatic life is anticipated.

Remediation Goals That Account for Background Contamination

Because sediments in the lower Hudson River are widely contaminated with some metals that exceed effects-based levels, background levels were factored into the development of site-specific remediation goals. The site-derived background concentrations were determined based on a combined sediment data set from the 2003 Feasibility Study and "Hudson River Estuary Sediments – Metals" (NYSDEC 2009). The 90^{th} and 95^{th} percentile values of the background data set were used to determine the range of site-specific background concentrations of metals.

Copper concentrations exceeded the effects range median (ER-M) of 270 ppm in shallow sediment at three locations: offshore of the sluice discharge area, offshore of the Building 15 SPDES discharge pipe, and in the northwest area over the Fill Unit. The extent of copper concentrations in the deeper sediments was greater in comparison to the shallow sediments.

Lead concentrations also exceeded the ER-M of 218 ppm in sluice area, the northwest area over the Fill Unit, and a location off-shore. The detection of high concentrations of lead were similar to copper, but at a lesser distance from shore.

The range of mercury contamination in shallow sediments (0.018 to1.4 ppm) is similar to background levels (0.41 to 2.5). The pattern of mercury contamination shows that levels are higher near shore and near the former marina, which are both sediment deposition areas. Because mercury levels are consistent with background, and there is no pattern of mercury contamination near OU 1 source areas, mercury appears to be caused by regional or upstream contaminant sources.

Nickel exceeded the ER-M of 52 ppm in both the shallow and deeper sediments at the same locations, off-shore of the sluice and water tower areas.

Silver exceeded the ER-M of 3.7 ppm in two locations of the northwest area of the site for the shallow sediments and broad areas offshore of the south boat slip, north boat slip, and old marina for the deeper sediments. Silver was not identified as a contaminant of concern on the OU 1 property, and the pattern of silver contamination is not consistent with the presence of the on-site source areas.

Zinc exceeded the ER-M of 410 ppm offshore of the sluice area and the water tower area for the shallow sediments. The deeper sediments exceeded the ER-M offshore of the sluice, Building 15 discharge pipe, and offshore of the water tower area.

The highest concentrations of metals in sediments are found in the offshore of the sluice area, Building 15 discharge pipe, and water tower area. The concentrations of metals found in these areas are much lower past approximately 100 feet of the shoreline. The deeper sediments within 100 feet of shore, up to 6 feet, generally have higher concentrations than the shallow sediments (0- 2 feet).

Figure 5 and 6 present the areas identified with PCB and metals sediment contamination from the site.

Table 2 - Sediment

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG	Site Derived Value [c] (ppm)	Frequency Exceeding Site Derived Value
Metals					
Arsenic	1.5 – 44.4	ER-L 8.2	330 of 543		
		ER-M 70	0 of 543		
Cadmium	ND – 87.3	ER-L 1.2	376 of 574		
		ER-M 9.6	181 of 574		
Copper	ND -4301	ER-L 34	393 of 546	104 to 129	219 of 546
		ER-M 270	92 of 546		190 of 546
Lead	ND- 2,700	ER-L 46.7	359 of 523	110 to 132	153 of 523
		ER-M 218	15 of 523		105 of 523
Mercury	ND – 4.0	ER-L 0.15	360 of 492		
		ER-M 0.71	284 of 492		
Nickel	ND- 1,390	ER-L 20.9	391 of 523		
		ER-M 51.6	8 of 523		
Silver	ND -11.9	ER-L 1.0	284 of 523		
		ER-M 3.7	65 of 523		
Zinc	ND- 6,450	ER-L 150	278 of 523	203 to 234	153 of 523
		ER-M 410	35 of 523		111 of 523
PCBs					
	ND-5,200	See Table 3		1	314 of 1014

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;
b - SCG: The Department's "Technical Guidance for Screening Contaminated Sediments."
c – Site Derived Value: Background range for metals (copper, lead and zinc) is the 90th to 95th percentile values of the metals background data set.
ER-L = Effects Range – Low and ER-M = Effects Range – Median. A sediment is considered contaminated if either of these criteria is exceeded. If the ER-M criteria are exceeded, the sediment is severely impacted. If only the ER-L is impacted, the impact is considered moderate.

Table 3 PCB Screening Criteria for Alternate Levels of Protection

LEVEL OF PROTECTION	PCB SCREENING CRITERION	FREQUENCY OF EXCEEDANCE IN SURFACE SEDIMENT (0-6")	FREQUENCY OF EXCEEDANCE IN SUBSURFACE SEDIMENT (>6")
Human Health Bioaccumulation	0.019 ppb[a]	85/153	380/863
Wildlife Bioaccumulation	34.2 ppb	85/153	380/863
Benthic Aquatic Life Chronic Toxicity	1.010 ppm	46/153	271/863
Benthic Aquatic Acute Toxicity	335 ppm[a]	0/153	21/863

These are site-specific values calculated based on the average measured organic carbon content of the sediment of 2.43%.

a - ppb: parts per billion, which is equivalent to micrograms per kilogram, ug/kg, in sediment;
a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;

Based on the findings of the Remedial Investigation, the presence of PCBs, copper, lead, mercury, nickel, silver and zinc have resulted in the contamination of sediment. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of sediment to be addressed by the remedy selection process are PCBs, copper, zinc and lead.

Exhibit B

Description of Remedial Alternatives

Site Specific Conditions Limiting the Development of Alternatives

Geotechnical instability associated with the northwest corner is a critical factor in the development of the alternatives. Global stability refers to the ability of a slope or retaining wall to resist a rotational or sliding failure that would cause destabilization. A slope or retaining wall failure in the northwest corner would release contaminated soil into the Hudson River and cause damage to the site. It is generally recognized that the global stability factor of safety of 1.5 is the minimum allowable for design of a slope or retaining wall. The global stability factor of safety for the existing condition in the northwest corner is approximately 1.0, indicating that the slope is marginally stable. Removal of existing rip rap from along this portion of the shoreline, even temporarily, would reduce the resistance to rotational failure (the "buttressing effect"), and increase the potential for contaminant release.

Because the contamination in the Northwest Corner Off-Shore Area cannot be fully removed, the following two remedial approaches are used in the alternatives to address the unique site conditions in the Northwest Corner Off-Shore Area.

Northwest Sloped Cap: This is a subaqueous cap which provides chemical and physical isolation of contamination from the environment. The cap would be placed in layers after sufficient dredging to allow the cap's final grade to approximate the existing bathymetry.

Northwest Extension Area:

This remedial approach involves the Northwest Corner Off-Shore Area of the site which is distinguished by the presence of rip rap and PCB Material that will be contained by a proposed sealed sheet pile wall. The sheet pile wall will contain PCB Material and prevent further release into the environment, and will be filled with lightweight fill to an elevation that rises to meet the OU 1 grade. To meet the requirements of Article 15 and 6 NYCRR Part 608, the sheet pile wall alignment will be placed to minimize filling of the Hudson River while still meeting the remedial goals. The alignment is anticipated to be along the toe of the rip-rap slope. Fill behind the wall will be minimized to reach the minimal necessary elevation for remedial actions. The location of the sheet pile wall was also chosen to avoid drag down of the PCB Material (liquid or semi-solid) or creation of vertical flow pathways along sheet piles into underlying uncontaminated layers. Due to the potential presence of PCB Material throughout this area, pile-supported structures will not be permitted on the Northwest Extension. This remedial approach will require aquatic habitat mitigation for placing fill into the Hudson River.

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A:

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Near Shore Cap and Northwest Sloped Cap

Alternative 2 includes installation of a 3-foot subaqueous cap in the near shore area with associated sediment dredging to maintain the existing bathymetry; targeted dredging and placement of a subaqueous cap or backfill in backwater and deepwater areas, as appropriate; dredging and installation of a sloped subaqueous cap in the northwest area; institutional controls and monitoring. The overall thickness of the subaqueous cap in near shore areas may allow for up to 12 inches to be deposited naturally through sedimentation. Disposal options for removed sediments include a combination of off-site disposal and potential on-site re-use in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. This alternative includes an institutional control, in the form of a site management plan, necessary to protect the sediment cap, protect public health, and monitor the environment due to contamination remaining at the site.

Present Worth: $74,400,000
Capital Cost: $65,800,000
Annual Costs:.. $394,000

Alternative 3: Near Shore Dredge (up to 6-feet) and Backfill and Northwest Sloped Cap

Alternative 3 includes dredging up to 6 feet in near shore areas where sediments exceed the site-specific cleanup goals listed in Table 2; placing subaqueous cap or backfill in near shore areas to restore dredged areas to existing grades, which may allow for natural deposition; targeted dredging and placement of a subaqueous cap or backfill in backwater and deepwater areas, as appropriate; dredging and installation of a sloped subaqueous cap in the Northwest Corner Off-Shore area; institutional controls; and monitoring. Disposal options for removed sediments include a combination of off-site disposal and potential on-site reuse in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. This alternative includes institutional controls, in the form of a site management plan, necessary to protect the sediment cap, to protect public health, and to monitor the environment due to contamination remaining at the site.

Present Worth: $77,900,000
Capital Cost: $69,400,000
Annual Costs:.. $394,000

Alternative 4: Near Shore Dredge (up to 10-feet) and Backfill and Northwest Sloped Cap

Alternative 4 includes dredging up to 10 feet in near shore areas where sediments exceed the site specific clean-up goals listed in Table 2; placing subaqueous cap or backfill in near shore areas to restore dredged areas to existing grades, which may allow for natural deposition; targeted dredging and placement of a subaqueous cap or backfill in backwater and deepwater areas, as appropriate; dredging and installation of a sloped subaqueous cap in the Northwest Corner Off-Shore area; institutional controls; and monitoring. Disposal options for removed sediments include a combination of off-site disposal and potential on-site reuse in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. This alternative includes institutional controls, in the form of a site management plan, necessary to protect the sediment cap, to protect public health, and to monitor the environment due to contamination remaining at the site.

Present Worth: $78,600,000
Capital Cost: $70,100,000
Annual Costs:.. $394,000

Alternative 5: Near Shore Cap with Dredge (for cap) and Northwest Extension

Alternative 5 includes installation of a 3-foot subaqueous cap in the near shore area with associated dredging to maintain the existing bathymetry; placing subaqueous cap or backfill in near shore areas to restore dredged areas to existing grades, which may allow for natural deposition ; targeted dredging in backwater and deepwater areas; extension of the Northwest Corner On-Shore Area to create an above-grade containment area; institutional controls for contaminated sediments; and long term monitoring. The Northwest Corner of the site property would be extended by installing a sealed sheet pile wall at a feasible location beyond the limits of Liquid PCB Material and backfilling it with clean material, while minimizing fill placed in the river. Disposal options for removed sediments include a combination of off-site disposal and potential on-site reuse in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. A mitigation plan would be developed and implemented to mitigate the habitat impacts associated with installation of the bulkhead wall and placement of fill into the river. This alternative includes institutional controls, in the form of a site management plan, necessary to protect public health and to monitor the environment due to contamination remaining at the site.

Present Worth: $89,000,000
Capital Cost: $79,100,000
Annual Costs: $454,000

Alternative 6: Near Shore Dredge (up to 6-feet) and Backfill and Northwest Extension

Alternative 6 includes dredging up to 6 feet in near shore areas where sediments exceed the site specific clean-up goals listed in Table 2; placing subaqueous cap or backfill in near shore areas to restore dredged areas to existing grades, which may allow for natural deposition; placing a subaqueous cap in backwater and deepwater areas; targeted dredging in backwater and deepwater areas; extension of the Northwest Corner as described in Alternative 5; institutional controls for contaminated sediments; and monitoring. Disposal options for removed sediments include a combination of off-site disposal and potential on-site reuse in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. A mitigation plan will be developed and implemented to mitigate the habitat impacts associated with the installation of the bulkhead wall and placement of fill into the river. This alternative includes institutional controls, in the form of a site management plan, necessary to protect public health and to monitor the environment due to contamination remaining at the site.

This alternative has been modified from the alternative developed in the FS to include additional dredging in deepwater, old marina, and north boat slip areas, as shown on Figure 7. The FS evaluated dredging in the near shore area limiting the area to be dredged to a maximum water depth of 15 feet, which represents the limit of commercially-available silt curtains. The location and types of sediment resuspension controls in greater than 15 feet of water may include other innovative and customized approaches to extend areas of dredging to approximately 100 feet from shore, or approximately 20 feet of water for targeted areas. This approach would dredge sediments in targeted areas which contain the most highly impacted sediment for PCB and metals and therefore represents a greater sediment volume than the original Alternative 6. Targeted dredging is defined for deepwater areas where resuspension controls cannot be feasibly used due to water depth and current velocities. The areas were preliminarily identified as those containing PCB contaminated sediments with greater than 50 ppm.

Present Worth: $92,600,000
Capital Cost: $82,700,000
Annual Costs: $454,000

Modified Alternative 6 Costs

Present Worth: $105,000,000
Capital Cost: $95,200,000
Annual Costs: $454,000

Alternative 7: Near Shore Dredge (up to 10-feet) and Backfill, Northwest Extension

Alternative 7 includes dredging up to 10 feet where sediments exceed the site specific cleanup goals listed in Table 2; placing subaqueous backfill in near shore areas to restore dredged areas to existing grades, which may allow for natural deposition; placing subaqueous cap in backwater and deepwater areas; targeted dredging in backwater and deepwater areas; installing a bulkhead wall (steel sheeting) beyond PCB dense non-aqueous phase liquid (DNAPL) in the Northwest Corner Area; institutional controls for contaminated sediments; and monitoring. Disposal options for removed sediments include a combination of off-site disposal and potential on-site re-use in OU-1. The details and limitations for the on-site re-use will be developed during the remedial design. Mitigation of habitat impacts due the installation of the bulkhead wall and placing fill in the river. This alternative includes institutional controls, in the form of a site management plan, necessary to protect public health and the environment from any contamination remaining at the site.

Present Worth: $93,300,000
Capital Cost: $83,400,000
Annual Costs: $454,000

Alternative 8: Near Shore/Backwater Dredge to Feasible Limits and Backfill, Limited Deepwater Dredging, Northwest Extension

This alternative would include dredging to the deepest feasible depth where sediments exceed the site specific clean-up goals listed in Table 2 in near shore and backwater areas; limited dredging in deepwater areas; placing subaqueous backfill in near shore, backwater, and deepwater areas, which may allow for natural deposition; installing a bulkhead wall (steel sheeting) beyond PCB dense non-aqueous phase liquid (DNAPL) in the Northwest Corner Area; institutional controls for contaminated sediments; and monitoring. The feasible dredging depth is defined as dredging all sediments that exceed site-specific clean-up levels to constructable limits. Disposal options for removed sediments include a combination of off-site disposal and potential on-site re-use in OU-1. The details and limitations for the on-site re-use will be developed during the remedial design. Mitigation of habitat impacts due the installation of the bulkhead wall and placing fill in the river. This alternative includes institutional controls, in the form of a site management plan, necessary to protect public health and the environment from any contamination remaining at the site.

Present Worth: $185,000,000
Capital Cost: $179,000,000
Annual Costs: $272,000

Alternative 9: Dredge to Feasible Limits in All OU-2 Areas and Backfill, Northwest Sloped Cap

This alternative would include dredging to feasible limits where sediments exceed the site specific clean-up goals listed in Table 2; placing subaqueous backfill in near shore, backwater and deepwater areas, which may allow for natural deposition; monitoring. The feasible limit to dredging in the Northwest Corner Off-Shore Area is based on driving steel sheeting along the toe of the rip rap to control DNAPL migration and removing all sediments that exceed site-specific cleanup levels to constructable limits. Sediment remaining in the Northwest Corner Off-Shore Area would be capped with a subaqueous cap. Disposal options for removed sediments include a combination of off-site disposal and potential on-site re-use in OU-1. The details and limitations for the on-site reuse will be developed during the remedial design. This alternative includes institutional controls, in the form of a site management plan, necessary to protect public health and the environment from any contamination identified at the site. The remedy will not rely on institutional or engineering controls to prevent future exposure. There is no Site Management, no restrictions, and no periodic review.

Present Worth: $245,000,000
Capital Cost: $242,000,000
Annual Costs: $174,000

Exhibit C
Remedial Alternative Costs

Remedial Alternative	Capital Cost[1] ($)	Annual Costs ($)	Total Present Worth[1] ($)
1. No Action	0	0	0
2. Near Shore Cap and Northwest Sloped Cap	$65,800,000	$394,000	$74,400,000
3. Near Shore Dredge (up to 6-feet) and Backfill and Northwest Sloped Cap	$69,400,000	$394,000	$77,900,000
4. Nearshore Dredge (up to 10-feet) and Backfill and Northwest Sloped Cap	$70,100,000	$394,000	$78,600,000
5. Nearshore Cap with Dredge (for cap) and Northwest Extension	$79,100,000	$454,000	$89,000,000
6. Nearshore Dredge (up to 6-feet) and Backfill and Northwest Extension	$82,700,000 ($95,200,000)[2]	$454,000	$92,600,000 ($105,000,000)[2]
7. Nearshore Dredge (up to 10-feet) and Backfill, Northwest Extension	$83,400,000	$454,000	$93,300,000
8. Nearshore/Backwater Dredge to Feasible Limits and Backfill, Limited Deepwater Dredging, Northwest Extension	$179,000,000	$272,000	$185,000,000
9. Dredge to Feasible Limits in All OU-2 Areas and Backfill, Northwest Sloped Cap	$242,000,000	$174,000	$245,000,000

[1] Capital Cost and Annual Costs include a 30% contingency in calculating Total Present Worth

[2] Modified Alternative 6 includes additional dredging in the following areas and increases the costs presented in Feasibility Study as follows:

Old Marina	6,000 $yards^3$ with an estimated cost of $600/ $yards^3$= $3,600,000
North Boat Slip	3,500 $yards^3$ with an estimated cost of $600/ $yards^3$= $2,100,000
Deepwater Areas for >50 ppm PCBs	4,700 $yards^3$ with an estimated cost of $1,200/ $yards^3$= $5,640,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department has selected modified Alternative 6, Near Shore Dredge (up to 6 feet) and Backfill and Northwest Extension as the remedy for this site. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figure 7.

Basis for Selection

The selected remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375.

The modified Alternative 6 was selected because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criteria described below. It achieves the remediation goals for the site by removing sediment containing greater than 1 ppm PCB and metals exceeding background from the near shore and backwater areas, where the potential for public health and environmental exposures are most likely. Dredging to a depth of 6 feet removes sediment that has the potential to be scoured and migrate, and thus represents an exposure pathway for human and environmental receptors. In deepwater areas, where dredging activities cannot be fully contained, the selected remedy removes PCBs in targeted areas at a higher threshold of 50 ppm up to a depth of 6 feet, thereby removing the highest levels of PCBs from the Hudson River environment. Targeting deepwater areas with PCBs above 50 ppm reduces the time needed to complete dredging activities when compared to deepwater areas above 1 ppm. While this action does not eliminate ecological exposures, it does limit the potential for construction-related impacts associated with disturbance to the river bottom and migration of suspended sediments. The majority of targeted PCB dredging areas identified in the deepwater are within the top two feet. Therefore, the targeted dredging will remove sediments which have the highest levels of PCBs and the greatest potential to migrate and be an on-going source to the environment.

In the Northwest Corner Off-Shore Area, where the full depth of sediment contamination cannot be feasibly excavated without destabilizing the shoreline, the selected containment of the area using sealed sheet piles provides the greatest degree of long term effectiveness by containing the material with the highest levels of PCBs. This extension also enables the more effective removal of Liquid PCB Material from the source area beneath the Northwest Corner On-Shore and Northwest Corner Off-Shore areas by creating a land platform to support additional investigation and removal activities. The sheet piles will be driven along an alignment that is known to be free of liquid or semi-solid PCBs, ensuring that drag down or migration of PCBs into the clean Basal Sand aquifer will not occur. Groundwater passing through the Northwest Corner On-Shore Area will be treated before entering the Hudson River, providing a higher degree of environmental protection and reliability than alternatives that rely on capping the Northwest Corner Off-Shore Area sediments in place. While creation of this filled area in the river results in greater impacts than the capping alternative in terms of loss of habitat, the need to eliminate environmental exposure to the PCBs in this area has been deemed to outweigh the loss of habitat. A mitigation plan will be developed and implemented to mitigate the habitat impacts associated with the installation of the bulkhead wall and placement of fill into the river.

Overall, Alternative 6 is an effective remedy which removes and isolates significant portions of the contamination from the environment that has the potential for exposure to the greatest feasible degree. The remaining known PCB material within the NEA is contained by a structure that provides the highest degree of environmental protection and reliability, and the greatest opportunity for removal of the most mobile material. This alternative creates the conditions necessary for the restoration of surface water and sediment to the extent practicable when it is integrated with the remedy for OU1.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1 Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternative 1, the No Action Alternative would not be protective of human health or the environment since it would not achieve remediation goals described in Section 6.5.

Alternatives 2 through 4 provide increasing protection for human health and the environment by removing sediment which exceeds cleanup levels for PCBs and metals. These three alternatives are comparable to Alternatives 5 through 7 because of the same depth of sediment removal outside of the Northwest Corner Off-Shore Area. Alternatives 2 through 4 and 5 through 7 involve the same increasing depths of sediment removal of up to 3, 6 and 10 feet, respectively. The removal of 3 feet of contaminated sediment would leave a greater amount of contaminated sediment than the removal of 6 feet of sediment. The removal of contaminated sediment to a depth of 6 feet provides greater overall protection by reducing the potential for sediment resuspension due to human activities or an extreme erosion event. Because sediment between 6 and 10 feet is not expected to migrate or become exposed, the removal of up to 10 feet of sediment would not provide a substantial increase in environmental protection in comparison to removing 6 feet of sediment. Alternative 6 provides the best balance in the level of protection for the Near Shore sediment because the highest levels of contamination will be removed.

For Alternatives 5 through 8, the installation of the sheet pile wall around the Northwest Extension is more protective of human health and the environment in comparison to the capping evaluated for the Northwest Corner Off-Shore Area in Alternatives 2 through 4 and 9. The sheet pile wall provides better overall protection of public health and the environment than the capping alternatives by more effectively containing PCB DNAPL; enhancing PCB DNAPL recovery options; and preventing PCB contaminated groundwater from entering the Hudson River. By minimizing the further release of PCBs to the Hudson River, the sheet pile wall will prevent site-related contributions to exceedances of surface water standards that contribute to the current PCB contamination in fish tissues in the vicinity of the site. However, installation of the sheet pile and creation of the filled area in the river does result in greater habitat impacts than the capping alternative, which will require mitigation.

Alternative 9 includes an area of extensive deepwater dredging which provides the highest degree of protection for human health and the environment because it would remove a greater extent of contamination that could potentially cause impacts at its current location. However, the substantially increased cost of this alternative ($140 million) is not justified, especially considering the increased short-term risks to the environment due to extensive dredging without turbidity control which could mobilize contaminated sediment to other areas.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The primary chemical specific SCGs for the site are the surface water quality standards and sediment screening guidance values. The No Action Alternative would not meet these criteria because groundwater discharging into the

Hudson River would continue to materially contribute to the contravention of the PCB surface water standard. The PCB and metals concentrations found in sediments also exceed the guidance values for screening contaminated sediments and as well as site-specific background sediment concentrations. Therefore, Alternative 1 is rejected as a potential candidate for a remedy for OU 2 because it would not meet the threshold criteria of protecting public health and the environment and would not achieve the SCGs for surface water and sediment.

Alternatives 2 through 4 and 9 would not be as effective in complying with the PCB surface water standard in the Northwest Corner Off-Shore Area, as compared to Alternatives 5 through 8. The capping alternatives (Alternatives 2, 3, 4, and 9) would continue to allow the flow of groundwater through highly contaminated sediment and fill with subsequent discharge into the Hudson River. The resulting desorption of PCBs from sediment into the water column, which currently contributes to the contravention of PCB surface water standards, would continue. Because Alternative 9 removes greater depths of sediment in the different areas, it complies with the SCG for the sediment source to the greatest extent for the alternatives which involve capping the Northwest Off-Shore Area. Alternatives 5 through 8 are more effective at complying with the surface water standard through the installation of a sealed sheet pile wall to contain PCB in the Northwest Extension and treat the groundwater contamination. Groundwater will pass through gates in the wall and will be treated to remove PCBs before it passes into the river. These alternatives will therefore provide a higher degree of surface water protection than Alternatives 2 through 4 and 9. Because Alternative 8 removes greater depths of sediments, it complies with the SCG for the sediment to the greatest extent for the alternatives that involve construction of the Northwest Extension.

Alternatives 2 and 5, which remove 3 feet of sediment, would leave behind a greater mass of PCB and metals which exceed the sediment background and screening guidance concentrations. Alternatives 3 and 6, which remove up to 6 feet of sediment, would address the PCB and metals which exceed the sediment background and screening guidance concentrations to a greater degree than Alternatives 2 and 5. Alternative 4 and 7, which remove up to 10 feet of sediment, would address the PCB and metals which exceed the sediment background and screening guidance concentrations to a greater degree than Alternative to 3 and 6.

In addition, the alternatives will need to meet the substantive requirements of the applicable location-specific SCGs found in 6NYCRR Part 608 Use and Protection of Waters and Environmental Conservation Law Article 15 due to the dredging and filling in the Hudson River. These requirements apply most significantly to Alternatives 5 through 8 because of the construction of the Northwest Extension and associated filling of approximately 0.88 acres of the Hudson River. The allowance for filling the River is based on the findings of the stability analysis and the engineering determination that it is not feasible to address the PCBs in the northwest corner of the site without the Northwest Extension. The NEA extension will be designed to minimize the filling of the Hudson River; however, creation or restoration of river habitat will be required to mitigate for the placement of fill in the river.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

The short-term impacts to the community, workers, and environment for Alternatives 2 through 4 and 5 through 8 generally increase, and are proportional, to the additional material handling activities (dredging, capping and containment work) performed. These impacts include noise, air emissions, resuspension of contaminated sediment from dredging and truck traffic. Alternatives 8 and 9 would have the greatest short-term impacts due to the greater area dredged and volume of sediment handled. The short term impacts from noise, air emissions, and resuspension would be controlled by monitoring and mitigation measures to protect human health and the environment and will be identified in the remedial design. Alternative 2 would have fewer short term impacts than Alternatives 3 and 4 for the dredging and capping alternatives. Alternatives 5 would have fewer short term impacts than alternatives 6 and 7 for the dredging, capping and containment alternatives.

The FS evaluated dredging in the near shore area limiting the area to be dredged to a maximum water depth of 15 feet, which represents the limit of commercially-available silt curtains. The location and types of sediment resuspension controls in greater than 15 feet of water may include other innovative and customized approaches to extend the area of dredging to approximately 100 feet from shore, or approximately 20 feet of water. The additional targeted dredging to approximately 100 feet from shore has the potential to increase the short term environmental impacts, but will increase long term effectiveness and overall environmental protection, provided the short term impacts can be controlled with the alternative approaches.

Short term environmental impacts with PCB resuspension for the dredging and capping Alternatives 2 through 4 and 9 will be greater than Alternatives 5 through 8 in the Northwest Corner Off-Shore Area. These short term impacts are greater because they involve dredging high levels of PCB sediment in the Northwest Corner Off-shore Area to install the cap as compared to containing the same area with the sealed sheet pile.

The short term environmental impacts of dredging in Deepwater Areas were also evaluated because complete resuspension control will not be feasible due to the water depths and velocities. Partial resuspension controls are available in the form of mobile containment systems that are suspended from dredging barges. These provide limited reductions in particle migration from the dredge, but are limited to the upper portion of the water column. The short term impacts for dredging PCB contaminated sediment in limited targeted Deepwater Areas (greater than 50 ppm PCB) in Alternatives 2 thorough 8 will provide long-term benefits by removing concentrated areas of PCBs, particularly in shallow sediments that are most vulnerable to migration and exposure.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Alternatives 2 through 4 would provide long-term effectiveness and permanence in increasing order by providing greater removal and capping of increased quantities of sediment. The capped or backfilled sediment layer represents a source of risk that is proportional to the remaining sediment contamination and its respective depth below the sediment surface. Of these alternatives, Alternative 2 will have the least long-term effectiveness and Alternative 4 will have the greatest for the capping alternatives. A monitoring and maintenance program will insure the reliability, but there are potential challenges to maintaining a cap at this location. There is the potential need to repair or replace portions of the cap if it is damaged or if contaminant breakthrough would occur, particularly for the PCB DNAPL beneath the Northwest Corner Off-Shore Area for Alternatives 2 through 4. Contaminant breakthrough is less likely where greater quantities of contaminated sediment are removed and there is a greater thickness of the cap or backfill materials placed over the remaining contaminated sediment. Additionally, the Department has concerns for the long-term stability of the northwest corner that are not addressed under Alternatives 2 through 4.

Alternatives 5 through 8 provide greater long-term effectiveness and permanence in increasing order of the alternative by the containment of PCB DNAPL in the Northwest Extension and dredging of sediments to greater depths. There is an increase in the long-term reliability for the alternatives which remove greater quantities of contaminated sediment. The remaining source of risk from the sediments is directly proportional to the remaining sediment contamination and the respective depth below the sediment surface. Alternative 5 will have the greatest potential for long-term risk and alternative 8 will have the least potential. The sealed sheet pile wall in the Northwest Extension provides the greatest degree of long term effectiveness for containment of the highest levels of PCBs without compromising the geotechnical stability of this area. The extension area also enables the greatest removal of Liquid PCB Material from the source area beneath the Northwest Corner Off-Shore Area by creating a land platform to support delineation and removal activities. The sealed sheet pile wall in the Northwest Extension is considered to be more effective and permanent to control both Liquid PCB Material migration and dissolved groundwater contamination as compared to the sloped shoreline and capping approach in Alternative 9. Monitoring of habitat and biota will be required to ensure the long-term effectiveness of the remedy. However, installation of the sheet pile and creation of the filled area in the river does result in additional ecological impacts because of the loss of habitat.

The removal of up to 6 feet of PCB and metals contaminated sediment in Alternative 6 is more permanent and effective in the long-term due to the removal of greater quantities of PCB and metals contaminated sediments than Alternatives 5. This significantly and permanently reduces the potential for migration of site-related contaminants through erosion, resuspension and re-distribution of sediments, including, but not limited to those mobilized during extreme events or human activities.

Alternative 9 includes extensive deepwater dredging area which will increase short-term impacts due to dredging without turbidity control and migration of contaminated sediment to other areas, however, the long-term impacts will be reduced by removal of the greater volume of contaminated sediment.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

The alternatives under consideration reduce the mobility of contamination by removing metal and PCB-contaminated sediments from the river system and placing them in secure upland areas and/or landfills. Alternatives that remove greater quantities of sediment provide a greater reduction in potential mobility. However, because the potential for sediment scour at depths greater than 6 feet is less than for surficial sediments, there is little additional reduction in mobility provided by Alternatives 4 and 7 as compared to Alternatives 3 and 6. The toxicity, mobility and volume of wastes at the site are reduced to the degree that Liquid PCB Material is removed from the Northwest Corner Off-Shore Area and destroyed off-site. As a result Alternatives 5 through 8, which include the Northwest Extension and a greater opportunity to remove Liquid PCB Material, would reduce the toxicity, mobility and volume of the PCB DNAPL to a greater degree than Alternatives 2 through 4 and 9. For PCBs that cannot be removed using recovery wells, the sealed sheet pile wall of the Northwest Extension (Alternatives 5 through 8) also provides a greater reduction in mobility than capping the Northwest Corner Off-Shore Area (Alternatives 2 through 4 and 9).

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Dredging sediment for all alternatives poses implementation challenges related to water depths and flow dynamics, resuspension control and monitoring, and debris management. Proven technologies such as energy and turbidity barriers, real-time turbidity monitors and a variety of dredging equipment are available to address these challenges. The OU 1 site property provides a large staging area for managing the sediments. The location of the site on a major navigable waterway and adjacent to a rail line greatly expands opportunities for dredged material transport. The major construction differences between alternatives involves the installation a sloped shoreline (Alternatives 2, 3, 4, and 9) versus a sheet pile wall (Alternatives 5, 6, 7, and 8) in the Northwest Corner Off-Shore Area; the depth for dredging sediments; and deepwater dredging. Both groups of alternatives are implementable and acceptable from a geotechnical perspective by using readily available, materials, equipment, and construction practices.

Alternatives 5 through 8 are more challenging to construct because they require the off-shore construction of a large bulkhead wall requiring heavy king pile construction; associated tie-rods and deadman system; and a corrosion protection system. The tie-rod and deadman system will need to be designed to accommodate settlement. Both groups of alternatives will require monitoring and maintenance to add fill for areas that experience settlement. For Alternatives 2, 3, 4, and 9 in Northwest Sloped Cap will require additional construction of erosion protection for wave, ice and potential scouring events to protect the capped areas. The maintenance of the sheet pile wall for repairs and cathodic protection is more specialized in comparison to the sloped shoreline.

Dredging contaminated sediments at deeper depths will require the same monitoring as for the shallower depths of dredging. Sediment resuspension controls will be used during dredging which are designed for the appropriate water depth and velocity conditions at the site. Dredging in the deepwater areas will be performed with limited resuspension controls in targeted areas, which may require site-specific evaluations to implement. Alternative 9, which requires extensive dredging in the Deepwater Areas is the most difficult alternative to implement.

The ability to monitor the effectiveness of the alternatives is more difficult for the Northwest Sloped Cap shoreline in Alternatives 2, 3, 4 and 9. The monitoring will need to determine if PCB breakthrough of the cap over the sloped shoreline area is occurring.

Both groups of alternatives will require a permit from the United States Army Corps of Engineers for construction within the in the navigable waters of the Hudson River. The administrative implementability is more challenging for Alternatives 5, 6, 7, and 8 than for Alternatives 2, 3, 4 and 9 due to the construction of the Northwest Extension into the Hudson River. Permitting and approvals will be required from local and federal agencies for all alternatives that involve fill being placed into the Hudson River and the installation of the sheetpile wall.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The no action alternative would be the least expensive to implement since there would be no cost associated with its implementation.

The costs associated with the alternatives for this site are substantial, and range from $74.4 to $245 million due to the size and complex nature of the site conditions. Alternatives 2 through 9 involve increasing present worth costs which vary with the extent of dredging, capping, backfilling, creating the Northwest Extension, and monitoring. These costs increase with the volume of material dredged and disposed. In general, Alternatives 2 through 4 have a lower present worth cost ($74.4 to $78.6 million) in comparison to Alternatives 5 through 7 ($89 to $93 million). The major reason for the increase in cost between the two sets of alternatives involves the higher cost to construct the Northwest Extension as compared to the installation of the Northwest Sloped Cap. However the extension of land is cost effective because the sealed sheet piles provides a greater degree of long term effectiveness for containment of the highest levels of PCBs. This extension also enables the greatest removal of Liquid PCB Material from the source area beneath the Northwest Corner On-Shore Area by creating a land platform to support delineation, monitoring and removal activities.

Table 4 provides a summary of the total costs of Alternatives 2 through 9 with several measures of cost-effectiveness. The costs increase proportionally for dredging PCB and metals contaminated sediments at greater depths. The present worth cost for Alternative 3 is $3.5 million greater than Alternative 2 due to the additional sediment dredging depth (6 feet versus 3 feet) and material handling. Alternative 3 removes roughly the same amount of PCBs as Alternative 2 (2,610 pounds versus 2,590 pounds), but more than twice the amount of copper (19,440 pounds versus 8,240 pounds). The increased present worth cost for Alternative 4 is $0.7 million over Alternative 3 and removes the same amount of PCB and slightly more copper.

Of the alternatives that include the Northwest Extension, the present worth cost of Alternative 6 is $16 million greater than Alternative 5 for the additional sediment dredging depth and material handling. Alternative 6 removes roughly the same amount of PCB as Alternative 5 (610 pounds versus 590 pounds), but more than twice the amount of copper (18,240 pounds versus 7,040 pounds). The increased present worth cost for Alternative 7 is $4.3 million and represents removal of the same amount of PCB as Alternative 6 and a slight increase (1,000 pounds) in the amount of copper contaminated sediment. These estimates represent dredging to a maximum water depth of 15 feet. Other temporary containment approaches may extend the area of dredging to approximately 100 feet from shore and would similarly increase the estimated volume of sediment in each alternative.

The total present worth costs for Alternative 8 and Alternative 9 are $185 and $245 million, respectively. While these alternatives provide for greater sediment dredging and disposal, they are not considered cost effective due to the substantial increase in capital costs relative to the additional environmental benefit.

Table 4: Cost Effectiveness Measures of Alternatives 2 through 9

Alternative	Depth of Sediment Removal and volume[2]	Estimated PCB mass removal (contained) and percentage	Estimated Copper mass removal and percentage	Estimated Lead mass removal and percentage	Cost
2	3 feet 15,800 yd^3	2,590 lbs 25%	8,240 lbs 11%	10,100 lbs 45%	$74, 400,000
3	Up to 6 feet 22,400 yd^3	2,610 lbs 25%	19,440 lbs 27%	12,800 lbs 48%	$77,900,000
4	Up to 10 feet 23,300 yd^3	2,610 lbs 25%	20,440 lbs 29%	14,300 lbs 64%	$78,600,000
5[1]	3 feet 12,900 yd^3	590 lbs 6%	7,040 lbs 10%	8,600 lbs 39%	$89,000,000
6[1]	Up to 6 feet 19,500 yd^3	610 lbs 6%	18,240 lbs 25%	11,200 lbs 50%	$92,600,000 ($105,000,000)
7[1]	Up to 10 feet 20,800 yd^3	610 lbs 6%	19,240 lbs 27%	12,700 lbs 57%	$93,000,000
8[1] (NWE)	Greatest extent practicable nearshore and backwater areas 98,700 yd^3	3,000 lbs 29%	41,020 lbs 57%	19,400 lbs 87%	$185,000,000
9 (NW Slope)	Greatest extent practicable 168,300 yd^3	10,460 lbs 100%	71,500 lbs 100%	22,200 lbs 100%	$245,000,000

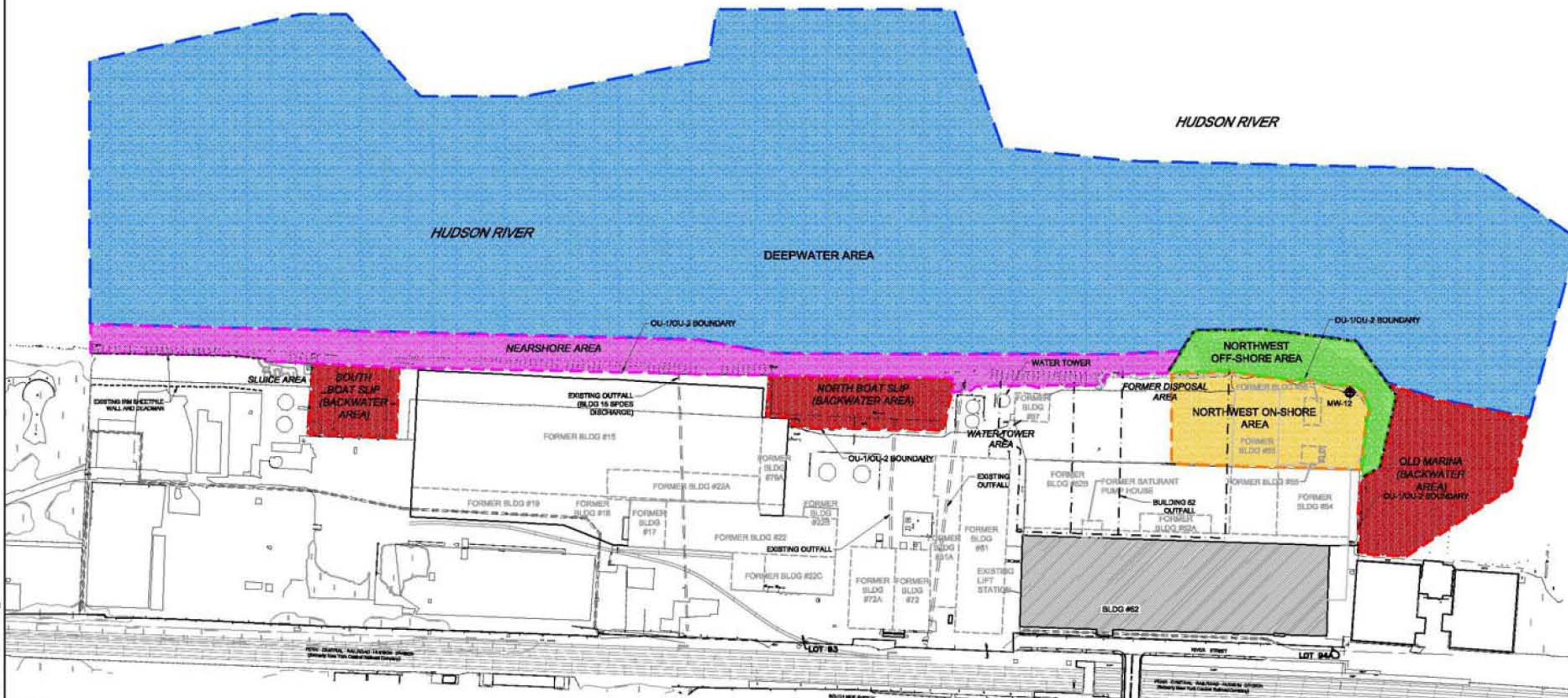
[1] Alternatives which include the Northwest Extension will contain approximately 2,000 pounds of PCBs within the sheetpile wall
[2] The estimated volume of sediment removed assumed dredging to a maximum water depth of 15 feet. Targeted dredging in deepwater areas would increase the estimated volume of sediment in each alternative.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary has been prepared that describes public comments received and the manner in which the Department will address the concerns raised.

Alternative 6 has been selected because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

Site Location



LEGEND:

- RAIL ROAD
- EXISTING STRUCTURES
- RIP-RAP
- BUILDING 52 OUTFALLS
- EXISTING OFFSITE OUTFALLS
- MONITORING WELL
- DEEPWATER AREA
- NEARSHORE AREA
- NORTHWEST OFF-SHORE AREA
- NORTHWEST ON-SHORE AREA
- BACKWATER AREA

NOTES:

1. BASE PLAN PROVIDED BY BOSWELL ENGINEERING DRAWING NO. 04-209-MW (01/27/2006).
2. OTHER SITE FEATURES BASED ON VARIOUS HISTORICAL DOCUMENTS.
3. NUMEROUS MONITORING WELLS ARE LOCATED ON SITE. HOWEVER, ONLY MW-12 IS SHOWN AS IT IS THE FIRST LOCATION WHERE LIQUID PCB MATERIAL WAS OBSERVED.
4. MEAN HIGH AND MEAN LOW WATER ARE EL. +2.2 AND EL. -2.0, BASED ON HISTORICAL SITE REPORTS.
4. THE OU-2/OU-1 BOUNDARY IS LOCATED AT THE MHW.

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SCALE IN FEET

HALEY & ALDRICH

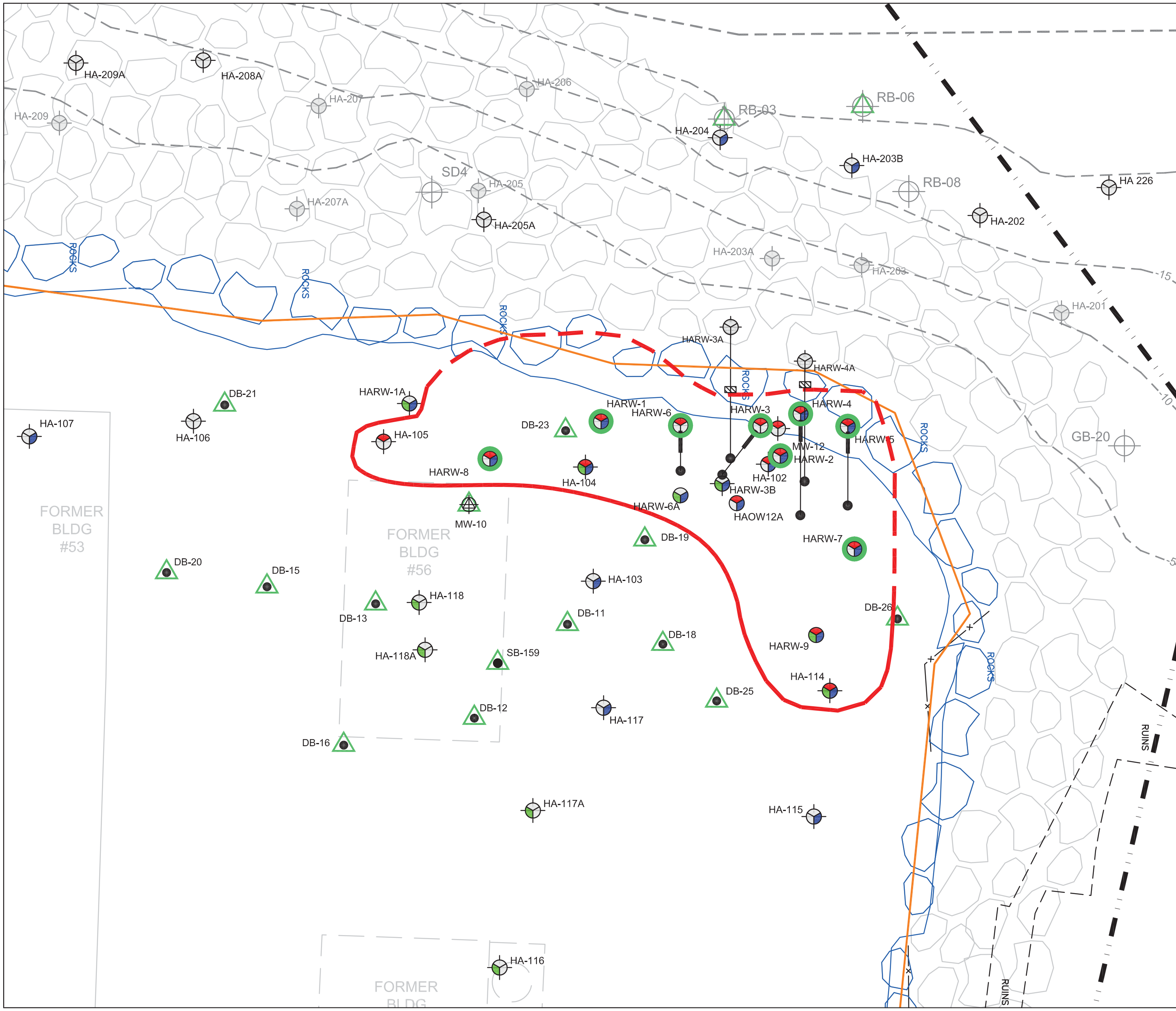
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

Site Features
OU-2 SITE PLAN WITH AREA DESCRIPTIONS

SCALE: AS SHOWN
MAY 2011

FIGURE 2

G:\PROJECTS\28612\250 - RFS\CAD\PLAN VIEWS & SECTIONS\28612-OU-2 SITE PLAN_D2.DWG



LEGEND:

- EXISTING STRUCTURES
- DNAPL BARRIER
- OU-2/OU-1 BOUNDARY
- APPROXIMATE ASSUMED RECOVERAL DNAPL EXTENTS
- INVESTIGATED RECOVERABLE DNAPL EXTENTS
- RIP-RAP
- POTENTIAL FORMER WOODEN BULKHEAD
- EXPLORATION LOCATION TO MARINE SILT INTERFACE
- HA-XX EXPLORATION LOCATION WHERE MARINE SILT WAS NOT ENCOUNTERED DUE TO REFUSAL
- MONITORING WELL LOCATION
- HISTORICAL SAMPLE LOCATION (DEPTH VARIES)
- HISTORICAL SAMPLE LOCATION (DEPTH VARIES)
- ANGLED EXPLORATION LOCATION
- ANGLED WELL LOCATION WITH SCREENED INTERVAL

SAMPLE LEGEND:

- LIQUID PCB MATERIAL
- SEMISOLID PCB MATERIAL
- TRACE PCB MATERIAL
- LIQUID PCB MATERIAL OBSERVED
- SEMISOLID PCB MATERIAL OBSERVED
- TRACE PCB MATERIAL OBSERVED
- NO PCB MATERIAL OBSERVED
- INFERRED POTENTIAL PCB MATERIAL LOCATION
- RECOVERY WELL

NOTES:

1. BASE PLAN PROVIDED BY BOSWELL ENGINEERING DRAWING NO. 04-209-MW (01/27/2006).
2. HISTORICAL SURVEY INFORMATION PROVIDED BY PARSONS IN JULY 2005.
3. MEAN HIGH AND MEAN LOW WATER ARE EL. +2.2 AND EL. -2.0, BASED ON HISTORICAL SITE REPORTS.
4. RIP-RAP DESIGNATION IN THE RIVER IS BASED ON INTERPRETATION OF SIDE SCAN SONAR DATA PROVIDED BY AQUASURVEY INC. IN NOVEMBER 2007.
5. HA-100 SERIES BORING LOCATIONS ON SHORE SURVEYED BY BOSWELL ENGINEERING IN SEPTEMBER 2007 & APRIL 2008.
6. HA-200 SERIES BORING LOCATIONS OFF SHORE WERE LOCATED USING A GLOBAL POSITIONING SYSTEM.
7. CURRENTLY AVAILABLE DATA COLLECTED DURING DNAPL IRM PILOT TESTS, SUPPLEMENTAL NORTHWEST CORNER INVESTIGATION AND HISTORIC BORINGS.

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1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

PCB MATERIAL LOCATIONS AND DNAPL EXTENTS IN THE NORTHWEST CORNER

SCALE: AS SHOWN
SEPTEMBER 2011

FIGURE 3

G:\PROJECTS\28612\250 - RFS\COMMUNICATIONS\2011-09-29 DEC FIGURE\28612-PCB MATERIAL EXTENTS_DF.DWG

Figure 3: Conceptual Model of PCB Migration

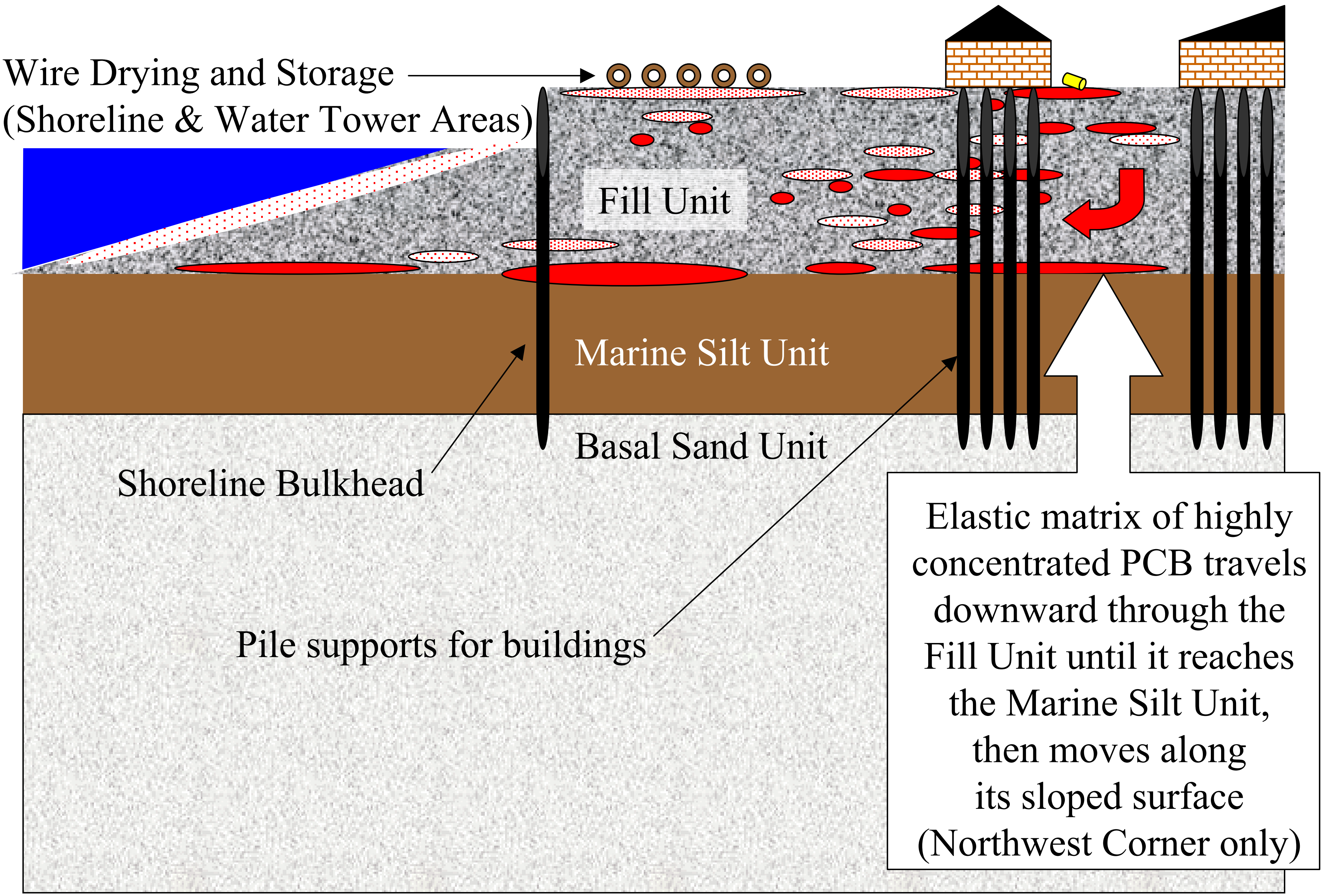


Figure 5

Extent of PCB in Sediments

Harbor at Hastings

Town of Greenburgh, Westchester County

Site No. 3-60-022

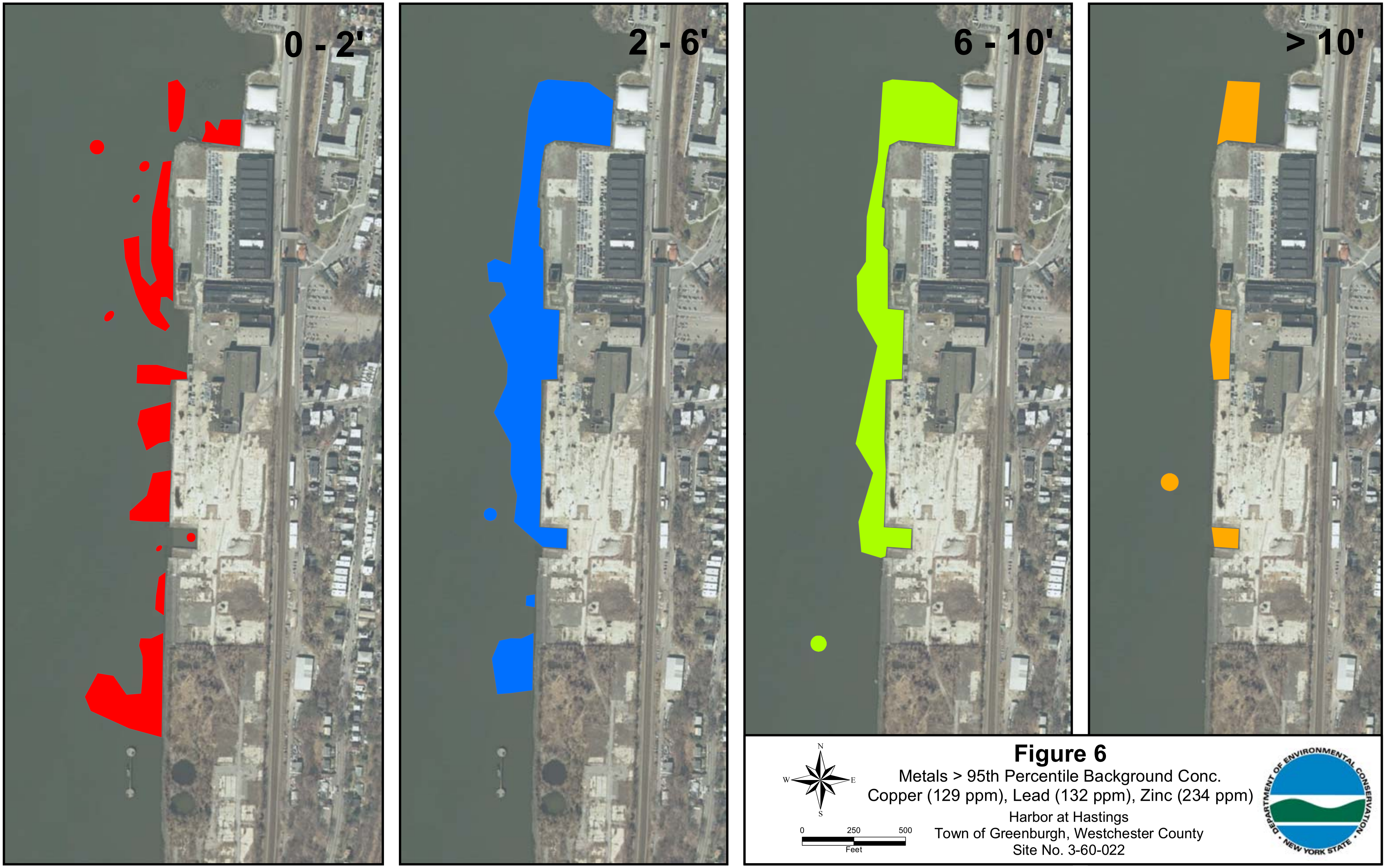
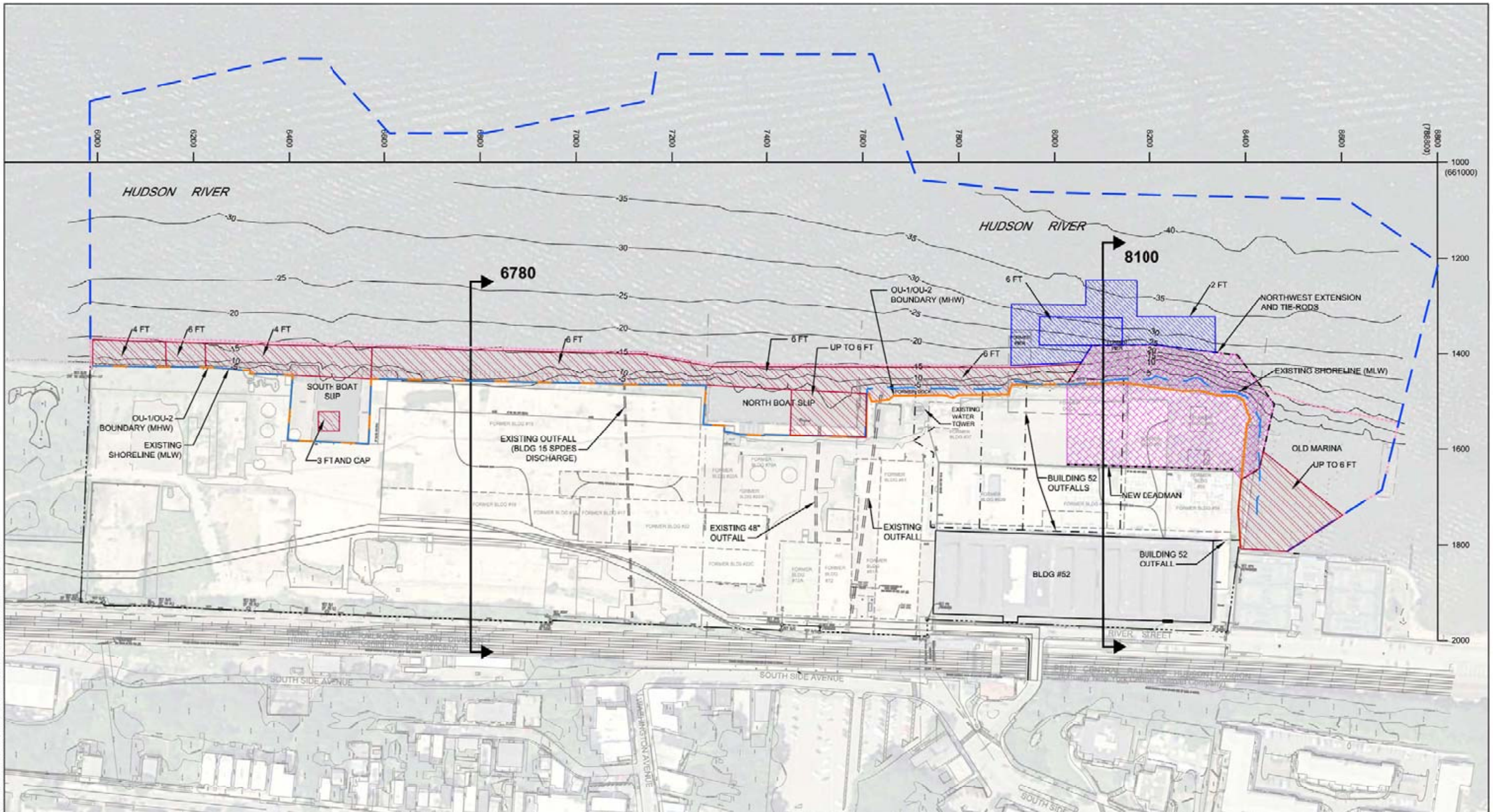


Figure 6

Metals > 95th Percentile Background Conc.
Copper (129 ppm), Lead (132 ppm), Zinc (234 ppm)

Harbor at Hastings
Town of Greenburgh, Westchester County
Site No. 3-60-022



LEGEND:

- PROPERTY LINE
- RAIL ROAD
- FENCE
- RIP-RAP
- EXISTING OFFSITE OUTFALLS
- EXISTING SHORELINE (MLW)
- OU-1/OU-2 BOUNDARY (MHW)
- SILT CURTAIN
- OU-2 SECTION LINES
- NORTHWEST EXTENSION
- NEARSHORE AND BACKWATER DREDGE AREA
- DEEPWATER DREDGE ARIA
- BULKHEAD WALL
- OU-2 LIMITS

NOTES:

1. BASE PLAN PROVIDED BY BOSWELL ENGINEERING DRAWING NO. 04-209-MW (01/27/2006).
2. OTHER SITE FEATURES BASED ON VARIOUS HISTORICAL DOCUMENTS.
3. EXISTING 5 FT BATHYMETRY BASED ON DATA FROM ALPINE OCEAN SEISMIC SURVEY (1997).
4. ELEVATION CONTOURS ARE BASED ON NAVD 88 DATUM.
5. BACKGROUND ORTHOIMAGERY FROM NAIP, 2010.
6. DREDGE DEPTHS ARE SHOWN AS MAXIMUM DEPTHS. ACTUAL DREDGE MAY BE CONSTRAINED BY CONSTRUCTIBLE LIMITS, AS SHOWN ON THE SECTIONS.
7. OU-1 REMEDIAL ACTIVITIES ARE SHOWN ON FIGURES 28 AND 30.
8. MEAN HIGH AND MEAN LOW WATER ARE EL. +2.2 AND EL. -2.0, BASED ON HISTORICAL SITE REPORTS.

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SCALE IN FEET

HALEY & ALDRICH

NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

PLAN VIEW
MODIFIED ALTERNATIVE 6

SCALE: AS SHOWN
FEBRUARY 2012

FIGURE 7

G:\PROJECTS\28612\265 - FINAL RFS\CAD\MODIFIED ALTERNATIVE 6\28612-265-FRAP MODIFIED ALT 6.DWG

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Harbor at Hastings
Operable Units No. 1 and 2
State Superfund Project
Village of Hastings on Hudson, Westchester County, New York
Site No. 360022

The Proposed Remedial Action Plan (PRAP) for the Harbor at Hastings site, was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on January 2012. The PRAP outlined the remedial measure proposed for the contaminated soil, sediment, surface water, groundwater at the Harbor at Hastings site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on January 26, 2012, which included a presentation of the remedial investigation and feasibility study (RI/FS) for the Harbor at Hastings as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period was to have ended on February 10, 2012, however it was extended to March 12, 2012, at the request of the public.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

COMMENT 1: Justification of the 1ppm PCB cleanup goal for soils should be provided through risk assessment modeling.

RESPONSE 1: The 1 ppm soil cleanup objective (SCO) is set forth in 6 NYCRR 375-6.8, and this SCO is protective for residential and ecological resources as well as the future intended use of the site for restricted-residential. The 1 ppm SCO was adopted from EPA and was based on risk management considerations for high occupancy scenarios as described in section 6 of the Development of Soil Cleanup Objectives Technical Support Document, September 2006, which may be found at http://www.dec.ny.gov/chemical/34189.html

COMMENT 2: What are the health hazards of the proposed sediment processing operation?

RESPONSE 2: The NYSDEC and NYSDOH pay close attention to the quality of life for the surrounding community during all parts of the remedial work at a site, including the sediment processing portion of the cleanup. All concerns will be addressed whether it is noise, odor or dust migration in a manner that will monitor and minimize any release or potential for exposure. See response number 11 for CAMP details. Monitoring and other appropriate engineering controls will be in place to assure no hazards result from this or any other operations required to implement the selected remedy.

COMMENT 3: Will BP/ARCO reimburse the State for its costs?

RESPONSE 3: Yes, reimbursement of New York State costs is expected as part of the consent order negotiated with BP/ARCO, the responsible party.

COMMENT 4: Has soil beneath Building 52 been sampled to determine if contamination is beneath it?

RESPONSE 4: Yes the soil beneath Building 52 was sampled and characterized to determine the levels of contaminants below the building.

COMMENT 5: How much semi-solid PCBs are present beneath the river?

RESPONSE 5: The presence of semi-solid PCB has been identified in the areas shown on Figure 3 of the ROD. The full extent and amount of semi-solid PCBs present beneath the river has been difficult to estimate due to the difficulty in installing borings and sampling the area immediately offshore of the Northwest Corner. This area was not extensively sampled because the equipment needed to penetrate the rip rap could not access areas of shallow water under current conditions.

COMMENT 6: Is it safe to use Kinnally Cove for recreational wading in the water and sediments due to potential contamination?

RESPONSE 6: Yes, Kinnally Cove may be used for recreational wading in the water with respect to the contamination associated with the site. Sediments in Kinnally Cove were sampled for PCBs by the Department in 2001, the range of concentrations detected were 0.088 and 1.5 ppm of total PCBs.

COMMENT 7: Will the proposed Northwest extension include cathodic protection of the steel sheeting?

RESPONSE 7: Yes the Northwest extension will include cathodic protection of the steel sheeting.

COMMENT 8: There is concern for sea level rise greater than predicted by the USACE. The remedy needs to add additional rip rap and foundation to accommodate the potential rise in sea level.

RESPONSE 8: The remedial design will include design considerations which take into account estimated sea level changes. Shore protection will be designed to prevent erosion of the shore due to the action of wind, waves and other forces to prevent damage to on-shore development or potential exposure and subsequent transport of contaminated soils.

COMMENT 9: We support the proposed restricted residential use of the site.

RESPONSE 9: Comment noted.

COMMENT 10: What is the scientific basis for the two-foot cover system for restricted residential use of the site?

RESPONSE 10: The basis for the 2 foot cover system is 6NYCRR Part 375, and the associated 2006 Technical Support Document, which may be found at http://www.dec.ny.gov/chemical/34189.html

COMMENT 11: When the CAMP is developed, we are concerned for using the standard particulate action level as a proxy for airborne PCBs. Before construction begins, the community needs a presentation of how the action level for PCBs is developed as part of the CAMP.

RESPONSE 11: In the remedial design phase a site specific Community Air Monitoring Plan (CAMP) will be developed which will specify the action levels for dust, volatile organic compounds and PCBs. Before implementation of the remedy a public meeting will be held and will explain in further detail how the CAMP will be protective of the community.

COMMENT 12: The green remediation elements of the PRAP are too vague. More specific requirements should be stated to minimize construction impacts to Village. These include requirements for barge and/or train transport of contaminated and clean soil, filtered diesel emissions, use of ultra low sulfur diesel fuels and Tier 3 diesel emission standards.

RESPONSE 12: The green remediation elements presented are there to acknowledge the DEC's commitment to green remediation, specific green remediation elements will be identified in the remedial design. The goal will be to minimize construction impacts to the Village to the extent feasible while implementing the remedy.

COMMENT 13: Will the two foot soil cover be able to be breached to construct building foundations?

RESPONSE 13: In areas where building will be permitted, the two foot soil cover may be disturbed provided the requirements included in the approved Site Management Plan are followed.

COMMENT 14: The annual cost of the two-foot cover system is underestimated because it does not include the additional cost for implementing the Site Management Plan during development.

RESPONSE 14: The annual cost does not factor in the costs for development, since these are beyond the scope of this ROD.

COMMENT 15: Who is responsible for the annual costs that are presented in the PRAP?

RESPONSE 15: ARCO will be responsible for the annual operation and maintenance costs.

COMMENT 16: What are potential health effects of other metals in the sediment, such as nickel, mercury and arsenic?

RESPONSE 16: In order to have health effects from metals present in the sediment there first has to be direct contact with these contaminants. Presented below are potential health effects if exposure occurred and at high concentrations.

Nickel: The most common reaction is a skin rash at the site of contact. The skin rash may also occur at a site away from the site of contact. Less frequently, some people who are sensitive to nickel have asthma attacks following exposure to nickel. Some sensitized people react when they consume food or water containing nickel or breathe dust containing it.

Mercury: Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

Arsenic: Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Additional information on these metals can be found on the Agency for Toxic Substances and Disease Registry's website.
http://www.atsdr.cdc.gov/substances/index.asp

COMMENT 17: Will there be any stipulated penalties in the Order on Consent to ensure compliance with the schedule for implementing the remedy?

RESPONSE 17: Stipulated penalties will be subject to negotiations between ARCO and the Department concerning the OU2 Order on Consent. Note that Environmental

Conservation Law also provides for penalties for non-compliance with the terms and conditions of orders on consent.

COMMENT 18: When will the remedial work start and end?

RESPONSE 18: The remedial work will begin after an Order on Consent that includes the OU2 remedy is signed and the remedial design is completed. The public will be notified at important milestones. The Department anticipates the project will take approximately 5 years to complete.

COMMENT 19: What are likely impacts upstream and downstream of the dredging project? We are concerned about this project harming the ongoing efforts to establish oyster beds just upstream of the site.

RESPONSE 19: The impacts upstream and downstream from implementing the remedy are expected to be minimal as a result of the controls that will be in place. This is based on the nature of the contamination and knowledge gained at other sediment remedial projects. The majority of the dredging will be performed using silt curtains which will minimize resuspension from dredging. Monitoring will be performed to identify acceptable requirements to protect water quality in upstream and downstream locations. It is also our understanding of the proposal that the oyster beds are not intended for human consumption.

COMMENT 20: The Department and/or ARCO should use additional outreach such as social media methods to keep residents apprised of the remedial progress and address concerns for airborne exposures during construction. Information should be disseminated in layman's terms using hubs in the Village such as coffee shops, the train platform, etc. as posting locations.

RESPONSE 20: The Department has successfully used websites which provide weekly updates, construction status and daily monitoring, and will work with the PRP explore and implement a website or additional outreach to keep the community informed during the remedial design and construction.

COMMENT 21: Is the proposed 2-foot cover consistent with the five foot cover that is required by the Village and Riverkeeper's Federal Consent Decree with ARCO?

RESPONSE 21: The proposed 2-foot cover is consistent with the Village and Riverkeeper's Federal Consent Decree with ARCO.

COMMENT 22: The Department should request and review ARCO's proposed lighting plan as part of the remedial design.

RESPONSE 22: The need for extensive construction lighting will depend on the nature and schedule of the work to be performed. Decisions concerning work hours and the need for supplemental lighting to safely conduct the work will be made in consultation with the Village of Hastings-on-Hudson.

COMMENT 23: What is included in the proposed restricted residential use? Why are single family homes not permitted?

RESPONSE 23: Restricted residential use is the land use category when there is to be common ownership or a single owner/managing entity for the site. Therefore apartment buildings, condominiums and recreational uses would be allowed that are managed by a single entity pursuant to a site management plan (SMP). It prohibits single family housing because managing and restricting the use of property would be more difficult, and could result in a greater possibility for individual owners and hired contractors to take actions not in conformance with the SMP. Furthermore, agriculture or vegetable gardens on the controlled property would be prohibited with the exception of community gardens with the approval of the Department.

COMMENT 24: Where will additional sampling be conducted in pre-design? Not just in the Northwest Area.

RESPONSE 24: Additional sediment sampling will be performed to identify depths of sediment contamination that will be removed in both nearshore and deepwater areas. Baseline monitoring will also be performed for the long-term monitoring plan to determine the pre-remedial conditions. The baseline monitoring plan will include sampling at background locations to determine ambient contaminant levels that are unrelated to the Harbor at Hastings site.

COMMENT 25: Will the liquid PCB removal operation affect the ability to use the northwest corner and northwest extension area?

RESPONSE 25: The remedial design will seek to minimize the impact of PCB recovery operations on the future use of the northwest extension area.

COMMENT 26: Can some of the shoreline be used for deep water dock access?

RESPONSE 26: The future use of portions of the shoreline for deep water dock access would need to be identified during the remedial design to assure the design takes this into account.

COMMENT 27: Does the PRAP provide for financial assurance to ensure long term monitoring and maintenance of the remedy?

RESPONSE 27: The PRAP and Record of Decision do not include financial assurance to ensure the long term monitoring and maintenance of the remedy. However, the Department has regulatory authority to require financial assurance, and could consider this option during the negotiation of the Order on Consent.

COMMENT 28: What information and experience from the Upper Hudson remediation will be utilized in the design and implementation of this remedy?

RESPONSE 28: While representing a different set of site specific conditions, the applicable information and experience from the Upper Hudson, will be used extensively to design and implement this remedy. Experience concerning the types and frequency of monitoring, community interaction issues, debris removal, air monitoring, dredge techniques, and silt controls will be used in developing the remedial design.

COMMENT 29: Where will the PCBs be taken after they are removed from the site?

RESPONSE 29: The dewatered PCB sediment will be taken to a facility which is permitted to accept PCB waste of the type and concentration removed.

COMMENT 30: Barge and rail transport of both clean and contaminated soils and sediments should be evaluated during the remedial design.

RESPONSE 30: The modes of transport for both clean and contaminated soils and dewatered sediment will be evaluated in the remedial design.

COMMENT 31: Is there a plan for diverting and/or protecting river traffic during the dredging operation?

RESPONSE 31: The appropriate navigational warnings will need to be reviewed and approved for conformance with US Coast Guard requirements before they are deployed.

COMMENT 32: Discuss the significance of the "drag-down" concept.

RESPONSE 32: The "drag down" refers to the potential for the liquid and semisolid PCB material to adhere to the steel sheet piles as they are driven through these materials into deeper into uncontaminated zones. The concern is that PCBs would be carried down into an uncontaminated area during the driving of the piles or flow as a dense non-aqueous phase liquid (DNAPL) through a newly-created migration pathway.

COMMENT 33: Are the proposed new wells in the northwest extension area just to monitor PCBs?

RESPONSE 33: The remedy anticipates installing new wells to both monitor and recover the PCB DNAPL, if present. The details of the additional work will be identified in the remedial design and site management plan.

COMMENT 34: How much of the PCBs have you removed so far in terms of the total amount there?

RESPONSE 34: The amount of PCB DNAPL present was not estimated due to the difficulty in obtaining samples from the immediate offshore area. As a result, the proportion of PCBs removed has not been calculated, but to date approximately 500 gallons of PCB DNAPL have been collected and disposed off-site.

COMMENT 35: Were samples for metals treated with acid to allow for metals speciation?

RESPONSE 35: Yes, samples for metals analysis were acidified, and therefore the results represent total metals in the sample. However, metal speciation was not performed.

COMMENT 36: Were single or duplicate assays performed?

RESPONSE 36: Most samples were single analysis. However, a certain number of samples were analyzed as duplicates, in accordance with generally-accepted practice for conducting environmental investigations.

COMMENT 37: Do you have to do more investigation to determine whether the new bulkhead will go into the liquid PCB pool?

RESPONSE 37: More investigation will be performed during remedial design to determine the final alignment of the sheet pile wall. Previous probing work identified a proposed location which is shown on Figure 7. The major factor concerning the alignment is the presence of the rip rap which will need to be avoided or moved during installation.

COMMENT 38: How long will the monitoring wells be there?

RESPONSE 38: The monitoring wells will remain in place as long as they are needed to monitor contamination in the groundwater.

COMMENT 39: Are you getting pure PCBs out of the recovery wells now?

RESPONSE 39: The material being removed from the wells contains approximately 30-40 % PCB.

COMMENT 40: As to backfilling the site, it is underwater at times. The Army Corps of Engineers (ACOE) guidelines you are following need to be enhanced.

RESPONSE 40: The remedial design will evaluate design considerations which take into account estimated sea level changes. Shore protection will be designed to prevent erosion of the shore due the action of wind, waves and other forces to prevent damage to on-shore development or potential exposure and subsequent transport of contaminated soils. These design elements will also be part of the review by the ACOE as part of their permitting process.

COMMENT 41: What action levels will be used in the CAMP? How can you justify 1ppm for baseline? How, during a limited public comment period, can the public determine whether the 1ppm is sufficiently protective?

RESPONSE 41: The 1 ppm action level is the soil cleanup objective for soil. The Community Air Monitoring Plan (CAMP) still needs to be developed, and it will define the site specific action level for airborne PCBs. The Department has used a 100 ng/m^3 action level for PCBs on recent PCB removal projects. However, the site-specific action level will be developed and documented in the CAMP during the remedial design phase.

COMMENT 42: Has contamination from the upper Hudson River dredging released contamination to the lower Hudson River down to this location, will it?

RESPONSE 42: In 2009 and 2011, the General Electric Company under the oversight of the US Environmental Protection Agency dredged PCB contaminated sediment from stretches of the Upper Hudson River as part of the Hudson River PCB Superfund Site. During dredging, Hudson River water quality was monitored daily at several locations downstream of operations in the Upper Hudson (north of Troy) and samples were collected monthly in the Lower Hudson River at Albany and Poughkeepsie. Water quality was also monitored in the Upper Hudson during the off-season when no dredging was underway. Most relevant based on proximity to the Harbor at Hastings Site are the PCB levels measured in water samples collected from Poughkeepsie; these sample results indicate that PCB levels in river water at Poughkeepsie during dredging are consistent with levels measured before dredge operations began. Water quality will continue to be closely monitored as dredge operations continue.

Jacques Padawer, Ph.D. submitted a letter via email dated February 1, 2012, which included the following comments:

COMMENT 43: Does the DEC have chromatographic and elemental profiles of these three (or more) PCB species in the Arco property? This is critical, should be available, and should be disclosed.

RESPONSE 43: Chromatograms may be found in several documents, including the January 2005 "Field Work Summary Report for Fall 2004" Appendix C, and the November 2009 "Report on Supplemental Northwest Corner Investigation Findings". These documents are available for public review in the repositories.

COMMENT 44: Low chlorination PCBs (“liquid?”) of relatively higher vapor pressure are known to be sequestered by the liver, bind to DNA, and induce liver carcinomas. What modified precaution(s) does the DEC propose to use to monitor the new threats?

RESPONSE 44: In order to have health effects from these PCBs there first has to be exposure to them. In the remedial design phase a site specific Community Air Monitoring Plan (CAMP) will be developed which will specify the action levels for these PCBs. Before implementation of the remedy a public meeting will be held and will explain in further detail how the CAMP will be protective of the community.

Jeremiah Quinlan a Trustee with the Village of Hastings-on-Hudson submitted a letter dated February 29, 2012 which included the following comments:

COMMENT 45: Evaluate and, as appropriate, remediate sanitary/process sewers on site

RESPONSE 45: The process sewers and floor drains from Building 52 are identified for removal. Other sanitary and process sewers will be further identified during the remedial design and will be evaluated for remediation as appropriate.

COMMENT 46: Evaluate the use of the adjacent railroad thoroughly and use it to the extent reasonable.

RESPONSE 46: See Response 30.

COMMENT 47: Disposal of on-site sediments: Strict standards are needed to avoid future issues. Clean and sandy sediments will have less future risk of being a future contamination issue and will have fewer compaction/settlement issues.

RESPONSE 47: The remedial design will identify the parameters for reusing sediment on-site. The reuse of sediments on-site has the benefit of reducing transportation related impacts for both contaminated material and backfill.

COMMENT 48: Where a sloped shoreline will be employed, heavy armoring will provide better protection during storms.

RESPONSE 48: The type of armoring will be identified in the remedial design and the protection during storm events will be evaluated as a factor in identifying the proper size of the material.

COMMENT 49: Concerns on how will the IRM wells be protected from the public in the northwest corner that will be a public park.

RESPONSE 49: The recovery wells in the Northwest Extension Area will be protected from the public in anticipation that the area may be used for public access. This area may need to be temporarily closed during operation and maintenance activities. The remedial design will identify approaches, such as flush mounting the wells; dedicated vaults; or other engineering controls to protect the public while allowing the operation of the wells for their intended purpose.

Eileen Bedell, the property owner of the Hudson Valley Health & Tennis Club, submitted a letter dated March 9, 2012 which included the following comments:

COMMENT 50: I would like the plan to show my property lines reflected on all drawings. My deed includes both shallow and deep water riparian rights. In fact, all of the "Old Marina" is owned by Hudson Valley Health & Tennis Club, although I have no objection to the use of "Old Marina" on your diagrams.

RESPONSE 50: The property lines will be shown on the future drawings and plans in the remedial design. The Department acknowledges the ownership and potential future use of the marina and the need to gain access.

COMMENT 51: I would like the plan to be modified to take into consideration my future plans for reopening the marina. This includes depth, configuration and access issues.

RESPONSE 51: The sediment removal areas are based on the contamination identified in the remedial investigation phases. The approved plans for potential re-use of the marina will be factored into the remedial design with the objective of reducing the footprint of the Northwest Extension Area and minimizing backfill in the marina area. The backfill requirements will be evaluated and adjusted for the future and reasonably anticipated use of the sediment removal area of the marina. However, any additional or future dredging for the marina project must obtain approvals through the regular permitting process, including ECL Article 15 or 6NYCRR Part 608. As noted earlier, additional investigations will be needed before the final sheet pile wall alignment is determined.

COMMENT 52: The metals and PCB contamination plan is inconsistent with the data ARCO has provided me. In addition, test sampling was often restricted by the logistics of sample extraction.

RESPONSE 52: The extent of metals and PCB contamination is identified in the Feasibility Study, Appendix C. The sediment results are presented based on the depth below the sediment/water interface, and are consistent with previous reports. The Department agrees that data gaps exist in the marina area due to the inability to physically access certain locations. For this reason additional sediment sampling will be performed during the design phase and the obstructions are removed.

COMMENT 53: I would like the plan to clarify how future zoning changes for the ARCO property apply or do not apply to my property.

RESPONSE 53: The easement placed on the ARCO property pursuant to the ROD will not apply to the Hudson Valley Health & Tennis Club property. Concerns related to future zoning issues should be directed to the Village of Hastings-on-Hudson.

COMMENT 54: I would like clarification as to whether piles and pile-supported structures will be permitted in the marina.

RESPONSE 54: Restrictions on the installation of piles and pile-supported structures outside of Northwest Extension Area (NEA) are not planned. The installation of piles will not be restricted in the marina area provided that PCB DNAPL is not present. The remedial design will determine the precise boundaries of the NEA.

COMMENT 55: I have no need for backfilling of the marina post dredging. In addition I welcome reuse of the silt as landfill on the OU1 site.

RESPONSE 55: The comment is noted. See Response 51.

COMMENT 56: As you are aware from our discussions, I am opposed to the plan as drafted, particularly based on #2 and #3 above (*as referenced in the letter*). Without modification, I would be unwilling to grant access for executing the work.

RESPONSE 56: The Department acknowledges the plans for re-use of the marina. Additional work will be performed during the remedial design to minimize or eliminate the sheet pile wall on your property, to the extent it can be while still meeting the ROD objectives, to allow implementation of both the remedy and the proposed marina.

Daniel E. Estrin and Justin M. Davidson from Riverkeeper submitted a letter dated March 12, 2012 which included the following comments:

COMMENT 57: Riverkeeper is particularly concerned with the PRAP's general lack of clarity regarding the cleanup procedures that will be followed. In the interest of providing an open and transparent dialogue around the Department's efforts to remediate the site, we want to ensure that the public is well informed as to the particular processes that will be employed during the long-awaited cleanup of the Site.

RESPONSE 57: The cleanup procedures will be identified in the remedial design. The Department shares Riverkeeper's concern that the public should remain well informed during the remedial design and implementation of the remedy. Additional outreach activities will be scheduled at appropriate milestones in the project.

COMMENT 58: The PRAP is unclear as to where additional delineation sampling and study will be conducted. Before dredging and removal activities commence in the deepwater portion of the site, additional delineation sampling must be conducted in order to entirely understand and characterize the full extent of contamination. In particular, paragraph 6 of the proposed remedy provides, "the specific area where fixed sediment resuspension controls can be feasibly deployed will be evaluated during design based on the water depth and velocity conditions. Alternative designs for fixed resuspension controls will be evaluated to increase the depth of feasible resuspension controls." Paragraph 7 of the proposed remedy – which deals with "removal of sediment from a targeted area outside the northwest extension area in deeper than 15 feet of water" – explains that "during design, sampling will be performed to determine whether additional areas of PCBs greater than 50 ppm exist. Based upon an evaluation of the significance of the distribution of contaminants and the feasibility of removal, additional areas of sediment may be targeted for dredging." Taken in conjunction, these two statements suggest that the PRAP fails to define with reasonable specificity the areas where these additional sampling efforts will take place. Particularly, it is not clear whether this sampling will be confined to the immediate vicinity of the northwest extension area, or whether it will appropriately extend downriver to other areas where earlier incomplete and insufficient sampling indicates the possible presence of PCB concentrations.

RESPONSE 58: Additional sampling will be performed in both the near shore and deepwater areas where data gaps exist to provide a precise delineation of sediment to be removed. Such additional sampling is not confined to the immediate vicinity of the Northwest Area.

COMMENT 59: Definition of the areas to be sampled and the associated extent of the potential dredging are essential elements of efforts to evaluate the potential for resuspension and contaminant dispersion and the need for and type of resuspension controls. Recent experience in the upper Hudson near Fort Edward, New York indicates that the combination of equipment selection and dredging protocols can substantially reduce downstream dispersion and in many cases have the potential to eliminate the need for fixed controls such as silt curtains. This potential should be carefully evaluated with full consideration of complications associated with water depths in excess of 15 feet and/or energetic river and/or tidal flows after specification of the area and associated contaminant mass to be dredged. It does not appear to Riverkeeper that such an evaluation has been conducted to date.

RESPONSE 59: The Department has determined that resuspension controls will be used where feasible to reduce and minimize the dispersion of contaminants and will require that the extent of contamination, and the associated extent of the potential dredging, be determined during the design in order to design the controls necessary to address resuspension and contaminant dispersion. The recent experience in the upper Hudson River has provided information that can be applied to the remedial design of this dredging project. However this experience has limitations since the river velocities in the upper Hudson River are less than the current velocities near Hastings-on-Hudson. Also the sediment matrix at this site is also much finer than in the upper Hudson. These site-specific factors will be evaluated in the remedial design to choose the appropriate resuspension controls. The Department contacted a silt curtain manufacturer and a remedial contractor to independently verify the limitations for resuspension controls based on the site specific conditions in selecting the remedy.

COMMENT 60: During the Public Meeting on January 26, 2012, held in the Village of Hastings-on-Hudson, DEC Staff (Mr. George Heitzman) explained that during design, additional delineation sampling will be conducted "throughout." However, it is still unclear where precisely this additional sampling will be conducted, and a thorough explanation should be described in the Record of Decision ("ROD") for OU-2. DEC Staff further explained that additional sampling will be conducted only in areas where previous sampling results indicated "contiguous or concentrated" concentrations over 50 ppm of PCB, rather than "one hit" concentrations above 50 ppm. Earlier sampling that was conducted in portions of the deepwater site outside the northwest extension area was incomplete and unable to accurately define the full extent of contamination, so it would be erroneous to base future sampling efforts on what was conducted previously. Extensive additional delineation sampling should be conducted throughout the entire deepwater portion of the site to best understand precisely where these contiguous or concentrated zones exist and to allow accurate definition of the mass of PCB in each zone.

RESPONSE 60: The previous sampling provided sufficient information to allow the selection of remedy, but the remedy calls for additional sediment sampling in the deepwater areas to further delineate the areas to be dredged to meet the cleanup goals for PCBs. Post-ROD delineation sampling is routinely conducted at remediation sites to more precisely determine removal limits. The Department also agrees that additional sampling is needed to identify whether, and where, contiguous or concentrated zones may exist to allow accurate definition of the sediment to be dredged.

COMMENT 61: Because of the ambiguity surrounding the additional delineation sampling, Riverkeeper requests that an Additional Delineation Sampling Workplan be developed to describe with specificity the locations, actions, and timing of the additional delineation sampling to be conducted. In light of the lack of detail in the PRAP concerning additional in-river sampling to be conducted, we believe this Workplan should be publicly noticed and made available for public comment.

RESPONSE 61: The Department will require the development of a Sediment Delineation Sampling Work Plan as an element of the design and it will be publicly noticed and made available for public review.

COMMENT 62: The proposed action level of 50 ppm for the OU-2 deepwater area is premature, and a more stringent action level threshold below 50 ppm is necessary to protect the benthic community. The PRAP indicates that dredging of sediment in the deepwater portion of OU-2 will be conducted in areas defined by PCB concentrations greater than 50 ppm to six feet below the existing bottom. However, the PRAP completely fails to explain the technical rationale for the proposed 50 ppm action level. According to the DER-10, a PRAP must summarize the "alternatives considered and discuss the reasons for proposing the remedy," which has not been done here with respect to this proposed action level. During the Public Meeting on January 26, 2012, DEC Staff stated that a 50 ppm action level "struck the right balance," given the practical concerns and difficulties with dredging in deeper water. While Riverkeeper understands these concerns, this narrative answer can not suffice as a cogent technical basis to support 50 ppm as the appropriate action level. A satisfactory technical explanation must be made so the public can be informed and properly analyze the bases for selecting an action level that is relatively high.

In addition, on choosing a 50 ppm action level, the PRAP only states that "Targeting deepwater areas with PCBs above 50 ppm reduces the time needed to complete dredging activities when compared to deepwater areas above 1 ppm." However, when asked at the Public Meeting about whether NYSDEC calculated or estimated exactly how much longer dredging would take under a more stringent action level, DEC Staff (Mr. William Ports) responded that DEC had not calculated the time. The PRAP should not conclude without technical backup that choosing a higher action level of 50 ppm will reduce the amount of time needed for dredging when the Department has not calculated or estimated any such temporal differences.

The matter of remedial criteria warrants careful elaboration in the ROD for OU-2. Under the NYCRR, the goal of any remedial program for a specific site is to "restore the site to pre-disposal conditions, to the extent feasible. At a minimum, the remedy selected shall eliminate or mitigate all significant threats to the public health and to the environment presented by contaminants disposed at the site through the proper application of scientific and engineering principles." These words are echoed verbatim in the PRAP as two of its stated goals. The selection of the higher threshold of 50 ppm, without sufficient technical support and explanation supporting that action level, does not appear consistent with this legal mandate and the PRAP's stated goals.

While Riverkeeper understands that this higher threshold selection may be based on concerns that dredging will facilitate dispersion and ultimately increase contaminant bio-availability beyond current levels, such concerns must be based on hard data with particular emphasis on the mass of contaminant to be addressed by dredging. In the presence of a small mass – *i.e.*, a discrete area containing less than several pounds of PCBs where that mass is subject to continuing deposition and minimal erosion – the higher threshold of 50 ppm *may* be justified. However, for larger masses, lower thresholds are recommended with 10 ppm being the highest consistent with values used in other sites in the Hudson River and New England when dealing with significant masses of PCB. Because the data available in the PRAP and Revised Feasibility Study (RFS) do not provide sufficient information to properly assess the mass of PCB concentrations throughout the extent of the Site, the public is unable to determine whether the contamination presents "significant" threats to the public health and environment. As a result, the specification of the threshold is at the very least, premature. The present protocols specified in the PRAP do not appear to be sufficient to provide the necessary level of specificity, and the current approach based on sparse sampling and assumptions of costs should be reconsidered. The ROD for OU-2 must provide the basis for quantitative evaluation of the extent of contamination allowing subsequent evaluation and definition of the threshold criteria.

RESPONSE 62: As discussed in the Basis for Selection section of the ROD, the 50 ppm action level for deepwater sediments balances the potential for construction-related impacts associated with disturbance to the river bottom and migration of suspended sediments with the removal of sediments which have the highest levels of PCBs and the greatest potential to migrate and be an on-going source to the environment. The deepwater sediments present a number of concerns which were factored into the decision to remediate sediments in the site specific deepwater areas. These include environmental consequences of resuspending contaminated sediments without resuspension controls in these areas, the potential for remaining contaminated sediments to be disturbed in the future, the proximity of contamination to the sediment surface, and the concentration of contaminants. The Department evaluated the degree and extent of contamination for different action levels based on currently available information. The additional delineation sampling data from the deepwater areas to be collected during the remedial design will be further evaluated and the following factors will be considered in determining the final deepwater dredge area: 1) depth of PCB contamination, 2) type of environment (erosional or depositional), 3) contiguous areas of contamination, 4) thickness of clean sediment above the PCB contamination, 5) duration of dredging and associated potential for migration of resuspended sediments, and 6) the area weighted surface concentration of PCBs.

The time to remove the sediments in the deepwater areas was estimated for different action levels and is presented in the table below. These estimates are based on standard production rates and do not account for certain site-specific factors. The estimated volume of deepwater sediments that contain greater than 50 ppm PCBs is approximately 5000 cubic yards. The size of the mechanical dredge was assumed to be 5 cubic yards, with a production rate of 80 cubic yards per hour. Time estimates were prepared for both an 8-hour dredge day, and a 4-hour dredge day. The latter estimate reflects an attempt to limit deepwater dredging to the slack period during each daylight portion of the tidal cycle to minimize the migration of fines from the dredge area.

Deepwater PCB Remedial Goal	Estimated Volume of Sediment yd^3	Estimated Time in hours of Dredging	Estimated Days (8 hrs/day)	Estimated Days (4 hrs/day)
50 ppm	5000	64	8	16
10 ppm	20,000	250	31	62
1 ppm	53,000	662	83	166

The Department notes that comparison to action levels for unspecified sites in the upper Hudson River and New England site (presumably the Housatonic River) may not be valid due to the site-specific conditions encountered at this site. Sediments in the deepwater portion of the Harbor at Hastings site are significantly finer, comprising approximately 90% fines passing the #200 sieve, as compared to around 40% fines for the upper Hudson River project. Combined with the greater water depth and current velocity, the potential for uncontrolled dispersion during dredging is much greater at this site. The Department also notes that the Housatonic River project was performed by diverting the river and dredging in a dewatered condition, which provides a high degree of migration control, but is not a feasible approach at this site. As a result, the site-specific action levels that resulted from the balancing of criteria for those sites are not comparable to the Harbor at Hastings site.

To the extent feasible the site will be restored in a manner that will be protective of both the environment and public health. The remedy described in this ROD acknowledges the added difficulties of attaining pre-disposal conditions in an environment that contains levels of PCBs that are above standards in upstream locations not affected by the site. However, through implementation of engineering and institutional controls selected in the remedy, significant threats to public health and the environment will be mitigated.

COMMENT 63: As the Department is aware, on September 8, 2011, Riverkeeper submitted to NYSDEC a position statement for proposed PCB and removal criteria for the offshore areas of the Hastings site prepared by our technical consultant, Dr. W. Frank Bohlen, PhD. *See* Exhibit 3. In that statement, Riverkeeper suggested that sampling should be conducted at sites with PCB concentrations of 10 ppm at the surface (0-6 inches) or 50 ppm on the vertical between 0.5 and 3.0 feet below the sediment-water interface, unless the site was surrounded by a minimum of four (4) other cores spaced around the acre surface centered on the high concentration site. Supplementary sampling should consist of four (4) sediment cores each to six (6) feet below the sediment-water interface with each taken at the midpoint (or some reasoned alternative) of the perimeter boundaries of a one acre square centered on the high concentration site. Each core should to be sectioned and analyzed to determine PCB concentrations over the vertical for the 0-6 inches, 0.5-3.0 feet, and 3.0-6.0 feet segments. These data will be compiled with concentrations on the 0-3 feet interval used for computation of the area weighted average (AWA) concentrations. The data detailing concentrations in the 3-6 feet layer would be retained for informational purposes.

RESPONSE 63: This approach will be considered in the development of the Sediment Delineation Sampling Work Plan during the remedial design.

COMMENT 64: Department Staff apparently propose to reject Riverkeeper's position statement as a reasonable way to proceed with additional sampling and PCB remediation in the Deepwater areas. Riverkeeper continues to believe that a more stringent action level below 50 ppm is necessary to protect the benthic community, and in turn, human health and safety. Dr. Bohlen advises that a lower threshold concentration of 10 ppm for the first six inches of sediment would greatly reduce the potential for the bio-accumulation of PCBs by the local marine biological community. *See* Exhibit 3. Dr. Bohlen's specification of the 10 ppm threshold is based on distributions of higher concentrations of PCBs residing below that level as shown in the May 2011 data set in the Revised Feasibility Study. If additional sampling shows that these distributions are very localized or that the deeper sediments contain lower concentrations, then leaving them in place *may* be justified. However, that conclusion cannot be made until a more substantive and robust discussion of the issue supported by data is presented.

RESPONSE 64: The Department has not rejected Riverkeeper's approach to additional sampling and remediation in deepwater areas. The Department will consult with the interested stakeholders after the additional sampling data is obtained.

COMMENT 65: First among the nine factors used in selecting a remedy for a site is the "Overall protectiveness of the public health and the environment." Indeed, the PRAP recognizes that "[t]o be selected, the remedy must be *protective of human health and the* environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable." In order to meet the PRAP's stated goal to "eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site," Riverkeeper believes that DEC *must* consider and adequately study the feasibility of dredging in deepwater areas with a 10 ppm action level for the first six inches below surface ground. This includes additional sampling and study required to properly assess the mass of PCB concentrations. In fact, as DEC Staff explained in the January 26, 2012 Public Meeting, one of the key lessons learned from the GE Site remediation is to "fully characterize" the contamination. As per DEC's own guidance and experience, therefore, DEC is obligated to fully investigate the extent of contamination, which requires more than a superficial examination and testing of potentially contaminated areas.

RESPONSE 65: See Response 62 above. The Department and NYSDOH believe the selected remedy is protective of human health and the environment because it is unlikely for recreational users of the river to be exposed to site-related contaminants through the incidental ingestion of contaminated surface water and direct contact with contaminated sediments in the deepwater area, the primary human exposure pathway is through the consumption of contaminated fish tissue. One goal of the monitoring program will be to determine if the remedy is successful in reducing the local contribution to PCB tissue concentrations in biota. This program will monitor the performance and effectiveness of the remedy in achieving the remedial goals established for the project and will be a component of the monitoring and maintenance of the site. For specific advisories on fish consumption in this area please refer to NYSDOH's annual Health Advise on Eating Sportfish and Game.
http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/docs/advisory_booklet_2011.pdf

COMMENT 66: The ROD for OU-2 should describe the equipment or technology to be used for the in-water dredging activities. In discussing the proposed elements of the cleanup of the OU-2 portion of the site, the PRAP does not describe what types of technology or equipment will be used during the dredging activities. Section 375-1.8(a)(4) of the NYCRR provides that "Remedy selection at a site may consider the use of innovative technologies which are demonstrated to be feasible to meet the remediation requirements." The upriver dredging operations at the GE site provided for several technical advancements in dredging and re-suspension technologies. Even though the PRAP represents the initial stages of the design effort, it would be important to see the use of advanced technologies evaluated in the ROD and implemented at the Hastings site.

RESPONSE 66: In general there are two types of dredging technologies which are applicable to the Harbor at Hastings site. These include mechanical and hydraulic dredging equipment, both types of dredges will be evaluated during the design. Debris removal will be performed before sediment dredging begins.

COMMENT 67: The DEC should consider effects of flooding and sea level rise in its site design. The PRAP makes no mention of potential effects on OU-1 and OU-2 due to flooding of the adjoining upland portions of the site. Although some accommodation has been made in the preliminary OU-1 designs for expected long-term sea-level rise (accepting the Army Corps of Engineers' two-foot fill layer recommendation), there is also the matter of direct rainfall, storm surge and/or high river stage effects on OU-1 to consider. Over the past several years this area of the Hudson River has experienced several extreme storm events resulting in standing water on the site. In fact, as several local Hastings-on-Hudson residents attested to at the January 26, 2012 Public Meeting, the area around the Site has experienced several major flood events over the past several years, indicating a possible change in climate conditions and storm patterns that should be accounted for in DEC's evaluation and design. Depending on source, volume, and velocity, such waters have the potential to overwhelm proposed containment/treatment facilities and destabilize portions of the shoreline and/or groundcover. The displacement of any contaminants from these areas may in turn affect portions of the adjoining offshore. The ROD for OU-1 and OU-2 should include efforts to demonstrate the adequacy of proposed designs to effectively armor the site and minimize sensitivity to storm impacts.

RESPONSE 67: The Department shares the concerns expressed regarding the potential influence of climate change and rising sea level on the long-term effectiveness of the remedy to contain contamination during large storm events. The remedial design will consider future storm events and rising sea level that are likely to result in more intense storms, higher water events, and greater erosive forces on the site than have been documented in the past.

Eric Larson with ARCO submitted a letter dated March 9, 2012 which included the following comments:

COMMENT 68: We anticipate that remediation (both in OU-1 and in OU-2) may need to be coordinated with anticipated site redevelopment. While future uses of the site have not been resolved, we understand that Atlantic Richfield supports the concept of beneficial reuse of this site and anticipates working closely with the Village and other stakeholders in this regard. We would request that the ROD allow for some flexibility in design so that remediation does not unnecessarily impede redevelopment efforts while still maintaining environmental effectiveness.

RESPONSE 68: The Department agrees with this comment and will implement additional discussions to address issues and concerns with the Village and stakeholders while the remedial design proceeds. However, implementation of the remedy will not be delayed due to development-related issues.

COMMENT 69: Targeted Deepwater Dredging: In the October 2003 PRAP for OU-2, consistent with the scope of the RI work and data developed as part of the administrative record, NYSDEC did not propose to conduct any dredging in the deepwater area. Instead, the 2003 PRAP proposed a long term monitoring program for the deepwater area. Since that time, and consistent with the RI scope, there has been only limited additional analysis of the issues surrounding deepwater dredging as proposed in the current OU-2 PRAP. Silt curtains and other resuspension controls are unlikely to be feasible in this environment, nor are they likely to serve as effective barriers to the transport of resuspended sediments at these depths and flows. Therefore, any targeted dredging must balance the negative environmental consequences of resuspending contaminated sediment with the environmental benefits of conducting this dredging. These considerations weigh in favor of conducting limited targeted dredging for shallow (0-2 feet) hot spots (50 ppm or greater) in areas of scour that show a contiguous and concentrated pattern of sediment contamination. Consideration should be given to an alternative deepwater cleanup level at or below the 335 ppm Level of Protection screening criterion included in Table 3 of the PRAP.

We suggest that deepwater dredging of sediments deeper than about 2 feet, particularly in areas that do not appear to be subject to scour, does not provide an environmental benefit that outweighs the potential negative consequences associated with resuspension and transport of contaminated sediments. The deepwater areas identified in the PRAP on Figure 7 are generally consistent with this remediation approach and we do not believe additional dredging in other areas is warranted based on a review of the existing data and the multiple lines of evidence that suggest a consistently depositional environment. The current geometric weighted average concentration of PCBs in surface sediments is approximately 1.3 ppm for all areas outside the proposed deepwater dredge extents.

In this regard, we asked two reviewers, Dr. Michael Palermo and Dr. Victor Magar to review the proposed remedy with respect to the targeted deepwater dredging and we have attached their comments as well.

RESPONSE 69: The areas of targeted dredging in the deepwater areas will be further refined in the remedial design. The Department recognizes that standard silt curtains will not be effective in this environment. However, the Department does not want to predicate the means and methods of minimizing or reducing sediment resuspension in the deepwater areas. The dredging in the deepwater areas must balance the distribution of contaminants and the feasibility of removal. Therefore when additional sediment data is available from the deepwater areas the following factors will be considered: 1) depth of PCB contamination, 2) type of environment (erosional or depositional), 3) contiguous areas of contamination, 4) thickness of clean sediment above the PCB contamination, and 5) the duration of dredging required and associated potential for migration of resuspended sediments, and 6) the area weighted surface concentration of PCBs.. The Department rejects using the PCB cleanup level of 335 ppm in the deepwater areas because it would protect the environment based only on acute toxicity to benthic organisms, and it is feasible to achieve a higher level of protection. The Department believes that the 50 ppm cleanup in targeted areas provides the best balance of the selection criteria given site specific conditions at the site.

COMMENT 70: Metals: Nearshore, Old Marina, North Boat Slip

The OU-2 PRAP proposes dredging sediments to depths of up to 6 feet below the current sediment surface in the nearshore area, Old Marina, and North Boat Slip. There appear to be several rationales for this dredging including: (a) removal of sediments exceeding the PCB remediation criteria; (b) removal of sediments exceeding the PRAP's selected metals criteria; and (c) the provision of sufficient depth to install backfill or a cap to isolate remaining contamination and/or protect against scour or erosion.

The metals remediation criteria selected in the PRAP do not reflect metals toxicity and are not indicative of ecological risk. Indeed, site related investigations into metals toxicity have demonstrated the absence of toxicity at levels much higher than the criteria established in the PRAP. Thus, this approach is not consistent with EPA policy and guidance regarding the evaluation of sediment toxicity and the selection of sediment remedies. For this reason, we do not support the metals criteria set forth in the PRAP. We asked Dr. Kenneth Jenkins to review the PRAP with respect to metals criteria, ecological risk, and evidence of site-related toxicity. We have attached his comments in that regard.

Although metals concentrations in sediments do not justify nearshore dredging up to 6 feet in depth as a general approach, we recognize that site-specific evidence suggests that there may be some benthic toxicity associated with copper concentrations in excess of 982 ug/l, in nearshore sediments if they were to become exposed to biota through inadequate separation. In these targeted areas, near two outfalls along the southern portion of the site, metals concentrations in sediment may support dredging sufficient to protect against scour and provide physical separation from biota.

In addition, as a practical matter, there may be other reasons why some of the proposed nearshore dredging may be appropriate for the ROD. For example, much of this dredging will also remove sediments contaminated with PCBs. For areas without PCB contamination, considerations of site-specific scour potential and the need to improve site-specific aquatic habitat depth could also support portions of the proposed dredging. For this reason, we would urge that the ROD provide for dredging of up to 6 feet in depth while allowing some flexibility in remedial design to determine whether certain nearshore areas could be dredged to less than 6 feet in depth.

While returning sediments to pre-existing conditions to the extent feasible is an RAO, there may be little to no ecological benefit from the removal of metals above the remediation criteria set in the PRAP. As a result, short and long term impacts should be the primary consideration for the feasibility of additional dredging, and the ROD should provide some flexibility to reduce nearshore dredging depths during remedial design to minimize short and long term adverse impacts of dredging, particularly in areas where PCB contamination is absent while accounting for aquatic habitat depth, the integration of a sloped shoreline between OU-1 and OU-2, and other localized factors as may be appropriate.

RESPONSE 70: The metals remediation criteria in the PRAP are based on background concentrations of metals in the sediment. The use of a background concentration as a basis for cleanup concentrations is not based on toxicity but on the occurrence and concentration of the metals in the surrounding area. Toxicity testing conducted on the site was not sufficiently robust to develop a site-specific toxicity threshold. The dredging depth was established to allow for the feasible removal of contaminated sediments and the restoration of the river bed following the remediation. Actual dredge depth will be determined during design based on sampling that indicates the actual depth at which the sediments exceed the cleanup criteria. If other feasibility concerns arise during design, consideration will be given to adjusting dredging appropriately.

COMMENT 71: Capping and Backfilling in the Nearshore Area

The PRAP also proposes the use of backfill and/or capping materials in the nearshore area to protect against scour or erosion, to return the area to pre-dredge depths, and to provide isolation from remaining contamination. Regardless of whether the material is backfill or a cap, 6 feet of fill is not necessary to protect human health and the environment from any contamination that may remain. The analysis presented in the RFS indicated that 3 feet was sufficient. The need for anything more than engineered controls that provide physical separation or isolation is unnecessary. A cover of 6 feet far exceeds any cover necessary to provide separation or isolation of remaining contamination. It is also far more than necessary to provide a substrate for biological activity that would be protected from contact with site-related contaminants. We asked Dr. Danny Reible to review this issue, and we have attached his comments.

Further, in some cases, the requirement for up to 6 feet of backfill may impede the coordination of redevelopment and remediation. The ROD should provide flexibility for backfill/capping in the nearshore areas with between 2 and 6 feet of material and should allow both the full extent of the cap/backfill and the type and nature of soils, sands, or gravels to be used will be determined in remedial design.

RESPONSE 71: Flexibility regarding backfill is provided for in the ROD. Other than the isolation capping layer, the specific substrate for backfill is not specified. Additionally, the remedy allows for a river flow and deposition study to consider allowing natural in-filling following dredging. As noted in the ROD the purpose of the backfill is to "isolate remaining contamination, prevent erosion of cap materials, restore bathymetry, and provide a habitat layer". Depending on dredging depth and location, replacement of riverbed materials with significantly less than what is removed during dredging would not meet all of these goals. See also Response 51.

COMMENT 72: Certain technical challenges have been deferred to design. Perhaps the most significant is whether resuspension/transport controls might be effective in deeper water to allow the expansion of the nearshore dredging area. We have conducted an initial investigation as part of the studies previously submitted to NYSDEC, which shows that the current limits established in the RFS and PRAP for the implementation of resuspension/transport controls are accurate. Our investigation indicates that there is no demonstrated feasible technology that would allow us to significantly expand the proposed dredging limits without creating a substantial risk of contaminant resuspension and transport. In fact, the limits proposed are at the outer edge of silt curtain effectiveness. Thus, consideration of any expansion of the nearshore area in the design phase is unwarranted. There is no compelling reason to treat this technical issue any differently than other technical issues where future improvements during the design process are always possible and are taken into account if and when they are identified.

In this regard, we asked Dr. Palermo to review this issue, and we have attached his comments as well.

RESPONSE 72: The comment is noted.

COMMENT 73: Long Term Monitoring of the Remedy

The RAOs selected in the PRAP are generic and not site-specific. This presents various potential issues including long term monitoring to evaluate the success of the remedy. In particular, the Hudson River (and particularly the lower Hudson) is a highly urbanized watershed that has been home to industry for over 150 years. As a result, the Hudson River has substantial, system-wide contamination that is not related to the Hastings site, including PCB and metals contamination. We note that concentrations of PCBs in Hudson River reference sediments upstream of the Site range from 1 ppm to 2.1 ppm in a background sample within the 0-2 foot interval. As a result, even with successful remediation, site sediments will eventually "equilibrate" with urbanized background concentrations of PCBs, metals, and other pollutants, making the generic RAOs difficult to achieve. The presence of this background industrial contamination must therefore be taken into account in the design and implementation of a long term monitoring plan. Metrics like PCB concentrations in fish tissue, for example, which are more likely to reflect Hudson River conditions in general rather than site specific conditions, are not suitable for inclusion in a long term monitoring program.

We have attached the comments of Dr. Magar on this issue.

RESPONSE 73: The Department has used monitoring to discern different PCB source conditions in urban watersheds. These include PCB congener analysis; analysis of recently deposited surface sediment concentration; analysis of the source of the metals; and other techniques that have been used on other sediment remediation sites. The Department acknowledges that there are other sources of contamination that are unrelated the Harbor at Hastings site. The long-term monitoring plan described in the PRAP is expected to include the consideration of other industrial inputs in the river mainly through the use of baseline and reference sampling during monitoring. Previous data on the site indicated a local effect of increased PCBs in eels associated with the site. Since PCBs will remain in the river and the remedy will depend on engineering controls to prevent continued release of PCBs long-term monitoring of organisms in the river, including fish, is necessary to demonstrate the effectiveness of the remedy to decrease the site-specific influences on the local fish and therefore, must be retained as a component of the monitoring plan.

COMMENT 74: An expected schedule for the combined remedy in OU-1 and OU-2, exclusive of the regulatory process leading up to initiation of design, is included in the RFS. Note that the PRAP has added investigation and scope to the alternative recommended in the RFS.

RESPONSE 74: The Department understands and recognizes the added investigation and scope to the remedy will take additional time.

COMMENT 75: A transportation study regarding the handling of materials being brought into the site and leaving the site is specifically indicated in the RFS and will be part of the design process. The RFS assumptions provide a basis for comparison but do not limit the outcome of the transportation study.

RESPONSE 75: The comment is noted

COMMENT 76: Current Zoning and Uses. Portions of the site are no longer leased to other parties.

RESPONSE 76: The comment is noted and the ROD has been revised to reflect this.

COMMENT 77: Historical Uses. Wire manufacturing duration was much longer than the duration that manufacturing involving PCBs. PCBs were used in the manufacture of wire and cable only during the World War II period.

RESPONSE 77: The comment is noted and the ROD has been revised to clarify that PCBs were only used during a portion of the operation period.

COMMENT 78: Operable Units. This section describes "the site" as two operable units, however, in other sections OU-1 is described as "on site" while OU-2 is described as "off-site". The use of the word "site" in two different contexts is confusing. Note that there are some references to "on-site" within the document that specifically refer to OU-2. Also note that when the term "off-site" is used to reference OU-2 portions of the project the term should not reflect the status of ownership of said area.

RESPONSE 78: The Department acknowledges this comment.

COMMENT 79: Atlantic Richfield Company has in fact been participating in the site investigation and the remedy evaluation process for many years and voluntarily developed the feasibility study for OU-2.

RESPONSE 79: The comment is noted the ROD was revised to reflect ARCO's voluntary efforts in developing the remedy for the site.

COMMENT 80: Paragraph 6.3. It should be noted that specific fish advisories in the area of the site are primarily due to regional contamination issues and would remain in effect regardless of any remedial actions taken at this site.

RESPONSE 80: The Department acknowledges that certain contaminants in the fish tissue of certain species are attributable to regional contamination issues. However it is not clear whether for certain species, the fish advisory would remain regardless of remedial actions taken at the site.

COMMENT 81: Paragraph 6.4. Paragraph 6.1.2 states the contaminants of concern (COCs) as PCBs, copper, lead and zinc. Paragraph 6.4 re-states theses as the "primary" COCs for the site (previously defined as OU-1) and then describes a different list of COCs related to OU-1. Clarifying the terminology would assist understanding.

RESPONSE 81: As stated in Exhibit A, primary contaminants of concern are those that drive the remedy. The COCs for OU1 and OU2 are slightly different because beryllium was found in OU1 soils but was not found in OU2.

COMMENT 82: Paragraph 6.4. "Metals in sediment pose a toxicity threat to benthic organisms," Multiple investigations previously conducted indicate that toxicity levels are significantly higher background. We have attached Dr. Jenkins' comments on this issue.

RESPONSE 82: The metals remediation criteria in the PRAP are based on background concentrations of metals in the sediment. The use of a background concentration as a basis for cleanup concentrations is not based on toxicity but on the occurrence and concentration of the metals in the surrounding area. Toxicity testing conducted on the site was determined to be not sufficiently robust to develop a site-specific toxicity threshold.

COMMENT 83: Paragraph 6.5. The RAOs assigned in the PRAP are generic and not Site-Specific. Due to the regional contamination issues, achievement of the specific objectives listed, especially for surface water, are not controlled by the site conditions. We have attached Dr. Magar's comments on this issue.

RESPONSE 83: The comment is noted. However, the surface water contributions from the site will be controlled by the remedy. Baseline and long term monitoring will be implemented to determine the effectiveness of the remedy.

COMMENT 84: Paragraph 1. The reference to the "FS" is presumed to be to the 2011 Revised Feasibility Study (RFS).

RESPONSE 84: The comment is correct.

COMMENT 85: Element 2. The Dense Non-Aqueous Phase Liquid (DNAPL) observed in OU-1 consists of approximately 30-40% PCBs dissolved in a solvent. The DNAPL occupies the void space within the existing fill otherwise occupied by water. The Revised Feasibility Study (2011) used the term "DNAPL" or Liquid PCB Material. Liquid PCBs were not used in the manufacturing process and have not been observed in OU-1 or OU-2. During the World War II era, PCBs were delivered to the site in the form of powder and then mixed with a solvent on site before application in the manufacturing process as a viscous cable coating for certain shipboard cables made for the United States Navy. This war time use of PCBs is the only known manufacturing use of PCBs in cable production at the site.

RESPONSE 85: The comment is noted and the ROD was revised to eliminate references to "liquid PCBs" in favor of "Liquid PCB Material".

COMMENT 86: Element 5. Text variations within the PRAP resulted in inconsistencies with respect to the proposed dredge in the Nearshore and Backwater areas. NYSDEC has prescribed specific areas of potential/anticipated additional dredging in the Old Marina and North Boat Slip that would be in addition to those described in Alternative 6 as shown on the PRAP Figure 7. This additional dredge scope is consistent with the description of the modified Alternative 6 found in exhibit B which states that "This alternative has been modified from the alternative developed in the FS to include additional dredging in deepwater, old marina, and north boat slip areas, as shown on Figure 7." And goes on to explain that "This approach would dredge sediments in targeted areas which contain the most highly impacted sediment for PCB and metals and therefore presents a greater sediment volume than the original Alternative 6." To be consistent with the Exhibit B description and Figure 7, along with the associated volume and cost estimate presented in the PRAP, the description of the proposed remedy in this section should include a more precise description of the dredging limits required to satisfy the remedial goals. For example: "Removal of Nearshore and targeted Backwater sediment and fill..."

An updated figure titled Plan View Modified Alternative 6 (attached) shows the dredge extents proposed for Alternative 6 along with the additional areas delineated in Figure 7 of the PRAP. This would represent the anticipated dredge extents for the modified alternative 6 that was recommended in the PRAP.

RESPONSE 86: The removal of sediment from the Backwater areas falls under the existing remedy component for sediment removal where silt curtains may be feasibly installed in less than 15 feet of water. The additional dredging scope was explicitly added to the alternative description in Exhibit B to clearly distinguish the PRAP alternative from the similar alternative developed in the FS.

COMMENT 87: Element 6. The requirement for evaluation of alternative resuspension control designs is open ended. In order to maintain a reasonable project schedule, the extent of the evaluation should be limited to the current standard or proven practice for similar settings at the time the evaluation is conducted. As noted in the introduction of these comments, no feasible alternatives or proven technologies that would be appropriate for the existing river conditions were identified in the RFS process based on our contact with a supplier of mobile silt curtains. We have attached Dr. Palermo's comments on this issue.

RESPONSE 87: The Department agrees that a limited evaluation will be performed regarding alternative resuspension control designs in the deepwater areas. This will include current standard or proven applications in similar settings.

COMMENT 88: Element 7. We do not believe that additional sampling is required in the deepwater area because the data collected to date indicates a high degree of heterogeneity with average concentrations near background. The average surface sediment concentration of PCBs is 1.3 ppm outside of the currently proposed deepwater dredge areas which suggests that contamination is neither contiguous nor concentrated and that the distribution of the relatively few exceedances of 50 ppm are not significant or that dredging would be warranted in light of the negative short and long term impacts associated with dredging in these water depths. If additional sampling is included in the ROD, it should be limited to delineating areas as shown on Figure 7 of the PRAP and where existing data indicates the potential need for targeted dredging. We have attached Dr. Magar's comments on this issue.

RESPONSE 88: The Department will require additional sediment sampling to determine the distribution of PCB sediments in the deepwater areas to delineate areas to be dredged. This comment is also addressed in Responses 24, 58, 60, 61, 62 and 69.

COMMENT 89: Element 9. Not all elements of an "isolation" cap as defined by the PRAP are necessary at all locations where remaining contamination is above background concentrations. The ROD should allow for the selection of backfill material and capping components to accommodate design for factors including erosion protection requirements (i.e. riprap) and residual contamination as well as provide flexibility for equivalent methods for chemical isolation and habitat creation. For example, areas subject to high erosion forces would require riprap or other appropriate erosion protection at the surface and would not allow for the placement and retention of a 24 inch habitat layer of fine grained silt. Additionally, the migration of divalent metals (including copper) from pore water is improbable and would not require a sand isolation layer in addition to the backfill. We have attached Dr. Reible's comments on this issue. Note that: It is known that this reach of the river has levels of total organic carbon (TOC) with a range of 2.2 – 3.2% (Llansó and Southerland, 2006). This range is considerably elevated compared to other sediment samples obtained from the Hudson (Llansó, R.J. and Southerland, M., 2006). In estuarine/marine systems, copper (Seligman and Zirino, 1998; 2002; Rivera-Duarte, 2006) and other metals (Di Toro et al., 2005;) are known to bind strongly to organic carbon and will be retained even under fairly rigorous extraction procedures (Daminouka and Katsiri, 2009). The likelihood of metals, particularly copper, desorbing from organic ligands in OU-2 sediment is therefore negligible. Previous studies that measured the capacity of naturally occurring sulfides (S-2) to bind divalent metals in both sediment grabs and cores showed that the vast majority of samples had concentrations of S-2 that were greatly in excess of the amount of metals that could be simultaneously extracted with acid (and therefore not bioavailable). Based on equilibrium partitioning sediment benchmarks derived for the protection of benthic organisms to metal mixtures, these levels of sulfides will afford considerable excess binding capacity of any freely dissolved divalent metals in pore water. In addition to this, the placement of backfill would inhibit overlying oxygen in the water column from diffusing into the naturally occurring sediment and therefore encourage anaerobic conditions which, in turn, will stimulate the generation of S-2. The latter would bind to divalent metals, rendering them immobile. Remedial design will consider backfill material and composition for factors including erosion protection requirements (i.e. riprap) and residual contamination concentrations. The ROD should provide flexible language similar the language in the OU-1 ROD

Amendment "The habitat/surface substrate layer will be designed to restore …"

RESPONSE 89: The PRAP identified isolation capping material, but did not specify the specific substrate that should be used for the site backfill. The substrates to be used for restoration will be determined during design and the substrates can vary depending on location in the River.

COMMENT 90: Element 11.a. It is presumed that the phrase "remain in place" with respect to the sediment containment system does not include the habitat layer but rather is intended to ensure that the erosion protection and isolation layers remain in place and are effective.

RESPONSE 90: The comment is correct and is intended for the erosion protection and isolation layers to remain in place. In addition, the habitat layer will be designed to remain in place.

COMMENT 91: Element 11.a.i. The term Northwest Area is introduced in this paragraph and is not defined or shown on the figures. For the purposes of OU-2, it is presumed that this restriction applies to the Northwest Extension Area ("NEA") as defined in the PRAP. Restrictions on the currently existing land in OU-1 are addressed in the OU-1 Proposed ROD Modification.

RESPONSE 91: This element was revised in the ROD to read "Northwest Extension Area", which is located in Operable Unit 2.

COMMENT 92: Element 11.b. After remediation is complete, surface sediments and biota will continue to be affected over time by regional Hudson River contamination that is not associated with the Site, including regional PCB contamination. As a result, it is probable that neither (a) future monitoring of the presence and concentrations of contaminants in surficial sediment nor (b) future monitoring of fish and other migratory species tissue concentrations, or other biologic metrics will provide reliable indicators of the performance of the site remedy. Because these types of monitoring metrics cannot reliably distinguish between local site-related issues and regional contamination, any monitoring program should focus on other parameters, such as bathymetric analysis, to provide information about performance of the remedy. The ROD should provide for sufficient flexibility in the design of a long term monitoring program to allow for these issues to be evaluated during remedial design.

For example, one approach to be considered is evaluating restoration of remediated areas by monitoring for re-colonization by native invertebrate communities. Re-colonization should be weighted more heavily as a monitoring metric than biotic tissue concentrations because of known and ongoing PCB flux from upstream sources and ongoing remediation. Similarly, if re-colonization occurs, benthic macroinvertebrate body burdens should be considered as a more reliable line of evidence for potential site-

related contributions of PCB to biota than would tissue concentrations of other aquatic species. However, benthic macroinvertebrate data would need to be evaluated in the context of sediment and porewater vertical profiles and any protocol for such evaluation must take into account the potential for post-remediation contamination of surficial sediments through deposition from regional non-site related sources.
Fish tissue PCB concentrations should not be considered for monitoring remedy effectiveness because of the conditions throughout the river.
Surface water quality compliance is difficult to measure at the SCG (0.001 parts per trillion). Surface water measurements are potentially confounded by inclusion of suspended particles, which may emanate from multiple sources, including sources unrelated to the site. An apparent absence of migration of site contaminants through porewater to surface water should preclude the need for monitoring biotic tissue, recognizing that the potential tissue concentrations to be influenced by other in-river sources. We have attached Dr. Magar's comments on this issue.

RESPONSE 92: The Department disagrees with the comment regarding the ability of the long term monitoring to be able to distinguish between the site specific PCB sources and those unrelated to the site. Fish tissue samples have been analyzed previously in areas adjacent to the site and have shown site specific influences from the site. The results are reported in the Department's report *1999 As A Special Spatial Year For PCBs in Hudson River Fish*, May 2002.

COMMENT 93: Element 11.b.i and 11.b.ii. The specific baseline and long-term sampling requirements should be developed during design and should consider methods that would provide reliable conclusions that consider regional contamination impacts. We have attached Dr. Magar's comments on this issue.

RESPONSE 93: The Department agrees with the comment that baseline and long-term monitoring should consider methods that would provide reliable conclusions that consider regional contamination impacts.

COMMENT 94: Element 11.c.ii. Regarding "maintaining site access controls", there are no site access controls currently in place for OU-2. A perimeter fence exists in OU-1 along the shore but will be removed as part of the OU-1 remedy implementation.

RESPONSE 94: The comment is noted and the ROD has been revised to reflect this understanding.

COMMENT 95: Page 2. Note that OU-2 samples containing PCB Material have only observed Semi-Solid or Trace PCB Material. No DNAPL has been observed in sediment samples.

RESPONSE 95: The Department does not disagree with the comment that no liquid PCB material have been observed in sediment samples, however the investigation of sediments beneath the rip rap slope has been limited by the inability to obtain samples.

COMMENT 96: Page 3. Surface Water data as summarized on page 3 and in Table 1 requires additional analysis since the conclusions presented are not consistent with other data. Specifically: PCBs; We do not agree with the PRAP's conclusion regarding Surface Water that the degree of chlorination "…results suggest that the Site is the source of PCB contamination in the Hudson River." Any conclusions regarding the source of PCBs within a regional water system like the Hudson River, where there are multiple sources, must be carefully analyzed based on the weight of evidence. For example, while PCBs may be present in samples taken from different locations, sampling results may show differing congener patters, differing degrees of chlorination, or different weathering patterns each of which must be accounted for in attempting to correlate any result to a particular "source." Once in the environment the composition of PCBs changes over time due to various physicochemical properties and biological processes: vapor pressure, solubility, octanol-water partitioning, adsorption, and biodegradation. As the number of chlorine atoms increases, both vapor pressure and water solubility decrease, while adsorption and the octanol-water partitioning coefficient increase. Dechlorination of PCBs occurs primarily through aerobic and anaerobic microbial degradation. Aerobic bacteria preferentially dechlorinate less-chlorinated PCBs resulting in an increase in the degree of chlorination residual over time (i.e., within decades a less chlorinated Aroclor will look more like a more chlorinated Aroclor). Anaerobic bacteria preferentially dechlorinate more highly chlorinated PCBs, mainly by replacement of meta and para positioned chlorine atoms with hydrogen atoms, resulting in predominately ortho substituted mono- through tetra-chlorobiphenyls (i.e., a more chlorinated Aroclor will look more like a less chlorinated Aroclor over time). Additionally, less-chlorinated PCB congeners are less persistent in the environment due to volatilization and solubility; more-chlorinated PCBs are more persistent in the environment due to adsorption. Therefore, over time, under common sediment conditions, an initial release of a less chlorinated Aroclor will often subsequently "weather" in the environment such that sediment samples will present as a more chlorinated Aroclor in laboratory analyses. In summary, the composition of an original PCB mixture released to the environment can be expected to change due to a combination of the processes mentioned above. Therefore, any attempt to determine the source of the PCBs or Aroclors identified in an environmental sample must be approached with caution. Furthermore, Hudson River PCB concentrations show that surface water sample concentrations sampled at the Site are consistent with background concentrations based on all sample locations from 1975 through 2007, summarized in the Injury Determination Report Hudson River Surface Water Resources, Hudson River Natural Resource Damage

Assessment. In addition, surface water PCB concentrations show significantly higher PCB concentrations at upstream sampling locations. Site concentrations show Site levels are consistent with sampling locations immediately upstream and immediately downstream. Therefore, Site surface water PCB concentrations are at, and in most cases below, background PCB levels which suggests that the Site is not a significant contributor of PCBs to the Hudson River. Also note that Site PCB data reports the concentrations of PCBs as Aroclors, whereas the recent NYSDEC results reports the concentrations of PCBs as congeners. During performance studies conducted by EPA for the development of EPA Method 8082, the concentrations determined as Aroclors were larger than those obtained using the congener method, which suggests that Site PCB concentrations reported as Aroclors may be biased high. It should also be considered that, based on initial hydraulic calculations, the pore water volume exiting the site is a small fraction of the surface water and would not be capable of significantly changing the surface water concentrations from background or impacting surface water to the levels indicated in the samples presented within the PRAP. It is unclear if adequate precautions were taken to acquire samples at a location where interference from bottom sediments were eliminated to avoid samples results that were biased high.

RESPONSE 96: The comment is noted.

COMMENT 97: Lead; We do not agree with the conclusion that "The primary surface water contaminants are…lead associated with historical manufacturing and disposal at the site." Based on Gibbs (1994), total suspended sediment concentrations 1 meter above the river bottom increased from approximately 10 mg/kg at the ocean (Varrazano Narrows Bridge, ~45-50 km downstream) to 140 mg/kg in the middle of Haverstraw Bay (~25 km upstream). This work also demonstrated that suspended sediments have metal concentrations much higher (2 to 3 orders of magnitude) than bottom sediments. Site, total and dissolved, lead porewater concentrations as shown in Appendix C of the Field Work Summary Report for Fall 2004 Atlantic Richfield Supplemental Offshore Investigation Former Anaconda Plant Site Operable Unit No. 2 report were reviewed. For the 18 samples collected, all dissolved lead concentrations ranged from non-detect (<0.24 ug/L) to 1.9 µg/L, well below the SCG lead value of 8 µg/L. The total pore water lead concentration averaged 4.7 µg/L and ranged from 0.5 µg/L to 13.2 µg/L; only one sample, which measured 13.2 µg/L lead and was collected in one area south of the south boat slip, exceeded the SCG lead value of 8 µg/L. Given the low Site pore water lead concentrations and the study performed by Gibbs, demonstrating an increase in suspended sediments concentration and associated metals concentration further upstream, one can conclude that the Site is not a significant contributor of lead to the Hudson River.

RESPONSE 97: The Department has a different interpretation of the article by Gibbs. The suspended sediment concentrations measured in the water column for lead will be different from the lead concentration measured in the sediment next to the site. The Department maintains that the lead concentrations found in the sediments near the site are primarily from Harbor at Hastings source areas in OU1, which were identified and found to be related to the former manufacturing and direct discharges into the Hudson River.

COMMENT 98: Page 4. Movement of PCB Material as DNAPL through the fill in OU-1 has historically occurred vertically and, to a limited extent, horizontally along the interface with the Marine Silt. It appears that there has been some historical movement of DNAPL along the Marine Silt interface near the boundary between OU-1 and OU-2. However, there are also other transport mechanisms by which PCBs were likely deposited in OU-2. For example, PCB Material was likely associated with the outfalls of pipes associated with Building 52 and other manufacturing operations on OU-1. In addition, historic activities such as the mixing of PCB manufacturing ingredients along the Northwest Corner may have resulted in the overland transport of PCBs to the River, and other historic activities along the old dock and pier structures may also have resulted in PCB deposition in river sediments. Finally, prior to the installation of the IRM in the northwest corner, PCB contaminated soils may have washed or eroded from the upland surface soils.

RESPONSE 98: The comment is noted and the ROD has been revised accordingly.

COMMENT 99: Page 4, "Screening Criteria for Metals". As noted in the RFS, the ER-L and ER-M values do not account for site-specific conditions. These values are typically used to initially identify contaminated sediment. As stated in the 1999 NYSDEC Technical Guidance for Screening Contaminated Sediments, "Once a sediment has been identified as contaminated, a site-specific evaluation procedure must be employed to quantify the level of risk, establish remediation goals, and determine the appropriate risk management actions. The site-specific evaluation might include for example: additional chemical testing; sediment toxicity testing; or sediment bioaccumulation tests". If criteria are exceeded then sediment contamination is quantified, evaluated with respect to exposure to biota and the significance of exceedances are described in terms of the predicted effects. The guidance also states that "If sediment concentrations of a compound are less than all of the sediment criteria for that substance, aquatic resources can be considered to be not at risk (from that compound)." Given this procedure for evaluating sediments, if the sediment is not considered or shown to be a risk, then remedial action is not necessary. A discussion of previous studies and standard practices is provided hereafter as it pertains to toxicity evaluation of metals in sediment.
The biogeochemistry of sediments influences environmental risk for metals contaminants more than for any other category of environmental contaminants. The PRAP includes provisions for remedial goals based on

background, or ambient concentrations of metals in sediments. Based on empirical evidence and relevant site characteristics, metals in OU-2 sediments are expected to pose no risk to human health or the environment at concentrations much greater than background or ambient concentrations. The proper evaluation of environmental risks caused by sediment contamination typically requires the evaluation of three lines-of-evidence: bulk sediment chemistry, sediment toxicity, and the native benthic invertebrate community. These three lines of evidence (LOEs) (often referred to as a Sediment Quality Triad or SQT) are then evaluated relative to a background or 'reference' area(s), to make an overall conclusion (i.e. a 'weight-of-evidence' or WOE) about risks that contaminated sediments pose to ecological receptors.

Accordingly, remedial goals should consider actual risks to human health and the environment associated with sediment, acknowledging that background conditions may constrain the levels to which cleanup can be sustained. Because of the many factors governing the potential toxicity of metals in sediments, sediment quality values (SQVs) are particularly suspect for metals, and therefore inadequate for basing remedial action decisions without supporting lines of evidence. If toxicity and benthic community results were to reflect an absence of chemical affect on the sediment habitat, metals concentrations exceeding SQVs should not be given greater weight than the other biological lines of evidence. Studies within OU-2 (e.g., Llansó and Southerland, 2006; BB&L, 2006) have identified conditions that indicate a reduction in both the surface sediment concentrations and potential risks of divalent metals (and also PCBs) in the biologically active sediment zone, including:

Deposition of sediments at background concentrations: the OU-2 reach adjacent to the site is "depositional," accumulating suspended sediment from upstream sources (~1 inch/year based on the RI). Ongoing deposition has resulted in levels of constituents of potential concern (CPOCs) that are near background conditions.

Elevated TOC: levels of total organic carbon are greater than most Hudson River reaches (recent data suggests an average of 2.96%), which aids in binding contaminants in sediments, reducing bioavailability to invertebrates and fish; and

Strongly reducing conditions in sediment and a marked excess of acid-volatile (AVS): both contribute to limit or eliminate metals bioavailability - no benthic toxicity is predicted for this type of sediment per the USEPA metals mixtures guidance and should be taken into consideration at this site.

It should also be noted that non-chemical stressors at OU-2 likely affect the benthic community more than site-related COPCs. The degraded conditions at 'reference' locations support this conclusion (e.g., at Greystone.) Also note that the native benthic communities are similar at locations upstream and downstream of OU-2.

It is important that metrics that consider the above lines of evidence be included as a component of remedy selection activities. We have attached Dr. Jenkin's comments on this issue.

RESPONSE 99: This statement is not an accurate summary of the sediment criteria. The criteria indicate a need for analysis of potential toxicity is necessary if the criteria are exceeded. A lack of appropriate investigation cannot be used as a basis to assume the lack of risk from exceedance of the criteria. Toxicity and AVS/SEM testing at this site were not sufficiently robust to determine a site-specific toxicity threshold. Therefore, there has been no demonstration that site-specific factors are ameliorating the expected effects associated with metals concentrations above the sediment criteria.

COMMENT 100: Page 4 "Background Contamination" We note that Site Specific Background Values attributed to our site are similar to background values identified in the TAPPAN ZEE HUDSON RIVER CROSSING PROJECT Draft Environmental Impact Statement. The 95th Percentile concentrations for the 313 samples analyzed for the Tappan Zee Bridge were similar to the background samples selected for OU-2. This data shows that the concentrations upriver of OU-2 were much higher than background in some locations:
Copper 1,550 ppm
Lead 604 ppm
Zinc 399 ppm
PCBs 1.2 ppm

RESPONSE 100: The comment is noted. The Department also notes that the cited values are the maximum values of the Tappan Zee DEIS data set, and may have been taken from a distinct source area that does not represent the potential for remediated sediments to be recontaminated.

COMMENT 101: Table 1. The text indicates the maximum detection was 62.4 ppt, the table indicates 57.0 ppt.

RESPONSE 101: The correction was made in the ROD.

COMMENT 102: Table 2 footnotes, last sentence. "If only the ER-L is impacted …" should read " If only the ER-L is exceeded …"

RESPONSE 102: The correction was made in the ROD.

COMMENT 103: Table 3. Note that a site-specific organic carbon content of 2.96% was measured in more recent investigations which would raise the site-specific screening criteria applicable to this project.

RESPONSE 103: The Department used the organic carbon content value of 2.43% which represents all the reported values including the more recent investigations.

COMMENT 104: Northwest Extension Area. The term "sealed sheet pile wall" is presumed to mean a sheet pile wall with sealed joints as described in the RFS.

RESPONSE 104: Yes.

COMMENT 105: Alternative 6. Clarification. The text refers to "site-specific cleanup goals" in Table 2. Based on Figure 2 it appears that the 95th percentile value in the column labeled "Site Derived Value" in Table 2 is the reference. The ROD should explicitly state the Site-specific Cleanup Levels. The values stated by NYSDEC during the Public Meeting were as follows:
Copper 129 ppm
Lead 132 ppm
Zinc 234 ppm

RESPONSE 105: Footnote c of Table 2 indicates that the site-derived cleanup values are the range of the 90^{th} to 95^{th} percentile values of the background data set.

COMMENT 106: The reference in the first paragraph to Section 7.2 is presumed to be a reference to Section 7 of the PRAP.

RESPONSE 106: The correction is noted and incorporated into the ROD.

COMMENT 107: Basis for Selection, 2nd paragraph, 5th line. Regarding the statement that "Dredging to a depth of 6 feet removes sediment that has the potential to be scoured and migrate." The preceding sentence implies this statement is applicable to both nearshore and backwater areas. In the backwater areas, the natural deposition cited in other sections does not indicate that scour is likely to a depth of 6 feet. Preliminary estimates do not indicate that scour in the nearshore would reach 6 feet and wherever dredging and backfill occurs the backfill will be designed for the river conditions, therefore, dredge to 6 feet is not required to eliminate the potential for scour of contaminated sediment. We have attached Dr. Reible's comments on this issue.

RESPONSE 107: The comment is noted and the ROD is modified to include additional language to justify the removal of sediments to 6 feet. The decision to select the 6 feet is based on the removal of sediment to pre-release conditions to the extent feasible, consistent with the remainder of the site.

COMMENT 108: Criteria 1. The correct increased cost for Alternative 9 is $140 million.

RESPONSE 108: The correction was made in the ROD

COMMENT 109: Figure A. The areas identified as Northwest Off-shore and On-shore Area are presumed to be the Northwest Corner Off-shore and On-shore Areas.

RESPONSE 109: The correction was made in the ROD

COMMENT 110: Note that Atlantic Richfield Company has not declined to implement a remedial program as stated.

RESPONSE 110: The OU1 ROD Amendment is modified to reflect that ARCO has agreed to implement the OU1 remedial program. The OU2 ROD was revised to state that the PRPs for the site declined to implement the remedial investigation and feasibility study portion of the remedial program for OU2 when first requested by the Department. Since 2003 the PRPs have voluntarily performed additional investigations and submitted work plans and reports which include a feasibility study to advance the remedial program.

COMMENT 111: Paragraph 6.1.2. The DNAPL is a PCB mixture, not liquid PCBs. Only Semi-Solid and Trace PCB Material has been observed in sediment. The potential presence of DNAPL (i.e. Liquid PCB Material) beneath the rip-rap has been assumed by NYSDEC but has not yet been confirmed.

RESPONSE111: The comment is correct concerning the Department's expectation of the presence of Liquid PCB Material beneath the rip-rap based on the finding of this material in close proximity to the shoreline. Further delineation will be performed in this area to verify this expectation.

COMMENT 112: Paragraph 6.4. It should be noted that beryllium in groundwater was only slightly exceeded in one out of twenty samples and was non-detect in 20 pore water samples collected during the 2005 OU-2 sampling event. Existing conditions do not suggest the need to include beryllium in long term monitoring plans.

RESPONSE 112: The Department believes that beryllium should be included as a baseline monitoring parameter in the long term monitoring plan. If it is not detected, the monitoring plan may be revised to omit it.

COMMENT 113: Paragraph 6.4. It should be noted that PCBs in groundwater are limited by the extremely low solubility of site-specific Aroclors that are associated with the DNAPL and the mobility of local concentrations is restricted by other site factors including organic content of the soil.

RESPONSE 113: The statements in the comment are accurate, however, PCBs have been detected in unfiltered groundwater samples at the site which exceed the Department's ambient groundwater standards. The selected remedy is intended to prevent contaminated groundwater from leaving the site, and monitoring will be performed to identify PCB concentrations in groundwater.

COMMENT 114: Paragraph 7.2. As previously noted, the presence of Liquid PCB Material off-shore has not been confirmed. Semi-Solid PCB Material has been observed but "PCB DNAPL" has not been "found beneath the river".

RESPONSE 114: See Response #111

COMMENT 115: Paragraph 7.3. Since the westward extent of the DNAPL is unconfirmed, we believe that once the area is accessible during construction, delineation should precede installation of recovery wells.

RESPONSE 115: The Department agrees that delineation of PCB/ DNAPL will precede installation of recovery wells.

COMMENT 116: Paragraph 7.3. The sentence "The containment element for the Northwest On-Site Contamination (formerly identified as the Northwest Corner and Northern Shoreline Area)..." uses an undefined Northwest On-site Contamination term. It is presumed that this statement should be as follows "The containment element for the northwest on-site contamination (formerly identified within the Northwest Corner and Northern Shoreline Area)..."

RESPONSE 116: The comment is correct and the change will be incorporated into the ROD Amendment.

COMMENT 117: Element 2. Note that one of the "additional scope" items referred to in Section 8, Paragraph 7 is an expansion of the extent of excavation (and therefore the areas) in the Northwest Corner and Northern Shoreline areas (see Figure 2 comment below).

RESPONSE 117: The Department acknowledges this increased scope based on the additional information gathered during the pre-design investigations. Although the excavation criteria have not changed, the increased extent will be noted in the ROD Amendment.

COMMENT 118: Element 5. The term "sealed sheet pile wall" is presumed to mean a sheet pile wall with sealed joints as described in the RFS.

RESPONSE 118: Agreed.

COMMENT 119: Element 6. We propose the ROD incorporate the flexibility to accommodate constructability limitations, e.g. "eliminate to the extent practicable any additional fill material…"

RESPONSE 119: The Department agrees with the concept of maintaining flexibility to accommodate constructability limitations during remedial design. There will likely be modifications to the remedial design which were not anticipated at the issuance of the Record of Decision. These will be documented and addressed on a case by case basis and the Department will follow its guidance and policy regarding such modifications.

COMMENT 120: Element 7. Operation of recovery systems should be continued only as long as recoverable DNAPL is observed.

RESPONSE 120: The shutdown criteria for recovery of DNAPL will be identified in the Site Management Plan. Recoverable DNAPL will be defined and provisions will be included which identify periodic monitoring to determine if the shutdown criteria is acceptable or additional recovery is necessary.

COMMENT 121: Element 10.bi. Groundwater quality and elevation monitoring does not provide data regarding the remedy performance and should not be required for such purposes. The compliance monitoring in Paragraph 10.c.i would provide the required data.

RESPONSE 121: The Department disagrees with the comment. Groundwater quality and elevation monitoring will be needed to evaluate the remedy performance and evaluate any corrective measures needed should they arise in the future. The Department is willing to evaluate and reduce the frequency based on the results obtained.

COMMENT 122: Element 10.b. Consideration should be given to regional contamination when establishing long term monitoring and criteria for groundwater discharged from the Northwest Extension Area. Groundwater treatment may not be necessary based on the extremely low solubility of site-specific Aroclors that are associated with the DNAPL and their concentrations relative to background surface water contamination.

RESPONSE 122: The PCB groundwater results will be evaluated and used to determine appropriate treatment of groundwater. The PCB groundwater results from the site indicate that levels exceed New York State Ambient Groundwater Standards.

COMMENT 123: Element 10.b.iv is presumed to be part of the previous bullet.

RESPONSE 123: The correction was made in the ROD

COMMENT 124: Figure 2. An updated version of Figure 2 that has been updated for the new data and uses the nomenclature in the text of the proposed modification is attached.

RESPONSE 124: The revised figure will be included.

APPENDIX B

Administrative Record

Administrative Record

Harbor at Hastings
Operable Unit No. 2
State Superfund Project
Village of Hastings on Hudson, Westchester County, New York
Site No. 360022

1. Proposed Remedial Action Plan for the Harbor at Hastings site, Operable Unit No. 2, dated October 2003, prepared by the Department

2. Proposed Remedial Action Plan for the Harbor at Hastings site, Operable Unit No. 2, dated January 2012, prepared by the Department

3. Referral Memorandum dated August 16, 1999 for Harbor at Hastings site, Operable Unit No. 2.

4. RI/FS Work Plan, Work Assignment No. D003821-15

5. Remedial Investigation Report, Harbor at Hastings (OU#2), Site 3-60-022, Earth Tech, December 2000

6. Mariniello Cove Sediment Sample Results, NYSDEC November 11, 2001

7. Final Feasibility Study Report, Harbor at Hastings (OU#2), Site 3-60-022, March 2003

8. Public Meeting Transcript for Remedial Actions Proposed for the Harbor at Hastings Site, Operable units #1 and #2, November 19, 2003

9. Supplemental Feasibility Study Report for Operable Unit No. 2, Parsons, April 2006

10. Revised Feasibility Study OU2, Former Anaconda Wire and Cable Company Site, NYSDEC Site # 3-60-22, Haley & Aldrich, October 31, 2012

11. Letter dated March 22, 2005 from Dave Kalet of ARCO regarding, Request to Initiate Technical Dialogue and for Additional DEC Information

12. Letter dated May 10, 2005 from Dave Kalet of ARCO regarding Additional AVS/SEM Information

13. Letter dated June 8, 2005 from George Heitzman of NYSDEC to Dave Kalet regarding Equilibrium Partitioning Sediment Benchmarks

14. Letter dated August 4, 2005 from Dave Kalet of ARCO regarding Use of Equilibrium Partitioning Sediment Benchmarks Methodology

15. Letter dated September 26, 2005 from George Heitzman of NYSDEC to Joseph Sontchi regarding Equilibrium Partitioning Sediment Benchmark

16. Letter dated October 14, 2005 from Dave Kalet of ARCO regarding Application of Equilibrium Partitioning Sediment Benchmarks Methodology to OU-2

17. Letter dated March 12, 2009 from William Ports of NYSDEC to Dave Kalet regarding Equilibrium Partitioning Sediment Benchmark

18. Letter dated February 1, 2012 from Jacques Padawer, Ph. D

19. Letter dated February 29, 2012 from Jeremiah Quinlan, Village of Hastings-on-Hudson Trustee

20. Letter dated March 9, 2012 from Eric Larson of Atlantic Richfield Corporation, including attachments

21. Letter dated March 9, 2012 Ms. Eileen Bedell, owner of the Hudson Valley Health & Tennis Club, including attachment

22. Letter dated March 12, 2012 from Daniel E. Estrin and Justin Davidson of the Pace Environmental Litigation Clinic, Inc. representing Riverkeeper, Inc., including Exhibits