

EXHIBIT 1

III. MODULE III SUPPLEMENT
CORRECTIVE ACTION REQUIREMENTS
RELATED TO ACID BROOK DELTA SEDIMENTS
AND UPLAND SOIL AREAS

A. Introduction

1. This Module III Supplement contains the selected corrective measures for the Acid Brook Delta ("ABD") sediments and the Upland Soils area. The Acid Brook is identified as Solid Waste Management Unit ("SWMU") Number 118 in the permit. Acid Brook discharges into the delta in Pompton Lake.
2. The provisions of Module III of the permit remain in effect. This Supplement carries out the provisions of Module III. E: 7, 8 and 9 of the permit concerning the basis and nature of corrective measures.
3. This Permit Module III Supplement is the culmination of the permit modification process initiated in April 1, 2011 by the Permittee's submittal of the permit modification application. The permit modification process included the following:
 - An information session on the draft permit modification was held at the Borough Council Chamber, Pompton Lakes, New Jersey on October 20, 2011.
 - Publication of the Public Notice of the draft Permit Modification on November 20, 2011 in the Suburban Trends and Bergen Record.
 - A public comment period starting on November 20, 2012 and ending on January 13, 2012.
 - A public hearing at the Pompton Lakes High School on January 5, 2012.
 - Results of a 2011 bathymetric survey submitted to EPA by the Permittee in a document dated January 9, 2012 entitled "Comparison of the 2011 and 2007 Bathymetric Surveys, Acid Brook Delta, Pompton Lake, Pompton Lakes, New Jersey".

After receipt of additional relevant information and public comments, which include written comments and comments made in the public hearing, the final permit modification was developed after evaluating and addressing the comments, which EPA deems significant and relevant to the corrective action of the ABD study area.

B. Corrective Action Measures Selection Factors

The criteria for selection of corrective action measures pursuant to the permit are set forth in detail in Module III.E.7. These criteria are utilized by EPA to ensure that the corrective measures are protective of human health and the environment by meeting protective standards or concentration levels for hazardous constituents in each medium, and by controlling sources of releases so as to reduce or eliminate, to the maximum extent practicable, any further releases of hazardous constituents that might pose a threat.

Long term reliability and effectiveness are key factors, and are evaluated in terms of the magnitude of residual risks associated with corrective measures, the type of long term management required, and potential exposure. A potential remedy is also evaluated in terms of the reduction of toxicity, mobility or volume of hazardous material. A remedy is also evaluated in terms of the concentration levels of hazardous constituents that must be achieved to be protective of human health and the environment.

The ease or difficulty of implementing potential corrective action measure(s) is assessed, and factors including difficulty of technology, operational requirements, costs, and the availability of any necessary storage or disposal services are considered in the assessment.

The corrective action measures for the ABD sediments and Upland areas that are contained in this Module III Supplement set forth the requirements that the Permittee must meet to achieve compliance with the requirements of this Permit Modification.

C. Relevant Documents Submitted by Permittee

The Permittee submitted the Revised ABD Remedial Investigation Report (“RIR”), dated January 30, 2008, and the ABD Area Remedial Action Selection Report/Corrective Measures Study (“RASR/CMS”), dated September 18, 2009. These documents provide information to support the remedial alternatives evaluated, a description of the process of evaluating remedial alternatives and the remedial alternative selected. DuPont submitted a HSWA Permit Modification Application, dated April 1, 2011, which included the remedies proposed in the RASR/CMS.

In September 2011, the Permittee submitted a revised Corrective Measures Implementation Work Plan (“CMIWP”) containing information on the proposed implementation of the final remedies for the ABD, which are excavation of Uplands Soils and dredging of the sediments in the ABD. The CMIWP includes a Project Operations Plan (in Appendix F of the Corrective Measures Implementation Plan), which outlines issues to be addressed during implementation, such as staging, treatment of the excavated and dredged soil and sediments, transportation and disposition of the contaminated material, restoration and monitoring, and a proposed implementation schedule. The Project Operations Plan will be updated as set forth below, and may be further amended, as deemed necessary, based on the data gathered and the findings during implementation of the required work set out in this Permit Modification.

D. Updated CMIWP and Schedule

1. Within 30 days of the permit modification effective date, or by such other date as is approved by EPA, the Permittee shall submit to EPA, for approval, an updated Appendix F. of the CMIWP with respect to the dredging operation, based on the conditions set forth in condition III.E of this Permit Modification.

2. As part of the updated Appendix F of the CMIWP, Permittee shall also describe how its operations, where appropriate, comport with principles and practices of "Green Remediation" as outlined the EPA Region 2 "Clean and Green Policy."
3. Upon receiving EPA approval of the updated Appendix F of the CMIWP, including any modifications, Permittee shall implement the approved work plan in accordance with its schedule, and the provisions of this Permit Modification.

E. Specific Corrective Action Measures for the ABD Sediments and Upland Soils

1. ABD Sediments

a. Qualitative RAOs

There are no promulgated applicable remediation standards for sediment to use as quantitative RAOs. However, narrative qualitative RAOs have been developed to set goals for protecting human health and the environment in the ABD.

The following qualitative RAOs for sediment shall apply in order to be protective of ecological receptors:

- Reduce the potential for mercury methylation in near-shore sediment (defined as sediment within 200 feet of the shoreline in water less than 5 feet deep); and
- Reduce the area of exposure of ecological receptors to elevated mercury concentrations in sediment.

This removal is intended to:

- Remove 100% of the mercury from the near shore environment where there is the maximum potential for methylation of mercury;
- Reduce the mass of mercury in the surficial sediment (0 to 0.5 feet) by approximately 97%;
- Reduce the mercury mass in the deep sediment (> 0.5 feet) by approximately 93%; and
- Reduce the total mercury mass in the ABD by approximately 95%.

b. Selected Remedial Alternative #4 from the RASR/CMS, as Revised by EPA -- Dredging of the ABD Sediments

The removal area consists of the area within (west of) the "RAO line" centered at the discharge point of Acid Brook into Pompton Lake (see Figure 1 of this Permit Modification). The sediment removal, which will take place as part of the

dredging operation, shall focus on the mercury-impacted sediments and shall include all sediments located within (west of) the "RAO line". The underlying peat may also be removed where necessary to capture sediments not separated from the peat.

c. Confirmation of Implementation of the Remedy for the ABD Sediments

Confirmation of dredging completion shall be conducted. Both traditional and dredge mounted survey techniques shall be used to verify that the horizontal and vertical limits of sediment removal have been achieved. Upon satisfactory evidence that excavation has been completed in compliance with this Permit Modification, the Permittee shall cover the dredged area with a minimum of 6 inches of granular material which shall serve as a layer within which the benthic community will re-establish itself. Where the peat layer is not well-established, an additional 6" shall be removed and a minimum of 12" restorative layer shall be placed.

d. Sediment Sampling Plan

(1) Within 30 days of the effective date of this Permit Modification, or by such other date as is approved by EPA, Permittee shall design and submit to EPA, for approval, a Sediment Sampling Plan ("SSP"), including an implementation schedule, designed to: (a) delineate the mercury concentration in the sediment for the area east of the "RAO line" (i.e., the area of the lake that is not targeted for dredging), and along the channel down to the Pompton Lake Dam; and (b) characterize the sediment quality for the portion of the Ramapo River from the Pompton Lake Dam downstream to the wetlands area adjacent to Riverside Park, Wayne, New Jersey ("Riverside Park"). Subsequent remedial activity shall be determined based on the findings of the SSP. Data collected as part of the SSP shall also be used to support the Ecological Risk Assessment described in condition E.1.f, below.

(2) Prior to submittal of the SSP for EPA approval, Permittee shall make arrangement for consultation (in a meeting and/or teleconference) with EPA, NJDEP, and the United States Fish and Wildlife Service ("USFWS") to discuss the SSP.

(3) The Permittee shall implement the SSP upon its approval by EPA and submit an SSP report in accordance with the schedule contained in the SSP.

(4) Upon EPA approval of the SSP report, including any modifications to the report resulting from EPA comments, the report will be used by EPA to determine whether any areas east of the "RAO line" require remedial activity.

e. Lake System Sampling and Monitoring Program

Within 30 days of the effective date of this Permit Modification, Permittee shall design and submit to EPA, for approval, a Sampling and Monitoring Program ("SMP") designed to establish baseline conditions and conduct long-term monitoring of the lake system (Pompton Lake and the Ramapo River downstream to the Pompton Lake Dam), which program shall include a proposed monitoring schedule, and shall include the measurement of the following applicable parameters, at a minimum: (1) heavy metals: mercury, copper, lead; (2) methyl-mercury; (3) appropriate bio-monitoring parameters, including, but not limited to, the validation of rate of mercury deposition in leaf litter and of mercury bioaccumulation. Data collected as part of the SSP shall also be used to support the Ecological Risk Assessment described in condition D.1.f, below.

(1) The SMP shall include establishment of a baseline. The baseline sampling shall take place in the dredging area prior to the initiation of the dredging operation.

(2) The SMP shall include a schedule for data collection, analysis, quality assurance, reporting, and record-keeping. The lake system shall be monitored for a minimum of five (5) years following completion of all required dredging and restoration activities.

f. Ecological Risk Assessment

Two years after dredging and re-establishing the layer over the dredged area in accordance with this Permit Modification, the Permittee shall conduct an Ecological Risk Assessment ("ERA") of the lake system. This ERA shall be an updated ERA, utilizing risk data, bioaccumulation factors, and other relevant information.

1) Within 30 days after the excavation of all contaminated sediment requiring removal, or by such other date as is approved by EPA, Permittee shall submit an ERA Workplan to EPA, for approval, which contains a schedule to conduct a post-excavation ecological assessment of the delta and lake.

(2) Upon receiving EPA approval of the ERA Workplan, Permittee shall implement the Workplan in accordance with its schedule.

(3) Permittee shall submit the ERA report for EPA approval in accordance to the schedule within the approved SSP Workplan. The need for any subsequent remedial activity shall be determined based on the findings of the approved ERA report.

(4) In the determination of additional appropriate remedial activity is necessary, relevant factors shall be evaluated, including but not limited to: whether exposure presents unacceptable risk to ecological receptors, evidence regarding likelihood of contaminated sediment to resuspend/redistribute, evidence for attenuation of exposure through natural processes (burial by natural sediment loads), proximity of contaminated sediment to special habitats (or other resources) of significance, balancing remedial options with disturbance to lake ecology and human uses of lake, and limits of available technology

2. Remediation and Restoration Plan for the Upland Soil Areas

Within 30 days of the effective date of this Permit Modification, or by such other date as is approved by EPA, the Permittee shall design and submit to EPA for approval, an updated Remediation and Restoration Plan ("Plan"), including a post-remedial monitoring program and an implementation schedule, for the Upland Soil Areas designed to ensure that the potential pathways for ecological receptors to mercury-contaminated soil will be addressed. The Remediation and Restoration Plan to be updated was submitted by the Permittee as part of the CMIWP.

Prior to submittal of the updated Plan, Permittee shall make arrangements for consultation (in a meeting and/or teleconference) with EPA, NJDEP, and USFWS to discuss its development.

Upon EPA approval of the updated Plan, including any modifications, Permittee shall implement the Plan according to the approved schedule.

a. RAOs for Upland Soil Areas

(1) Quantitative RAO for Upland Soil Areas Outside of the Wetlands Transition Zone and Wetlands

Both human health and ecological criteria have been selected as RAOs for the Upland Soil Areas located outside the Wetlands Transition Zone and Wetlands. The updated plan shall incorporate excavation so that after excavation, levels of analytes are below the surface and subsurface soil criteria set out in the RAOs in the Table below.

Uplands RAOs and Removal Criteria

Analyte	Surface Soil Criteria (mg/kg)	Subsurface Soil Criteria (mg/kg)
Copper	1,100	3,100
Mercury	20.5	23
Lead	400	400
Selenium	5.05	390
Zinc	1,507	23,000

(2) RAO for Upland Soil Areas Within the Wetlands Transition Zone and Wetlands

The RAO for the remedy selected to address the Upland Soil Areas within the wetlands transition zone and wetlands must address the potential ecological exposure pathways to contaminants in the soil.

In the updated Plan for the Upland Soils located within the wetlands transition zone and wetlands, the Permittee shall incorporate the following considerations, at a minimum:

- the root depth of the various plant species proposed for use in the restoration (roots should not reach into the contaminated zone);
- the rate of mercury uptake by the various plant species proposed for use in the restoration (to demonstrate that the selected species will not act as a vegetative pump);
- the rate of mercury deposition in leaf litter and of mercury bioaccumulation;
- the need to develop a site-specific criteria for delineating limits for any soil excavation in the Plan; and
- the ability of any engineering controls to eliminate or minimize ecological exposure.

b. Selected Remedial Alternative #4 from the RASR/CMS -- Excavation of the Upland Soil

The selected remedy is Alternative #4 from the RASR/CMS, which is excavation of the soil for off-site disposal to be followed with restoration of the excavated areas, with the following additional specific requirements and clarifications.

(1) For surface and subsurface soils outside of the Wetlands Transition Zone and Wetlands (as depicted in Figure 2 of this Permit Modification):

Permittee shall excavate in accordance with Alternative #4, of the RASR/ CMS with the RAOs being the lower of the NJDEP Soil Remediation Standards ("SRS") and the "Ecological Soil Delineation Criteria" developed in the RIR (which is the Table in E.2.a(1) above);

(2) For the Upland Soil areas within the Wetlands Transition Zone and the Wetlands (as depicted in Figure 2 of this Permit Modification):

Permittee shall adhere to the approved Remediation and Restoration Plan as required by permit condition E.2.a(2) above, to address the potential ecological exposure pathways to contaminants specific to the wetlands transition zone and wetlands:

c. Confirmation of Implementation of the Remedy for the Uplands Soils

The Permittee shall confirm that the Upland Soil Areas are remediated and restored in accordance with the Plan. Surveying shall be used to verify that the horizontal and vertical levels of removal and or re-contouring (placement of fill) that are specified in the approved Plan have been achieved.

Figure 1: Figure showing Pompton Lake, ABD and the RAO Line.

Figure 2: Figure showing the Uplands Soils Areas and the Wetland Transition Zone line.

Figure 1



EXHIBIT 2



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

**NOTICE OF ISSUANCE
OF
FINAL HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984 ("HSWA") PERMIT
MODIFICATION I TO E. I. DU PONT DE NEMOURS & COMPANY, INCORPORATED
POMPTON LAKES WORKS, POMPTON LAKES, NEW JERSEY**

The United States Environmental Protection Agency, ("EPA") Region 2, is issuing final Permit Modification I to the HSWA Permit for E. I. Du Pont De Nemours Company, Incorporated Pompton Lakes facility. Enclosed is a copy of the final Permit Modification I and EPA's Responsiveness Summary. The Responsiveness Summary provides EPA's responses to significant comments received by EPA during the public comment period with respect to the draft of Permit Modification I, including the public hearing held in Pompton Lakes on January 5, 2012.

Anyone wishing to appeal the permit modification decision should refer to the procedures set forth in 40 C.F.R. § 124.19. Any person who filed comments on the draft Permit Modification during the public comment period may petition the Environmental Appeals Board to review any provision of the final Permit Modification. Any person who failed to file comments on the draft Permit Modification during the public comment period may petition for review only to the extent of changes from the draft to the final Permit Modification. Any appeal must be filed with the Environmental Appeals Board within thirty (30) days after January 3, 2013.

Any appeal of this permit modification decision must be filed with the EPA Environmental Appeals Board, according to the information below:

All requests for administrative review, if sent via the U.S. Postal Service (except by Express Mail), must be addressed to:

Clerk of the Board
U. S. Environmental Protection Agency
Environmental Appeals Board
1200 Pennsylvania Avenue, NW
Mail Code: 1103M
Washington, D.C. 20460-0001

Internet Address (URL) • <http://www.epa.gov>


Recycled/Recyclable • Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 50% Postconsumer content)

Or, if delivered to the Board by hand or courier, including Federal Express, UPS, and U.S. Postal Service Express Mail, must be delivered to:

Clerk of the Board
U.S. Environmental Protection Agency
Environmental Appeals Board
1201 Constitution Avenue, NW
U. S. EPA East Building, Room 3332
Washington, D.C. 20004

Electronic filing of a request for review is also permitted. See the Environmental Appeals Board website at www.epa.gov/eab for information on electronic filing and EAB procedures and practices.

This Permit Modification I shall be effective on February 4, 2013 unless the Environmental Appeals Board issues a stay as to the Modification, or portion(s) thereof.



John Filippelli, Director
Clean Air and Sustainability Division
U.S. Environmental Protection Agency
Region 2
290 Broadway, 25th Floor
New York, New York 10007-1866

12/19/12
Date Issued

EXHIBIT 3

STATEMENT OF BASIS

RCRA CORRECTIVE ACTION PERMIT MODIFICATION I

**E.I. du Pont de Nemours & Company, Incorporated
Pompton Lakes, New Jersey**

EPA ID Number NJD002173946

I. INTRODUCTION

This Statement of Basis (“SB”) outlines the United States Environmental Protection Agency’s (“EPA”) corrective action decisions for the E.I. du Pont de Nemours & Company (“DuPont”) Pompton Lakes Works (PLW), 2000 Cannonball Road, Pompton Lakes, Passaic County, New Jersey. EPA has consulted with the New Jersey Department of Environmental Protection (“NJDEP”) in reaching these corrective action decisions.

DuPont is subject to the Corrective Action program under the Resource Conservation and Recovery Act (“RCRA”). The corrective action program is designed to ensure that facilities investigate and, if necessary, clean up any releases of hazardous wastes or hazardous constituents that may have occurred at their properties (including any releases that have migrated off-site). Pursuant to this program, DuPont has conducted numerous environmental investigations to characterize the nature and extent of contamination attributed to the DuPont facility and has implemented numerous interim corrective measures to address on-site and off-site contamination.

This SB includes an overview of corrective action efforts implemented at DuPont’s facility and off-site, and explains why EPA is issuing a permit modification to impose the remedy to address contamination at the Acid Brook Delta (“ABD”). Additional detail for this remediation will be imposed through approval of the ABD Area Revised Corrective Measures Implementation Work Plan (“CMIWP”), dated September 2011, which will be further revised in accordance with the requirements set forth in the permit modification, and as additional information on the project becomes available.

This permit modification is limited to the ABD study area, which is one of the 202 solid waste management units (“SWMUs”) and areas of concern (“AOCs”) that must be addressed by the Permittee. Remedy selection for the other remaining AOCs will occur in later permit modifications when investigations have been completed and remedies recommended by the Permittee are evaluated. Opportunities for public participation will continue to be provided through future public notices as well as informal meetings.

Information summarized in this SB is available in greater detail in the relevant documents identified herein and included in the Administrative Record for this facility. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of environmental conditions at the DuPont PLW and the RCRA activities conducted to date. The documents are available for public review at the locations provided at the end of this SB.

II. DRAFT PERMIT MODIFICATION – PUBLIC REVIEW PROCESS – INTER-AGENCY CONSULTATION – ADDITIONAL INFORMATION

On November 20, 2011, EPA published a public notice for a draft permit modification, which proposed final remedy selection for the ABD sediments, the Upland Soils, and the Shoreline Properties

The ABD investigation looked at three major components -- the ABD sediments, the Uplands Soils, and the Shoreline Properties. In the draft permit modification, EPA proposed as the final remedy for the ABD the dredging of approximately 68,000 cubic yards of sediments from 26 acres of the Lake, which are contaminated primarily with mercury and lead, which would be removed and disposed of at an authorized off-site disposal facility. The proposed remedy also provided for the excavation of approximately 7,800 cubic yards of soil from approximately one acre of the Upland Soils area, contaminated with mercury and lead, which would also be disposed of at an authorized off-site disposal facility. It was determined that the Shoreline Properties were not impacted by ABD sediments during historic storms, and no corrective work was proposed for that area.

Prior to the public notice of the draft permit modification, EPA held a Public Availability (Information Session) in the Borough Council Chambers in Pompton Lakes on October 20, 2011, at which EPA made presentations and provided information on the proposed remedial actions, and public participants offered their views on the matter. EPA, pursuant to the procedures set forth in 40 C.F.R. Part 124, published a public notice of the draft permit modification on November 20, 2011 and provided a public comment period from November 20, 2011 to January 13, 2012 for any interested parties to submit written comments. A public hearing was held during the public comment period on January 5, 2012 at the Pompton Lakes High School, at which approximately 32 persons provided comments on the draft permit modification provisions. During the public comment period, written comments were received from 29 persons (one additional written comment was received after the end of the public comment period due to an electronic equipment problem experienced by the commenter; EPA granted permission for the late submission).

EPA used the administrative procedures set forth in 40 C.F.R. Part 124 to solicit public comments prior to making its final corrective action and permit modification decision(s) for the ABD. In making this decision, EPA has evaluated all written comments and comments from the public hearing received during the public comment period including one set of written comments that was submitted after the end of the public comment period. Relevant information and comments received on this project have influenced the development of the final permit modification. As required by regulations, EPA also consulted various federal agencies and the state for input on the proposed permit modification. Consultation with the United States Fish and Wildlife Services (“USFWS”) and the NJDEP have also influenced the

development of the final permit modification. In addition, DuPont ("Permittee") provided to EPA, the results of a bathymetric survey, dated January 9, 2012. The survey was performed to compare the lake bed elevation to the 2007 bathymetric survey. This information also influenced the development of the final permit modification. This final permit modification is, therefore, the outgrowth of EPA's public participation procedures, consultation with other regulatory and resource agencies, and evaluation of additional pertinent information received. This final permit modification includes the following requirements:

- An expanded ABD sediment removal program requiring removal of all sediment down to the peat layer in an expanded area from the mouth of the Acid Brook to a line nearer to the Ramapo River channel, running approximately north-south, and coinciding with the 2 ppm surficial mercury concentration contour line. This expanded area encompasses approximately 40 acres as compared to the originally proposed 26 acre dredging area.
- Sediment characterization sampling to delineate sediment mercury concentrations in the areas not initially targeted for dredging. The objective is to identify "hot spots" within the rest of the lake system which may require removal and to also characterize any sediment quality/contaminant impact from the Pompton Lakes Dam downstream to Riverside Park, Wayne, New Jersey ("Riverside Park"), a distance of approximately 3 miles. This will be conducted simultaneous with the ABD dredging.
- Design and implementation of a plan to establish baseline conditions of the Pompton Lake/Ramapo River system prior to dredging. This information will be used to help determine the effectiveness of the dredging/restoration project and the need for further dredging.
- Design and Implementation of a Post-Remedy Long-Term Monitoring Program of the lake system to confirm effectiveness of the dredging/restoration project.
- Design and performance of an updated Ecological Risk Assessment ("ERA"), utilizing up-dated risk data, bioaccumulation factors, and relevant collected site-specific information.
- Design and implementation of a revised Uplands Restoration Plan which ensures that the potential pathways for ecological receptors to mercury-contaminated soil are eliminated.

Except for the ERA Workplan, which must be submitted for EPA approval 30 days after the completion of all dredging activities, all workplans required under this permit modification are due for EPA review and approval 30 days after the effective date of the permit.

EPA considers the final version of the permit modification as an outgrowth of EPA's evaluation of written and oral comments received concerning the proposed permit modification, review of additional relevant information, and consultation with NJDEP and USFWS.

III. FACILITY BACKGROUND

The DuPont PLW facility occupies approximately 570 acres of land, surrounded by mountainous areas to the north, Lake Inez (now drained) to the west and residential areas to the east and south. Two parallel valleys (Wanaque River and Acid Brook) run through the site north to south. Land use in the vicinity of the site is predominantly residential and commercial, but also includes undeveloped areas, an interstate highway (Route 287) and state-owned forest. (See Attachment 1.)

DuPont PLW conducted operations at the site from 1902 to April 1994, when the facility ceased its operations. Products manufactured included explosive powder (e.g., mercury fulminate and lead azide) and finished products (e.g., detonating fuses, electric blasting caps, metal wires, and aluminum and copper shells). The manufacturing operations and waste management practices resulted in contamination of the soil, sediment, and groundwater. The primary contaminants in the soil and sediments are lead and mercury. Groundwater contaminated with chlorinated volatile organic compounds ("VOCs"), such as tetrachloroethylene ("PCE"), trichloroethylene ("TCE"), cis 1,2-dichloroethylene, and vinyl chloride, has migrated off-site from the Eastern Valley part of the facility towards Pompton Lake.

Soil and sediment contamination occurred off-site along the Wanaque River, which flows through the Western Valley side of the facility. Operations in the Western Valley ceased in the mid -1920's and relocated to the Eastern Valley side of the plant. Due to releases of lead and mercury to Acid Brook, soil along Acid Brook was contaminated. Acid Brook flows from north to south through the Eastern Valley and discharges into the ABD of Pompton Lake, resulting in contamination of the ABD sediments.

Between 1991 and 1997, Acid Brook was the subject of remedial efforts that included streambed remediation and excavation of floodplain soil. The cleanup at the ABD in Pompton Lake is now the focus of this permit modification. DuPont submitted a permit modification application in April 2011 to propose final remedies for the ABD.

IV. REGULATORY AND PERMIT FRAMEWORK

In 1988, DuPont entered into an Administrative Consent Order ("ACO") with the New Jersey Department of Environmental Protection ("NJDEP"). In 1992, EPA issued to DuPont a Hazardous and Solid Waste Amendments ("HSWA") permit under the Resource Conservation and Recovery Act ("RCRA"). The NJDEP ACO and the EPA HSWA Permit required DuPont to conduct investigation and cleanup of contamination on and/or migrating from the site.

As a result of the RCRA Facility Assessment ("RFA") conducted in 1986 and subsequent investigations conducted under the permit and Order, 202 solid waste management units and/or areas of concern ("SWMUs/AOCs") were identified. The combined remedial investigation reports for the Northern Manufacturing Area, Western Manufacturing Area, and Eastern Manufacturing Area characterize conditions at the 202 SWMUs/AOCs on- and off-site. The off-site SWMUs/AOCs include: the Wanaque River, Acid Brook, ABD, and the groundwater plume.

In addition to the Remedial Investigation Reports (“RIR”) for the Northern, Eastern, and Western Manufacturing Areas, all three of which are dated June 30, 2010, there is the ABD RIR, dated December 19, 2008, the RIR for Pompton Lake Uplands, dated June 30, 2010, Acid Brook Delta Area Remedial Action Selection Report (“RASR”)/Corrective Measures Study (“CMS”), dated September 18, 2009, and the Acid Brook Delta Area Revised Corrective Measures Implementation Work Plan, dated September 2011.

Remedial activities have been implemented both on-site and off-site, to protect human health and the environment. These included off-site soil cleanup, on-site groundwater extraction, and long-term monitoring. Stabilization of the groundwater contaminated with volatile organic compounds (“VOCs”) is being implemented through an on-site groundwater pump and treat system. The groundwater is treated and the treated water is discharged into infiltration basins to flush through the aquifer. Numerous soil remedial and interim remedial activities have been implemented on-site to remediate and stabilize the contamination. In addition, due to off-site vapor intrusion, vapor mitigation systems have been installed by DuPont and third party contractors at more than 240 residences affected by the plume of VOC contaminated groundwater located between the site and Pompton Lake. Planning and installation activities are underway for additional homes.

The remainder of this SB will focus on the selected remedy for the ABD and the permit modification provisions for remedial actions for the ABD and lake

V. ABD OF POMPTON LAKE STUDY AREA

Pompton Lake is a 196-acre impoundment of the Ramapo River that was originally formed in 1858 when the Pompton Lakes Dam was constructed by the U.S. Army Corps of Engineers at the southern end of the lake. The Ramapo River flows over the Pompton Lakes Dam. Approximately 1.5 miles downstream, the Ramapo and Pequannock Rivers join to form the Pompton River. The Pompton River flows into the Passaic River, which empties into Newark Bay. The dam was enlarged in 1908. When the dam was enlarged, the area that is now the delta was submerged.

Current uses of the lake include boating and fishing. However, recreational activities on the lake are restricted. Due to elevated levels of coliform and bacteria within the surface water, swimming and wading in the lake are prohibited. There is a state consumption advisory for fish due to mercury from DuPont and other sources. The advisory also cites polychlorinated biphenyls, chlordane, dioxin, and DDX (DDT, DDE and DDD), which are from sources other than the DuPont PLW facility.

It is anticipated that current use of the lake will continue into the future. Restrictions on human use can be enforced as they currently are; however, restrictions cannot be applied to ecological receptors. While the potential for unacceptable risks were shown to be minimal, ecological data for the delta contained in the Ecological Risk Assessment (2003) indicated that mercury concentrations in some biota were higher in the delta than in the background reference areas.

The ABD Area includes three general areas (1) the portion in Pompton Lake (i.e., lake sediments) termed the delta, (2) the uplands portion defined as the soils between Lakeside Avenue and the water's edge along the lake (including wetland areas), and (3) the shoreline soils adjacent to Pompton Lake south of Lakeside Avenue Bridge and north of the Pompton Lake Dam. (See Attachments 1, 2, and 3.) The ABD lake sediments include the portion of Pompton Lake south of the Lakeside Avenue Bridge, east of the discharge point of Acid Brook into Pompton Lake, and west of the centerline of the former Ramapo River channel (as defined by the 2007 bathymetric survey of Pompton Lake).

The permit modification requires DuPont to design and implement a sediment characterization sampling plan, subject to EPA approval, for the eastern portion of the lake down to the Pompton Lakes dam and, for the portion beyond the dam along the Ramapo River to the wetlands area at Riverside Park (approximately 3 miles), a sampling strategy for range-finding will be employed.

(Note: The delineation of mercury is explained in greater detail in the Revised Acid Brook Delta Remedial Investigation Report ("ABD RIR"), dated June 19, 2008 and the Draft Remedial Action Plan, November 2006.)

VI. INVESTIGATIONS OF THE ABD STUDY AREA

Between 1995 and 2008, studies were conducted within the ABD area, including multiple phases of ecological investigation, scientific studies, and remedial investigations. In March 2004, NJDEP required DuPont to delineate the ABD sediment mercury contamination to 2 mg/kg. This is not a remediation goal, but a level much lower than human health standards that facilitated development of Remedial Action Objectives protective of ecological receptors. The major reports of the ABD Study Area include the Remedial Investigation Report ("RIR") for the ABD, dated December 19, 2008, the RIR for the Uplands, dated June 30, 2010, the Remedial Action Selection Report ("RASR")/Corrective Measures Study ("CMS"), dated September 18, 2009, and the ABD Area Revised Corrective Measures Implementation Work Plan, dated September 2011.

There are both human and ecological receptors in the ABD study area. Humans may have direct contact with surface water and sediment during recreational activities although recreational activities on the lake are restricted due to elevated levels of coliform and bacteria within the surface water. Swimming and wading in the lake are prohibited. It is expected that current use of the lake will continue into the future. Ecological receptors, aquatic species in particular, have direct contact with surface water and sediment. Both humans and ecological receptors may have direct contact with surficial soil and, to a lesser extent, subsurface soil. Surface water flow (i.e., rainfall) may potentially transport soil containing constituents of concern ("COCs") in the Uplands to the lake.

Therefore, the focus on risk management for impacted sediment is on the potential concern for ecological receptors.

A. ABD Sediments

The ABD sediment is the lake sediment in the area adjacent to the discharge of Acid Brook into Pompton Lake. The medium of concern in the ABD area is sediment.

Several site-related metals have been investigated as part of the ABD investigations including lead, mercury, copper, selenium, barium, and zinc. Barium, copper, selenium, and zinc concentrations are below the current the NJDEP Residential Direct Contact Soil Remediation Standards ("RDCSRS") in N.J.A.C. 7:26D. In areas where lead is above RDCSRS, the lead-impacted area will be addressed by remediation of the co-located mercury-impacted area. The lead and mercury exhibit similar spatial distributions in that the highest concentrations of each are near the shore in the vicinity of the Acid Brook discharge. Mercury is the sole COC that methylates -- i.e., converts from the inorganic form to an organic compound through biological processing with certain bacterium to add a methyl-group-- and therefore, has the potential for bioaccumulation. Methyl mercury was identified as a COC in preliminary studies. It was, however, determined that methyl mercury distribution was based primarily on location and not on the concentration of mercury in the sediment. Therefore, mercury is the constituent driving the remediation both, in areal extent and in depth, and is the primary COC. The highest mercury concentrations, greater than 100 milligrams per kilogram, (mg/kg) were generally found in the sediment near the Acid Brook discharge.

To summarize the results of the ABD sediment investigation:

- Sediment thickness ranges from 0 to 5.2 feet. Sediment thickness, although variable, is generally less than 2 feet. Sediment is often, but not always, underlain by peat. (The peat is the original ground surface prior to the construction of the dam. The underlying peat ranges in thickness from 0 to 4.3 feet with an average thickness of 1.9 feet.)
- Water depth ranges from less than 1 foot near the mouth of Acid Brook to more than 18 feet near the Pompton Lakes Dam. In sediment, mercury concentrations along with other site-related metals generally decrease with distance from the mouth of Acid Brook. (Mercury was identified as the primary COC.)
- Surface water methyl mercury concentrations represent an integration of methyl mercury produced by the underlying sediment. The data shows that the near-shore sediment is the most important site of mercury methylation in the ABD area.
- In general, the distribution pattern of mercury in sediment overlying the peat is consistent with the physical parameters of the conceptual model -- i.e., the mercury concentrations decrease with distance from the discharge point of Acid Brook and increase with sediment depth.

B. Upland Soils Area Remedial Investigation

The Upland Soils Area encompasses approximately 2.6 acres south of Lakeside Avenue. Of those 2.6 acres, approximately 0.9 acres is a relatively flat area situated approximately 8 feet above the lake, 0.7 acres is a wooded slope, and 1 acre is relatively flat wetlands along the lake's shore.

For the Upland Soils area, soil is the primary medium of concern. Barium, copper, lead, mercury, selenium, and zinc were identified as COCs for either human health and/or ecological receptors in some areas of the Uplands. Lead and mercury are the primary COCs with detected concentrations above the NJDEP RDCSRS.

To enhance investigation efforts, the Upland Soils Area was divided into five areas (Areas A through E) to delineate the vertical and horizontal extent of site-related constituents in soil. Existing soil analytical data was used to focus the delineation sampling. Vertical delineation in surface soil (0 to 0.5 feet) was based on the lower value of NJDEP's November-2009 RDCSRS and ecological soil delineation criteria allowing for unrestricted use of the Uplands. The RDCSRS was used as the criteria for evaluating soil greater than 0.5 feet deep in the Uplands and surface soil for the shoreline.

Sampling results indicate that soils in Areas A through E were delineated to show the comparison to the applicable NJDEP soil remediation standard. (The results of this investigation are presented in the Pompton Lake Uplands RIR, dated June 30, 2010.)

Much of the soils in Areas A through E are located within the wetland transition zone or within the fully-established wetland. After consideration of applicable comments received during the public comment period, for the Upland Soil areas that are located within the wetlands transition zone or within the fully-established wetlands, EPA is requiring DuPont to design and implement a Remediation and Restoration Plan, subject to EPA approval, that will adequately address the ecological exposure pathway in soil to site contaminants or develop an updated "ecological soil delineation criteria" for the soil areas within the wetlands transition zone and the wetlands, that will be used to design the excavation. A combination of remedial measures and restoration in the Upland Soil areas will be utilized to address the ecological exposure pathway to remaining site contaminants.

C. Shoreline Properties Remedial Investigation

Soil sampling within the floodplain was also conducted to determine whether historic flooding may have deposited sediment containing site-related metals onto the shoreline properties. A floodplain analysis was completed to identify the low-lying areas of the adjacent properties along the lake. Samples were then collected from properties along the western shoreline adjacent to Pompton Lake south of Lenox Avenue and north of the Pompton Lake Dam, and analyzed for lead and mercury for characterization purposes. The results of the shoreline sampling indicated that the surface soil had not been impacted by ABD sediment during historic flooding events. The results of this investigation are presented in the Uplands RIR.

D. Sediments at Two Lower Ramapo River Channel Areas

During the remedial investigation mercury delineation studies, sediments in two lower Ramapo River channel areas upstream of the dam with elevated mercury detections were identified for potential inclusion in the remediation area targeted for sediment removal. One area is located on the northern side of an island, and the other area is located adjacent to the western shore at the beginning of the channel. However, after further delineation sampling in the spring of 2010, EPA no longer believes that removal of the sediments at the two areas is needed to meet the qualitative Remedial Action Objectives described in Section VI., below. The areas either exhibit low mercury concentration or are overlain by several feet of non-impacted sediment. (See Appendix A in the CMIWP, dated September 2011.) EPA had expected these conditions will be maintained or improved following implementation of the selected remedies and re-establishment of normal flow conditions over time.

However, after consideration of relevant information and comments received during the public comment period, EPA is requiring DuPont to perform a Sediment Characterization Sampling Plan for these and other areas outside of the initial dredging operations area, to determine whether any subsequent remedial activity should be required.

See Attachments 2, 3, 4, 5 and 6 for the contamination delineation of the ABD study area.

(See also the Acid Brook Delta Area Remedial Action Selection Report/Corrective Measures Study [September 2009] for a more comprehensive discussion.)

VII. **REMEDIAL ACTION OBJECTIVES (“RAOs”)**

RAOs were developed to address potential unacceptable risks associated with site conditions and the exposure pathways identified. These are media-specific goals that are aimed at protecting human health and the environment. The RAOs were developed as long-term, media-specific goals and were used to assist in selecting a remedial alternative to address elevated mercury concentrations in sediment and various metals concentrations in Uplands Soils.

For this project, potential exposure for human receptors to impacted soil and sediment is expected to be minimal. Previous investigations indicated that the ABD near-shore area had higher dissolved mercury and methyl mercury concentrations in surface water when compared to portions of the ABD area further from the shore and the rest of Pompton Lake. For ecological receptors, both the Ecological Risk Assessment (“ERA”) and triad weight of evidence approach indicated that the sediment does not pose an unacceptable risk to benthic macroinvertebrates. (See the Acid Brook Delta Ecological Investigation Reference Area Evaluation and Phase 1 Data Report, dated January 1997, and the Acid Brook Delta Ecological Investigation Phase 2 Report, dated January 2003.)

In developing the RAOs for the ABD study area, both quantitative and qualitative RAOs were considered in analyzing ways to reduce potential exposure to COCs in soil and sediment.

A. Quantitative RAO for Upland Soils

Quantitative RAOs are typically defined as promulgated numerical criteria that have been developed to be protective of human health and/or ecological receptors for a particular medium (i.e., sediment, soil). The specific values used for humans may be different than those for ecological receptors because of the differences in toxicity and exposure between the two receptor groups and the medium type. Therefore, while the concentration of a particular constituent in sediment may be unacceptable for ecological receptors, the same concentration in sediment may not result in an unacceptable risk for humans.

For Upland Soils north or outside of the wetlands transition area, both human health and ecological criteria have been selected as the RAOs. As presented in the approved work plan for surface soil (0 to 0.5 foot), the RAOs are based on achieving the lower value of the two, the Residential Direct Contact Soil Remediation Standards and ecological soil delineation criteria. Using the lower value of the RDCSRS and ecological soil delineation criteria allows protection for use of the Uplands by humans while also providing adequate protection for ecological receptors. For subsurface soil (i.e., deeper than 0.5 foot), the RAO is the RDCSRS. As such, the criteria for the constituents of concern ("COCs") considered in establishing the RAOs for the uplands area are provided below.

Uplands RAOs and Removal Criteria

Analyte	Surface Soil Criteria (mg/kg)	Subsurface Soil Criteria (mg/kg)
Copper	1,100	3,100
Mercury	20.5	23
Lead	400	400
Selenium	5.05	390
Zinc	1,507	23,000

Therefore, to achieve the project RAOs, Upland Soils with contaminants exceeding the applicable criteria will be removed and disposed of at an authorized facility.

Regarding Upland soils within the wetlands transition area and fully-established wetlands, after consideration of applicable comments received during the public comment period, EPA is requiring DuPont to design and implement a Remediation and Restoration Plan, subject to EPA approval, that will adequately address the ecological exposure pathway to site contaminants or develop an updated "ecological soil delineation criteria" for the Upland Soil Areas within the wetlands transition zone and the fully-established wetlands. (The excavation limits will be based on the up-dated ecological soil delineation criteria.) A combination of remedial measures and restoration in the Upland Soil areas will be utilized to address ecological exposure pathway to remaining site contaminants.

B. Qualitative RAO for the ABD Sediment

There are no promulgated applicable remediation standards for sediment to use as a quantitative RAO. However, remediation standards can be narrative standards to which contaminants must be treated, removed or otherwise cleaned in order to meet health risk or environmental standards. As such, qualitative RAOs (narrative standards) were developed for the ABD area sediment to set long-term goals for protecting human health and the environment.

It is anticipated that the current use of the lake will continue in the future by both human and ecological receptors. Restrictions on human use can be enforced as they currently are; however, restrictions cannot be applied to ecological receptors. While the potential for unacceptable risks were shown to be minimal, the ecological data for the ABD area indicated that mercury concentrations in some biota were higher in the ABD area than in reference areas.

Previous investigations concluded that mercury in ABD area sediment appears to be tightly bound to the fine-grained particles as indicated by toxicity characteristic leaching potential ("TCLP") data. However, biological processes in the upper few centimeters of sediment are able to mobilize some mercury in the form of methyl mercury, which then enters the food chain. Furthermore, the near-shore area within the ABD has higher dissolved mercury and methylmercury surface water concentrations when compared to portions of the ABD further from the shore and the rest of Pompton Lake.

It should be noted that the RAOs for the ABD sediment are driven by ecological risk and not human health risk. In order to be protective of ecological receptors, the following qualitative RAOs for the ABD sediment were developed:

- Reduce the potential for mercury methylation in near-shore sediment; and
- Reduce the area of exposure of ecological receptors to elevated mercury concentrations in ABD sediment.

Along with the numerous sediment delineation sampling data, multiple lines of evidence (such as dissolved mercury study, methyl mercury potential study, toxicity study, and the ecological risk assessment), the RAO Limit line for the ABD was established. The region to the west of the RAO Limit line will be the area targeted for sediment removal. (See Draft Remedial Action Plan, November 2006 for details on sediment delineation and studies supporting the lines of evidence for the RAO Limit line.)

After consideration of additional information relevant to the ABD and applicable comments received during the public comment period, in the final permit modification, EPA requires DuPont to (1) expand the dredging area footprint; (2) conduct sediment sampling at the portion of Pompton Lake that is not targeted for the initial dredging and the Ramapo River channel downstream to the Pompton

Lakes Dam; (3) conduct sediment sampling to determine contaminant impact to the portion of the river from the dam downstream to the wetlands adjacent to Riverside Park; (4) conduct an ecological risk assessment two years after the restoration of the dredged areas; and (5) conduct long-term monitoring of the lake system (post-Restoration) and establish baseline conditions (prior to excavation and dredging).

Baseline conditions must be established prior to dredging. Long-term monitoring will be considered in the design of the sampling requirements to establish the baseline.

VII. REMEDIAL ALTERNATIVES AND REMEDY SELECTION

A. Remedy Selection

A detailed analysis was completed for five remedial alternatives to evaluate the general suitability of various remediation technologies to meet the established RAOs and specific objectives. The following remedial action alternatives were evaluated as part of the RASR/CMS:

Alternative #1: No Action

Alternative #2: In-Situ Stabilization

Alternative #3: Capping

Alternative #4: Removal of sediment (shallow and deep) and soil (uplands)

Alternative #5: Removal of sediment (shallow) and soil (uplands) and Capping (sediment area beyond 5 feet deep water)

Based on the screening evaluation of the five remedial alternatives listed above, Alternatives #4 and #5 were retained for further review. EPA has now selected Alternative #4: Removal of sediment (shallow and deep) and soil (uplands) because:

- Removal reduces the potential for mercury methylation in near-shore sediment within the ABD area.
- Removal increases the amount of material removed from the lake and will, therefore, increase the water storage capacity of Pompton Lake.
- There are no concerns regarding contaminant mobility if the contaminant is removed.
- There are no concerns regarding cap stability during storm events.
- There is no need for a long-term cap monitoring program.

Alternative #5 was also considered to be a viable remedial alternative for the ABD area. However, we prefer Alternative #4 because, although adequately protective, capping would decrease the depth of the Lake and therefore, its capacity. The capacity of the Lake is important in terms of flood control.)

It should also be noted that NJDEP has a policy to reduce the mercury contamination under its New Jersey Mercury Reduction Action Plan (November 2009), which provides additional support for the Alternative #4.

(A more detailed description of the remedial alternatives and selection process is in the document, Acid Brook Delta Area Remedial Action Selection Report/Corrective Measures Study, dated September 2009.)

The final permit modification includes the following requirements that are in addition to the provisions that were publicly noticed on November 20, 2011 in the permit modification draft.

- Upland Soil Areas

- The Upland Soil Areas that are located outside the wetlands transition zone and the fully-established wetlands will be excavated, based on the NJDEP SRS.
- For the Upland Soil Areas within the wetlands transition zone and the fully-established wetlands zone, DuPont is required to design and implement a Remediation and Restoration Plan, subject to EPA approval, that will adequately address the ecological exposure pathway to site contaminants or develop "updated ecological soil delineation criteria," on which the excavation limits will be based. A combination of remedial measures and restoration in the Upland Soil areas will be utilized to address ecological exposure pathway to remaining site contaminants.

- ABD Sediment

- DuPont is being required to dredge the area west of the RAO line, which now extends east to approximately coincide with the Ramapo River channel (and the 2 ppm concentration line), as depicted in Attachment 7.
- DuPont shall design and conduct sediment characterization sampling (to be designed with the objective of delineation of areas of high mercury concentration) in the eastern portion of the "RAO line" and along the Ramapo River channel downstream to the dam. An evaluation of the contaminant distribution shall be made in consultation with EPA and USFWS to identify areas of high mercury concentration for removal.
- DuPont is being required to design and implement a sediment sampling plan designed with the objective of determining how far downstream the contaminant impact may reach. The sampling will occur in the Ramapo River south of the dam to the wetlands adjacent to Riverside Park. The sampling results will be evaluated to determine whether there should also be sampling further downstream.

- Long-Term Monitoring Program

- DuPont will design and implement a long-term monitoring program of the lake system to ensure that the restoration plan adequately addressed the elimination of exposure pathways to contaminated sediment or soil.
- DuPont will establish a baseline for the lake project, subject to EPA approval. The baseline will be established prior to dredging. A sampling plan will therefore be designed to gather the information needed to establish the baseline.
- **ERA** -- Two years after the restoration plan is carried out, DuPont will conduct an ERA of the lake system, which will utilize up-dated risk data and information.

Subsequent corrective action activities, if any, will be determined by the results of sediment sampling plans and the ERA findings.

B. Anticipated Post-Remediation Result – Sediment

The selected final remedy for the ABD sediment consists of dredging the area west of the extended RAO line, as depicted in Attachment 7 to this module, conduct additional sediment characterization in the east portion of the lake outside the RAO line and downstream to the Pompton Lakes dam, and conduct range-finding sampling beyond the dam to Riverside Park. As a result of additional sediment characterization sampling, additional areas of sediment may be required to be dredged. Implementation of the final remedy is expected to result in the removal of a greater mass of mercury than in the proposed version, specifically:

- 100% reduction of mercury in the near-shore environment of the ABD;
- A greater reduction in mercury in the surficial sediment (0 to 0.5 feet)
- A greater reduction in mercury in the deep sediment (>0.5 feet); and
- A greater reduction overall of mercury in the ABD area.

C. Anticipated Post-Remediation Result – Soil

The design and implementation of the Remediation and Restoration Plan, subject to EPA approval, and consisting of a combination of remediation (including excavation and engineering control) and restoration at the Upland Soil areas or excavation to an EPA approved “updated ecological delineation criteria” will ensure that the ecological exposure pathway will be adequately addressed in the Upland Soil areas.

VIII. REMEDIAL APPROACH FOR THE ABD TO BE IMPOSED BY THE PERMIT MODIFICATION

This permit modification imposes conditions which require DuPont to implement dredging the ABD and excavation of the Uplands soils, sediment sampling at the portion of the lake that is not targeted for dredging to the dam and from south of the dam to Riverside Park, up-dated ecological risk assessment, and long-term monitoring. Additional operational details are included in the latest revision to the Corrective Measures Implementation Workplan ("CMIWP") submitted September 2011. In light of changes to the permit modification which have been incorporated into final permit conditions, DuPont is required to submit an updated CMIWP to address any changes necessary to implement the final remedies.

EPA is also requiring DuPont to identify how the CMIWP comports with Green Remediation practices and principles outlined in EPA Region 2's "Clean and Green Policy" as part of the up-date. The goal of the Region 2 Clean and Green Policy is to enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable. Additional information on the policy is available at the following website:

http://www.epa.gov/region02/superfund/green_remediation/policy.html

The operational details of the project to be determined include: methods and location for treatment, locations for equipment mobilization, sediment transport routes, and specific locations for temporary storage and stabilization areas.

These are the major components of the remedial approach in the CMIWP, as outlined in the September 2011 submittal:

A. Dredging Containment System

A containment system using rigid and/or flexible methods will be installed around the ABD area to provide an engineering control to protect the surrounding water from re-suspended sediment that may be generated during dredging activities. The chosen system will enclose the removal area and will be put in place prior to any removal activities. The uplands removal area will be isolated with control measures to reduce the potential for erosion or washout from disturbed areas to uncontained areas of the ABD or other areas within the uplands.

Note: It is expected that there will be a buffer zone of approximately 50 feet between the area for targeted sediment removal and the rigid containment system. The area to be dredged will extend as close to the rigid containment system as practicable, and the amount of sediment to be removed will exceed the estimated 68,000 cubic yards.

B. Dredging and Excavation

ABD sediments will be dredged (in the wet) using hydraulic equipment. The sediment will be pumped or placed into small scows or other suitable containers on a barge for subsequent transport/re-handling. The removal area consists of the area from the discharge point of Acid Brook into Pompton Lake to approximately the Ramapo River channel. (See Figure 1, Permit Module Supplement.) Conventional excavation equipment will be used to excavate the Uplands Soils.

Confirmation of dredging completion will be conducted using both traditional and dredge mounted survey techniques. For the Uplands Soils, removal completion confirmation surveying will be used to verify that the horizontal and vertical limits of removal have been achieved.

C. Re-handling and Solidification

The dredged sediment will be moved to the shoreline. Sediment in the ABD area is a very soft, fine-grained material with very low strength. It is expected to require solidification prior to transport and disposal to meet disposal requirements. The Uplands Soil is typical of conventional earthwork projects and may not require any solidification prior to disposal. It will likely be loaded directly into trucks for transport.

D. Sediment Transport

After all necessary treatment, the sediment and soil will be transported for disposal or re-use at an authorized off-site facility.

E. Restoration

Following dredging and removal, the Uplands area and adjacent wetlands will be restored. The restoration plan will include re-grading of the Uplands to accommodate planting with native vegetation, and placement of park amenities and pathways for public use. In the ABD, the dredged area will be restored by placing a granular layer of sand (i.e., eco-layer) over the dredged area to establish a zone for benthic community re-colonization over time. Additionally, planting and seeding of desirable aquatic native vegetation in the ABD area will take place. The plantings, along with the sand layer, will expedite restoration and increase the ecological functions of both the aquatic and benthic habitats.

The RAO for the Restoration stage is to adequately address the elimination of exposure pathways to contaminated sediment or soil.

F. Monitoring

Water column monitoring will be performed during the dredging and eco-layer placement activities within the ABD area to assess the potential impacts of the remedial activities (e.g., turbidity and mercury concentration). Air monitoring will be conducted during excavation, dredging, and material handling and processing activities. Monitoring will also be conducted for activities that may cause vibration (e.g., rigid barrier installation within the ABD area) at structures within a specified distance from the work area. We will also develop an appropriate post-remediation monitoring program as part of the CMIWP to monitor the effectiveness of the implemented remedies and confirm expected conditions over time.

There is a river diversion along the Ramapo River (south of the Pompton Lake outlet), which is used by North Jersey District Water Supply Commission (NJDWSC) as one of the three intakes feeding the Wanaque Reservoir and has a capacity of delivering up to 150 million gallon per day (MGD), on an "as needed basis," and which is ultimately treated before being transmitted to the municipalities as drinking water. Use of turbidity curtains and water column monitoring will ensure no adverse impact to the water used by the NJDWSC.

G. Additional Sediment Sampling at Pompton Lake and Ramapo River Channel

Contemporaneous with the dredging operation, DuPont will be required to conduct additional sediment characterization sampling, designed with the objective of determining contaminant distribution within the portion of the lake that is not targeted for the initial dredge, in the portion of the lake east of the RAO line and along the river channel to the dam. Additional sediment sampling, designed with the objective of determining the extent of site-contaminant impact downstream of the lake, will be conducted from the dam to Riverside Park. (Riverside Park is an initial endpoint. The sampling results will be evaluated to help determine the need to sample further downstream.)

H. ERA

Two years after the Restoration stage is complete, DuPont is required to conduct an ERA of the lake system, which will utilize up-dated ecological risk data and information.

IX. RCRA CORRECTIVE ACTION CONCLUSIONS

The corrective action decisions by EPA contained in the Permit Modification I, including the dredging in the ABD and the excavation of Upland Soil areas, are based on the Acid Brook Delta Area Remedial Action Selection Report/Corrective Measures Study, September 2009 ("RASR/CMS") and the Acid Brook Delta Area Revised Corrective Measures Implementation Work Plan, dated September 2011 ("CMIWP"). The corrective action decisions in the final Permit Modification contain revisions that are discussed in this SB. It is EPA's position that the corrective measure (or remedy) selection, as revised, conforms to the requirements set forth at Permit Module VI.7(a) and (b)

for corrective measure selection. In addition, the CMIWP, which will be revised and submitted for EPA approval, is expected to conform with the requirements set forth at Permit Module VI.8.a for corrective measure implementation.

X. FINANCIAL ASSURANCE

The permit modification incorporates provisions for financial assurance for corrective action, pursuant to 40 CFR 264.101 and Section 3004 of RCRA. The provisions list mechanisms the Permittee may use to establish financial assurance and requires that the Permittee establish and keep up-to-date a cost estimate for necessary corrective action. The initial estimate must be submitted within 90-days of the effective date of this permit modification.

XI. PUBLIC PARTICIPATION

EPA and NJDEP have participated in the Pompton Lakes Community Advisory Group ("CAG") since October 2010. EPA has asked for input from the community on what type of information would be most useful. As a result, in many of the CAG sessions EPA made presentations and responded to questions from the community.

In addition, DuPont conducted a poster session in July 2011 in which it presented many of the options to be determined in the CMIWP. EPA conducted an Availability Session on the proposed remedy selection for the ABD on October 20, 2011. EPA will continue to conduct regular information sessions as a means of outreach in this community, and will also prepare newsletters on the remediation project.

EPA, NJDEP and DuPont will continue to be responsive by conducting activities and developing communications tools to provide timely dissemination of information to the public and encourage on-going, two-way communication between DuPont and external stakeholders.

These activities will include: meetings, regular information sessions, outreach office, website presence, news releases, newsletters, and fact sheets.

This Statement of Basis, final permit modification and Responsiveness Summary, and other relevant documents can be reviewed at:

Pompton Lakes Public Library
333 Wanaque Avenue
Pompton Lakes, New Jersey
(973) 835-0482
<http://www.pomptonlakeslibrary.org/libraryinfo.stm>

The administrative record and all relevant documents pertaining to the facility may be reviewed Monday through Friday from 8 AM to 4 PM at:

U.S. EPA
RCRA Records Center
290 Broadway, 15th Floor, Room 1538
New York, NY 10007-1866
(212) 637-3043

The permit modification and relevant documents are also available at:

EPA website:
http://www.epa.gov/region02/waste/dupont_pompton/index.html

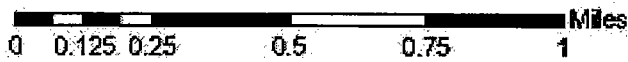
and at:

New Jersey Department of Environmental Protection website:
http://www.nj.gov/dep/srp/community/sites/dupont_pompton_lakes/more_site_info.htm
Mindy Mumford, Office of Community Relations, (609) 777-1976

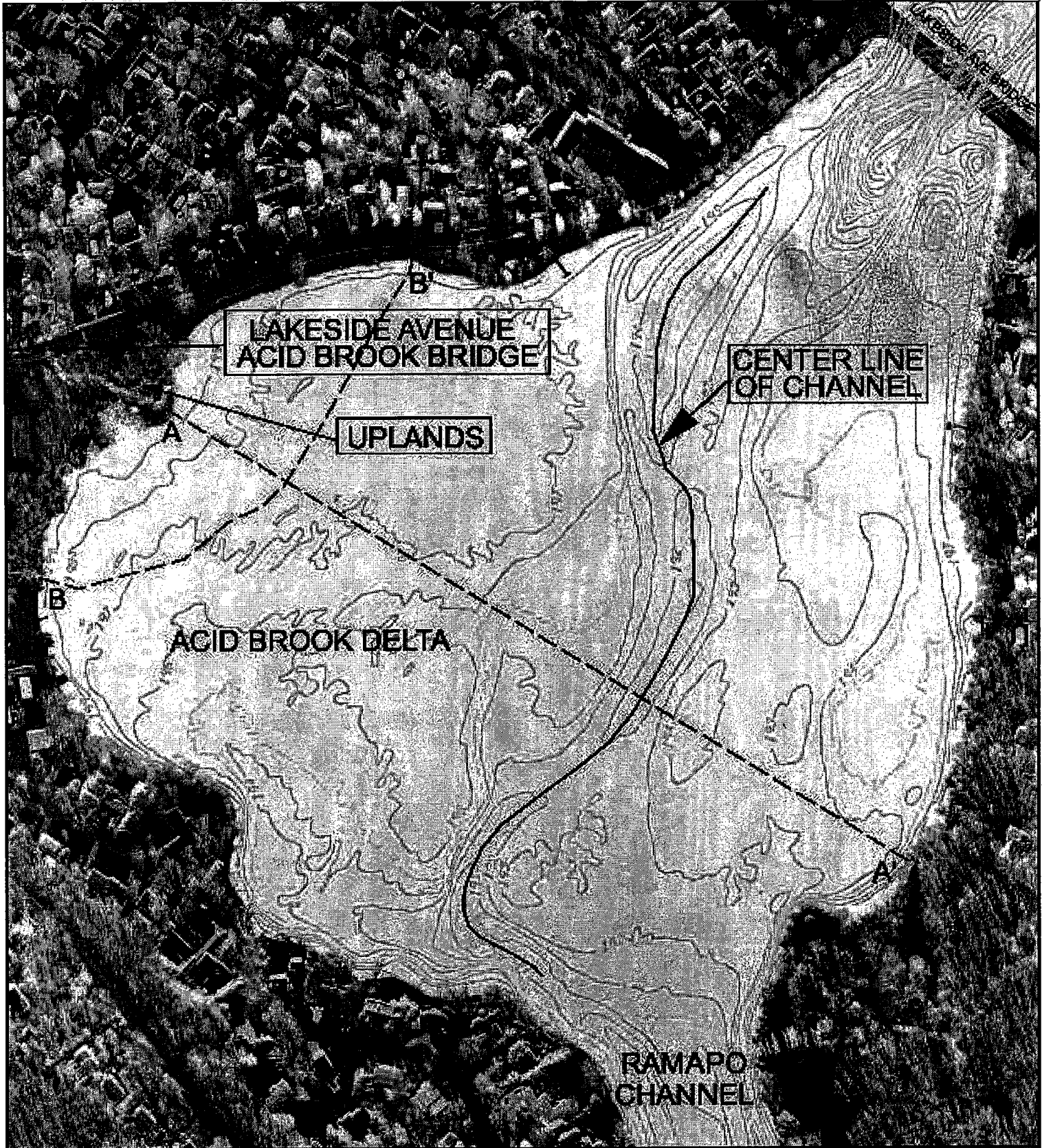
For additional information about the permit modification and corrective action decision please contact Clifford Ng, Project Manager, EPA RCRA Programs Branch, at (212) 637-4113 or email: ng.clifford@epa.gov.

Attachments to the Statement of Basis:

- 1: Fig. 1 from the Permit Modification Application 4/2011 (Quadrant map)
- 2: Fig. 1A from the RASR 2009 (Areal Extent of ABD)
- 3: Fig. 2 from the Permit Modification Application 4/2011 (Uplands site plan)
- 4: Fig. 3 from the Permit Modification Application 4/2011 (ABD Remedial Approach)
- 5: Fig. 12 from the RASR 2009 (ABD sediment mercury concentration polygons)
- 6: Fig. 15 from the RASR 2009 (Remedial Alternative #4 – Removal)
- 7: Fig. Total Mercury Results 2003 – 2007, Fig 1-4 with the RAO in red.



<p>Legend:</p> <p>Base is portions of the USGS Wanaque and Pompton Plains QUAD.</p>	<p>PARSONS</p> <p>200 Cottontail Lane South Somerset, New Jersey 08873</p>	<p>Site Location Map</p> <p>DuPont Pompton Lakes Works Pompton Lakes, New Jersey</p> <p>Figure 1</p>
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LEGEND

Background (MAD) on this file, based on April 2004 source data collected by Dimeo Survey, Inc.

- 1-foot contour
- 3-foot contour

Scale: 1 inch = 200 feet

Made in cooperation with the New Jersey Dept. of Environmental Protection, 2004. By T.M. MBR and J.M.R.

Project: RAMAPO DELTA



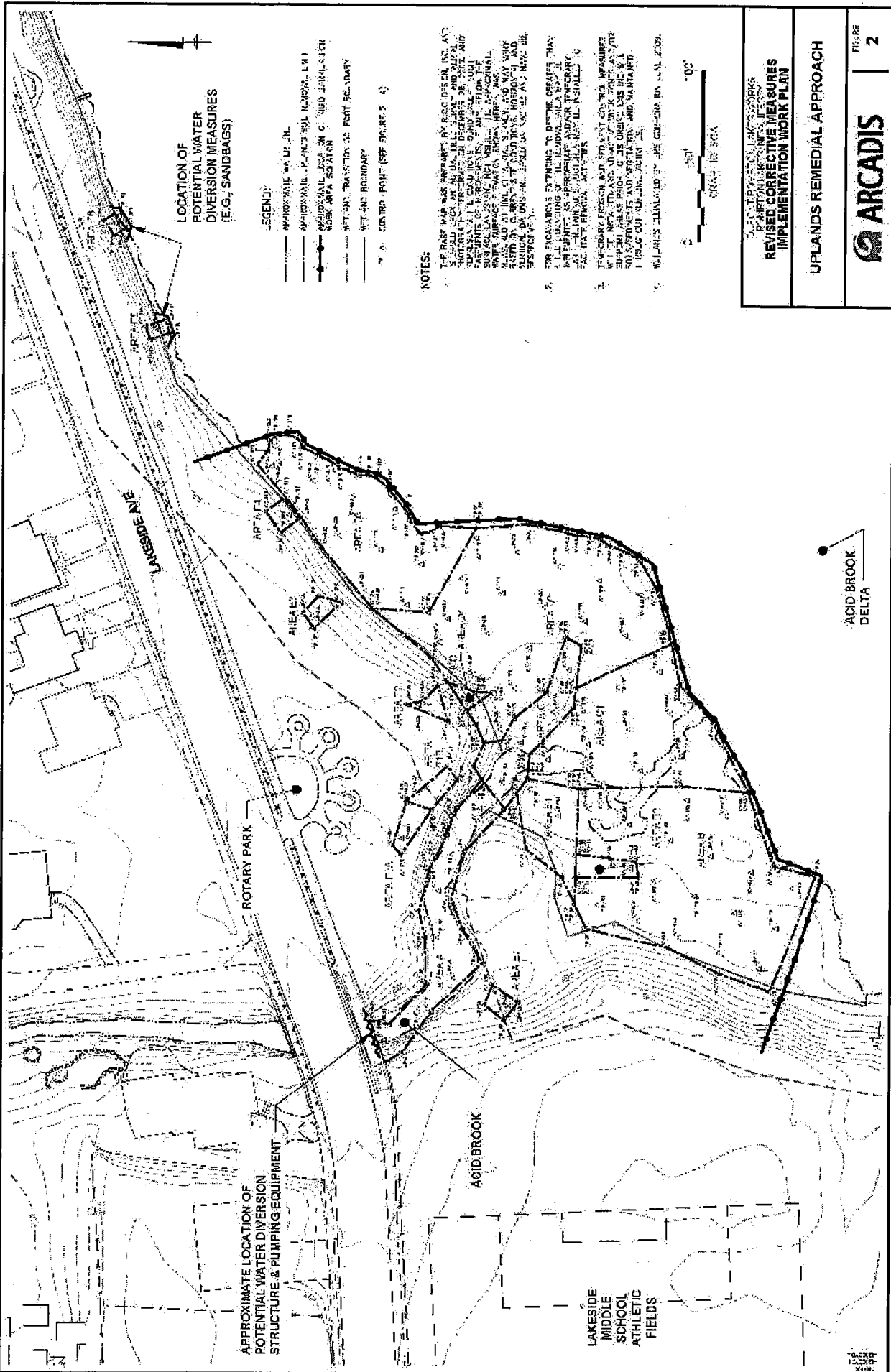
CORPORATE REMEDIATION GROUP
*An Alliance Between DuPont
 and URS | Cleaver Group*

2000 Clarendon Hill Hotel
 Pompton Lakes, New Jersey

Aerial Extent of the Acid Brook Delta

Acid Brook Delta
 DuPont Pompton Lakes Works

Figure 1A



LOCATION OF
POTENTIAL WATER
DIVERSION MEASURES
(E.G., SANDBAGS)

LEGEND:

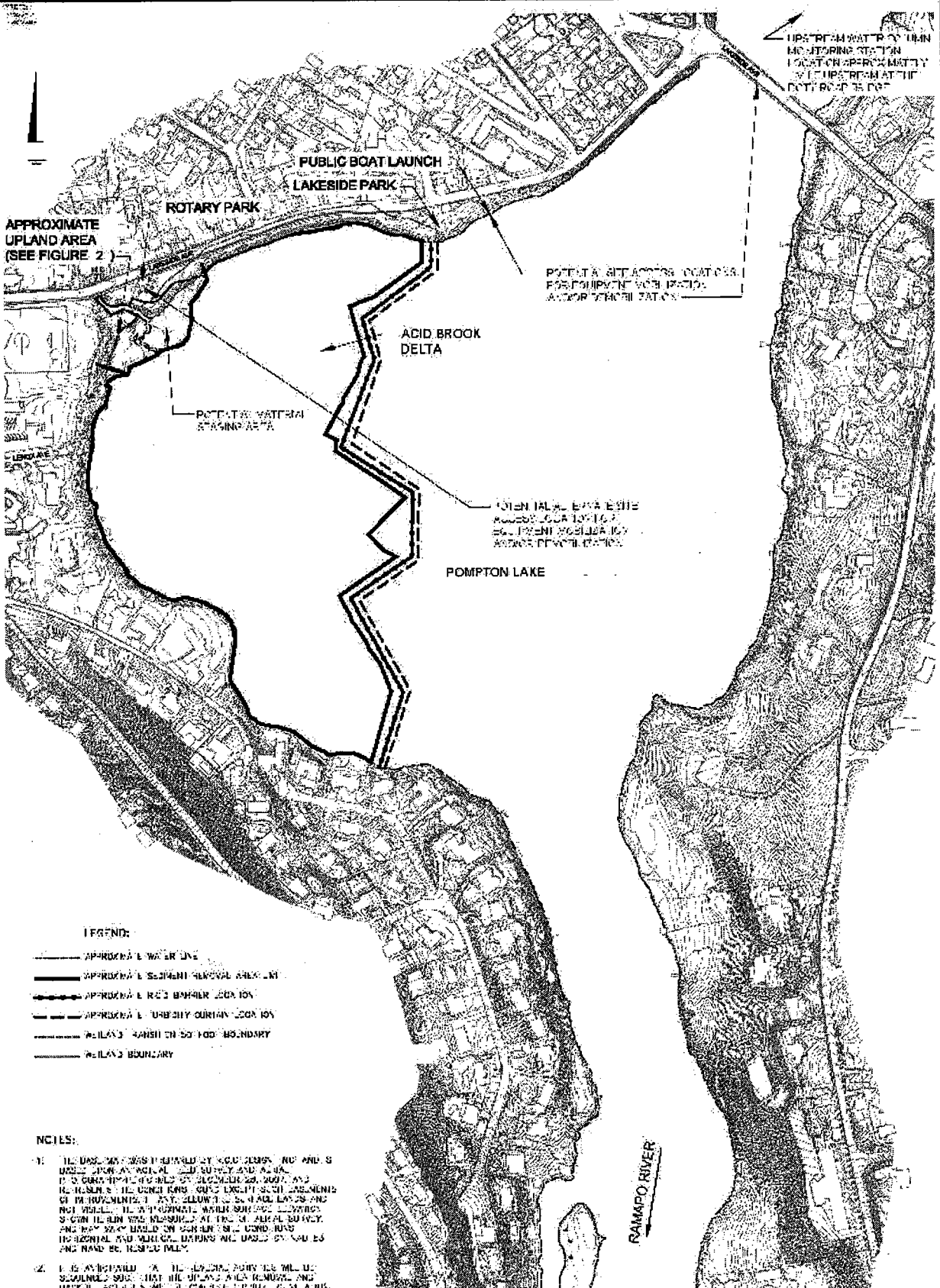
- APPROXIMATE LOCATION OF POTENTIAL WATER DIVERSION STRUCTURE & PUMPING EQUIPMENT
- POTENTIAL WATER DIVERSION MEASURES (E.G., SANDBAGS)
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- APPROXIMATE LOCATION OF POTENTIAL WATER DIVERSION STRUCTURE & PUMPING EQUIPMENT

NOTES:

1. THIS MAP WAS PREPARED BY THE CONSULTANTS, INC. AT THE REQUEST OF THE BOARD OF SUPERVISORS AND THE BOARD OF HEALTH OF THE COUNTY OF SAN DIEGO. THE CONSULTANTS, INC. AND THE BOARD OF SUPERVISORS AND THE BOARD OF HEALTH OF THE COUNTY OF SAN DIEGO SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREON. THE CONSULTANTS, INC. AND THE BOARD OF SUPERVISORS AND THE BOARD OF HEALTH OF THE COUNTY OF SAN DIEGO SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREON.
2. THE CONSULTANTS, INC. HAS CONDUCTED VISUAL INSPECTIONS OF THE AREA AND HAS IDENTIFIED THE POTENTIAL WATER DIVERSION MEASURES AND THE APPROXIMATE LOCATION OF THE POTENTIAL WATER DIVERSION STRUCTURE & PUMPING EQUIPMENT. THE CONSULTANTS, INC. HAS CONDUCTED VISUAL INSPECTIONS OF THE AREA AND HAS IDENTIFIED THE POTENTIAL WATER DIVERSION MEASURES AND THE APPROXIMATE LOCATION OF THE POTENTIAL WATER DIVERSION STRUCTURE & PUMPING EQUIPMENT.
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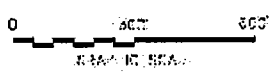


COUNTY OF SAN DIEGO
 BOARD OF SUPERVISORS
 BOARD OF HEALTH
**REVISED CORRECTIVE MEASURES
IMPLEMENTATION WORK PLAN**
 UPLANDS REMEDIAL APPROACH
 FIG. RE 2
ARCADIS



- LEGEND:**
- APPROXIMATE WATER LINE
 - APPROXIMATE SEWAGE REMOVAL AREA LIMIT
 - APPROXIMATE ROAD BARRIER LOCATION
 - APPROXIMATE UNIVERSITY CURB/VALE LOCATION
 - WILSON'S CURB/VALE LOCATION BOUNDARY
 - WILSON'S BOUNDARY

- NOTES:**
1. THE DELTA WAS FORMED BY COALITION AND IS USED FOR AN AGRICULTURAL SUPPLY AND ALTHOUGH IT IS CURRENTLY USED FOR RECREATION AND FISHING, THE UNDERLYING GROUNDWATER CONTAINS HIGH LEVELS OF CONTAMINANTS. THE UNDERLYING GROUNDWATER IS NOT BEING USED FOR AGRICULTURE AND NOT BEING USED FOR RECREATION. THE UNDERLYING GROUNDWATER IS BEING USED FOR AGRICULTURE AND RECREATION. THE UNDERLYING GROUNDWATER IS BEING USED FOR AGRICULTURE AND RECREATION.
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 3. WILSON'S CURB/VALE LOCATION BOUNDARY
 4. APPROXIMATE CURB/VALE LOCATION BOUNDARY



STATE POWER AND LIGHTWORKS
 POMPTON LAKE WATERSHED
**REVISED CORRECTIVE MEASURES
 IMPLEMENTATION WORK PLAN**

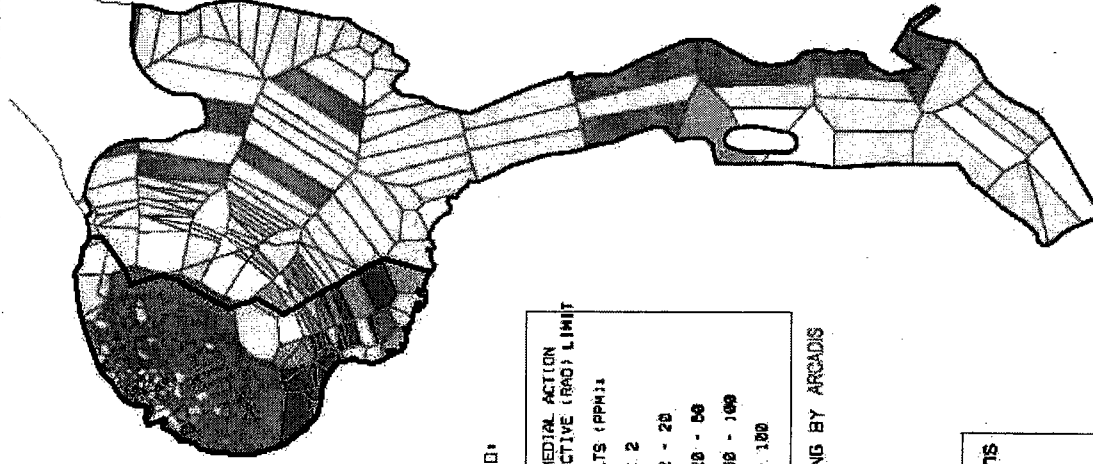
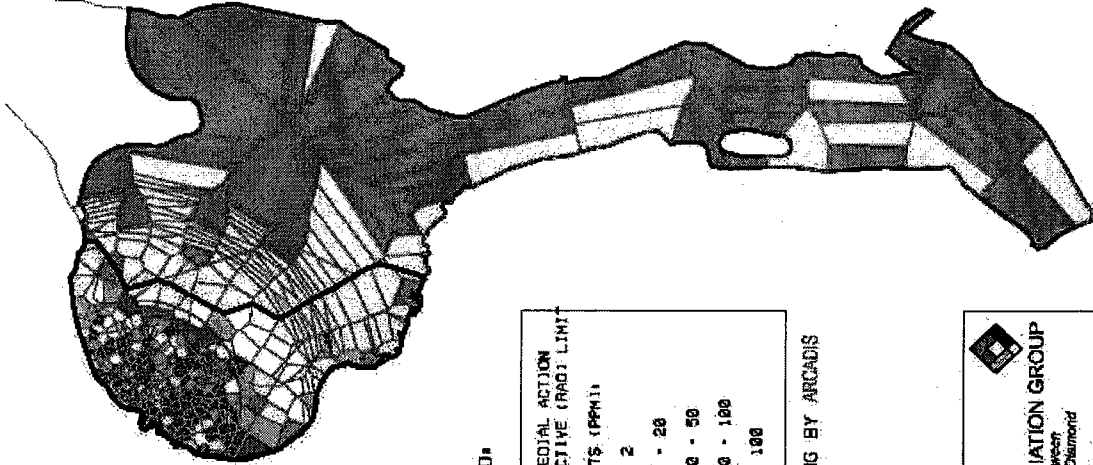
**ACID BROOK DELTA
 REMEDIAL APPROACH**

ARCADIS

Page **3**

SURFACE RESULTS (Ø-6 INCHES SEDIMENT THICKNESS)

SUBSURFACE RESULTS (>6 INCHES SEDIMENT THICKNESS)



LEGEND:

	REMEDIAL ACTION OBJECTIVE (RAO) LIMIT
	MERCURY RESULTS (PPM):
	< 2
	2 - 20
	20 - 50
	50 - 100
	> 100

BASE DRAWING BY ARCADIS

LEGEND:

	REMEDIAL ACTION OBJECTIVE (RAO) LIMIT
	MERCURY RESULTS (PPM):
	< 2
	2 - 20
	20 - 50
	50 - 100
	> 100

BASE DRAWING BY ARCADIS

CORPORATE REMEDIATION GROUP
 An Alliance Between
 DuPont and USGS Diamond
 2000 Commercial Road
 Pompton Lakes, New Jersey

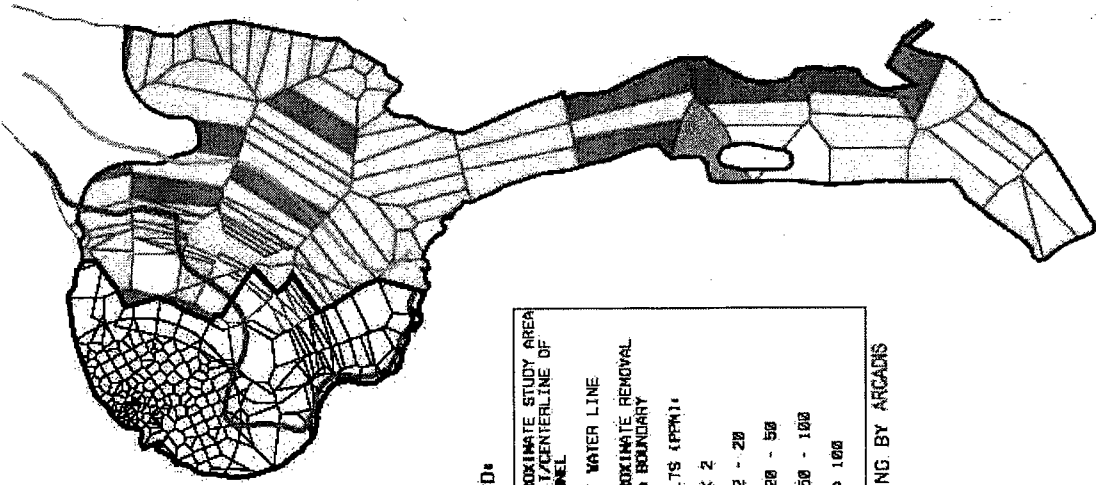
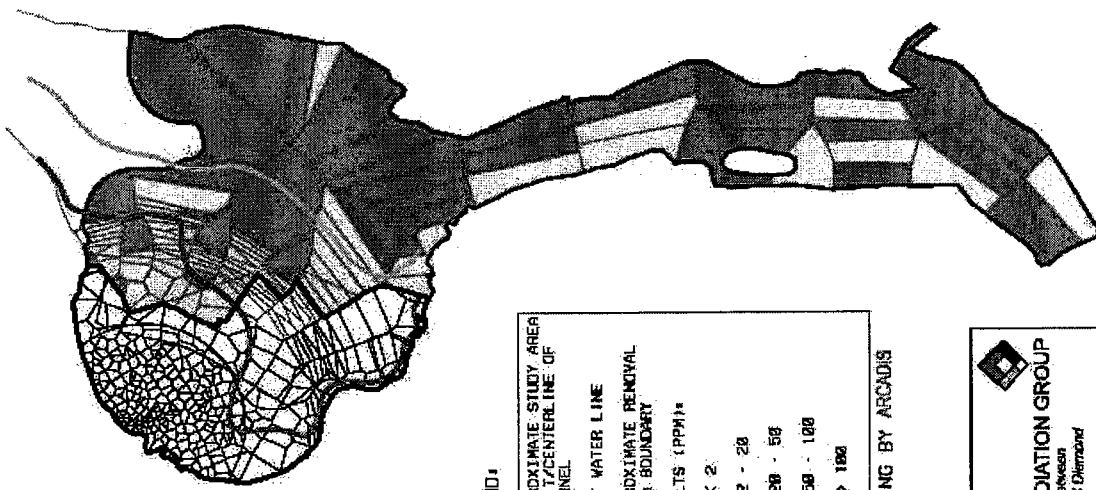
Sediment Mercury Concentration Polygons
 Acid Brook Delta
 DuPont Pompton Lakes Works
 Pompton Lakes, New Jersey

FIGURE 12

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SURFACE RESULTS (0-6 INCHES SEDIMENT THICKNESS)

SUBSURFACE RESULTS (>6 INCHES SEDIMENT THICKNESS)



LEGEND:

- APPROXIMATE STUDY AREA LIMIT/CENTERLINE OF CHANNEL
- APPROXIMATE REMOVAL AREA BOUNDARY
- MERCURY RESULTS (PPM):
 - < 2
 - 2 - 20
 - 20 - 50
 - 50 - 100
 - > 100

BASE DRAWING BY ARCADIS



Remedial Alternative 4: Removal
 Acid Brook Delta
 DuPont Pompton Lakes Works
 Pompton Lakes, New Jersey

CORPORATE REMEDIATION GROUP
 An Alliance between
 DuPont and URS Diamond
 2000 Commercial Road
 Pompton Lakes, New Jersey

FIGURE 15

PROJECT: ACID BROOK DELTA, DU PONT POMPTON LAKES WORKS, REMEDIATION ALTERNATIVE 4: REMOVAL. DRAWING NO. 15. DATE: 10/15/03. PREPARED BY: ARCADIS ENVIRONMENTAL CONSULTANTS, INC. FOR: URS CORP. AND DU PONT COMPANY. SCALE: AS SHOWN. SHEET NO. 15 OF 15.



EXHIBIT 4

RESPONSIVENESS SUMMARY

Hazardous and Solid Waste Amendments of 1984 (“HSWA”)

Permit Modification

E.I. du Pont de Nemours & Company, Incorporated (“DuPont”)

Pompton Lakes Works (PLW)

Pompton Lakes, New Jersey

EPA I.D Number NJD002173946

In this document, EPA provides responses to comments received by EPA from the public in relation to the RCRA/HSWA permit modification request filed by DuPont PLW for the proposed remedy selection to address the Acid Brook Delta (“ABD”) Study Area in Pompton Lake.

DuPont PLW’s permit application request has generated significant public interest in Pompton Lakes, New Jersey and other communities. Prior to the permit modification application, there was already great public interest on all remedial activities related to DuPont PLW. As a result of the public interest, a Community Advisory Group (“CAG”) was formed. EPA conducted information sessions, public meetings, and attended regular CAG meetings. Currently, EPA does not attend CAG meetings, but continues the other methods of outreach and has implemented a bi-monthly newsletter.

DuPont submitted its permit modification application in April 2011. As supporting documents, DuPont provided the remedial investigation report for the ABD, dated December 19, 2008, the Remedial Investigation Report (“RIR”) for Pompton Lake Uplands, dated June 30, 2010, ABD Area Remedial Action Selection Report (“RASR”)/Corrective Measures Study (“CMS”), dated September 18, 2009, and the ABD Area Revised Corrective Measures Implementation Work Plan (“CMIWP”), dated September 2011.

The permit modification process included the following events:

- EPA held an information session on the draft permit modification at the Borough Council Chamber, Pompton Lakes, New Jersey on October 20, 2011.
- The Public Notice of the draft Permit Modification was published on November 20, 2011 in two newspapers -- the Suburban Trends and Bergen Record.
- The public comment period started on November 20, 2012 and ended on January 13, 2012.

- A public hearing was held at the Pompton Lakes High School on January 5, 2012.

Additional information relevant to the permit modification became available to EPA after the public notice of the draft permit modification. DuPont submitted the result of the 2011 bathymetric survey of the Pompton Lake/Ramapo River system to EPA in a document dated January 9, 2012 entitled "Comparison of the 2011 and 2007 Bathymetric Surveys ABD, Pompton Lakes, New Jersey".

Though all comments and additional information received were reviewed and considered by EPA, only those EPA determined to be significant in relation to the permit modification are addressed in this summary, as per 40 C.F.R. Part 270.42(c)(6). Comments that were expressed by many individuals, such as form letters, were also considered. In its response, EPA has grouped all significant comments under topical headings, which are discussed in the following sections of this summary.

Facility Permit's History

The DuPont PLW facility occupies approximately 570 acres of land, surrounded by mountainous areas to the north, Lake Inez (now drained) to the west and residential areas to the east and south. Two parallel valleys (Wanaque River and Acid Brook) run through the site north to south. Land use in the vicinity of the site is predominantly residential and commercial, but also includes undeveloped areas, an interstate highway (Route 287) and state-owned forest.

DuPont PLW conducted operations at the site from 1902 to April 1994, when the facility ceased its operations. Products manufactured included explosive powder (e.g., mercury fulminate and lead azide) and finished products (e.g., detonating fuses, electric blasting caps, metal wires, and aluminum and copper shells). The manufacturing operations and waste management practices resulted in contamination of the soil, sediment, and groundwater. The primary contaminants in the soil and sediments are lead and mercury. Groundwater contaminated with chlorinated volatile organic compounds ("VOCs"), such as tetrachloroethylene ("PCE"), trichloroethylene ("TCE"), cis 1,2-dichloroethylene, and vinyl chloride, has migrated off-site from the Eastern Valley part of the facility towards Pompton Lake.

Soil and sediment contamination occurred off-site along the Wanaque River, which flows through the Western Valley side of the facility. Operations in the Western Valley ceased in the mid-1920's and relocated to the Eastern Valley side of the plant. Due to releases of lead and mercury to Acid Brook, soil along Acid Brook was contaminated. Acid Brook flows from north to south through the Eastern Valley and discharges into the ABD ("ABD") of Pompton Lake, resulting in contamination of the ABD sediments.

In 1988, DuPont entered into an Administrative Consent Order ("ACO") with the New Jersey Department of Environmental Protection ("NJDEP"). In 1992, EPA issued to DuPont a corrective action permit, under the Resource Conservation and Recovery Act ("RCRA"), as amended by the Hazardous and Solid Waste Amendments of 1984 ("HSWA"). The NJDEP

ACO and the EPA HSWA Permit required DuPont to conduct investigation and cleanup of contamination on and/or migrating from the site.

As a result of the RCRA Facility Assessment (“RFA”) conducted in 1986 and subsequent investigations conducted under the permit and Order, 202 solid waste management units and/or areas of concern (“SWMUs/AOCs”) were identified. The remedial investigation reports for the Northern Manufacturing Area, Western Manufacturing Area, and Eastern Manufacturing Area characterized the conditions at the 202 SWMUs/AOCs on- and off-site. The off-site SWMUs/AOCs include: the Wanaque River, Acid Brook, ABD, and the groundwater plume.

In addition to the RIR for the Northern, Eastern, and Western Manufacturing Areas, all three of which are dated June 30, 2010, there is the ABD RIR, dated December 19, 2008, the RIR for Pompton Lake Uplands, dated June 30, 2010, ABD Area RASR/CMS, dated September 18, 2009, and the ABD Area Revised Corrective Measures Implementation Work Plan (“CMIWP”), dated September 2011.

Between 1991 and 1997, Acid Brook was the subject of remedial efforts that included streambed remediation and excavation of floodplain soil. The cleanup at the ABD in Pompton Lake is the focus of this permit modification. DuPont submitted a permit modification application in April 2011 to propose final remedies for the ABD area.

RESPONSES TO SIGNIFICANT COMMENTS RECEIVED FROM THE PUBLIC ON THE DUPONT HSWA PERMIT MODIFICATION

1. Dredging Area in the Lake

Nineteen commenters submitted comments regarding the limits of the geographic area (i.e., 26 acres) that was to be dredged under the proposed permit modification.

Seventeen commenters questioned limiting dredging of contaminated sediments to the 26 acres in the ABD. Many of these commenters called for the entire lake to be dredged. Various reasons were cited for this concern including: the potential for recontamination of the project area, unacceptable risks associated with mercury present in sediments in the remainder of Pompton Lake, the use of Pompton Lake as a drinking water source, the potential for remobilization of contaminants and sediments from the lake bed. The specific reasons supporting the commenters' general concern that the proposed areal extent of dredging was insufficient are addressed as separate comments in this Response to Comments document.

Two commenters expressed support for proceeding with the dredging of the 26 acre area of the ABD as outlined in the proposed permit modification. The significantly higher mercury concentrations (and attendant risk) present in the Delta sediments relative to areas outside the 26 acre footprint and the commenters' desire to expedite the cleanup of Pompton Lake were cited as reasons for the support of proceeding with the 26 acre dredging area.

RESPONSE:

Exposure of aquatic organisms and water-dependant birds and wildlife to sediment-sorbed contaminants is directly dependant on the contaminants and sediments being physically and chemically available to those organisms. Contaminated sediments that are exposed at the surface of the lake bottom are more physically available to organisms than are contaminated sediments buried at depth. The depth of overlying water and proximity to shore are other important factors that determine the degree to which avian and wildlife species may be physically exposed to contaminated sediment. In addition, the chemical form in which the contaminant is present is also very important in determining exposure. In the case of mercury, the organic (i.e., methylated) form is far more available for uptake by organisms (and is also significantly more toxic) than inorganic forms.

Surface sediment (0 - 6") mercury concentrations in the ABD are significantly higher than elsewhere in Pompton Lake. In addition, ABD sediments also meet all of the other factors outlined above that increase risks – shallow overlying water, proximate to shore, greater percentage of mercury present as organic form. Accordingly, contaminated sediments in the ABD present the greatest mercury risk in the Pompton Lake system and their remediation is the highest priority.

While remediation of the ABD is the highest priority for remediation of Pompton Lake, EPA has determined that remediation of Pompton Lake will not be limited to dredging the 26 acres of contaminated sediment in the ABD. The permit requires DuPont to remediate the lake in two phases. DuPont is to immediately initiate dredging in an expanded area of lake bottom (beyond the 26 acre area identified in the draft permit modification) to remove mercury-contaminated sediments from areas west of the channel of the Ramapo River (see Figure 1 to the Permit Module III Supplement). The dredging depth will generally be to the peat layer.

While this dredging is being conducted, DuPont is also required to conduct mercury sampling across a grid of locations interspersed throughout the remainder of the lower Pompton Lake system (from Lakeside Avenue Bridge to the Pompton Lake Dam). Sectioned core data from these locations will be used to identify areas of the lake bottom that are significantly elevated in mercury compared to other areas of the lake outside the Delta (i.e., hotspots). Any identified hotspots identified during the sampling will be further delineated with additional sampling to determine appropriate boundaries for the dredging. The permit requires DuPont to dredge contaminated sediments from these 'hotspot' areas (expected to occur before dredged material management operations are demobilized from the project area).

Based on a comparison of results of 2007 and 2011 surveys of bottom depths across the project area which showed that sediments in the narrow stretches of lower Pompton Lake were significantly scoured during that time interval (presumably as a result of major flow events) and redistributed to other areas of the lake (presumably downstream areas), the permit also requires DuPont to collect and analyze sediment samples along transects interspersed at various distances downstream from the Dam to determine the extent to which mercury from the Pompton Lakes Works site may have contaminated downstream stretches of the Ramapo River.

Finally, the permit requires DuPont to submit a remediation and restoration plan for the Upland Soil Areas, for EPA approval incorporating recommendations of the EPA and the US Fish and Wildlife Service ("USFWS"). This is to ensure that ecological pathways are adequately addressed.

EPA believes that restoration of the Uplands, and the dredging of the expanded ABD soil areas including any "hotspots" will serve to minimize the potential for redistribution of sediment mercury onto remediated and downstream areas while reducing mercury exposure to fish, wildlife, and humans in the ABD (and the Pompton Lake system).

While dredging of the ABD is ongoing, the permit modification also requires DuPont to conduct the studies necessary to update the ecological risk assessment. The ecological risk assessment will be updated using alternate methods recommended by the USFWS and will be used to determine whether (and the extent of) any additional remediation of mercury in the Ramapo River (including unremediated areas of Pompton Lake) will be required to protect wildlife after DuPont has completed the dredging of the expanded area of the ABD and of identified hotspots outside the Delta.

While the need for additional remediation beyond the actions specified in this permit modification cannot be determined until an updated ecological risk assessment is completed, EPA believes that taking more aggressive excavation and dredging action at this time will serve to maximize the efficacy of the required remedial actions and reduce the scope of any additional future remediation that may be deemed necessary.

2. Background Quality

Six commenters expressed concerns whether mercury concentrations in areas of the lake that are not proposed for dredging at this time can truly be considered “background.” Additionally, several commenters requested that any non-PLW sources that are cited as significant contributors of mercury to the lake be identified and verified.

RESPONSE:

As one commenter correctly pointed out, background concentrations should represent natural or anthropogenic levels of mercury in the system that would be present in the absence of contributions from the PLW site. As such, mercury concentrations can only be considered to be at background levels if they are present at a magnitude similar to concentrations existing upstream and outside the influence of the site or alternatively to concentrations in other systems in the region that do not have point discharges of mercury.

In 1990, the US Army Corps of Engineers collected samples at various locations in the Ramapo River as part of environmental studies supporting the Ramapo River Flood Protection Project. Samples were taken from just south of where the Ramapo River discharges into Pompton Lake to just below the Susquehanna & Western Railroad Bridge in Oakland, New Jersey. Mercury concentrations were below detection limits (<0.1 ppm) in all sediment samples. In 1996, DuPont’s contractor collected three sediment samples from each of three reference areas in upper Pompton Lake (See ABD Ecological Investigation Reference Area Evaluation and Phase 1 Data Report, PTI Environmental Services, 1997). The highest concentration of mercury measured in any of these upper lake samples was 0.53 ppm.

The New Jersey Mercury Task Force Report (see Chapter 7) summarizes sediment mercury data available for other New Jersey lakes and reservoirs. Sediment mercury concentrations in nine New Jersey lakes ranged between 0.07 - 0.09 ppm for nine unidentified lakes in one study; between 0.13 – 0.35 ppm for three unidentified lakes in a second study; 0.45 ppm in Packanack Lake; and 0.38 ppm in Clyde Potts Reservoir in 1992. In light of these comparable concentrations, it can be concluded that areas of Ramapo River and Pompton Lake that are upstream of the Acid Brook Project area are characteristic of background lake levels in New Jersey and have not been significantly impacted by processes at DuPont Pompton Lakes Works (including its mercury fulminate operation, which operated from 1912 to early 1950).

Considering these data collectively, mercury concentrations in the Ramapo River and Pompton Lake can only be considered to be at background levels if they are at or below approximately 0.5 ppm. Mercury concentrations measured in much of lower Pompton Lake outside the area proposed for dredging under this permit modification (i.e., outside the ABD) clearly exceed both mercury concentrations measured in upstream stretches of Pompton Lake and Ramapo River and concentrations measured in similar New Jersey lakes and reservoirs. Therefore, EPA has concluded that the available data demonstrates areas of lower Pompton Lake, including areas outside the proposed dredging area have mercury concentrations that exceed expected background concentrations. Furthermore, EPA has determined that these elevated levels of mercury can almost exclusively be attributed to PLW historical mercury discharges to Pompton Lake via the Acid Brook.

3. Contamination Below Dam

Five commenters expressed concerns about the potential for contamination of areas downstream of the Pompton Lakes Dam.

RESPONSE:

EPA shares the concern that mercury contamination attributable to the DuPont PLW site potentially extends to areas downstream of the Pompton Lakes Dam. Accordingly, this permit modification requires DuPont to sample sediments across the Ramapo River along several transects south of the Dam to determine whether a mercury gradient exists. A revised risk assessment will be developed for the Pompton Lake/Ramapo River system to determine what, if any, additional remediation will be required in the future (including the need for remediation downstream of the Pompton Lake Dam).

To evaluate the likelihood that mercury derived from the PLW site has been transported downstream beyond the Dam, EPA reviewed available data and directed sampling of downstream floodplain areas and concluded that mercury from the PLW site is likely to have been transported beyond the Dam. The lines of evidence examined are discussed below.

Surface water sampling conducted by DuPont in the Ramapo River and Pompton Lake between May 2004 and May 2005 showed that under normal flow conditions, surface water samples taken in shallow areas of the ABD are mercury-enriched (including methyl mercury) when compared to water sampled further upstream. This mercury condition is not very evident in waters downstream of the ABD; probably owing to significant dilution by Ramapo River water that has not contacted the ABD sediments. However, water mercury concentrations at the Dam were modestly higher than in samples taken just upstream of the ABD during several of the sampling events. This is consistent with enrichment of mercury in Ramapo River water passing the Dam as it flowed through lower Pompton Lake.

Another line of evidence suggesting that PLW mercury is being transported past the Dam is a survey of water depths (bathymetry) across the ABD and adjacent areas of the Lake which was conducted in Fall 2011 as part of preconstruction planning. Results of this survey were compared to results of a 2007 bathymetry survey to verify that conditions in the project area were unaffected by major flooding events in 2010/2011. There was little change evident in water depths in areas where the Lake was widest. However, it is clear that a significant amount of sediment had been scoured from the main river channel bottom in narrow areas just north and south of the ABD. Sediments scoured from the downstream areas included sediments that had previously been buried below the river bottom during the 2003-04 sampling seasons with documented mercury concentrations of approximately 20 ppm. Presumably, much of this sediment was transported downstream beyond the dam. It is possible that the change of position and operation of the dam gates caused this apparent change in sediment stability of the river bottom in narrow areas during the intervening years between the surveys.

At EPA's direction, DuPont collected five samples of fine grained alluvial deposits on the bank of the river's bend just downstream from the dam in September 2010. These deposits resulted from March 2010 major flooding event. Concentrations of mercury in the samples ranged from below detection (two samples) to 1.39 ppm. These concentrations mostly reflect background levels of mercury, however, it is important to consider that storm events may bring large amounts of sediment into the watershed which can significantly dilute contaminated sediments that are re-suspended and mobilized by the storm.

4. Depth of dredging and post-dredging capping

One commenter characterized the proposed remediation of the ABD as a capping operation, because the depths to be dredged in shallow areas of the delta are measured in inches. The commenter questions whether subsurface mercury is migrating deeper and whether the underlying peat layer is an appropriate marker for defining the depth of dredging.

RESPONSE:

Surface sediments in the ABD project area are underlain by a layer of peat. The occurrence of this peat layer ranges from several inches to several feet below the present lake bottom. This peat layer corresponds to turf that was flooded in 1908 upon the construction and operation of the Pompton Lake Dam which resulted in an impoundment of Ramapo River (referred to as Pompton Lake). Water flowing down the Acid Brook transported mercury-contaminated sediments to the impoundment and deposited them across the ABD. (DuPont started operations in the Eastern Manufacturing Area in 1928.)

Sediment cores collected from throughout the ABD were vertically sectioned and analyzed to delineate the vertical and horizontal distribution of mercury in the area. Analysis of the vertical sections of core established that mercury contamination is limited to sediments that are above the peat layer and that in most areas the highest concentrations are located at some distance below the sediment surface. Sediment below the peat layer is not contaminated with mercury.

Capping of sediments is not proposed for remediation of mercury-contaminated sediments within the expanded area of the ABD (and in selected areas outside the ABD). The permit modification requires that all areas be remediated by dredging to below the level of contamination-- the dredging depth will generally e to the peat layer. This remedy is projected to remove 97% of mercury found at the surface (0-5") of the lake bottom and 95% of the mercury overall (including buried deposits). Following dredging, a layer of clean sand is to be placed over the dredged areas. The purpose of this layer of clean sand is not to serve as a barrier to cover contaminated-sediment in-place (which would require regular maintenance), but to encourage the re-establishment of the ABD bottom's ecological community. Nevertheless, the clean cover will provide an additional measure of protection by isolating much of any residual mercury that may be left behind following dredging. EPA anticipates that this layer should remain in place as data from the vertical sections of cores indicates that the ABD appears to be a stable sedimentary environment where bottom sediments are not readily redistributed even during major flow and flooding events. This expectation is further supported by EPA's comparison of 2007 and 2011 depth data which showed little effect of the 2010 flooding events on bottom depths across the ABD.

5. DuPont Responsibility

Twelve commenters indicated that the proposed action suggests that the regulatory agencies (New Jersey DEP and EPA) have concluded that DuPont is only responsible for mercury contamination in the 26 acres of the ABD. The commenters expressed strong disagreement with any determination that DuPont is not responsible for all of the mercury contamination in the Pompton Lake.

RESPONSE:

EPA recognizes that there are additional sources of mercury to the Pompton Lake system (most importantly, atmospheric deposition), however, EPA has concluded that DuPont is responsible for the overwhelming majority of buried and exposed mercury in the lower Pompton Lake system. EPA and NJDEP do not believe that DuPont's responsibility is limited to the 26 acres of the ABD.

At EPA's direction, DuPont reviewed available information to identify potential upstream sources of mercury. [Ref. DuPont, 2010. Supplemental Technical Information Report ABD Project, DuPont Pompton Lakes Works, Pompton Lakes, New Jersey, June 2010.] In addition to atmospheric sources, DuPont identified six publicly-owned treatment works on the upper Ramapo River and one National Priority Site (i.e., the Ramapo Landfill Superfund site) as potential point sources of mercury to the lake system. While these point sources may very well exist in the watershed, the results of sediment sampling conducted by the US Army Corps of Engineers and by DuPont's contractor in the 1990s in areas of the river (see Response to Comment No. 2) below the potential sources (but upstream of the project area) do not suggest that these point sources introduced enough mercury to the system to produce the elevated concentrations present in the lower Pompton Lake system.

The permit modification requires DuPont to dredge mercury-contaminated sediments from an expanded area of the ABD and to conduct comprehensive sampling of the lower Pompton Lake to characterize mercury concentrations outside the proposed dredging area and across transects of stations at varying distances below the Pompton Lake Dam. This permit also requires DuPont to dredge sediment from areas outside the expanded area that are shown to be "hotspots" of mercury. DuPont is also required to collect data to support an updated risk assessment of the lake system to determine if additional remedial actions will be required to address mercury remaining in the lower lake and Ramapo River after the initial dredging actions.

6. Recontamination of the lake

a. Ten commenters expressed concerns that areas of the ABD that are to be remediated via dredging will be recontaminated by mercury in groundwater emanating from the PLW site and discharge from the Acid Brook and redistribution of mercury from unremediated areas of the Ramapo River and Pompton Lake. Commenters suggested that any such contamination be addressed by more comprehensive dredging and remedial actions at the PLW site. Four commenters provided related comments suggesting that the remediation sequence is wrong and that the dredging should only occur after PLW Areas of Concern and the groundwater plume are addressed.

RESPONSE:

Corrective action under the Resource Conservation and Recovery Act ("RCRA"), as amended by the Hazardous and Solid Waste Amendments of 1984 ("HSWA"), generally consists of the following steps: the RCRA Facility Assessment ("RFA"), Stabilization, RCRA Facility Investigation ("RFI"), Corrective Measure Study, and Corrective Measure Implementation ("CMI").

At the DuPont site, since the mid-1980's, there have been on-going investigations on-site (Northern, Western, and Eastern Manufacturing Areas) and off-site (Wanaque River, Acid Brook, ABD in Pompton Lake, and off-site groundwater contamination plume) to evaluate the need for interim remedial measures (also called interim corrective measures or stabilization measures). As a result of these studies, DuPont has implemented a number of on-site (and off-site) actions (referred to as interim/stabilization measures) pursuant to NJDEP and EPA directives. These interim measures serve to prevent further migration of contaminants to the environment and are entirely consistent with the final remedy.

This permit modification addresses remediation of the ABD in Pompton Lake. The ABD is just one of the numerous areas of concern associated with the PLW that are subject to corrective action. Remediation of the other PLW areas of concern will be the subject of permit modifications at a later date. Corrective action for the remaining AOCs at the site can occur in parallel or progress at a different rate. Because PLW site contamination conditions are stabilized, corrective action at the various areas of concern can proceed at its own pace and does not need to follow a particular sequence. As the corrective action process for the various AOCs approaches the remedy selection stage, EPA will continue to solicit and incorporate public

comment and participation.

Nevertheless, EPA agrees that the potential for recontamination of a project area is an important consideration before conducting any remedial activities at any site. EPA reviewed various lines of evidence to assess the potential for recontamination of the project site. These are discussed in the following paragraphs.

Groundwater

EPA has determined that there is no potential for recontamination of the project area due to mercury introduced by groundwater contaminated at the PLW. In 1995, mercury was eliminated as a contaminant of concern in the Comprehensive Groundwater Monitoring Program based on a review of data collected from on-site and off-site monitoring wells between 1982 and 1995. Only sporadic and generally minimal exceedances of applicable groundwater mercury standards were found in that review and there was no indication that mercury was migrating off-site via the groundwater pathway. (The groundwater contamination from the DuPont site is primarily chlorinated volatile organic compounds.)

Upstream contamination (Upper Lake and Ramapo River)

EPA has reviewed available historical sediment and water chemistry datasets for areas of the Ramapo River that lie upstream from the project area to assess the potential for recontamination of the project area. In 1990, the US Army Corps of Engineers collected samples at various locations in the Ramapo River as part of environmental studies supporting the Ramapo River Flood Protection Project. Samples were taken from just south of where the Ramapo River discharges into Pompton Lake to just below the Susquehanna & Western Railroad Bridge in Oakland, NJ. Mercury concentrations were below detection limits (< 0.1 ppm) in all sediment samples. In 1996, DuPont's contractor collected three sediment samples from each of three reference areas in upper Pompton Lake (See ABD Ecological Investigation Reference Area Evaluation and Phase 1 Data Report, PTI Environmental Services, 1997). The highest concentration of mercury measured in any of these upper lake samples was 0.53 ppm. When compared to the limited sediment mercury data available for other New Jersey lakes and reservoirs, these concentrations suggest that sediment mercury concentrations upstream of the project area are of the order expected for other New Jersey lakes and reservoirs (0.07 - 0.09 ppm for nine lakes; 0.13 - 0.35 ppm for three lakes; 0.45 ppm in Packanack Lake; and 0.38 ppm in Clyde Potts Reservoir in 1992 (see Chapter 7 of the NJ Mercury Task Force Report). Therefore, EPA does not believe that upstream segments of the Ramapo River (including upper Pompton Lake) will recontaminate the project area after remediation.

PLW and Acid Brook

The DuPont PLW historical operation had resulted in releases of mercury, lead and copper to Acid Brook, which discharges to the ABD. In April 1994, DuPont ceased its operation and initiated closure of its regulated units, decommissioning of processes, and cleanup. There are no continuing releases of contaminants migrating to the Acid Brook that would result in contaminated sediment and subsequently impacting the ABD.

EPA considers there to be little potential for recontamination of the project area from PLW-derived mercury via the Acid Brook discharge. The PLW and floodplains of the Acid Brook were extensively remediated between 1991-1997. During that remediation, the PLW grounds were re-graded to control surface water run-off and erosion; the floodplains and streambed of the Acid Brook were excavated, cleaned, and stabilized; and Acid Brook was largely channelized in concrete sides. As a result, the Acid Brook has low-flow that varies seasonally and transports little sediment to Pompton Lake.

Acid Brook has been tested several times since its remediation. Most recently, EPA conducted water and sediment sampling throughout the stream to assess the potential for mercury transport to the lake. In November 2011, EPA collected one water and sediment sample at four locations (two at the headwaters of Acid Brook above PLW, one downstream of the facility gate, and one just upstream of DuPont Place). In February 2012, EPA collected three water and sediment samples at five locations (upstream from Lakeside Avenue, Van Avenue and DuPont Place, downstream of Colfax Avenue (only one sample taken), and at downstream of the facility gate). Mercury was below detection in all water samples during both sampling efforts. Mercury in sediment was 0.3 ppm in samples collected at the headwaters (2011), 0.1- 0.2 ppm at Lakeside Avenue (2012), ranged between 0.7 to 3.0 ppm in Van Avenue and Colfax Avenue samples (2012), and was between 2.2 - 2.9 ppm downstream of the facility gate (2011, 2012).

Higher concentrations (10 – 29 ppm) were measured in sediments sampled from the location upstream from DuPont Place. It is unclear why sediment concentrations were elevated in this stretch of the brook. It appears that under normal flow conditions, sediments from this stretch are unlikely to be re-mobilized and transported to the lake; however, EPA is concerned that under storm conditions these sediments could re-mobilize and make their way downstream to the lake. DuPont is being directed to investigate the cause of these high concentrations and, if warranted, perform additional remediation at this stretch of the brook to eliminate the source of mercury or mercury contaminated soil. Following DuPont's remedial action in this stretch, EPA is confident that discharges of sediment and water from the Acid Brook will not recontaminate the ABD.

Redistribution of Mercury from Unremediated areas of lower Pompton Lake

The potential for redistribution of mercury from unremediated portions of the lake onto the ABD is difficult to assess. Results of a 2011 depth survey of the project area were compared to results of a 2007 survey to verify that conditions in the project area were unaffected by the two major flooding events in 2010. The comparison showed that a significant amount of sediment had been

scoured from the bottom of the main river channel in narrow areas just north and south of the ABD. There was little change evident in wider areas of the lake (i.e., in the ABD and across to its opposing shore). Currents generally flow downstream. Based on this and the lack of significant decreases in depth on the ABD, we expect that the majority of sediments that are re-suspended from these areas moved downstream rather than onto the ABD. The permit minimizes the potential for recontamination of the project area by redistribution of mercury from unremediated portions of the lower lake by requiring DuPont to remove sediments from an expanded area of the ABD and from areas outside the ABD that are shown to have sediments with substantially higher mercury concentrations than the remainder of the unremediated areas of lower Pompton Lake (i.e., hot spots).

Post dredging monitoring and a revised ecological risk assessment will be used to support future decisions regarding the need for any additional remedial activities in the remainder of the lake.

7. Impacts From Storms

Four commenters expressed concerns about the potential for redistribution of mercury by severe storms.

RESPONSE:

Despite documented instances of high-flow and flooding occurring in the Ramapo River, consistently higher concentrations of mercury were found to be buried below the surface sediments throughout the lower Pompton Lake study area in the 2003-2004 survey. EPA interpreted this pattern to mean that the sediment at the bottom of the lake was stable enough to not be disturbed by storms. However, a comparison of the results of a preconstruction survey of water depths (bathymetry) across the ABD and adjacent areas of the Lake conducted in Fall 2011 to results of a 2007 bathymetry survey showed that a significant amount of sediment had been scoured from the main river channel bottom in narrow areas just north and south of the ABD. This scouring was presumably caused by two major flooding events of 2010 and 2011. There was little change evident in wider areas of the lake (i.e., in the ABD and across to its opposing shore). It is possible that the change of position and operation of the dam gates caused this apparent change in sediment stability of the river bottom in narrow areas during the intervening years between the surveys.

Therefore, EPA agrees with the cautions of the commenters to consider storm effects and has altered this permit modification to require dredging of an expanded area of the ABD and identification and removal of more contaminated sediments outside the ABD. In addition, the permit modification requires DuPont to sample sediments across transects at varying distances downriver from the Pompton Lake Dam to determine whether mercury associated with PLW has migrated beyond the dam as a result of recent (and past) storms. This data will be used to assess the need for additional remediation in downstream areas of the Ramapo River.

8. Bioaccumulation and Methyl mercury

Four commenters submitted comments or concerns that the remedy may not adequately consider the potential for methylation and bioaccumulation of mercury. Concerns were raised about whether the remedy would protect certain species (i.e., migratory and resident birds) and result in fish that are safe for human consumption.

RESPONSE:

The primary environmental concern related to mercury contamination in Pompton Lake is mercury's propensity to accumulate in tissues of exposed organisms and to build to higher levels in the food web. As discussed in Response #1, the form in which mercury is present is extremely important in determining its environmental fate and risk. Organic -- i.e., methylated -- forms of mercury are far more efficiently taken up by organisms and transferred through the food web than are inorganic forms. Organic mercury (methyl mercury) is also significantly more toxic. Conversion of inorganic mercury to organic forms (i.e., methylation) occurs via a bacteria-mediated process that takes place in sediments under certain environmental conditions (typically, high organic content and anaerobic sediments). [Detailed discussions of mercury methylation and bioaccumulation are presented in the RASR 2009, the Ecological Investigation Phase 2 Report (Exponent, 2003) and the delta investigation report (see Appendix D in the Draft Remedial Action Proposal).]

Accordingly, identifying and remediating lake bottom areas that are favorable to mercury methylation were emphasized in selecting a remedial strategy for Pompton Lake. Studies conducted in 2003 and 2004 showed that sediments in the ABD had higher total mercury and organic carbon contents than sediments in deeper areas of the lake and further away from the shoreline. The proportion of methyl mercury to total mercury in sediment revealed a strong correlation of mercury methylation with proximity to the shoreline. These data indicate that the near-shore sediments in the ABD are an important site for methylation of mercury in the Pompton Lake system. This finding was used as one of the multiple lines of evidence in the support of the initial proposal for the mass removal project. [See the Draft Remedial Action Proposal for ABD Sediments (Draft Remedial Action Proposal; CRG, November 2006), Appendix A, for a more detailed description of this study.]

One commenter suggested that because anaerobic sediments are a precondition for methylation of mercury, the potential for generation of methyl mercury should be greater in deeper areas of the lake where overlying water dissolved oxygen levels are low. Although it is true that anaerobic conditions in the sediment are necessary, it is not the only factor for methylation. The data suggest that environmental and geochemical factors, such as proximity to shore and organic carbon content, are important factors affecting methylmercury concentrations in Pompton Lake. Indeed, the empirical data from studies at this site supports that the strongest correlation is between methylation and proximity to shoreline. This suggests that, in addition to mercury concentration, the location of samples and other factors should be considered in deciding which additional areas should be included in expanded "hotspot" dredging required in the initial phase of the Pompton Lake/Ramapo River remediation project (see Response to Comment No. 1).

EPA agrees that the potential for risks due to bioaccumulation of mercury (and therefore, methyl mercury) must be considered in setting the final permit conditions for remediation of Pompton Lake. As set forth in the Response to Comment #1, in addition to expansion of the delta footprint and inclusion of "hotspots" for sediment targeted for removal in the first phase of this remediation, the permit requires DuPont to conduct a revised ecological risk assessment to characterize risks to appropriate receptors and endpoints and to identify any additional remedial efforts that may be required. In addition, the permit requires DuPont to submit a remediation and restoration plan for the Uplands Soil Areas, for EPA approval, to address methylmercury and ensure that ecological pathways are adequately addressed, in accordance with EPA and USFWS recommendations.

The design and conduct of this risk assessment will be coordinated closely with U.S Fish and Wildlife Service to ensure that the most appropriate risk assessment methods are used and that the assessment addresses risks to appropriate avian, fish and wildlife species.

9. Drinking water status of Pompton Lake

Several commenters noted that there is a diversion in the Ramapo River, which flows through Pompton Lake. The diversion is sometimes used to supplement the Wanaque Reservoir which is used for distributing drinking water to Northern New Jersey. The implication is that the remedial activities anticipated to be taking place could impact the quality of the raw water being diverted. One commenter questioned why water from the Ramapo River could be used for drinking water but was not suitable for swimming and other recreational uses.

RESPONSE:

The North Jersey District Water Supply Commission (NJDWSC) operates Wanaque Reservoir above the town of Pompton Lakes on the Wanaque River. NJDWSC is a regional wholesale water purveyor serving over 3 million New Jersey residents. In addition to other sources, NJDWSC is authorized to make diversions of water from the Ramapo River on an "as needed basis." The raw water is conveyed to the Wanaque Reservoir (which has a capacity of 29.6 billion gallons) where it combines with raw water from several other sources (including the Passaic River). The water diverted from the Ramapo River is delivered via the Ramapo Pump Station at Pompton Lakes. When operating, the delivery rate of the Ramapo Pump Station (150 MGD) is less than the other raw water sources (such as Pompton/Passaic confluence in Wayne, which can pump 250 MGD). The water from the Wanaque Reservoir must be treated using conventional filtration (a series of processes including filtration, flocculation, coagulation and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection to comply with applicable drinking water requirements prior to transmission of the water to the municipalities.

Pompton Lake water was sampled in January, March, and May of 2004 and analyzed for contaminants of concern associated with DuPont (mercury, lead and copper). The sample location is just south of the intersection of Acid Brook and the Lakeside Avenue Bridge (where the brook discharges). Dissolved mercury measurements ranged from 13.6 to 40.4 ppt (parts per trillion) and total mercury ranged from 30.1 to 47.9 ppt. Dissolved copper ranged from 2.6 to 3.5 ppb (parts for billion) and total copper was measured at 5.6 ppb. (Lead was not detected.) [Ref. ABD RIR.] All measured concentrations of contaminants of concern associated with DuPont did not exceed their respective drinking water or NJ surface water standards.

To minimize the impact of remedial activities to take place at the ABD, this permit requires the installation of steel-pilings to partition off the project area, utilization of turbidity curtains, and a lake monitoring program to ensure that the remedial activities do not result in unacceptable impact to the rest of the lake or residents. As an added precaution, the need for limiting the conduct of any hotspot remedial activity in the lake/river outside the sheetpile during the July and August period (when diversion of water from the Ramapo River is prohibited) will be considered.

Restrictions on recreational activities in the lake (swimming, wading) are due to elevated levels of coliform bacteria within the surface water. These elevated levels do not result from activities associated with the PLW site and will not be addressed by the remedial actions required by this permit. In addition, there is a state consumption advisory for fish caught in Pompton Lake due to mercury, PCBs, chlordane, dioxin, and DDX. It is important to recognize that while the remedial actions required by this permit modification are expected to result in substantial reductions in fish mercury body burdens, all lakes in New Jersey are currently under fish consumption advisories for mercury owing to atmospheric inputs of mercury associated with a multitude of sources (e.g., power plants). Fish consumption restrictions can be obtained from this website: <http://www.state.nj.us/dep/dsr/fishadvisories/freshwater-advisories.htm>. Therefore, EPA does not expect that the current use restrictions of Pompton Lake will change based on the actions required in this permit modification.

10. Traffic study

Several commenters asked whether a traffic study was conducted to determine the most appropriate route for the transportation of the excavated contaminated material to ensure safety of the residents.

RESPONSE:

DuPont is required by the permit modification to submit e an updated Project Operation Plan, which is a component of the Corrective Measure Implementation Work Plan (CMIWP), which will include details for remedial activities. A draft Project Operations Plan was proposed by DuPont in September 2011. EPA will provide opportunity for public education and feedback on the updated Project Operations Plan and other components of the CMIWP.

Various preparation activities and control measures will be implemented prior to and/or during remedial construction to limit potential construction impacts on the surrounding areas. These will include establishing security and traffic control, implementing noise controls (as appropriate), identifying and relocating (as necessary) aboveground and underground utilities, installing erosion and storm water control measures, accessing and establishing appropriate material and equipment staging areas, and clearing activities.

Site security will be established during initial mobilization to the site, and will be continuously maintained during the non-working hours until demobilization activities are complete. Appropriate temporary fencing will be installed to restrict access to active areas and protect monitoring and construction equipment. Traffic control (e.g., signage, flag person) will be provided, where construction activities may interfere with normal vehicle or pedestrian traffic in the vicinity of the work area. It is also important to note that, when school is in session, coordination will also be required with the local schools to avoid transport of materials and other construction-related traffic during certain morning and afternoon hours (i.e., from 7:30 a.m. to 8:30 a.m. and 2:30 p.m. to 3:30 p.m.) and minimize interference with school-related traffic.

A traffic study will be conducted and the preferred traffic route for transport will be determined in coordination with the town. Traffic control will be coordinated with the town during remedial activities to ensure the safety of the community.

It should be noted that the updated Project Operations Plan will address, at a minimum, issues related to the following operational details: Dredging; Boat Ramp preparation; Historic and Archaeological Resources; Natural Resources; Stormwater; Flooding; Restoration; Stormwater Outfalls; Stockpiling, Dewatering and Treatment of Dredge Spoils/Soil; Lake Access for Residents; Temporary Roads; Acid Brook Restoration; Post-Dredging Restoration of ABD; Post-Restoration Maintenance; Public Safety; Security; Storm water; General; Traffic and Roads; Public Involvement Plan; Vibration; Parking; Noise; Sanitation; Utility Impacts; Air Monitoring; and Odors.

11. Excavated sediment handling

Several commenters asked about the details of processing the excavated contaminated sediment from the delta. How will the water be managed after the filtration of the excavated material?

RESPONSE:

DuPont is required to submit an updated Project Operations Plan, which is a component of the CMIWP and will include the details for the sediment excavation and excavated sediment processing.

The objective is to remove the contaminated sediment from the lake delta and dispose of the sediment at an authorized landfill off-site. To do this, the dredged contaminated sediment will be processed to separate out the lake water from the sediment and then the contaminated sediment will be prepared for off-site disposal. The separated water will be recycled back into

the lake within the rigid barrier surrounding the ABD. A treatability study conducted on the sediment separation process indicates that the filtrate (i.e., the water separated out from the process) contains mercury, lead, and copper at concentrations less than the drinking water standards for mercury, lead, and copper. [Ref. draft CMIWP, 9/20/2011.] It should be noted that the dredge operation and management of the filtrate is also subject to applicable New Jersey state permitting requirements.

A description of the excavated material processing is as follows:

- Sediments will be removed "in the wet" utilizing a hydraulic dredge.
- Monitoring in the lake will be performed during dredging activities to assess the impact of construction on the surrounding environment and community (e.g., water column monitoring).
- Sediment removed during the dredging process will be directly transported as slurry via pipeline to the shore for processing. Lake water is added to the slurry to maintain the quality for efficient flow. Dredging will begin at the southeastern corner of the ABD area, with work generally progressing north and west. The updated Project Operations Plan will provide additional details on the dredge sequencing.
- The dredged slurry will be pumped through a vibrating shaker screen to remove debris, stones, large wood chips, and gravel from the slurry. Screenings will be discharged onto the staging pad for transport to stockpiles.
- The screened dredge slurry will then gravity feed into a V-bottom tank and be drawn off the bottom and sent through the desanding units.
- The underflow from the desanders will then be directed over dual vibrating linear motion shakers with 200 mesh screens (74 microns) for further sand removal.
- The overflow from the desanders will be pumped to a gravity thickener to thicken (concentrate) the silt fraction of the sediments and decant the free water back to the ABD within the sheet-pile area.
- The thickened sediments will be pumped into six 20,000 gallon agitated mix tanks.
- Filter press fast feed centrifugal pumps will draw from the agitated mix tanks to fill the six 219 cubic-foot filter presses.
- Upon transfer from the six 20,000 gallon agitated feed tanks, polymer will be added to the dredge slurry, through a flow meter, static mixer, and polymer injection system.
- The addition of polymer to the dredged slurry will be used to improve the filterability of the solids.

- The amended slurry will be pumped to one of six 219 cubic foot recessed filter presses.
- The filtrate will be discharged into the filtrate tank to be pumped for discharge back into the lake (within the rigid barrier surrounding the ABD).
- Removal completion confirmation will be elevation-based as defined by the dredge prism. It is anticipated that an approximate 50-foot by 50-foot grid will be used for survey confirmation efforts by a NJ licensed professional. DuPont may elect to perform an independent post-dredging survey to confirm the results of the.

12. Radioisotope dating of sediment

Two commenters inquired why radioisotope carbon dating was not conducted to estimate the age of the sediment. The implied use is to identify the source of mercury in the sediment.

RESPONSE:

Radioisotope dating on sectioned cores was in fact employed during the remedial investigation. Isotope dating was conducted on two sediment cores -- cores E and C-34. [See Draft Remedial Action Proposal, Appendix B, November 2006.]

The result of radioisotope dating correlates the lowest sediment layer to the year 1906, which is the approximate year the lake was flooded with the maximum mercury concentrations measured in sediment collected from core depths that correspond to a time horizon of approximately 50-55 years ago. Sediments above the highest mercury concentrations have been deposited in the last 50 to 55 years and a comparison of these results show that sediment deposition rates in the Delta have been variable over time and space (within the Delta) but show an increasing trend with time. The C-34 core (collected at the center of the Delta near the 800-foot radius) shows a generally increasing rate of sediment deposition that approaches 0.21 g/cm²/year over the last eight years. In contrast, Core E (collected near the western shore of the Delta) shows a recent decrease in sedimentation rate over the last 16 years, with rates currently approaching 0.14 g/cm²/year. The overall gradual increase in deposition rate may be, in part, due to changes in land use in the watershed.

Radioisotope dating will be used in the on-going remedial investigation and monitoring, if necessary. However EPA has concluded that mercury in the lower Pompton Lake is overwhelmingly the result of historical discharges from the DuPont Pompton Lake Works and therefore estimating the approximate date of deposition is judged to be less important than comprehensively characterizing the distribution and potential for remobilization of mercury in the Ramapo River/Pompton Lake system so that effective remedial actions can be taken.

13. Several commenters requested that USFWS be consulted.

RESPONSE:

USFWS provided a comment letter (dated February 9, 2012) to EPA on the proposed permit modification for remediation of Pompton Lake. In that letter, USFWS expressed support for the immediate dredging of the highly-contaminated areas of the ABD, but expressed concerns about mercury in areas and compartments of the Pompton Lake system that would not be addressed by the proposed action. USFWS also expressed concerns about the approach and conclusions of the ecological risk assessment used to support the permit decision and recommended use of alternate ecological risk assessment methods. EPA met with USFWS to discuss its concerns. This meeting resulted in an agreement to require DuPont to implement the proposed dredging and excavation as described in Response to Comment 1 while the Agencies work closely to identify and address data and information gaps to support development of a revised ecological risk assessment. The results of that ecological risk assessment will be used to determine the need for any further remedial action beyond the actions prescribed in this permit. EPA will closely coordinate with USFWS throughout the project.

14. Two commenters requested the inclusion of long-term monitoring of the remedy to ensure its effectiveness.

RESPONSE:

The permit requires that DuPont implement a long-term monitoring program following completion of the excavation, dredging, and habitat restoration activities. This program will last a minimum of five years to ensure that there are no substantial physical changes to the post construction project (e.g., scouring of the biolayer). The monitoring program will also include a requirement to characterize various pre-construction conditions (e.g., mercury concentrations in water flowing past the Pompton Lakes Dam) to provide a baseline for comparing future conditions and assessing the efficacy of the actions required by the permit. These baseline data will be used in conjunction with the updated ecological risk assessment to determine the need for any additional remedial actions in the Pompton Lake/Ramapo River system.

15. Several commenters suggested using an independent contractor to conduct the work in this project.

RESPONSE:

Consistent with current regulations and common practice, EPA requires DuPont to conduct the required remedial activities (DuPont utilizes professional contractors). EPA and the NJDEP will review all work plans and reports and will provide close and thorough oversight of the remedial activities. Where appropriate, EPA may use various methods to provide this oversight, such as split-sampling, auditing or observing sampling, confirmation surveying, and conducting both, announced and unannounced, site visits/inspections while remediation activities are underway.

16. A commenter requests that future sampling and analysis include a full list of contaminants (including radioactive waste) in sediment samples and on-site soil samples.

RESPONSE:

EPA will consider sampling sediment and on-site soil for the full list of contaminants for release scenarios where there is evidence that a wide variety of hazardous wastes and/or hazardous constituents was managed within a SWMU/AOC or where there is a lack of information on the waste management and release information.

A sampling plan and quality assurance plan are prepared for any sampling event. The sampling parameters and rationale are included in the sampling plan. There could be sampling scenario where it is not necessary to sample for the full list of contaminants.

17. Two commenters mentioned a fish kill incident that occurred in Pompton Lake on May 22, 2010 and suggested that the event was linked to DuPont contamination.

RESPONSE:

During the weekend of May 22, 2010, hundreds of dead carp (and some dead sunfish) were found floating in Pompton Lake. A newspaper article in The Record (http://www.northjersey.com/news/94986794_Natural_causes_suspected_in_Pompton_Lake_fish_kill_.html?page=all) reported that NJDEP's Division of Fish and Wildlife had concluded that the cause of the mortality "was most probably a disease" because the affected fish were primarily made up of a single species and water quality parameters were found to be within normal ranges. Furthermore, because the affected fish were carp (which are not among the most sensitive of species) and mostly older fish (which tend to be less sensitive to water-borne contaminants), the scientist concluded that the mortalities did not result from contamination associated with DuPont but rather were likely to be the result of a bacterial or virus infection affecting fish that were in a weakened state due to spawning. Further support that the mortalities were not linked to DuPont contamination were similar occurrences at other ponds and lakes in the area (e.g., in Potash Lake in Oakland, Wild Duck Pond in Ridgewood) at or around the same time.

18. There were comments asking why DuPont was not fined for the contaminants at its facility and asserting that EPA was not enforcing RCRA requirements.

RESPONSE:

Prior to the implementation of RCRA in 1981, many common industrial practices, at the time, had resulted in releases to the environment. These were not violations of any existing law or statute and therefore, did not subject the facility to fines. However, with the implementation of RCRA, facilities with past contamination, now subject to RCRA, were subjected to requirements to perform Corrective Action to remedy these past releases. That is the ongoing situation at the DuPont site.

19. There was a comment regarding reporting requirements concerning groundwater contamination at the facility in that EPA's groundwater reporting has not been accurate.

RESPONSE:

Groundwater contamination reporting is required by the NJDEP. EPA believes that its determination that groundwater contamination at the DuPont site is under control is accurate and is based upon the performance of the Groundwater Pump and Treatment System which indicates that, since its installation, has provided containment of contaminated groundwater on site and has reduced contamination of off-site groundwater as evidenced by reduced contaminant levels revealed through periodic groundwater monitoring.

20. There were comments that DuPont should be subject to natural resource damage claims.

RESPONSE:

New Jersey DEP and the USFWS have the authority to evaluate this question; it is not part of the RCRA permit modification process.

22. There were comments suggesting the DuPont site should be a Superfund site.

RESPONSE:

EPA has previously considered this question and determined that the site will remain under RCRA Corrective Action. EPA is giving priority and emphasis to corrective action at the DuPont site, and the best framework to be utilized for that work will be evaluated on an ongoing basis.

23. There was a comment stating that the scope of the public hearing on the draft permit modification should not have been limited to the proposed permit modification.

RESPONSE:

The procedures for the public hearing on the draft permit modification were in accordance with the requirements of 40 Code of Federal Regulations (CFR) Section 124.10. The public notice for the public hearing described the DuPont facility in its entirety and comments were received on the permit modification proposed. EPA did not limit or rule out specific comments offered at the public hearing or submitted as separate statements during the public comment period. All comments have been reviewed and evaluated by EPA.