

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 extend 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 per 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 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 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.