DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo Code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **DuPont - Repauno Facility**
Facility Address: **200 North Repauno Avenue, Gibbstown, New Jersey**
Facility EPA ID#: **NJD002373819**

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., sitewide)).

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA Corrective Action program, the EIs are near-term objectives, which are currently being used as program measures for the Government Performance and Results Act of 1993 (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation Recovery Act Information (RCRAInfo) national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

The Repauno Plant is a 1,856acre site located along the southern shore of the Delaware River. The site is bounded to the north by the Delaware River, to the east by a Hercules Chemical manufacturing plant, to the south by the city of Gibbstown, and to the west by wetlands and Repauno Creek. The western half

of the site consists almost entirely of surface water bodies and wetlands. Former and current production operations are located in the northeastern part of the site. Several production areas have discontinued operations and structures have been razed. The eastern half of the site also consists of some upland and wetland ecological communities.

Originally, the Repauno Meadows Corporation operated the site as a dairy. DuPont purchased the site from Repauno Meadows Corporation and has owned and operated the site since 1880. DuPont originally operated the site as an explosive manufacturing facility. All explosive manufacturing and ammonia production were discontinued during the 1960s. In 1917, DuPont expanded operations to include the manufacturing of organic compounds, which continued until 1986. According to the 2002 Annual Groundwater Progress report, the area previously used by DuPont as a terminal location for anhydrous ammonia is being cleaned for reuse. In addition, several different companies currently lease areas at the Repauno facility. In 1998, Repauno Products LLC purchased the manufacturing operation that produced sodium nitrite and nitrosylsulfuric acid. In 1999, Spring AG purchased the industrial diamond refining operation, which ceased in late 2002. Dry ice production continues to be performed at the site by Cardox Corporation.

DuPont entered into an Administrative Consent Order (ACO) with New Jersey Department of Environmental Protection (NJDEP) in January of 1990, which required DuPont to conduct a Remedial Investigation (RI) and Feasibility Study (FS) of 12 solid waste management units (SWMUs) and 11 areas of concern (AOCs) at the site. As of August 2003, DuPont has completed four phases of the required RI.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from SWMUs, regulated units (RUs), and AOCs), been **considered** in this EI determination?

   _X_ If yes - check here and continue with #2 below.

   ____ If no - re-evaluate existing data, or

   ____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs):

Twelve SWMUs and eleven AOCs, shown on Figure 1.2 in the Phase IV RI (Ref. 7), have been identified and investigated at the DuPont site. Based on four phases of RI investigation, seven SWMUs (SWMUs 1, 2, 4, 5, 6, 7, and 10), four AOCs (AOCs B, E, I, and K), and three portions of the former Eastern Laboratories area (located in AOC F) (i.e., the former research and development area, the rocket propellant area, and Testing Ground 5) have been determined to require no further action (Ref. 9). None of these SWMUs and AOCs will be discussed further in this EI determination. SWMUs and AOCs for which additional activity (investigation or remediation) is planned are identified below.

SWMU 3, Terephthalic Acid Basin: This unit originally consisted of a 4- to 8-acre unlined basin used to contain waste terephthalic acid (TPA). In 1975, the basin was cleaned by dissolving the TPA in an alkaline solution and flushing the solution into the Ditch System, presently included in SWMU 9 (Ref. 2). Benzene and xylene have been detected in subsurface soil near the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC), as well as in groundwater and ditch sediments. During the Phase II and Phase III investigations, this area was investigated as part of AOC C, and significant impacts at SWMU 3 were fully delineated. Remedial alternatives for SWMU 3 will be evaluated and implemented in conjunction with further activity at AOC C.

SWMU 8, Iron Oxide Pile: This unit consists of a 10- to 15-acre area where spent iron oxide from nitrobenzene and aniline production processes has been stored since 1959. In the 1970s, Ironite Corporation processed material in the pile, but only a small portion of the total volume was removed. Arsenic and polychlorinated biphenyls (PCBs) have been detected in surface soil above NJ NRDCSCC. Volatile organic compounds (VOCs) have been detected in groundwater above New Jersey Groundwater Quality Criteria (NJ GWQC) (Ref. 4). Contamination at SWMU 8 has been delineated, and remedial alternatives will be evaluated and implemented in conjunction with further activity at AOC D.

SWMU 9, Ditch System: Several ditch systems are present on the DuPont site, including the dimethyl terephthalate (DMT) ditch, nitrobenzene ditch, acid ditch, neutralization basin and downstream, landfill ditch, EL Sluice ditch, and the former explosives ditch. Former discharge locations and juncture points of the Ditch System have been investigated during various phases of the RI effort. Surface water in the ditch system has been slightly impacted by organic and inorganic constituents (i.e., benzene, arsenic, copper) above New Jersey Surface Water Quality Criteria (NJ SWQC), and significant dilution and attenuation of contaminants in groundwater is

occurring prior to discharge to surface water (Ref. 5). Sediments in the ditch system have been impacted more extensively by organic and inorganic constituents, as well as PCBs above NJ NRDCSCC. The primary concern associated with SWMU 9 is the potential effects of observed contamination on local ecosystems; human health exposure is not expected to be a concern due to the location of the ditches, their condition, and the lack of access (Refs. 5 and 6). An ecological evaluation divided the SWMU into two zones: Zone 1 (ditches in the permitted plant area drainage upgradient of the mixing basin) and Zone 2 (ditches between the mixing basin and the Sand Ditch). No further action is recommended for the EL Sluice and Zone 2 of the ditch system (Ref. 7). Zone 1 was identified as a potential contaminant source for downgradient ditches, but not as a concern with regard to its use as a habitat for foraging receptors. Remedial alternatives will be evaluated for Zone 1 of SWMU 9.

SWMU 11, Sanitary Landfill: This 20-acre unlined unit includes a 10-acre inactive sanitary landfill; an inactive burning ground; a glass pit; six tar pits; and one waste oil pit (previously remediated). Wastes disposed in this landfill between 1880 and 1989 included aniline, DPA, DMT, scrap metal, building rubble, asbestos, octylated DPA, and xylene. The approved closure/post-closure plan for this unit (Ref. 3) required installation of a 18-inch cover soil and topsoil layer, and ongoing groundwater and surface water monitoring in compliance with the facility's current NJPDES permit. Organic constituents have been detected in shallow groundwater beneath this unit, but are contained within site boundaries (Ref. 4). In addition, because the unit is capped and in a non-operating area of the site with limited access, human exposure to contaminated landfill materials is not a concern. Nevertheless, remedial alternatives will be evaluated for this SWMU.

SWMU 12, Former Fuel Oil Tank: This unit consisted of an aboveground storage tank (AST) surrounded by a diked area that was used between 1919 and 1990 to store up to 55,000 barrels (2.3 million gallons) of No. 6 fuel oil. The fuel oil tank was dismantled, and the berm area was graded, in 1990. A small-scale investigation conducted at that time concluded that no routine or continual releases had occurred from the tank. Slightly elevated levels of total petroleum hydrocarbons (TPH) were detected in the decanting area, but no further action was required due to the low levels detected, the minimal extent of contamination, and the substantial clay layer encountered beneath the unit. However, two surface soil samples were collected during the Phase I RI contained arsenic, copper, thallium, and zinc above NJ NRDCSCC. According to the Phase IV RI Report (Ref. 7), soil contamination at this SWMU has been delineated and human exposures are not expected to be significant due to general inaccessibility of this location. Nevertheless, remedial alternatives will be evaluated to address the inorganic exceedances in soil.

AOC A, Acid Area: This area is used for production of nitric acid and sodium nitrite, and for processing of sulfuric acid and oleum. Sulfuric and mixed acids were also formerly generated in this area. A wood-lined ditch that once collected acidic wastewater runs through the area; this ditch now receives only non-contact cooling water. The ground surface across this AOC is covered by pavement, old foundations, existing buildings, or a gravel layer between three and six inches thick. Various VOCs and metals have been detected in subsurface soil and groundwater above applicable standards. During the Phase II RI (Ref. 4), it was determined that groundwater impacts are not migrating off site, and the potential for human exposure to contamination in this area is limited by engineering controls, permit requirements, tenant restrictions, and security

patrols. Nevertheless, to address remaining exceedances in subsurface soil and groundwater, an evaluation of remedial alternatives is recommended for this AOC.

AOC C, Former PMDA/DMT Production Area: This 31-acre area was formerly used to produce pyromellitic dianhydride (PMDA) and DMT. Because their associated process units were also located in this area, SWMUs 2, 3, 5, and 6 have been incorporated into this AOC for further activity. Benzo(a)pyrene, xylene, and copper are the only contaminants exceeding the NJ NRDCSCC in soil. A variety of organic constituents (including benzene, xylene, aniline, and nitrobenzene) have been reported above NJ GWQC in shallow groundwater at AOC C. However, the extent of environmental impact in this area has been delineated, and groundwater contamination is not migrating beyond site boundaries (Ref. 4). Furthermore, because this AOC is in a non-operating area of the site with restricted access, human exposure to contaminants is not expected to be significant. Remedial alternatives will be evaluated for this AOC.

AOC D, Former Nitrobenzene Production Area: This area was used to manufacture nitrobenzene, aniline, and diphenylamine (DPA) between 1916 and 1985. Process wastewater from this area was discharged to the nitrobenzene production ditch until 1974, and then to the steam stripper column at AOC C until 1985. The buildings in this area have been demolished and the area is clear of any structures, with only concrete slabs remaining. A total of 4,524 tons of contaminated soil was removed from this area as part of an interim remedial measure (IRM) in 1990 (Ref. 7). Aniline, benzene, benzo(a)pyrene, 2,4-dinitrotoluene (2,4-DNT), nitrobenzene, and arsenic are still present in subsurface soil at this AOC. In addition, due the lack of a confining layer in this area, shallow groundwater contamination has migrated into the deeper aquifers, and this area is believed to be the source of the organic constituent plume now being intercepted at the southern property boundary (Ref. 2). Nevertheless, groundwater contamination associated with this area is not migrating beyond site boundaries (Ref. 4), and human exposure to contaminants is not expected to be significant due to the location and relative inaccessibility of this AOC. An evaluation of remedial alternatives has been recommended to jointly address impacts at this AOC, SWMU 7, and portions of SWMUs 8 and 12.

AOC F, Former Explosives Manufacturing Area: This area was used to manufacture explosives (i.e., dynamite, trinitrotoluene (TNT), tetryl, Amotol, Nitramon, pentaerythritol tetranitrate (PETN), hexite, nitroglycerin, and ammonium nitrate) from approximately 1890 to 1960. As part of these operations, waste explosive materials were burned daily. All buildings in this area have been destroyed. Slightly elevated levels of chlorinated VOCs have been reported in groundwater beneath Testing Ground 3. In the Eastern Laboratories Area, only nitrobenzene and 2,4-DNT were detected above standards and only in the Lower Aquifer. No groundwater contaminants were detected above standards in the Former Nitroglycerin Production Facility. Natural attenuation of groundwater contaminants appears to be occurring, and the plume is contained within site boundaries (Ref. 4). Only one soil sample collected from the main portion of AOC F contained lead above the NJ NRDCSCC, but soil in the former Eastern Laboratories Areas has been more significantly impacted above NJ NRDCSCC. Soil contaminants reported in this area included arsenic in the TNT area, lead in the Dynamite Area, and lead and benzo(a)pyrene in the testing grounds above NJ NRDCSCC. Exposure to soil contamination at this AOC is not expected to be significant, however, due to general inaccessibility and to its location in a non-operating area of the facility. Remedial alternatives will be considered for the TNT Area, the Dynamite Area, and the impacted Testing Grounds Areas (Areas 1, 2, and 4).

AOC G, Industrial Diamonds Production Area: This area is the former location of the Eastern Laboratory (where Repauno conducted explosives research) and the current location for refining of diamond dust. This area is currently not in operation, and no known routine and systematic releases have been documented. The Diamonds Waste Acid Tank (SWMU 1), which was located within this area, has been closed and all associated contaminated soil was removed (Ref. 7). A baseline environmental site investigation performed in 1999 indicated inorganics and organics were present in subsurface soil and shallow above NJ NRDCSCC. Groundwater was also found to be impacted by a few VOCs, SVOCs, ammonia, and selected metals. The potential for human exposure to contamination in this area is limited by permit requirements, tenant restrictions, and security patrols. Nevertheless, an evaluation of remedial alternatives is suggested for this area.

AOC H, Wharf Tank Farm: This AOC consists of a small area of land that protrudes into the Delaware River and is used to unload barges and ships that carry ammonia or sulfuric acid. Several tanks and buildings formerly located in this area have been demolished. Although several small spills previously occurred in this area, each was excavated, neutralized, or washed into the Ditch System (SWMU 9). Benzene, polycyclic aromatic hydrocarbons (PAHs), and DNT were detected in surface soil, and Aroclor-1254 was detected in subsurface soil above NJ NRDCSCC. Metals and methylene chloride were detected in groundwater above NJ GWQC. Groundwater contamination beneath this area appears to be limited to an isolated perched zone and is not migrating off site (Refs. 2 and 4). Human exposures are not expected to be significant because this AOC is in a non-operating area of the facility, covered with gravel, and not easily accessible to on-site receptors. Further delineation of PCBs in subsurface soil is recommended for this area, along with an assessment of remedial alternatives.

AOC J, Wetlands: The DuPont site is located in a low-lying, tidal marsh region along the Delaware River, and several drainage paths, largely composed of natural wetlands, are located throughout the property. Wastewater from past operations were discharged to the ditch system that flowed through the wetlands prior to reaching SWMU 10. Elevated organic constituent levels were found in soil, presumably the result of contaminated groundwater discharging to surface water. Although groundwater to surface water discharge was confirmed by the Phase III RI, natural attenuation and dilution result in significantly lowered surface water contaminant concentrations (Ref. 5). Based on an ecological exposure assessment conducted as part of the Phase IV RI, only those wetland areas within Zone 1 of SWMU 9 warrant further concern. An assessment of remedial alternatives is recommended for wetland soil containing elevated levels of organic constituents. Due to the location, condition, and lack of access of this area, human exposures are not expected to be significant.

Sitewide Groundwater: Environmental impacts have been identified in both shallow and deep groundwater at the DuPont site. Source areas for the most significant contamination include the Former Nitrobenzene Production Area (AOC D), the Former PMDA/DMT Production Area (AOC C), the Sanitary Landfill (SWMU 11), Former Testing Ground 3 in the Former Explosives Manufacturing Area (AOC F), the Acid Area (AOC A), and the Iron Oxide Pile Area (SWMU 8). Areas south of these operations areas have also been impacted to some degree over time due to natural groundwater flow. Organic constituents most frequently detected above NJ GWQC in the Upper Aquifer included benzene and aniline. Organic constituents most frequently detected above NJ GWQC in the Lower Aquifer included benzene, trichloroethene (TCE), tetrachloroethene (PCE), nitrobenzene, aniline, naphthalene, chlorobenzene, and 2,4-dinitrotoluene

(DNT). Phase II analytical results and a site-wide tidal study have demonstrated that these constituents are not migrating beyond the site boundary in shallow groundwater. Groundwater contamination in deeper groundwater is captured on site by ongoing pumping from interceptor well U11I01L in the south-central portion of the property. The Interceptor Well System (IWS) was installed in 1985 as part of an IRM to protect water quality in on-site production wells and nearby public water supply wells, which draw from the lower aquifer. Groundwater extraction continues to date at a rate of approximately 300 gallons per minute (gpm). Extracted groundwater is then treated using granular activated carbon (GAC) filters and discharged to the Delaware River via the on-site ditch system and the NJPDES-permitted Outfall 001A. Annual monitoring is also conducted to monitor the effectiveness of this containment system, and establishment of a Classification Exception Area/Well Restriction Area is proposed (Ref. 6).

In general, groundwater and soil contamination associated with each of the DuPont SWMUs/AOCs appears to be contained within site boundaries. DuPont continues to monitor and recover contaminated groundwater on site as outlined in the ACO, and will consider all RI and monitoring results when determining a final remedy for each SWMU and AOC.

References:

1. Administrative Consent Order for the DuPont Repauno Site. Prepared by NJDEP. Dated December 11, 1989.
2. Phase I Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated June 11, 1993.
3. Repauno Landfill Closure/Post-Closure Plan. Prepared by GeoSystems Consultants. Dated October 1993.
4. Phase II Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.
5. Phase III Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated April 2000.
6. Proposed Classification Exception Area for the DuPont Repauno Site, Gibbstown New Jersey. Prepared by DuPont Corporate Remediation Group. Dated January 31, 2002.
7. Phase IV Remedial Investigation Report and Assessment of Current Site Conditions at the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.
8. 2002 Annual Groundwater Progress Report for DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated April 2003.
9. Email from Paul Harvey, NJDEP, to Barry Tornick, USEPA, re: Final Questions on DuPont (Repauno). Dated September 2, 2003.

2. Is **groundwater** known or reasonably suspected to be "**contaminated**"[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   _X_ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

   ____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   ____ If unknown - skip to #8 and enter "IN" status code.

Rationale:

VOCs were first detected in groundwater beneath the DuPont site in 1984. A groundwater sample from on-site production well PW-6 contained benzene, chlorobenzene, nitrobenzene, and PCE at concentrations above NJ GWQC for Class II-A groundwater. In response to these exceedances, NJDEP and DuPont entered into an ACO for environmental activities to be conducted at the facility. Four phases of groundwater investigation have been completed to date.

During the Phase I RI in 1993, the most significant organic contamination was reported in groundwater beneath the Former Nitrobenzene Production Area (AOC D) and the Former PMDA/DMT Production Area (AOC C). Lower levels of contamination were also reported in groundwater beneath the Sanitary Landfill (SWMU 11), the Former Testing Ground 3 in the Former Explosives Manufacturing Area (AOC F), the Acid Area (AOC A), and the Iron Oxide Pile Area (SWMU 8). The most common NJ GWQC exceedances were reported for benzene, xylene, nitrobenzene, aniline, and DPA. Chlorinated volatile organic compounds and 2,4-DNT and 2,6-DNT were also sporadically reported above NJ GWQC. Similar organic results were reported during the Phase II RI effort in 1995.

Arsenic, iron, and lead were the only inorganic constituents consistently reported above NJ GWQC during the Phase I RI. Since inorganic contamination was not expected at this site, DuPont completed a literature and database survey on regional inorganic concentrations during the Phase II RI in 1995. At that time, it was determined that arsenic and iron occur throughout the region at concentrations exceeding NJ GWQC (Ref. 4). Thus, exceedances for these two constituents are likely related to background conditions in the area and will not be addressed further in this EI determination. Pockets of elevated lead and other more sporadic inorganic constituents beneath the Acid Area and the Wharf Tank Farm are believed to be related to leaching associated with extreme pH conditions in these areas (Ref. 4).

The most recent sitewide groundwater sampling event was conducted as part of the Phase III RI effort in 1999. Samples were collected from 67 monitoring wells across the DuPont Repauno site. Organic

[1] "Contamination" and "contaminated" describe media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

constituents most frequently detected above NJ GWQC in the Upper Aquifer included benzene and aniline. The Phase III RI effort also confirmed that the Middle Aquifer has not been significantly impacted by site activity (with the exception of sporadic NJ GWQC exceedances for PCE in the lower part of this unit). Organic constituents most frequently detected above NJ GWQC in the Lower Aquifer included benzene, TCE, PCE, nitrobenzene, aniline, naphthalene, chlorobenzene, and 2,4-DNT. Maximum exceedances reported in the Upper and Lower Aquifers during the Phase III RI are presented in Table 1.

Table 1 – Maximum NJ GWQC Exceedances Reported During the Phase III RI (µg/L)

Constituent	NJ GWQC	Upper Aquifer Max.	Lower Aquifer Max.
Aniline	6	290,000	250,000
Benzene	1	32,000	27,000
Bis (2-ethylhexyl) phthalate	30	below standards	89
Carbon Tetrachloride	2	28	below standards
Chlorobenzene	5	8	130
Chloroform	6	130	110
1,2-Dichloroethane	2	below standards	3
1,1-Dichloroethene	2	5	below standards
DPA	200	610	1,100
1,2-Diphenylhydrazine	0.04	610	3,500
2,4-Dinitrotoluene	10	44	220
Nitrobenzene	10	550,000	580,000
PCE	1	180	3,900
TCE	1	110	320
Vinyl Chloride	5	31	6
Xylenes	40	3,600	below standards
Antimony	20	184	below standards
Cadmium	4	19	16
Chromium	100	below standards	608
Lead	10	463	95
Mercury	2	25	3
Nickel	100	below standards	233
Ammonia Nitrogen	500	332,000	9,000

In addition to the phased RI groundwater sampling events, ten wells are sampled annually to monitor the effectiveness of the groundwater IWS. Another five wells at the Sanitary Landfill are sampled annually in accordance with the facility's existing NJPDES Discharge to Groundwater (DGW) permit. The most recent available data were reported in the 2002 Annual Groundwater Report (Ref. 7) and the First Quarter 2003 Status Report (Ref. 8). Maximum exceedances for each sampling event are presented in Table 2.

Table 2 – Maximum NJ GWQC Exceedances Reported During Recent Annual Monitoring (µg/L)

Constituent	NJ GWQC	Max. Conc. 2002	Max. Conc. 2003
Benzene	1	360	150
Chlorobenzene	5	81	38
Chloroform	6	8	10
1,2-Dichloroethane	2	not detected	6
cis-1,2-Dichloroethene	10	130	380
2,4-Dinitrotoluene	10	81	71
Nitrobenzene	10	970	690
PCE	1	680	560
TCE	1	190	240

These NJ GWQC exceedances were reported almost exclusively in production well U11I01L (IW-46) and monitoring well T13M01L (MW-7). The only exceptions are sporadic estimated concentrations of PCE at or slightly above its NJ GWQC of 1 µg/L in production well R07P01M2 (PW-3) and landfill well AA18M02M1.

References:

1. Administrative Consent Order for the DuPont Repauno Site. Prepared by NJDEP. Dated December 11, 1989.
2. Phase I Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated June 11, 1993.
3. Repauno Landfill Closure/Post-Closure Plan. Prepared by GeoSystems Consultants. Dated October 1993.
4. Phase II Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.
5. Phase III Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated April 2000.
6. Phase IV Remedial Investigation Report and Assessment of Current Site Conditions at the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.

7. 2002 Annual Groundwater Progress Report for DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated April 2003.
8. Letter from Albert Boettler, DuPont Corporate Remediation Group, to Paul Harvey, NJDEP. Re: Repauno First Quarter 2003 Status Report. Dated April 28, 2003.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within the "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_X_ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and the rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination."[2]

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale:

The Repauno site is located in the outcrop/subcrop area of the major aquifer system of southern New Jersey (the Magothy-Raritan-Potomac Aquifer (MRPA) system). As a result, several units of the system are encountered near the surface at the site. Three aquifers of the MRPA system are encountered at the facility including the upper aquifer (MRPAU), the middle aquifer (MRPAM), which itself is further subdivided into two aquifers (MRPAM1 and MRPAM2), and the lower aquifer (MRPAL). In the northern and western portions of the site, the Delaware River has eroded and replaced much of the MRPA system. The upper unit in this area is referred to as the Holocene-Pleistocene-Pliocene-Miocene (HPPM) aquifer. Groundwater flow beneath the DuPont site is fairly complicated with horizontal movement observed in several different directions, groundwater discharges to surface water on site, and significant interaction among the various water-bearing units, as shown on Figure 16 from the Phase II RI Report (Ref. 3) .

Control of Impacts to the Upper Aquifer

In the Upper Aquifer (HPPM and MRPAU), groundwater flows horizontally in several directions, as shown on Figure 3.1F of the Phase IV RI Report (Ref. 5). Beneath the northern part of the site, flow is to the south, away from the Delaware River and toward the wetlands in the central part of the site. In the southern part of the site, a groundwater divide exists. Along this divide, shallow groundwater flows north towards the wetlands and south towards the southern portion of the site. In the wetlands area, shallow groundwater flows southwesterly toward the Sand Ditch. Water levels measured at staff gauges and piezometers show that Upper Aquifer (HPPM) groundwater also moves vertically to recharge streams, process ditches, and wetlands on the DuPont site (except in the Acid Area where discharges of non-contact cooling water recharge the Upper Aquifer). Water level measurements also show groundwater in this unit flowing downward to recharge the Middle and Lower Aquifers. Thus, impacted groundwater in the Upper Aquifer either discharges to surface water or migrates to deeper groundwater

[2] "Existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

units.

In the shallow aquifer, organic constituents exceeded NJ GWQC in the former PMDA/ DMT and Terephthallic Acid (TPA) Basin Area, the former Nitrobenzene Production Area, the Sanitary Landfill, and Testing Ground 3 in the former Explosives Manufacturing Area. Phase II analytical results and the sitewide tidal study have demonstrated that these constituents are not migrating beyond the site boundary in shallow groundwater (Ref. 3). However, organic constituents have migrated vertically from the former Nitrobenzene Production Area to the Lower Aquifer (MRPAL) at concentrations exceeding NJ GWQC. Control of these impacts are discussed below. Discharges of impacted groundwater to on-site surface water are discussed in the responses to Questions 5 and 6 of this EI determination.

Control of Impacts to the Middle Aquifer

Groundwater in the upper portion of the Middle Aquifer (MRPAM1) flows to the southeast from the Delaware River toward the southern boundary of the site. However, as indicated in the response to Question 2, the Upper Middle Aquifer does not appear to have been impacted by site activity and, therefore, no groundwater controls are needed at this time. The detection of PCE at its NJ GWQC of 1 µg/L in Upper Middle Aquifer well AA18M02M1 during the 2002 groundwater monitoring round (Ref. 6) will continue to be evaluated during subsequent annual monitoring events, but does not present significant concern at this time due to the low level of detection (not actually exceeding the NJ GWQC), its location near the Delaware River and far from the downgradient southern property boundary, and the overall lack of contamination elsewhere in this unit.

Groundwater in the lower portion of the Middle Aquifer (MRPAM2) has been impacted by sporadic NJ GWQC exceedances for PCE at production well PW-3. Occasionally, low levels of 2,4- and 2,6-DNT have also been observed in this well but not above NJ GWQC. Continuous pumping from plant production wells PW-3 and PW-6 ensures that even these minor impacts are contained within the site boundaries. Like groundwater in the upper portion of this unit, MRPAM2 groundwater flows southeast across the site away the Delaware River. However, as it moves into the southern portion of the site, groundwater in the Lower Middle Aquifer is captured by the two cones of depression shown around the production wells on Figure 3.1H of the Phase IV RI Report (Ref. 5). As a precautionary measure, groundwater extracted from the two production wells is treated using granular-activated carbon (GAC) filters prior to use on site.

Control of Impacts to the Lower Aquifer

The Lower Aquifer has been impacted by several organic constituents above NJ GWQC, including benzene, TCE, PCE, nitrobenzene, aniline, naphthalene, chlorobenzene, and 2,4-DNT. The majority of these impacts appear to have been transmitted to the MRPAL unit by direct vertical migration from the Upper Aquifer.

After this contamination was initially detected in the early 1980s, DuPont and NJDEP determined that an IRM was needed to prevent groundwater contaminants from leaving the site, and to protect water quality in on-site production wells and nearby public water supply wells. The DuPont IWS was installed in 1985. Current operations involve continuous pumping of contaminated groundwater from Lower Aquifer interceptor well U11I01L at a rate of approximately 300 gallons per minute (gpm), treating the extracted groundwater using GAC filters, and discharging treated effluent to the Delaware River via the on-site ditch system and the NJPDES-permitted outfall.

As shown on Figure 3.1I of the Phase IV RI Report (Ref. 5), groundwater in the Lower Aquifer (MRPAL) flows radially inward across the site toward the cone of depression created by interceptor well U11I01L. Based on a transmissivity of 64,000 gallons per day per foot and an average extraction rate of 300 gpm at well U11I01L, contaminant migration in the Lower Aquifer groundwater appears to be under control. This assessment is supported by recent groundwater monitoring results showing that NJ GWQC exceedances in the MRPAL groundwater area are limited to the area around production well U11I01L (IW-46) and monitoring well T13M01L (MW-7). In addition, several wells between the identified impact area and off-site City Well Number 5 (a municipal supply well for Greenwich Township, located approximately 1,500 feet south of the plant) have reported contamination either below applicable standards or not detected altogether (Ref. 4). Groundwater from the city well continues to show no impact from any of the site-related groundwater contaminants.

References:

1. Fact Sheet for the Public Meeting to Discuss the Remedial Investigation at the DuPont Repauno Plant in Gibbstown, Gloucester County. Prepared by NJDEP. Dated August 23, 1990.
2. Phase I Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated June 11, 1993.
3. Phase II Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.
4. Phase III Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated April 2000.
5. Phase IV Remedial Investigation Report and Assessment of Current Site Conditions at the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.
6. 2002 Annual Groundwater Progress Report for DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated April 2003.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_X_ If yes - continue after identifying potentially affected surface water bodies.

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown - skip to #8 and enter "IN" status code.

Surface Water:

Groundwater in the Upper Aquifer recharges the ditch system at various locations across the DuPont site. Figure 3.2 of the Phase IV RI Report (Ref. 3) shows the location of discrete drainage areas present on the property. Details on groundwater to surface water discharges are discussed below with respect to each of the key areas.

Permitted Plant Area Drainage

The majority of water managed in the Permitted Plant Area ditches in the north-central portion of the site consists of storm water runoff, neutralized wastewater from industrial diamonds production, and non-contact cooling water. Impacted groundwater beneath the main portion of the Permitted Plant Area also discharges to these ditches. Consequently, the Permitted Plant Area drainage system will be retained for additional evaluation in this EI Determination.

Sand Ditch Area

The Sand Ditch is located along the western edge of the Permitted Plant Area Drainage. Upper Aquifer groundwater contaminant exceedances closest to the Sand Ditch during the Phase III RI were reported in wells N16M01H (total xylene at 48 µg/L) and C-14 (bis-2-ethylhexyl phthalate at 200 µg/L). Neither constituent exceeded the applicable NJ GWQC by more than a factor of ten, and both wells are located approximately 1,500 feet east of the Sand Ditch. In addition, Upper Aquifer groundwater beneath the site production area flows to the north and south, rather than westerly toward the Sand Ditch. Consequently, any migration of current site-related contamination in the Upper Aquifer groundwater toward the Sand Ditch would be associated with natural lateral dispersion to the west. It is unlikely that lateral dispersion would transport identified contamination 1,500 to the west and into the Sand Ditch area, and even more unlikely that the contaminants would persist above applicable NJ GWQCs. Based on this assessment, it does not appear that the Sand Ditch is currently or will be impacted by direct discharges of impacted Upper Aquifer groundwater from the site. However, because it may be impacted by site-related contamination flowing in ditches from the Permitted Plant Area, the Sand Ditch body will be retained for additional evaluation in this EI determination.

EL Sluice Drainage

Surface water in the EL Sluice Drainage Area (east of the Permitted Plant Area Drainage) consists primarily of storm water runoff and tide swell from the Delaware River. Where the river recharges groundwater in the EL Sluice Drainage (the northern half of the drainage area), site-related groundwater contaminants are not expected to impact surface water. Minimal flow in the southern half of the EL

Sluice Drainage (where river recharge and tide swell do not occur) suggests that only very minor groundwater to surface water discharges occur in this area of the site. Furthermore, because impacted groundwater from the most heavily impacted areas (e.g., the Nitrobenzene Production Area) flows southwestward away from the EL Sluice Drainage, any groundwater that does discharge to the EL Sluice Drainage area is expected to be either free of site-related impacts altogether or impacted at concentrations below applicable standards. This contention is supported by the general lack of significant groundwater impacts in the former Eastern Laboratories Area (with the exception of RDX in well BB14M01M1 at 1 µg/L; NJ GWQC = 0.3 µg/L; MCL = 2 µg/L). For these reasons, the EL Sluice drainage system will not be addressed further in this EI determination.

Clonmell Creek Drainage

The Clonmell Creek drainage system is located at the easternmost edge of the site and is fed by both storm water runoff and groundwater discharge. Because the Delaware River recharges groundwater throughout most of the Clonmell Creek Drainage, the extent of groundwater to surface water discharge is limited. According to the Phase IV RI Ecological Assessment (Ref. 4), contaminant groundwater beneath the former landfill in the Clonmell Creek Drainage Area does not discharge to the ditches. However, because of the *potential* for impacted groundwater to reach surface water, this drainage system will be retained for additional evaluation.

White Sluice Race Drainage

The White Sluice Race Drainage (including Nehonsey Brook) covers the extreme southwestern and western portions of the DuPont Repauno Site. Because of its location, the White Sluice Race drainage system does not receive runoff or groundwater from the production areas on site. Consequently, this system is unlikely to be impacted by known site-related groundwater contamination. Furthermore, because the White Sluice Race Drainage is located largely off site, any impacts to surface water quality would most likely be attributable to off-site sources or local background conditions. Based on this assessment, the White Sluice Race Basin and Nehonsey Brook have been eliminated from further consideration in this EI determination.

Delaware River

The Delaware River recharges the Upper Aquifer in the northernmost portion of the DuPont site, and Upper Aquifer groundwater flows away from the river. Thus, this surface water body is not expected to directly receive significant quantities of impacted groundwater. Any site-related impacts to the river would be attributed to groundwater discharges into the ditch system and subsequent release into the Delaware River at Outfalls 001 and 007. Flow at Outfall 007B is associated only with serious flooding events and is not expected to carry significant groundwater contamination to the Delaware River (Ref. 3). Releases of more significantly impacted surface water are possible at Outfalls 001, but these discharges are covered under NJDPES Permit NJ0004219, and DuPont has been and remains in compliance with established NJDPES effluent limits. Furthermore, the Delaware River is highly industrialized, with resultant water quality degradation throughout the region. Consequently, any site-related impacts to the Delaware River are expected to be currently acceptable and minor, and will not be considered further in this EI determination.

References:

1. Phase II Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey.

Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.

2. Phase III Remedial Investigation Report for the DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated April 2000.
3. Phase IV Remedial Investigation Report and Assessment of Current Site Conditions at the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.
4. Ecological Investigation Report for the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 29, 2002.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times its appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or ecosystems at these concentrations)?

____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level(s)," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or ecosystem.

__X__ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown - enter "IN" status code in #8.

Rationale:

To determine if current groundwater to surface water discharges are having a significant impact on surface water quality, surface water data collected during Phases III and IV of the RI effort were evaluated against site-specific background concentrations and surface water screening levels. On-site samples were collected along the Permitted Plant Area Drainage (including the Sand Ditch) and the Clonmell Creek Drainage. Background samples were collected in off-site portions of the Clonmell Creek Drainage and along the Delaware River in Cedar Swamp. Established ecological surface water screening values were adjusted to account for site-specific hardness levels and then used to assess water quality at the site. Specific criteria used in the assessment included:

- New Jersey Surface Water Quality Standards for freshwater aquatic life (2000)
- EPA's National Recommended Water Quality Criteria for protection of aquatic life (1999)
- Delaware River Basin Commission (DRBC) water quality regulations (1996)
- EPA's Tier II Secondary Chronic Screening Values for protection of aquatic life (1993)

Based on this comparison, a number of constituents in surface water at concentrations above applicable

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

standards and/or background (Ref. 1) were identified. These exceedances are summarized in Table 3 below.

Table 3 – Surface Water Exceedances Reported During Phases III and IV of the RI (µg/L)

Sample Location	Constituent *	Screening Value	Maximum Concentration	Maximum Background
Permitted Plant Drainage				
GS-03	Aniline	3.4	57	NA
GS-03	Diphenylamine	4.9	440	NA
GS-03	Copper	19	569	3.5 J
GS-05	Copper	19	37	3.5 J
GS-03	Iron	1,000	40,800	2,600
GS-01	Lead	5.7	6.7	ND
GS-03	Lead	5.7	91.3	ND
GS-05	Lead	5.7	47.1	ND
GS-03	Mercury	0.01	0.065 J	ND
Detention Basin PAW2 (in Permitted Plant Area)				
PAW2-01	Zinc	286	292	32
Sand Ditch (in Permitted Plant Area)				
GS-09	Copper	11	14.2 J	3.5 J
GS-08	Lead	2.4	2.8 J	ND
GS-09	Lead	2.4	4.1	ND
Clonmell Creek Drainage				
CCD-01	Aluminum	87	401	302

* All inorganics reported as total metal concentration

Based on these observations, there is the potential that surface water impacts related to discharge of contaminated groundwater from the DuPont Repauno site may be significant and additional evaluation will be provided in the response to Question 6.

Note that impacts of groundwater discharge on sediment within surface water bodies are no longer considered in the CA750 EI determinations (Refs. 2, 3).

Reference:

1. Ecological Investigation Report for the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 29, 2002.
2. Presentation by Matt Hale, EPA. EPA National Corrective Action Conference, New Orleans, LA., June 24-25, 2003.
3. Article entitled “EPA Excludes Contaminated Sediment From RCRA Groundwater Goals”.

Dated June 30, 2003. www.insideepa.com

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments, or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

X If yes - continue after either: 1) identifying the final remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including an ecologist) adequately protective of receiving surface water, sediments, and ecosystems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable** ") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or ecosystem.

____ If unknown - skip to 8 and enter "IN" status code.

Rationale:

Despite the surface water exceedances discussed in the response to Question 5, groundwater to surface water discharges at the DuPont site appear to be currently acceptable because:

- Most of the water in the ditches comes not from groundwater, but rather from stormwater run-off, neutralized wastewater discharges, and non-contact cooling water.

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, an appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments, or ecosystems.

- Evaluation of water quality in the on-site ditches is highly conservative as they are not even considered true surface water bodies by NJDEP because their purpose is only to convey wastewater.
- As shown in Table 3, only a few constituents exceeded site-specific background concentrations and/or ecologically based screening values for surface water.
- Contaminated sediments – which, as mentioned previously are no longer a concern for the CA750 (Refs. 2, 3) – could be contributing to elevated surface water contaminant concentrations.
- An ecological assessment conducted as part of the Phase IV RI effort concluded that current surface water exceedances in the ditches are not causing significant negative ecological impacts (Ref. 1). Specific discussion on this consideration is presented below.

Surface water in the Permitted Plant Drainage was reported to contain two organic and four inorganic constituents above the ecological screening criteria discussed in the response to Question 5. Except for total lead (which exceeded screening criteria in all three surface water samples from this area), surface water exceedances reported in the Permitted Plant Drainage were all detected in the unfiltered sample from location GS-03. Because this sample was also high in total organic carbon (greater than 20 milligrams per liter), detected constituents were likely bound to suspended solids, rather than being present in a dissolved and bioavailable form. In addition, the sample collected approximately 600 feet downstream at location GS-01 showed only a minor exceedance for total lead (6.7 µg/L versus a benchmark of 5.7 µg/L). Thus, the extent of elevated organic and inorganic concentrations in Permitted Plant Area surface water in this area appears to be limited. In addition, surface water discharges are regulated by and remain in compliance with the existing NJPDES permit (including for total lead). Based on these considerations, all contaminants reported in Table 3 for the Permitted Plant Area have been eliminated as constituents of potential ecological concerns (Ref. 1), and their presence in Permitted Plant Area surface water is acceptable until a final remedy can be established for the site (Ref. 4).

According to the Ecological Investigation Report (Ref. 1), each of the remaining constituents listed in Table 3 has been found to be currently acceptable with regard to potential ecological impacts. Specific determinations include:

- Although total zinc was reported above screening levels in the Wetlands/Detention Basin Area (PAW2), the bioavailable dissolved zinc concentration was below applicable screening criteria.
- Although the total copper concentration in Sand Ditch surface water sample GS-09 slightly exceeded its screening value (14.2J µg/L, as compared to a hardness-adjusted toxicological benchmark of 11 µg/L), it is unlikely that bioavailable dissolved copper exceeds its screening value.
- Exceedances for total lead in the Sand Ditch area are reportedly attributable to inflow of surface water from the Delaware River, which has a site-specific DRBC-established total lead screening value of 16 µg/L, well above the standard screening level of 2.4 µg/L. Elevated total lead levels in the Sand Ditch are likely associated with influx of Delaware River surface water, which is permitted to contain higher than usual total lead concentrations.
- Although the total aluminum concentration in the Clonmell Creek Drainage area exceeded applicable screening criteria, bioavailable dissolved aluminum concentrations were reported as nondetected.

As presented above and fully documented in the Ecological Investigation Report (Ref. 1), none of the surface water exceedances identified in the response to Question 5 appear to be ecologically unacceptable, pending implementation of a final remedy for the site. This determination, in conjunction with the other factors outline in the first paragraph of this response, confirms that current groundwater to

surface water discharges at the DuPont Repauno site are acceptable (Ref. 4).

Reference:

1. Ecological Investigation Report for the DuPont Repauno Site, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated May 29, 2002.
2. Presentation by Matt Hale, EPA. EPA National Corrective Action Conference, New Orleans, LA., June 24-25, 2003.
3. Article entitled "EPA Excludes Contaminated Sediment From RCRA Groundwater Goals". Dated June 30, 2003. www.insideepa.com
4. E-mail correspondence from Dhruva Kanjarpane, NJDEP, to Barry Tornick, EPA. Re: DuPont (Repauno) Ecological Assessment. Dated September 5, 2003.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_X_ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

____ If no - enter "NO" status code in #8.

____ If unknown - enter "IN" status code in #8.

Rationale:

Groundwater monitoring was first initiated at the DuPont Repauno site in 1985. Specific details on the current groundwater monitoring program are presented in Table 5 below.

Table 5 – Current Groundwater Monitoring Program for the DuPont Repauno Site

Activity and Frequency	Purpose	Wells Included	Analytes
Annual Sampling of Wells Around the IWS	To monitor effectiveness of the IWS in reducing areal extent of groundwater impacts and to ascertain the amount of contamination removed from the subsurface	R07P01M2 (PW-3) T09P01M2 (PW-6) U11L01L (IW-46) T08M01L T13M01L U07M01M2 U07M04L U09M01L U09M02M2 City Well 5	Selected VOCs and base/neutral/acid extractable organic compounds (BNAs) (listed in Table 2 from Ref. 1), and total dissolved solids
Annual Sampling of Wells at the Industrial Landfill	To comply with requirements of NJPDES Permit Number NJ0004219	AA18M02M1 BB17M01M1 CC17M01M1 DD18M01M1 CC19M02M1	VOCs, BNAs, inorganics, and miscellaneous parameters (listed in Table 3 from Ref. 1)

In addition to the annual groundwater sampling and analysis effort indicated above, water level measurements are collected quarterly from 32 wells within the Lower Middle (MRPAM1) or Lower (MRPAL) Aquifers. Resultant data are used to prepare groundwater contour maps and flow diagrams to ensure adequate control of impacted groundwater beneath the DuPont site.

Reference:

1. 2002 Annual Groundwater Progress Report for DuPont Repauno Plant, Gibbstown, New Jersey. Prepared by DuPont Corporate Remediation Group. Dated April 2003.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the DuPont Repauno Facility, EPA ID# NJD002373819, located at 200 North Repauno Avenue, in Gibbstown, New Jersey. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

____ IN - More information is needed to make a determination.

Completed by: _____ Date:_____

Michele Benchouk
Environmental Engineer
Booz Allen Hamilton

Reviewed by: _____ Date:_____

Pat Shanley
Geologist
Booz Allen Hamilton

_____ Date:_____

Andy Park, RPM
RCRA Programs Branch
EPA Region 2

_____ Date:_____

Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: Original signed by: Date: September 23, 2003

Adolph Everett, Acting Chief
RCRA Programs Branch
EPA Region 2

Locations where references may be found:

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Andy Park, EPA RPM
(212) 637-4184
park.andy@epamail.epa.gov

Attachments

The following attachments have been provided to support this EI determination.

- Attachment 1 – Summary of Media Impacts Table

Attachment 1 - Summary of Media Impacts Table

DuPont - Repauno Facility

	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
SWMU 3. Terephthalic Acid Basin	Included in AOC C								
SWMU 8. Iron Oxide Pile	Included in AOC D								
SWMU 9. Ditch System	No	No	No	Yes	Yes	Yes	No	▸ Sediment removal in highly impacted ditches (i.e., nitrobenzene ditch - 4,524 tons, DMT ditch - 4,905 tons) ▸ Ecological evaluation performed ▸ Permit requirements/tenant restrictions ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, inorganics, PCBs (sediment only)
SWMU 11. Sanitary Landfill	Yes	No	No	No	No	Yes	No	▸ Installation of a 18-inch topsoil cover ▸ Groundwater and surface water monitoring as part of closure/post-closure activities ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs
SWMU 12. Former Fuel Oil Tank	No	No	Yes	No	No	No	No	▸ Tank removal ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	Inorganics
AOC A. Acid Area	Yes	No	Yes	No	No	Yes	No	▸ Groundwater monitoring ▸ Permit requirements/tenant restrictions ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, Inorganics

	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AOC C. Former PMDA/DMT Production Area	Yes	No	Yes*	No	No	Yes*	No	▸ Groundwater monitoring and extraction ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, Inorganics
AOC D. Former Nitrobenzene Production Area	Yes	No	Yes	No	No	Yes	No	▸ Groundwater monitoring and extraction ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, Inorganics, PCBs
AOC F. Former Explosives Manufacturing Area	Yes	No	Yes	No	No	No	No	▸ Groundwater monitoring ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, Inorganics, PCBs
AOC G. Industrial Diamonds Production Area	No	No	No	No	No	Yes	No	▸ Groundwater monitoring ▸ Permit requirements ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs, Inorganics
AOC H. Wharf Tank Farm.	No	No	Yes*	No	No	Yes*	No	▸ Further delineation of PCBs in subsurface soil planned ▸ Permit requirements ▸ Site security measures	VOCs, SVOCs, PCBs
AOC J. Wetlands	No	No	Yes	No	No	No	No	▸ Permit requirements/tenant restrictions ▸ Site security measures ▸ Evaluation of remedial alternatives planned	VOCs, SVOCs
Sitewide Groundwater	Yes	NA	NA	NA	NA	NA	NA	▸ Installation, ongoing operation, and annual monitoring of the groundwater IWS ▸ Proposed establishment of a CEA and WRA	VOCs, SVOCs, Inorganics

*Soil sample depth not readily available.