Documentation of Environmental Indicator Determination
RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA725)
Current Human Exposures 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 "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no unacceptable human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all 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 "Current Human Exposures Under Control" EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation Recovery Information System (RCRIS) national database ONLY as long as they remain true (i.e.,

RCRIS 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 soil, groundwater, surface water/sediments, and air, 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 #6 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. DuPont has made these determinations at locations where there are no significant impacts, where observed contamination has been attributed to another on-site source area already under investigation, and/or where unacceptable human health and ecological risks have been ruled out. 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 DuPont concluded that 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 exceedences 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 exceedences 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 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 was discharged to the ditch system that flows 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). An ecological exposure assessment conducted as part of the Phase IV RI concluded that 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 sites 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.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"[1] above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			VOCs, SVOCs, Inorganics
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)	X			VOCs, SVOCs, PCBs, Inorganics
Surface Water	X			VOCs, Inorganics
Sediment	X			VOCs, SVOCs, PCBs, Inorganics
Subsurface Soil (e.g., >2 ft)	X			VOCs, SVOCs, PCBs, Inorganics
Air (Outdoor)		X		

____ If no (for all media) - skip to #6, and enter YE status code after providing or citing appropriate levels, and referencing sufficient supporting documentation demonstrating that these levels are not exceeded.

__X__ If yes (for any media) - continue after identifying key contaminants in each contaminated medium, citing appropriate levels (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

____ If unknown (for any media) - skip to #6 and enter IN status code.

Rationale:

Groundwater

Hydrogeologic conditions beneath the site are very complex. Three aquifers and two confining units exist at the site, which are all part of the Magothy-Raritan-Potomac Aquifer (MRPA) system. These include: the upper aquifer (MRPAU), the confining unit between the upper and middle aquifers, the middle aquifer (MRPAM), the confining unit between the middle and lower aquifer, and the lower aquifer (MRPAL). The middle aquifer is locally divided into two aquifers [the upper-middle (MRPAM1) and lower-middle (MRPAM2)] that are separated by a confining unit. The MRPA system is a major water-bearing aquifer system in the area and is used extensively for potable and industrial water supply. Groundwater in the aquifer system flows from the Delaware River inland because of regional pumping of the aquifer system. This represents a reversal of natural groundwater flow and has resulted in the migration of brackish water from the Delaware River into the aquifer system, thereby degrading regional groundwater quality.

Historically, groundwater contamination at the site has existed primarily in the Upper and Lower Aquifer, with minimal contamination detected in the Middle Aquifer (please refer to the response to Question #1 for a more detailed discussion of site wide groundwater impacts, source areas, and remedial actions). Maximum exceedences reported in the

Upper Aquifer and Lower Aquifer during the most recent site wide sampling event, the Phase III RI, are presented in Table 1 below (Ref. 5). The Phase III RI effort also confirmed that the Middle Aquifer has not been significantly impacted by site activity (with the exception of very sporadic NJ GWQC exceedences for PCE in the lower part of this unit).

Table 1 - Maximum NJ GWQC Exceedences Reported in the Upper and Lower Aquifer

During the Phase III RI (µg/L)

Constituent	NJ GWQC	Upper Aquifer Max. Conc.	Lower Aquifer Max. Conc.
Aniline	6	290,000	250,000
Benzene	1	32,000	27,000
Bis (2-ethylhexyl) phthalate	30	NA	89
Carbon Tetrachloride	2	28	NA
Chlorobenzene	5	8	130
Chloroform	6	130	110
1,1-Dichloroethene	2	5	NA
1,2-Dichloroethane	2	NA	3
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	NA
Antimony	20	184	NA
Cadmium	4	19	16
Chromium	100	NA	608
Lead	10	463	95
Mercury	2	25	3
Nickel	500	NA	9,000
Ammonia Nitrogen	500	332,000	9,000

(Ref. 5)

In addition to the RI groundwater sampling events, ten wells (T08M01L [37], T13M01L [7], U07M01M2 [43], U07M04L [47], U09M01L [34], U09M02M2 [35], City Well 5,

R07P01M2 [PW-3], T09P01M2 [PW-6], U11L01L [IW-46]) are sampled annually to monitor the effectiveness of the groundwater interceptor well system (IWS), and another five wells (AA18M02M1 [91], BB17M01M1 [92], CC17M01M1 [93], DD18M01M1 [94], CC19M02M1 [95]) at the Sanitary Landfill are sampled quarterly in accordance with the New Jersey Pollution Discharge Elimination System Discharge to Groundwater (NJPDES-DGW) permit. Maximum exceedences reported during the most recent groundwater monitoring events are reported in Table 2 below (Ref. 8).

Table 2 – Maximum NJ GWQC Exceedences Reported During Most Recent Annual Monitoring (Jan/Feb, 2002) (*g/L)

Constituent	NJ GWQC	Max. Conc. 2003
Benzene	1	150
Chlorobenzene	5	38
Chloroform	6	10
1,2-Dichloroethane	2	6
cis-1,2-Dichloroethene	10	380
2,4-Dinitrotoluene	10	71
Nitrobenzene	10	690
PCE	1	560
TCE	1	240

(Ref. 8)

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

Air (Indoors)

Based upon the volatile nature of the contaminants detected on site, migration of contaminants in soil and groundwater into indoor air is a potential exposure pathway. Given the potential for exposure, DuPont conducted an Evaluation of the Vapor Intrusion to Indoor Air from the Groundwater and Soils Pathway (Ref. 9) in order to assess the potential for vapor migration into indoor air. While conducting this evaluation, DuPont followed the principles outlined in EPA's Draft Subsurface Vapor Intrusion Guidance (November 2002). Although this guidance is generally applicable to residential scenarios, DuPont utilized its principles to conservatively evaluate potential industrial exposures at the site. DuPont utilized the Occupational Safety and Health Administration (OSHA) permissible exposure levels (PELs) and the American Conference of Governmental Industrial Hygienist (ACGIH) threshold limit values (TLVs) as the appropriate indoor air target concentrations. DuPont then identified all volatile contaminants detected within 100 feet of occupied buildings at the site during the four RI phases. DuPont presented their findings, identifying all volatile contaminants detected,

their sample locations, and detected concentrations. Screening levels were then developed for soil and groundwater using the PELs and TLVs. All volatile contaminants were detected using the PELs and TLVs as the target indoor air concentrations. Based upon a review of the screening levels and detected concentrations at the site, there were no VOC exeedences in groundwater or soil (Ref. 9). Thus, vapor intrusion of VOCs from groundwater and soil at the site is not a considered a potential concern and indoor air is not currently considered an impacted medium.

Surface/Subsurface Soil

Soil investigations were conducted at various SWMUs and AOCs as part of the Remedial Investigation process that has been ongoing at the site. During the Phase IV RI, a current conditions assessment was prepared and summarized all investigations (Phase I - IV RIs, if applicable) performed at each AOC. The current conditions assessment summarized which contaminants were detected in soil at each AOC above the NJ NRDCSCC, given that the site is used for industrial purposes.

Current areas of contaminated soil are as follows:

SWMU 11, Sanitary Landfill: Organics in subsurface soil (given the nature of materials disposed in landfill and groundwater results in area) (Ref. 7).

SWMU 12, Former Fuel Oil Tank: Arsenic (84 mg/kg, NJ NRDCSCC = 20 mg/kg) and copper (17,400, NJ NRDCSCC = 600 mg/kg) in surface soil (See Figure 7.4, Phase IV RI [Ref. 7]). *Note: the Phase IV RI indicates that thallium and zinc were also detected above NJ NRDCSCC; however, specific concentrations and depths were not provided in the report.*

AOC A, Acid Area: Arsenic (maximum concentration = 34.9 mg/kg, NJ NRDCSCC = 20 mg/kg) and lead (maximum concentration = 787 mg/kg, NJ NRDCSCC = 600 mg/kg) in surface soil. Benzene (maximum concentration = 47 mg/kg, NJ NRDCSCC = 13 mg/kg) and 2,4-DNT (maximum concentration = 31.1 mg/kg, NJ NRDCSCC = 10 mg/kg) in subsurface soil (see Figure 5.1, Phase IV RI [Ref. 7]). *Note: the Phase IV RI indicates that 2,6-DNT was also detected above NJ NRDCSCC; however, the specific concentration and depth was not provided in the report.*

AOC C, Former PMDA/DMT Production Area: Benzo(a)pyrene (maximum of 5.6 mg/kg, NJ NRDCSCC = 0.66 mg/kg), xylenes (maximum of 14,000 mg/kg, NJ NRDCSCC = 1,000 mg/kg), and copper (maximum of 1,266 mg/kg, NJ NRDCSCC = 600 mg/kg) in soil (see Figures 7.2A and 7.2B, Phase IV RI [Ref. 7]). *Note: depth of contamination at this AOC was not provided in the Phase IV RI Report.*

AOC D, Former Nitrobenzene Production Area (includes impacts from SWMU 7 and SWMU 8): Arsenic (maximum of 172 mg/kg, NJ NRDCSCC = 20

mg/kg), Aroclor-1248 (maximum of 41.9 mg/kg, NJ NRDCSCC = 2.0 mg/kg), Aroclor-1254 (maximum of 4.6 mg/kg, NJ NRDCSCC = 2.0 mg/kg) in surface soil (primarily within SWMU 8). Aniline (maximum of 40,300 mg/kg, NJ NRDCSCC = 112 mg/kg), benzene (maximum of 690 mg/kg, NJ NRDCSCC = 13 mg/kg), benzo(a)pyrene (maximum of 12.5 mg/kg, NJ NRDCSCC = 0.66 mg/kg), 2,4-DNT (maximum of 4.4 mg/kg, NJ NRDCSCC = 4.0 mg/kg), nitrobenzene (maximum of 33,000 mg/kg, NJ NRDCSCC = 520 mg/kg) in subsurface soil (see Figures 7.3A and 7.3B, Phase IV RI [Ref. 7]).

AOC F, Former Explosives Manufacturing Area (Eastern Laboratory Areas - Former TNT Area, Former Dynamite Area, Former Testing Grounds and Rocket Propellant Area): Arsenic (36.2 mg/kg, NJ NRDCSCC = 20 mg/kg), lead (maximum of 14,500 mg/kg, NJ NRDCSCC = 600 mg/kg), benzo(a)pyrene (1.8 mg/kg, NJ NRDCSCC = 0.66 mg/kg), N-NDP (2.1 mg/kg, NJ NRDCSCC = 0.66 mg/kg) in surface soil (see Figures 5.3, 5.4, and 5.5, Phase IV RI [Ref. 7]).

AOC G, Industrial Diamonds Production Area: Arsenic (maximum of 80 mg/kg, NJ NRDCSCC = 20 mg/kg), copper (1,300 mg/kg, NJ NRDCSCC = 600 mg/kg), lead (maximum of 9,070 mg/kg, NJ NRDCSCC = 600 mg/kg), benzene (660 mg/kg, NJ NRDCSCC = 13mg/kg), benzo(a)pyrene (7.5 mg/kg, NJ NRDCSCC = 0.66 mg/kg), diphenylamine (11,000 mg/kg, NJ NRDCSCC = 200 mg/kg), N-NDP (2.0 mg/kg, NJ NRDCSCC = 0.66 mg/kg) in subsurface soil (see Figure 5.2, Phase IV RI [Ref. 7]).

AOC H, Wharf Tank Farm: Benzene, PAHs, DNT, in surface soil. Aroclor 1254 in subsurface soil. (Ref. 2). *Note: specific concentrations were not provided in available documentation.*

AOC J, Wetlands: Benzene (SWMU 10, Sand Ditch Area) (Ref. 2), aniline, DPA, nitrobenzene (AOC D, Nitrobenzene Production Area) (Ref. 4) in shallow wetland soil (believed to be from shallow groundwater discharge to surface water/wetlands on site). *Note: specific concentrations were not provided in available documentation.*

Surface Water

The DuPont facility is bounded to the north by the Delaware River. Several surface water bodies are present on the property including Wiggins Pond, Clonmell Creek, and White Sluice Race. In addition to these features, an extensive man-made ditch system is located across the site, as well as, numerous wetlands to the east, south, and west of the main production area (1,087 total acres of wetlands). The ditch system serves as an NJPDES-permitted wastewater and storm water convergence system for the majority of the site with two outfalls that discharge to the Delaware River. Effluent is monitored in the ditch system at Outfall 001A and for stormwater runoff at Outfall 007A (NJPDES Permit No. NJ0004219), which is located along the Delaware River at the north end of the E.L. Sluice Basin Area.

As part of the RI process, DuPont has conducted a tidal study to investigate the interaction between shallow groundwater and surface water on site. The investigations determined that groundwater flows from the Delaware River into the shallow and lower aquifers. With the exception of the Acid Area ditch, shallow groundwater recharges on-site ditches. Surface water and shallow groundwater in the northern portion of the plant (i.e., former PMDA/DMT and Nitrobenzene Production Areas) flows inland (south) toward the wetlands area in the central portion of the plant.

The ditch system at the site provides a migration pathway for contaminants from the process areas, as well as for impacted groundwater that enters the ditch system. During the Phase III investigation (Ref. 5), contaminants were detected above NJ GWQC in near-surface groundwater samples in the ditch areas. However, constituents detected in surface water were detected at much lower concentrations than constituent concentrations detected in groundwater sampled at each location, indicating attenuation occurs prior to migration into surface water. Contaminants detected in surface water in the ditch system above the NJ SWQC during the Phase III RI include: benzene, aniline, diphenylamine, arsenic, copper, lead, and mercury. Benzene (maximum concentration = 4.0 µg/L) was the only organic constituent detected in more than one surface water sample above screening criteria (NJ SWQC = 0.15 µg/L) (see Figure 4.2.3E, Phase III RI [Ref. 5]). Arsenic (maximum concentration = 4 µg/L) and copper (maximum concentration = 21 µg/L) of were the most significant detected inorganics above NJ SWQC (NJ SWQC = 0.0170 µg/L and 5.6 [chronic], respectively) (see Figure 4.2.3F, Phase III RI [Ref. 5]). Surface water discharging to the Delaware River at Outfall 001A, has been and remains in compliance with the requirements of the NJPDES permit.

Based upon the assessments conducted in Phases I, II, and III of the RI, DuPont concluded that the primary concern of surface water and sediment contamination is the potential effects on ecosystems, not on human health because of the potential for human exposure to areas of impact. Thus, during the Phase IV RI, additional surface water samples were collected and all available surface water quality data were evaluated against applicable ecological standards[3] (New Jersey Surface Water Quality Standards for freshwater aquatic life, EPA's National Recommended Water Quality Criteria for protection of aquatic life, Delaware River Basin Commission water quality regulations, and EPA Tier II Secondary Chronic Screening Values for protection of aquatic life). Exceedences of relevant screening criteria were shown in the Permitted Plant Drainage Area, Detention Basic PAW2, Sand Ditch, EL Sluice Drainage, and Clonwell Creek Drainage. The maximum concentrations of the primary constituents detected above applicable ecological screening levels include: aniline (57 µg/L, screening value = 3.4 µg/L); diphenylamine (440 µg/L, screening value = 4.9 µg/L); copper (569 µg/L, screening value = 19 µg/L); and lead (91.3 µg/L, screening value = 5.7 µg/L) (Ref. 6).

Sediment

As discussed above, the site contains an extensive wetland area, ditch system, and surface water bodies. Groundwater discharge into the wetlands or permitted ditch system may be a potential migration pathway for site-related constituents. Accumulation of these

constituents within the substrate (i.e., wetland soil and sediment) is a potential concern. Numerous organic and inorganic constituents as well as PCBs have been detected above sediment screening criteria (developed by DuPont to evaluate potential ecological risks and hazards) in the upper three feet of ditch material (in order to characterize SWMU 9 - Ditch System) (Ref. 5). Samples were also collected from natural subsoil beneath the ditches (approximately three feet below ditch material) and compared to the NJ NRDCSCC. For purposes of this EI Determination, all ditch material sediment sample results were also compared to the NJ NRDCSCC, given that the site is currently being used for industrial purposes. Several constituents were detected above NJ NRDCSCC in ditch material sediment samples as outlined in Table 3 below (See Figure 4.3.2A, Phase III RI for Sediment Sample Locations [Ref. 5]).

Table 3 - Contaminants Detected Above NJ NRDCSCC in

Ditch Material (Sediment) During the Phase III RI (SWMU 9)

Contaminant	Depth[a]	Sample Location [b]	Max. Conc.	NJ NRDCSCC
Arsenic	0-2.5	9-02, 9-04, 9-05, 9-06, 9-07	191	20
Lead	0-1	9-05, 9-07	1,590	600
PCB-1248 PCB-1254	0-0.5, 1-2 0-0.5, 2-3	9-06, 9-07 9-04, 9-07, 9-08	53 3.48	2.0 2
Benzene	0-2	9-05, 9-06	3,500	13
Benzo(a)pyrene	1-2	9-06	1.3J	0.66
2,4-DNT	0-1	9-05	13J	4
Diphenylamine	1-2	9-06	11,000	2,000
Nitrobenzene	0-2	9-05, 9-06	240,000	520
Xylenes	2-3	9-08	1,600	1,000

[a] Depth = the range (in ft bgs) in which contaminants were detected above the NJ NRDCSCC for sample locations.

[b] All sample locations with contaminants detected above NJ NRDCSCC are provided.

(Ref. 5)

Only one deeper natural soil sample (9-05) contained nitrobenzene (860 mg/kg) above the NJ NRDCSCC (520 mg/kg). Thus, DuPont concluded that contaminants are not being mobilized from the ditch material into underlying subsoils. The Phase III RI speculates that contamination in the wetland surface soil and sediment may be due to the shallow groundwater recharge that occurs in the ditch area, because shallow groundwater has been documented to discharge to surface water (i.e., wetlands) in the central portion of the site.

Air (Outdoors)

The DuPont property spans 1,856 acres, while the active areas of the site are mainly situated in the northeastern section of the property along the Delaware River. Based upon the areas where contamination is currently present (i.e., inactive, unused areas) and the fact that contaminants are concentrated in subsurface soil and groundwater, it is unlikely that outdoor air quality is of concern. It is believed that the natural mixing that occurs during normal air flow would disperse any contaminants such that they would not exceed levels of concern.

References:

1. Administrative Consent Order. Prepared by NJDEP. Dated December 11, 1989.

2. Phase I Remedial Investigation Report. 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. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.

5. Phase III Remedial Investigation Report. Prepared by DuPont Environmental Remediation Services. Dated April, 2000.

6. Ecological Investigation Report, DuPont Repauno Site. Volume I. Prepared by Dupont Corporate Remediation Group. Dated May 29, 2002.

7. Phase IV Remedial Investigation Report. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.

8. 2002 Annual Groundwater Report and Annual Cost Review Report. Prepared by DuPont Corporate Remediation Group. Dated April 2003.

9. Letter from Albert Boettler, DuPont Engineering, to Barry Tornick, USEPA - Region 2, re: Initial Indoor Air Assessment for the DuPont Repauno Site. Dated June 4, 2003.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

*Potential **Human Receptors** (Under Current Conditions)*

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food[4]
Groundwater	No	No	No	Yes	–	–	No
Air (indoor)							
Surface Soil (e.g. < 2 ft)	No	Yes	No	Yes	No	No	No
Surface Water	No	Yes	–	–	No	No	No
Sediment	No	Yes	–	–	No	No	No
Subsurface Soil (e.g., > 2 ft)	–	–	–	Yes	–	–	No
Air (outdoors)							

Instruction for Summary Exposure Pathway Evaluation Table:

1. Strike out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations, some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces. These spaces instead have dashes ("--"). While these combinations may not be probable in most situations, they may be possible in some settings and should be added as necessary.

___ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

__X__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale:

Groundwater

Based upon the four phases of the RI study, contaminated groundwater in the upper, middle, and lower aquifer is being contained within property boundaries. In the shallow aquifer, the distribution of organic and inorganic constituents above the NJ GWQC has been defined within the site boundary (see Figure 17, Phase II RI [Ref. 4]). Shallow groundwater is not used for potable or process water at the DuPont plant. Therefore, because contaminants in shallow groundwater are not migrating off site, and given that shallow goundwater is not used as a potable water supply on site, exposure to contaminants in this aquifer is unlikely (Ref. 5). DuPont indicates there are no planned on-site construction activities, and if construction activities do take place they would be performed in accordance with permit requirements and/or tenant restrictions in place at the site (Ref. 7). Thus, given that construction activities may occur upon obtaining the necessary permits, on-site exposure to construction workers has been identified as a potentially complete exposure pathway for shallow groundwater.

According to the Phase III RI (Ref. 5), organic constituents have migrated vertically from the former Nitrobenzene Production Area and contaminated the middle and lower aquifer at levels above the NJ GWQC (see Figure 18, Phase II RI [Ref. 4]). Inorganics have also been detected in the middle and lower aquifers. According to the RI results, constituents in the middle and lower aquifer are intercepted by well U11I01L, which was installed in 1985, and are prevented from migrating beyond the site boundary and toward plant production wells and off-site City Well 5 (Ref. 8). To monitor the performance of this interceptor well, DuPont conducts annual sampling from selected monitoring wells on site. In addition, groundwater recovered from this well is treated using GAC as a precautionary measure prior to discharge to the on-site ditch system through the NJPDES permitted outfall (Ref. 5). The on-site plant production well (T09P01M1 [former well identification PW-6]) is also treated using GAC as a precautionary measure. In addition, organic constituents are no longer being detected in the on-site plant production well above NJ GWQC (Ref. 5). Therefore, there is no potential for direct exposure to untreated groundwater in the middle and lower aquifer, and no current risk to on-site human health exists. In addition, because groundwater in the middle and lower aquifer is captured by the interceptor well system and not migrating beyond site boundaries, the Phase III RI concludes that there is no current risk to off-site human health.

Surface/Subsurface Soil

Based upon remedial investigation results (Phases I through IV, where applicable), surface and subsurface soil contamination exists only within property boundaries. Therefore, there is no potential for off-site exposure to contaminated soil. In addition, the facility is surrounded by a chain link fence on the west, south and east sides. The north side of the facility is bordered by a heavily industrialized segment of the Delaware River. The facility also maintains a security force that controls access to the site 24 hours a day. Routine security patrols are conducted throughout the facility. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring

(Refs. 6,7). Thus, trespasser access to on-site contamination is not considered a potentially complete exposure pathway.

As outlined in Question 2, surface soil contamination remains at several AOCs (SWMU 12, AOC A, AOC D, AOC F, and possibly AOC C and AOC H) above NJ NRDCSCC. Given that industrial activities are still being performed at the facility and on-site receptors are present (e.g., lease tenants, security personnel), on-site worker exposure to impacted surface soil is being considered a potentially complete exposure pathway at the site.

As outlined in the response to Question 2, subsurface soil contamination remains at SWMU 11 and several AOCs (AOC A, AOC D, AOC G and possibly AOC C and AOC H) above NJ NRDCSCC. In the Phase IV RI, DuPont indicates that on-site receptor exposure to impacted subsurface soil (>2 ft bgs) is unlikely. There are no planned on-site construction activities, and if construction activities do take place they would be performed in accordance with permit requirements and/or tenant restrictions in place at the site (Refs. 6, 7). Thus, given that construction activities may occur upon obtaining the necessary permits, on-site exposure to construction workers has been identified as a potentially complete exposure pathway for subsurface soil.

Surface Water/Sediment

Contamination in surface water and sediment is also contained within site boundaries. Therefore, only on-site receptors are of concern. Potential exposure to on-site workers is being evaluated as a potentially complete exposure pathway. As previously mentioned, the facility is surrounded by a chain link fence on the west, south, and east sides. The north side of the facility is bordered by the Delaware River. The facility has a security force controling access to the site 24 hours a day. Routine security patrols are conducted throughout the facility. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring (Refs. 6, 7). Thus, trespasser access to on-site contamination is not considered a potentially complete exposure pathway.

References:

1. Administrative Consent Order. Prepared by NJDEP. Dated December 11, 1989.

2. Phase I Remedial Investigation Report. 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. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.

5. Phase III Remedial Investigation Report. Prepared by DuPont Environmental Remediation Services. Dated April, 2000.

6. Phase IV Remedial Investigation Report. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.

7. Letter from Albert J. Boettler, DuPont Engineering, to Andrew Park, USEPA, Region II, re: Response to Booz Allen Hamilton Comments. Dated November 11, 2002.

8. 2002 Annual Groundwater Report and Annual Cost Review Report. Prepared by DuPont Corporate Remediation Group. Dated April 2003.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**[5] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks?

_X_ If no (exposures cannot be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale:

Groundwater

As outlined in Question 2, there is a potential for construction worker exposure to impacted on-site shallow groundwater. However, DuPont has put permit requirements and tenant restrictions in place for all intrusive activities at the site. These restrictions require excavation permits for any intrusive activity at the site. All intrusive activities would be checked against available site data to determine if activities were planned in impacted areas. If activities were to be performed in impacted areas, personal protective equipment (PPE) would be used in accordance with health and safety procedures in place at the site. Thus, any exposure to workers involved in intrusive activities in impacted areas is not expected to be significant. There is also an operating agreement in place with the tenants that utilize the DuPont facility (e.g., Repauno Products LLC, Cardox). Specific conditions within the operating permit prevent intrusive activities in tenant areas. If intrusive activities were desired, a formal written request would first need to be made directly to DuPont. DuPont would then review the request and determine if precautions need to be made to minimize exposure (Refs. 6, 7). Thus, any potential exposures that may occur to receptors in the tenant areas at the site are not expected to be significant.

Surface/Subsurface Soil

Surface

Surface soil contamination is present in the following AOCs: SWMU 12, AOC A, AOC D, AOC F, and possibly AOC C and AOC H.

> SWMU 12 is located outside of the tenant leasehold, in a non-operating area of the site. Thus, surface soil contamination in this AOC is not located in an area of the facility that is frequented by on-site receptors. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring to ensure on-site receptors are not exposed to surface contamination (Refs. 6, 7). Thus, any exposure to on-site receptors in this area is not expected to be significant.
>
> AOC A is currently leased to Repauno Products LLC. Surface soil contamination at this AOC is covered with pavement, old foundation, existing buildings, and/or gravel cover (approximately 3 - 6 inches) (Refs. 6, 7). Thus, any exposure to on-site receptors in this area is not expected to be significant.
>
> Surface soil contamination at AOC D is located within SWMU 8, the Iron Oxide Pile. This AOC is located off C Line Road, in a non-operating area of the site, and is adjacent to wetlands. Access to this area is restricted to on-site receptors by a post and chain fence that blocks entrance of unauthorized personnel to this area. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring to ensure on-site receptors are not exposed to

surface contamination (Refs. 6, 7). Thus, any exposure to on-site receptors in this area is not expected to be significant.

AOC F is located within a remote, wooded portion of the site. Primitive access roads within the AOC are used for security patrol and for investigation purposes only. In addition, portions of the area of thickly vegetated (See Ref. 7 for photographs of investigation areas within this AOC). In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring to ensure on-site receptors are not exposed to surface contamination (Refs. 6, 7). Thus, any exposure to on-site receptors in this area is not expected to be significant.

AOC C and AOC H are also both located outside of the tenant lease hold and in an non-operating area of the site. Thus, surface soil contamination in this AOC is not located in an area of the facility that is frequented by on-site receptors. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring to ensure on-site receptors are not exposed to surface contamination (Refs. 6, 7). Thus, any exposure to on-site receptors in this area is not expected to be significant.

Thus, based upon all available information, possible exposure for on-site workers to impacted surface soil at the DuPont site is not expected to pose significant risk.

Subsurface

As outlined in Question 2, there is a potential for construction worker exposure to impacted subsurface soil. However, DuPont has put permit requirements and tenant restrictions in place for all intrusive activities at the site. These restrictions require excavation permits for any intrusive activity at the site. All intrusive activities would be checked against available site data to determine if activities were planned in impacted areas. If activities were to be performed in impacted areas, PPE would be used in accordance with health and safety procedures in place at the site. Thus, any exposure to workers involved in intrusive activities in impacted areas is not expected to be significant. There is also an operating agreement in place with the tenants that utilize the DuPont facility (e.g., Repauno Products LLC, Cardox). Specific conditions within the operating permit prevent intrusive activities in tenant areas. If intrusive activities were desired, a formal written request would first need to be made directly to DuPont. DuPont would then review the request and determine if precautions need to be made to minimize exposure (Refs. 6, 7). Thus, any potential exposures that may occur to receptors in the tenant areas at the site are not expected to be significant.

Surface Water/Sediment

The surface water/sediment areas (e.g., wetlands, on-site ditches, drainage areas) at the site are either in areas that are difficult to access given that they are overgrown with thick vegetation and/or are located in remote areas of the site that are not routinely utilized by

on-site personnel. In addition, closed circuit cameras have been installed in all remote areas of the site for additional monitoring to ensure on-site receptors are not exposed to surface contamination (Refs. 6, 7). Thus, the potential for on-site workers to contact the limited areas of impacted surface water and sediment is unlikely and not expected to be significant. As mentioned previously, DuPont does not consider human exposure to impacted surface water and sediment at the site to be a concern (Ref. 6).

References:

1. Administrative Consent Order. Prepared by NJDEP. Dated December 11, 1989.

2. Phase I Remedial Investigation Report. 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. Prepared by DuPont Environmental Remediation Services. Dated January 29, 1996.

5. Phase III Remedial Investigation Report. Prepared by DuPont Environmental Remediation Services. Dated April, 2000.

6. Phase IV Remedial Investigation Report. Prepared by DuPont Corporate Remediation Group. Dated May 30, 2002.

7. Letter from Albert J. Boettler, DuPont Engineering, to Andrew Park, USEPA, Region II, re: Response to Booz Allen Hamilton Comments. Dated November 11, 2002.

8. 2002 Annual Groundwater Report and Annual Cost Review Report. Prepared by DuPont Corporate Remediation Group. Dated April 2003.

5. Can the "significant" **exposures** (identified in #4) be shown to be within acceptable limits?

____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale:

This question is not applicable. See response to Question #4.

6. Check the appropriate RCRIS status code for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

_X_ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI determination, "Current Human Exposures" are expected to be "Under Control" at the DuPont - Repauno Facility, EPA ID# NJD002373819, located at 200 North Repauno Avenue, in Gibbstown, New Jersey, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

___ NO - "Current Human Exposures" are NOT "Under Control."

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

Completed by: _____ Date: _____
Kristin McKenney
Risk Assessor
Booz Allen Hamilton

Reviewed by: _____ Date: _____
Kathy Rogovin
Sr. Risk Assessor
Booz Allen Hamilton

_____ Date: _____
Andrew 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 25, 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@epa.gov

Final Note: The Human Exposures EI is a Qualitative Screening of exposures and the determinations within this document should not be used as the sole basis for restricting the scope of more detailed (e.g., site-specific) assessments of risk.

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 surface soil	Air (Outdoors)	Corrective Action Measure
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., nitrobenz ditch - 4,524 tons, DMT ditch - 4,905 tons) * Ecological evaluation perform * Permit requirements/tenant restrictions * Site security measures * Evaluation of remedial alternatives planned
SWMU 11. Sanitary Landfill	Yes	No	No	No	No	Yes	No	* Installation of a 18-inch topso cover * Groundwater and surface wat monitoring as part of closure/p closure activities * Permit requirements * Site security measures * Evaluation of remedial alternatives planned
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
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
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
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
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
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
AOC H. Wharf Tank Farm.	No	No	Yes*	No	No	Yes*	No	* Further delineation of PCBs i subsurface soil planned * Permit requirements * Site security measures
AOC J. Wetlands	No	No	Yes	No	No	No	No	* Permit requirements/tenant restrictions

									* Site security measures * Evaluation of remedial alternatives planned
Sitewide	Groundwater	Yes	NA	NA	NA	NA	NA	NA	* Installation, ongoing operatio and annual monitoring of the groundwater IWS * Proposed establishment of a CEA and WRA

*Soil sample depth not readily available.

[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 appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Department of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

[3] Data from the Phase IV RI Ecological Evaluation are provided for information purposes only. Detected concentrations provided in the Ecological Evaluation were screened against ecological standards, and in many cases the detection limits were above corresponding NJ SWQC. Thus, given that DuPont has concluded that human exposure to contaminants in surface water and sediment at the site is unlikely, these data are provided for informational purposes only and the "relevant" ecological screening levels have been utilized.

[4] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish).

[5] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health risk assessment specialist with appropriate education, training and experience.