DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION Interim Final 2/5/99 RCRA Corrective Action Environmental Indicator (EI) RCRAInfo code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:DuPont Pompton Lakes WorksFacility Address:2000 Cannonball Road, Pompton Lakes, New Jersey 07442Facility EPA ID #:NJD 002173946

- 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 Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), 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.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) 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., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI 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 ground water 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 Determinations status codes should remain in 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).

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- 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 and Reference(s):

Acid Brook Valley

Groundwater was first sampled at the site in 1981. To date, 130 wells have been installed both on- and offsite in the Acid Brook valley, and characterization has continued to the present time. Quarterly groundwater data were reviewed in 1995 against the NJ Class IIA groundwater criteria (drinking water criteria) (GWIIA), and the results presented in the *Comprehensive Groundwater Monitoring Program (CGWMP)*, November 14, 1995. The CGWMP identified 10 VOCs as the constituents of concern (COCs). Since then, key monitoring wells on- and off-site are sampled on a semi -annual basis and results reported to NJDEP and EPA in an annual report. Groundwater data have delineated a chlorinated solvent plume [maximum approximately 2 ppm total volatile organic compounds (VOCs)] in the alluvium in the Acid Brook valley south plant region continuing south-southeast off-site to Pompton Lake.

Regarding bedrock, only well 107R currently exhibits VOCs above the GWIIA. Results of a recent bedrock investigation, presented in the DuPont *Site Investigation Groundwater Report* dated December 30, 2004, indicate that although some fractures are present in 107R, they are not productive and are not interconnected to any significant degree to bedrock or the deep alluvium. Well 107R exhibited no water flow during either the heat pulse flow meter testing or the packer testing, and no response was detected within the 107R borehole above the packer, in the deep alluvial well 107-D or in the other bedrock wells 106R and 125R during any of the three packer tests. DuPont has proposed to pump and sample well 107R periodically for six months to assess the extent of contamination. The program is designed to test DuPont's theory that the detections are the result of localized contamination caused by poor well construction practices. NJDEP has accepted this proposal; however, if concentrations do not significantly decrease as a result of pumping, then DuPont will be required to delineate the horizontal and vertical extent of bedrock contamination (e-mail correspondence from Frank Faranca, NJDEP to Ralph Sloat, DuPont, dated March 21, 2005).

Bedrock hydraulic conductivity is at least 8 orders of magnitude lower than the deep alluvium, so there is little to no migration of groundwater in the bedrock. The difference in the suite of detected VOCs in 107R compared to the alluvial wells above it suggests that the bedrock rock is not connected to the alluvium. In addition, the pump -and-treat system is maintaining an upward gradient from the bedrock to the deep alluvium, and the deep alluvium is captured by the pump -and-treat system (*Site Investigation Groundwater Report*. Prepared by DuPont December 30, 2004).

Wanaque River Valley

Six wells have been installed in the Wanaque River valley. A bedrock well was installed in 1990, and five alluvial wells were installed in 2002. No VOCs were detected in that groundwater system.

¹ "Contamination" and "contaminated" describes 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).

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- 3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "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 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 and Reference(s):

- Plume has the same foot print in the following reports, and the regional groundwater discharge area is Pompton Lake, so the off-site plume eventually discharges there:
 - Semiannual Groundwater Report (for November 1993), DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DERS. August 1, 1994.
 - Semiannual Groundwater Report (for May 1994), DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DERS. October 31, 1994.
 - Semiannual Groundwater Report (for November 1994), DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DERS. March 15, 1995.
 - Semiannual Groundwater Report (for May 1995), DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DERS. August 15, 1995.
 - Semiannual Groundwater Report, November 1995, DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DuPont Pompton, Lakes Works, Pompton Lakes, New Jersey. DERS. February 14, 1996.

Comprehensive Groundwater Monitoring Program. Prepared by DuPont. Dated November 14, 1995. Groundwater Interim Remedial Measures Summary of Groundwater Modeling, DuPont Pompton

- Lakes Works, Pompton Lakes, New Jersey. DERS. June 25, 1997.
- 1996 Annual Groundwater Report. DERS. February 10, 1997.
- 1997 Annual Groundwater Report. DERS. February 26, 1998.
- 1998 Annual Groundwater Report. Du Pont. February 26, 1999.
- 1999 Annual Groundwater Report. Du Pont. February 28, 2000.
- 2000 Annual Groundwater Report. Du Pont. February 26, 2001.
- 2001 Annual Groundwater Report. Du Pont. February 26, 2002.
- 2002 Annual Groundwater Report. Du Pont. February 26, 2003.
- 2003 Annual Groundwater Report. Du Pont. February 27, 2004.
- Site Investigation Groundwater Report. Du Pont. December 30, 2004.
- NJPESGW Quarterly P&T reports since Jan 1999
- CEA/WRA submitted in 2002.

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.

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

Х	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.

Rationale and Reference(s):

The PLW site sits on the southern edge of the New Jersey highlands, where groundwater systems are controlled to a large degree by topography. Acid Brook flows south through a valley characterized by bedrock ridges in the north and middle portions of the site. The valley is high and narrow in the north and slopes south, widening until it opens up in to a flat plain in the southern portion of the site. Acid Brook originates in the Ramapo State Forest land north/northeast of the site. Groundwater flows south through the Acid Brook valley on-site, then southeast from the southern plant region and off-site to discharge into Pompton Lake.

- 5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their 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 eco-systems 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 concentration³ of key contaminants discharged above their groundwater "level," 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 eco-system.
 - **X** If no (the discharge of "contaminated" groundwater into surface water is potentially significant) continue after documenting: 1) the maximum known or reasonably suspected concentration³ 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 concentrations³ 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 and Reference(s):

The significance of discharge of contaminants from groundwater to Pompton Lake can be evaluated by reviewing water quality data collected from monitoring wells located adjacent to the lake. Table 1 below presents the most recent data from adjacent wells, as presented in the *2003 Annual Groundwater Report*, prepared by DuPont, dated February 27, 2004. The data indicate that contaminant concentrations exceed 10 times the New Jersey Ground Water Quality Criteria (NJ GWQC) in wells 132, 132-I, and 27-I. Consequently, the discharge of VOC-contaminated groundwater to Pompton Lake cannot be considered "insignificant" and will be further assessed in the response to Question 6.

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

Table 1. Groundwater Contaminant Concentrations Detected Adjacent to Pompton Lake in October 2003 (µg/L)

		Well ID	131	131-D	131-I	132	132-I	140-I	27	27-I
	Date S	ampled	14-Oct-03	15-Oct-03	15-Oct-03	14-Oct-03	16-Oct-03	16-Oct-03	16-Oct-03	16-Oct-03
		Lab ID	4144824-1	4147044-1	4147045-1	4144825-1	4147071-1	4147052-1	4147046-1	4147033-1
GWIIA	Analyte	units								
1	TETRACHLOROETHYLENE	ug/l	*4.7	*7.8	0.09 J	*66	*610	0.09 J	0.07 J	*2000
1	TRICHLOROETHENE	ug/l	*2.3	*4.5	0.09 J	*4.6	*130	<0.08 U	<0.08 U	*72
70	CIS-1,2 DICHLOROETHENE	ug/l	4.8	9.2	<0.1 U	3.3	27	<0.1 U	<0.1 U	14 J
100	TRANS-1,2-DICHLOROETHENE	ug/l	0.4 J	1.3	<0.1 U	<0.1 U	<1.0 U	<0.1 U	<0.1 U	<5.0 U
2	1,1-DICHLOROETHENE	ug/l	<0.1 U	0.2 J	<0.1 U	<0.1 U	*5.4 J	<0.1 U	<0.1 U	*<5.0 U
30	1,1,1-TRICHLOROETHANE	ug/l	0.1 J	0.3 J	<0.1 U	0.2 J	22	<0.1 U	<0.1 U	6.9 J
50	1,1-DICHLOROETHANE	ug/l	<0.1 U	0.3 J	<0.1 U	<0.1 U	2.0 J	<0.1 U	<0.1 U	<5.0 U
2	1,2-DICHLOROETHANE	ug/l	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<1.0 U	<0.1 U	<0.1 U	*<5.0 U
5	VINYL CHLORIDE	ug/l	<0.2 U	3.1	<0.2 U	<0.2 U	<2.0 U	<0.2 U	<0.2 U	<10 U
2	CARBON TETRACHLORIDE	ug/l	<0.09 U	<0.09 U	<0.09 U	<0.09 U	*38	<0.09 U	<0.09 U	*<4.5 U
Materia	•									

Notes:

 $\label{eq:state} \begin{array}{l} < U = \mbox{undetected} \ at the specified detection limit \\ < \mbox{value, assumed to be 50\% detection limit} \\ J = \mbox{Estimated value between MDL and } \ \mbox{PQL} \end{array}$

MDL = Method detection limit

PQL = Practical quantitation limit * = Above GWIIA

GW -IIA = New Jersey Groundwater Standard for Class IIA aquifer

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptabl**e" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

If yes - continue after either: 1) identifying the Final Remedy decision incorporating Х these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), 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 specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, 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 acceptabl**e") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

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

Rationale and Reference(s):

Surface-water samples were collected in Pompton Lake during an evaluation of the lake to find an in-lake reference area for the Acid Brook delta ecological study (*Acid Brook Delta Ecological Investigation Reference Area Evaluation and Phase 1 Data Report*. Prepared by PTI. January 1997). No VOCs (the only COCs) have been detected in the lake water.

At the request of EPA, additional sampling was required to assess potential impacts resulting from the discharge of contaminated groundwater into the lake. Sampling locations were specified by EPA to characterize surface water discharge between wells 132-I and 27-I.

Sampling was conducted on August 6, 2004 with a confirmation sampling event on November 11, 2004. Sampling results and evaluation were submitted to EPA and NJDEP in a letter dated January 4, 2005. The November 2004 results are presented below in Table 2. Low concentrations of several VOCs were detected in the surface water. Maximum concentrations detected were tetrachloroethene $(3.2 \ \mu g/l)$, trichloroethene $(0.4 \ J \ \mu g/l)$, and cis -1,2-dichloroethene $(0.3 \ J \ \mu g/l)$. The lake is not used as a drinking water source and there are signs posted prohibiting swimming. Fish consumption advisories are also published for Pompton Lake. Potential exposure for residents is limited to other activities such as boating. The primary receptors for surface water are ecological.

Since there are no ecological surface water screening levels available for New Jersey or EPA Region II, a compilation of available ecological screening levels, presented below in Table 3, were used as a range of acceptable values for comparison purposes. The low concentrations of VOCs detected in Pompton Lake

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, 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 eco-systems.

were less than the range of ecological screening criteria. Based on this comparison, the discharge can be considered currently acceptable.

	Sample ID Date Sampled	POM-W-SW1 11-Nov-04	POM-W-SW1- DUP 11-Nov-04	POM-W-SW2 11-Nov-04	POM-W-SW3 11-Nov-04	POM-W-SW4 11-Nov-04	POM-W-SW5 11-Nov-04
		SW1	SW1 Dup	SW2	SW3	SW4	SW5
Analysis Name Units	NJ FW2			Re	sult		
Tetrachloroethene	0.388 (hc)	3.2	1.2	3.2	0.4 J	0.1 J	0.1 J
Trichloroethene	1.09 (hc)	0.3 J	0.2 J	0.4 J	0.08 J	U (0.08)	0.1 J
cis-1,2-Dichloroethene	-	0.3 J	0.2 J	0.3 J	U (0.1)	U (0.1)	U (0.1)
trans-1,2-Dichloroethene	592 (h)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)
1,1-Dichloroethene	4.81 (h)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)
1,1,1-Trichloroethane	127 (h)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)
1,1-Dichloroethane	-	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)
1,2-Dichloroethane	-	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	U (0.1)
Vinyl Chloride	0.0830 (hc)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.2)
Carbon Tetrachloride	0.363 (hc)	U (0.09)	U (0.09)	U (0.09)	U (0.09)	U (0.09)	U (0.09)

1 able 2 – Summary of Surface water Results in November 2004 (µg/1	Table 2 – S	Summary of S	Surface Water	Results in Nov	vember 2004 (µg	/L)
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Notes:

 $\begin{array}{l} U = \text{undetected at the specified method detection limit (MDL)} \\ J = \text{estimated value above the MDL but below the practical quantitation limit (PQL)} \\ \text{NJ FW2} = \text{New Jersey Surface Water Classification FW2} \\ \end{array}$

(c) = chronic aquatic life protection criteria

(h) = noncarcinogenic effect - based human health criteria

Table 3 –	Ecological	Benchmarks	for	Surface	Water	(ug/L)
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	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene
Canadian WQG	111	21	
EPA Region 4 Chronic	80		1350
EPA Region 5 ESL	8.9	75	
EPA Region 6	790	1110	14000
EPA Tier II SCV	90	40	590

Notes:

Reference: Letter from Ralph Sloat, DuPont, to Andrew Park, EPA, dated January 4, 2005.

WQG = Water Quality Guidelines ESL = Ecological Screening Levels

SCV = Secondary Chronic Values

- 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 and Reference(s):

Under the *Comprehensive Groundwater Monitoring Program*, groundwater monitoring of on- and off-site well clusters occurs semi-annually in May and November and is reported to the NJDEP in an annual groundwater report the following February. This report includes groundwater gradient maps and total VOC plume maps.

- 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 Pompton Lakes Works, EPA ID # NJD 00217346, located at 2000 Cannonball Road, Pompton Lakes, New Jersey 07442. 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.

Date

Date

Date: 4/14/2005

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

- IN More information is needed to make a determination.
- **Prepared by** : DuPont
- Reviewed by: Lucas Kingston, Hydrogeologist Booz Allen Hamilton

(signature) Andrew Park Remedial Project Manager RCRA Programs Branch, EPA Region 2

(signature) Barry Tornick Section Chief RCRA Programs Branch, EPA Region 2

Approved by: Adolph Everett Chief RCRA Programs Branch, EPA Region 2

Locations where References may be found:

EPA Region 2, RCRA Records Center, 290 Broadway, 15th Floor, NY, NY 10007-1866 NJDEP, Office of Records Custodian, Attn: Public Records Requests, 401 East State Street, P.O. Box 442, Trenton, New Jersey 08625-0442, (609) 341-3121, <u>http://www.nj.gov/dep/opra</u>

Contact telephone and e-mail numbers

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