DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: **Solutia Inc. Delaware River Plant (formerly Monsanto)**
Facility Address: **NJ State Highway Route 130, Bridgeport, New Jersey 08014**
Facility EPA ID#: **NJD001700707**

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 EIs 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 objectives 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 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 Solutia facility (formerly known as the Monsanto Delaware River Plant) is located on 461 acres in Bridgeport, New Jersey. The facility is bounded by the east bank of the Delaware River to the north and northwest, Shell Oil Company to the east, the Logan Cogeneration Plant to the west, and U.S. Highway

Route 130 to the south. Sun Oil and BP Oil operate petroleum refineries directly across the Delaware River in Pennsylvania. Birch Creek bisects the property from south to north and drains to the Delaware River. Historic manufacturing and waste disposal operations have been limited to approximately 220 acres of Solutia property situated on the western side of Birch Creek; another 167 acres of undeveloped Solutia property sits east of Birch Creek. The northern half of the site is located on fill silt and clay dredged from the Delaware River by the Army Corp of Engineers from 1915 through the 1950s. All land surrounding the site is zoned for industrial uses, but much of the land to the east and south is currently being leased for agricultural purposes. Several residences are located within one-half mile of the site, but the overall area remains sparsely populated; an estimated 5,400 people live within four miles of the site.

Manufacturing operations began at the Solutia site in 1961. Solutia manufactured plasticizers, flame retardants, organic industrial chemicals, and dyes. Raw materials used in production processes have included phenol, toluene, naphthalene, benzyl chloride, butanol, chlorine, and xylene, among other chemical constituents. Throughout the facility's operating history, Solutia/Monsanto has been using three production wells to draw groundwater from the deeper aquifer beneath the site inward and upward for plant production processes and non-community potable water use.

Investigation and corrective action efforts have been in progress at Solutia since 1983. Solutia's New Jersey Pollutant Discharge Elimination System-Discharge to Groundwater (NJPDES-DGW) permit from September 1988 requires ongoing monitoring of both shallow and deep groundwater. Solutia's final Hazardous and Solid Waste Amendments (HSWA) permit (1994) includes requirements for corrective action at 14 solid waste management units (SWMUs) and areas of concern (AOCs). The RCRA Facility Investigation (RFI) for Past Disposal Area (PDA) No. 1 was completed and approved in 1983. A site-wide RCRA Facility Assessment (RFA) was conducted at Solutia in 1987. Solutia conducted site-wide Phase I RFI activities in 1997. During 1998 and 1999, Phase II investigation activities were conducted at SWMUs 2, 3, and 4.

Based on previous investigations, Solutia has recommended no further action for most of the identified SWMUs and AOCs, but additional corrective measures are still required at several SWMUs and AOCs, as discussed in the response to Question No. 1. Solutia has continued pumping from extraction wells in the PDA No. 1 area and production wells in the center of the site to maintain hydraulic control. A semi-annual groundwater monitoring program is in place and will remain in effect. In addition, surface water and sediment pore water samples were most recently collected from the Delaware River in August 2005 to verify that contamination from the Solutia site has not had significant negative impacts on these media. Administrative institutional controls, including a Deed Notice and a groundwater Classification Exception Area (CEA), are also planned for the Solutia property.

In October 2000, Ferro Corporation purchased 293 acres of the 461-acre site from Solutia, which included the production area. Ferro continues to manufacture the same products, with the exception of the dyes. Solutia continues to be responsible for all contaminated areas of the site. Since the Solutia property historically included the entire 461 acre site, all SWMUs (including those now under the ownership of Ferro) have been considered in this evaluation.

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.

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs): Fourteen SWMUs and AOCs were identified in the HSWA Permit for Solutia (Ref. 2), and each is discussed in detail below. A map showing the location of SWMUs and AOCs is provided as Figure 9 in the Description of Current Conditions Report (Ref. 4).

SWMU 1, PDA No. 1: This unit consists of a 3.5-acre unlined landfill located in the northwest corner of the site, approximately 150 feet from the Delaware River. The landfill was used from 1961 to 1970 for disposal of benzyl chloride residues, polychlorinated biphenyl (PCB) materials, benzyl chloride, and a toluene/benzyl chloride mixture. The wastes were buried in drums and as free liquids. Hydrogeologic investigations have shown that groundwater in the vicinity of PDA No. 1 is contaminated with PCBs and VOCs. An Administrative Consent Order (ACO), signed by the New Jersey Department of Environmental Protection (NJDEP) and the facility in December 1983, required interim remedial measures for organic and inorganic constituents in this area. To eliminate the possibility that impacted groundwater would discharge off site into the adjacent Delaware River, Monsanto installed a slurry wall in 1983. To hasten remediation of the area and prevent contaminants from moving beyond the slurry wall, a subsoil flushing system was tested and installed in 1986. Pumping wells removed contaminated groundwater from the subsurface for treatment at the on-site waste treatment plant, followed by reinjection of clean water within the slurry wall. The system was modified in 1992 in response to new land disposal restrictions, and extracted groundwater was sent off site for treatment and discharge, rather than being reinjected into the aquifer. According to documentation provided by Monsanto, concentrations of soluble contaminants within the slurry wall had been reduced by approximately 70 percent by May 1992 (Ref. 1), but contaminant removal rates had leveled off due to limitations of pump and treat remedial systems and low contaminant concentrations in extracted groundwater (Ref. 3). As a result, the pump and treat system has been discontinued. However, to maintain hydraulic control, Solutia has continued pumping from extraction wells in the PDA No. 1 area and production wells in the center of the site. A geocomposite clay cap was placed over the disposal area in 1994. The slurry wall at SWMU 1 has been demonstrated to be effective and, along with clay capping over the area, constitutes the final remedy for groundwater beneath this portion of the site.

Groundwater monitoring conducted in this area in November 2002 (Ref. 18) indicated concentrations of benzene (estimated at 22 µg/L) and toluene (1,700 µg/L) above their respective New Jersey Ground Water Quality Criteria (NJ GWQC) of 1.0 and 1,000 µg/L in one SWMU 1 well (MW-53-1). The HSWA permit indicates that no additional investigation activities are required (Ref. 13). Nevertheless, to assess whether this SWMU has negatively impacted water quality in the Delaware River, surface water and sediment pore water samples were collected near the shoreline in August 2005 (Ref. 21). These

samples were analyzed for nine volatile organic compounds (VOCs) and two semivolatile organic compounds (SVOCs). None of these constituents of concern (COCs) were reported in any of the 15 sediment pore water samples or two of the five surface water samples (Ref. 22). Three of the five surface water samples contained toluene at levels ranging from 2.1 to 6.5 micrograms per liter (µg/L). However, because the most conservative NJ surface water criteria for toluene is 7,440 µg/L, the detected concentrations of toluene are considered insignificant.

SWMU 2, PDA No. 2: This unit consists of a seven-acre unlined landfill in the northwestern corner of the site near PDA Nos. 1 and 3. This unit was a non-RCRA regulated unit used for disposal of phthalic anhydride pitch, nonhazardous plant solid waste, and wastewater treatment plant (WWTP) sludge from 1970 to 1978. A 30-mil polyvinyl chloride (PVC) cap and an 18-inch thick layer of soil were installed over PDA No. 2 in 1980 with NJDEP approval. The HSWA permit required completion of an RFI for soil, soil gas, groundwater, surface water, and sediment at this SWMU. During this sampling, one surface soil sample (S2-7) showed a concentration of hexachlorobenzene that exceeded the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC) but was below the New Jersey Impact to Groundwater Soil Cleanup Criteria (NJ IGWSCC). Contamination was not identified in soil gas, surface water, and sediment. EPA and NJDEP required additional evaluation of possible hexachlorobenzene contamination in surface soil. Supplemental surface soil samples were collected to delineate possible soil contamination in the area during the second quarter of 1999. None of the samples contained elevated levels of hexachlorobenzene (Ref. 9). Solutia estimated that the extent of hexachlorobenzene contamination was limited (maximum of 59 cubic yards) and, thus, proposed to excavate all impacted soil and remediate this area to the NJ NRDCSCC (Ref. 13). Groundwater monitoring conducted in this area in May 2002 indicated a concentration of benzene (estimated at 2.04 µg/L) above the NJ GWQC (1.0 µg/L) in one well (MW-50S). However, benzene was not reported above its NJ GWQC in this well during the November 2002 sampling round (Ref. 18).

SWMU 3, PDA No. 3: This unit was the original solid waste landfill for the plant (a non-RCRA regulated unit) and had been used from 1961 to 1970. The unit was used for disposal of the facility's solid waste, including phthalic anhydride pitch, phthalic anhydride heads, laboratory wastes, trash, naphthalene, lime grits, activated carbon, phosphate ester filter waste, and spill cleanup material. A railroad spur has been constructed on the northern edge of the disposal area. When this unit closed, solid waste was buried north of the railroad tracks at PDA No. 2. This unit covers approximately three acres, is unlined, has been capped with a soil cover, and is now re-vegetated. Solutia submitted a request for permanent capping of PDA No. 3 to NJDEP in 1988, but the plan has not yet been implemented. The HSWA permit required completion of an RFI for soil, soil gas, groundwater, surface water, and sediment at this SWMU. With the exception of surface soil, Solutia found no significant contamination in any of these media during the 1997 field investigation. In surface soil, PCBs were reported above the NJ NRDCSCC and the NJ IGWSCC; hexachlorobenzene was also reported at elevated levels. Five rounds of supplemental sampling were conducted between 1999 through 2001 and confirmed widespread hexachlorobenzene and PCB contamination in surface soil in the vicinity of SWMU 3. Solutia proposed to install a permanent capping system at the SWMU 3 unit (including the PDA 3 landfill and PCB contamination extending beyond PDA 3 boundaries) to achieve final closure and minimize long-term risk for contact with contaminated soil and groundwater (Ref. 13). Groundwater monitoring performed in this area in May 2002 indicated a concentration of vinyl chloride (58.7 µg/L) above the NJ GWQC (5.0 µg/L) in one well (MW-27D); however, vinyl chloride was not detected above the NJ GWQC in this well during the November 2002 sampling round (Ref. 18).

SWMU 4, Phenol Equalization Lagoon (PEL): From 1975 to 1978, two separate sludge lagoons were operated west of PDA No. 3 in the area now covered by the PEL. The two lagoons were consolidated and now maintain dimensions of 330 feet long by 100 feet wide by 11 feet deep. Beginning in 1978, the PEL was used for equalization of wastewater containing phenol at concentrations up to 5,000 parts per million (ppm). In the 1980s, the PEL was designated a RCRA-regulated lagoon due to an assumption that the material contained within would have pH level that might classify the waste as RCRA hazardous for corrosivity. However, subsequent investigation determined that the pH levels did not qualify the material as RCRA hazardous; thus, this PEL should not have been designated a RCRA-regulated lagoon. In 1990, the lagoon stopped operating, and the contents were removed for off-site disposal. The equalization of wastewater containing phenol is now managed in an aboveground tank. The HSWA permit required completion of an RFI for soil, soil gas, and groundwater at this SWMU. Solutia found no significant contamination in soil gas or groundwater during the 1997 field investigation, but phenol was detected above the NJ IGWSCC in subsurface soil. Supplemental soil samples were collected in 1999 to 2001. Sample results indicated that no constituents were detected in surface soil surrounding the PEL. However, subsurface soils beneath the liner within the PEL and at two sample locations beneath the eastern dike have been impacted with phenol above the NJ IGWSCC. Phenol concentrations were not reported above the New Jersey Residential Direct Contact Soil Cleanup Criteria (NJ RDCSCC) and/or NJ NRDCSCC. Solutia has proposed to remove and dispose of the residual sludge, liner materials, and sand bedding materials beneath the liner and consolidate these materials in the East Landfill. The lagoon dikes will be removed and a permanent capping system will be installed across the PEL area. Dense non-aqueous phase liquid (DNAPL) was also identified in well MW-63-1 in 1998; however, upon further investigation Solutia concluded that the construction of this well provided a vertical migration pathway for product material that had been released from the lagoon at the northeast corner. Wells MW-63-1 and MW-101S were replaced with double-cased wells to eliminate the potential vertical migration pathway. Solutia indicates that the DNAPL found in well MW-63-1 is a localized impact area. Groundwater monitoring conducted at SWMU 4 in May 2002 indicated the presence of xylene in well MW-63 at an estimated and tentatively identified concentration of 55 µg/L (Ref. 18). This concentration exceeds the NJ GWQC for xylene of 40 µg/L. No samples were collected from this well in November 2002 with which to determine any trends in xylene concentrations.

SWMUs 5 and 6, Sludge Lagoon Nos. 3 and 4: These units received a combination of primary and secondary sludge from the on-site WWTP. Lagoon No. 3 was approximately 370 feet by 340 feet by 12 feet deep. Lagoon No. 4 was approximately 350 feet by 180 feet by 12 feet deep. Both are located in the northwest corner of the site, bounded by the three PDA SWMUs. Thickened sludge from both lagoons was regularly removed for placement in the East Landfill. The units ceased operation in 1986 and were closed in 1987. During closure, all remaining sludge was excavated, and unit liner materials were removed for final disposal in the East Landfill. Analysis of the sludge during closure revealed the presence of VOCs and SVOCs. The HSWA permit required completion of an RFI for soil, soil gas, and groundwater at these SWMUs. Solutia found no significant contamination in soil gas or groundwater during the 1997 field investigation, but VOCs and SVOCs were detected above the NJ IGWSCC in subsurface soil in the southern portion of SWMU 5. Clean fill caps at SWMUs 5 and 6 prevent direct exposure to contaminated media. Groundwater monitoring conducted in May and November 2002 show no contaminants above NJ GWQC at SWMUs 5 and 6 (Ref. 18). NJDEP approved these SWMUs for no further action in October 1998 (Ref. 7).

SWMU 7, Raw Waste Equalization Lagoon (RWEL): This unit is located on the western edge of the Solutia property, directly south of the PDAs and lagoons (SWMUs 1 through 6). The lagoon has a single

polyolefin liner and is approximately 250 feet by 230 feet by 10 feet deep. The RWEL was originally used as an off-specification wastewater lagoon for the WWTP. In 1978, it was converted to an on-line equalization lagoon for wastewater from the WWTP primary clarification step. The lagoon stopped operating in 1990, and the contents were disposed off site. The process formerly performed in the RWEL is now conducted in an aboveground equalization tank. The HSWA permit required completion of an RFI for soil, soil gas, and groundwater at this SWMU. Solutia found no significant contamination in any of these media during the 1997 field investigation. Groundwater monitoring conducted at SWMU 7 in May 2002 indicated the presence of xylene in well MW-105 at an estimated and tentatively identified concentration of 442 µg/L (Ref. 18), which exceeds the NJ GWQC for xylene of 40 µg/L. However, xylene was not reported above its NJ GWQC in this well during the November 2002 sampling event. This SWMU was approved for no further action in October 1998 (Ref. 7).

SWMU 8, Process Sewer System (PSS): The PSS collects and conveys all wastewater generated at the plant to the on-site WWTP. Sources discharging to the sewer system include surface water runoff collected from the production areas of the plant, cooling and process water from production operations, and surface water runoff from the hazardous waste storage pad and storage tank containment areas. Early groundwater monitoring revealed several VOCs in shallow groundwater near a damaged process sewer manhole. The manhole was repaired in February 1985, and major upgrading of portions of the sewer system was completed in 1992 and 1993. To assess the effectiveness of this work in mitigating the potential source area, the HSWA permit required completion of an RFI for soil, soil gas, and groundwater at this SWMU. Solutia found no significant contamination in soil gas or groundwater during the 1997 field investigation. VOCs were detected in subsurface soil above respective NJ IGWSCC in the vicinity of the former damaged manhole; however, historic groundwater data suggest that this contamination is not adversely impacting groundwater quality. This SWMU was approved for no further action in October 1998 (Ref. 7), but sewer lines must continue to be regularly monitored and may need to be upgraded in the future.

SWMU 9, Stormwater Drainage Ditch (SWDD): The SWDD drained portions of the property encompassing the three PDAs, chemical manufacturing areas, and waste storage areas. The SWDD consisted of a series of earthen channels throughout the site that combined to form a single main channel prior to discharge to the Delaware River at permitted outfall 002A. In 1985, the earthen drainage channels were replaced with corrugated metal stormwater pipes and a concrete retention basin. Much of the sediments and soil lining the main channel were excavated and deposited in the East Landfill during the upgrading process, but no soil quality data are available for the excavated material or surrounding soil. To determine if any other leaks had occurred, the HSWA permit required completion of an RFI for soil at this SWMU. PCBs were found in one surface soil sample above the NJ NRDCSCC value but below the NJ IGWSCC during the 1997 field investigation. This SWMU was approved for no further action in October 1998 (Ref. 7).

AOC 10, Dock Area: This AOC encompasses the area previously occupied by Solutia's deep water dock. Incoming raw materials and outgoing finished products were transported by tanker ship via this dock. Two releases of molten naphthalene were documented in this area; between 3,000 and 5,000 pounds were released on December 15, 1982, and approximately 500 pounds were released on November 7, 1983. The majority of the spilled product solidified on the dock and was recovered, but a total of approximately 250 pounds of naphthalene entered the river as a result of the spills. NJDEP was notified immediately after each event, and EPA investigated the spill area for residual contamination. In a report dated April 20, 1987, EPA recommended no further action. Nevertheless, the HSWA permit required

completion of an RFI for soil, soil gas, and shoreline sediment at this AOC. Solutia found no significant contamination in any of these media during the 1997 field investigation, and this AOC was approved for no further action in October 1998 (Ref. 7). Supplemental sampling of surface water and sediment pore water in August 2005 also indicated no significant contamination in these Delaware River media (Ref. 22).

AOC 11, Rail Loading Area: This AOC encompasses the area where raw materials (anhydrous ammonia and phosphoric acid) and finished products are loaded and unloaded from railroad tank cars. During the 1988 NJDEP visual site inspection (VSI), stained gravel and elevated soil gas readings indicated the possibility of contamination related to spills in this area. The HSWA permit required completion of an RFI for soil at this AOC. SVOCs were found in two different surface soil samples above the NJ NRDCSCC and/or NJ IGWSCC. This AOC was approved for no further action in October 1998 (Ref. 7). This SWMU now belongs to Ferro.

SWMU 12, Three Aboveground Storage Tanks (ASTs): The AST area is located at the east end of the plant process area. Three RCRA-regulated ASTs in this area are used to store hazardous wastes generated at the site, including benzyl chloride and still bottoms. The tanks are situated on diked concrete pads that drain to the plant sewer system and the WWTP. The area is paved and diked, but records indicate that deficiencies in the secondary containment system may have allowed runoff to escape before the pads were upgraded. The RCRA permit for the ASTs in this location was renewed in January 1994. The HSWA permit also addressed this SWMU by requiring completion of an RFI for soil in exposed areas surrounding the pads. Trichloroethylene (TCE) was found in one surface soil sample above the NJ IGWSCC but below the NJ NRDCSCC. Because TCE has not been reported recently in groundwater, this contamination does not appear to be negatively impacting other media. Furthermore, surface soil at SWMU 12 is covered with gravel and not exposed at the ground surface. This SWMU was approved for no further action in October 1998 (Ref. 7). This SWMU now belongs to Ferro.

AOC 12A, One Removed Aboveground Process Tank: This tank was included in the original RCRA permit issued by NJDEP in June 1988 for four ASTs in the production area. This AST was removed from the permit when it was renewed in January 1994 because it was classified as a process tank rather than a storage tank. The AST is situated within a concrete secondary containment basin in the area of SWMU 12. The bottom of the basin is set approximately 3.5 feet below ground surface (bgs). The HSWA permit required completion of an RFI for soil in exposed areas surrounding the basin. No impacted soil was identified during the 1997 field investigation, and this AOC was approved for no further action in October 1998 (Ref. 7). This SWMU now belongs to Ferro.

SWMU 13, Drum Storage Area: This unit is a RCRA-regulated paved drum storage pad covering 1,160 square feet with a capacity of 420 55-gallon drums. Hazardous wastes stored in this unit include spent benzyl chloride, phthalic anhydride, and waste oil. The pad is located on a portion of the central plant area that was paved in 1970. When cracks were found in the paved surface in 1981, the pad was resurfaced with an additional layer of asphalt, a spill containment curb was constructed, and a spill drainage collection system was installed. It is unclear whether secondary containment was provided for the unit before these upgrading steps were implemented. Although no soil gas readings were detected in the exposed sandy soil around the pad during NJDEP's 1988 VSI, the HSWA permit required completion of an RFI for soil around the pad's perimeter. Hexachlorobenzene was detected in one surface soil sample at a concentration exceeding the NJ NRDCSCC but below the NJ IGWSCC. Groundwater monitoring conducted in May and November 2002 show no contaminants above NJ GWQC at SWMU 13

(Ref. 18). This SWMU was recommended for no further action in October 1998 (Ref. 7). The Drum Storage Area was sold to Ferro in 2000**.**

SWMU 14, Hazardous Waste Landfill: This RCRA-regulated unit, commonly known as the East Landfill, was constructed on top of the dredge spoils fill in the northeastern corner of the site (but still on the western side of Birch Creek). The landfill operated from August 21, 1978 until 1987 under NJDEP Certificate of Registration for Facility 0809F issued on June 2, 1978 (Ref. 13). The nine-acre landfill was constructed with a double clay liner and leachate collection system. Primary and secondary WWTP sludges and solid chemical wastes were deposited in this unit. The landfill is currently capped with wood chips and a vegetated soil cover. Solutia continuously maintains this temporary cap condition with periodic surface grading and removal of stormwater trapped within the wood chip layer. Due to the subsidence of the East Landfill, Solutia has proposed to install a lightweight cap that would be replaced as necessary (possibly every ten to 15 years). Fifteen shallow monitoring wells are sampled semi-annually along with four deep wells as part of closure/post-closure groundwater monitoring required under the NPDES-DGW permit (Ref. 13). Groundwater monitoring conducted in May and November 2002 showed no contaminants above NJ GWQC at SWMU 14 (Ref. 18).

In summary, a majority of the SWMUs and AOCs at the Solutia site require no further action. Additional corrective measures and remedies have been proposed for several SWMUs, including SWMU 2 (excavation of residual hexachlorobenzene contamination), SWMU 3 (installation of permanent capping system), and SWMU 4 (remove and dispose of residual materials, remove lagoon dikes, and install permanent capping system). Nevertheless, Solutia must continue groundwater monitoring and complete establishment of appropriate deed restrictions. A CEA was submitted for the Solutia property on March 19, 2002 (Ref. 15); however, NJDEP indicated that the CEA required significant revision in a February 25, 2003 letter (Ref. 19).

References:

1. Fax from Don Hoegel, Monsanto Delaware River Plant, to Agathe Nadai, USEPA, re: PDA No. 1 Background. Dated May 4, 1992.
2. HSWA Permit issued to the Monsanto Company Delaware River Plant, Bridgeport, New Jersey. Prepared by USEPA. Dated December 5, 1994.
3. Remediation Plan for Final Closure of PDA-1, Monsanto Delaware River Plant, Bridgeport, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated March 1, 1995.
4. Description of Current Conditions Report. Prepared by Smith Technology Corporation. Dated January 1997.
5. SWMU/AOC Sampling and Analysis Report, Solutia Delaware River Plant, Bridgeport, New Jersey. Prepared by BCM Engineers. Dated January, 1998.
6. Letter from Barry Tornick, USEPA, to Donald Hoegel, Solutia, re: EPA ID No. NJD001700707. Dated July 17, 1998.
7. Letter from Barry Tornick, USEPA, to Donald Hoegel, Solutia, re: EPA ID No. NJD001700707. Dated October 1998.
8. Letter from Charles Evans, Solutia, to Agathe Nadai, USEPA, re: Solutia Delaware River Plant. Dated December 3, 1998.
9. Quarterly Progress Report No. 18, Solutia Delaware River Plant, Bridgeport, New Jersey. Prepared by BCM Engineers. Dated June 28, 1999.

10. Personal Communication between Michele Benchouk, Booz Allen Hamilton, and Agathe Nadai, USEPA, re: Current Status of Solutia Delaware River Plant as it Pertains to Achievement of the Environmental Indicator for Groundwater. March 28, 2001.
11. Letter from Glenn Randall, URS Corporation, to Gregory Zalaskus, NJDEP, re: Results of Second-Half 2000 Semi-Annual Groundwater Monitoring Program. Dated March 30, 2001.
12. Personal Communication between Michele Benchouk, Booz Allen Hamilton, and Agathe Nadai, USEPA, re: Current Status of Solutia Delaware River Plant as it Pertains to Achievement of the Environmental Indicator for Groundwater. April 18, 2001.
13. Sampling and Analysis Report for Phase II RFI and Corrective Measures Evaluation. Prepared by URS Corporation. Dated December 2001.
14. Letter from Glenn Randall, URS Corporation, to Elizabeth Butler, USEPA, re: Quarterly Progress Report 28 (Reporting Period Ending December 31, 2001). Dated January 17, 2002.
15. Letter from Glenn Randall, URS Corporation, to Gregory Zalaskus, NJDEP, re: Classification Exception Area Designation Request. Dated March 19, 2002.
16. Letter from Glenn Randall, URS Corporation, to Elizabeth Butler, USEPA, re: Quarterly Progress Report 29 (Reporting Period Ending March 31, 2002). Dated April 3, 2002.
17. Letter from Glenn Randall, URS Corporation, to Sameh Abdellatif, USEPA, re: Quarterly Progress Report 31 (Reporting Period Ending December 31, 2002). Dated January 20, 2003.
18. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 2003.
19. Letter from Raymond Pinkstone, NJDEP, to Glenn Randall, URS Corporation, re: Classification Exception Area Designation Request (March 19, 2002). Dated February 25, 2003.
20. Letter from Raymond Pinkstone, NJDEP, to Sameh Abdellatif, USEPA, re: Results of First Half Semi-Annual Groundwater Monitoring Program (November 2002). Dated February 25, 2003.
21. Email from Glenn Randall, URS Corporation, to Barry Tornick and Sameh Abdellatif, USEPA, re: Solutia PDA-1 Pore Water Sampling Update. Dated August 12, 2005.
22. Email from Glenn Randall, URS Corporation, to Sameh Abdellatif, USEPA, re: Solutia PDA-1 Sediment Pore Water Results. Dated August 29, 2005.

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:

Local Hydrology and Groundwater Flow

There are two distinct water-bearing units below the Solutia site. Water table groundwater at the site is encountered at depths of 1.5 to 14 feet bgs in the Cape May sands and dredge fill material. The water table aquifer is effectively separated from a deeper confined aquifer by the Raritan-Magothy Formation, which appears to be continuous across the site. The deeper aquifer is comprised of two zones separated by a layer of low permeability. The upper zone is approximately 50 feet thick at the plant site and contains fresh water. The lower zone contains brackish water.

Groundwater in the water table aquifer moves in three general directions at the Solutia site: easterly toward Birch Creek, westerly toward the site's western property boundary, and north to the Delaware River. A water table aquifer contour map from 1996 is provided in the January 1997 Description of Current Conditions Report (Ref. 6). The dividing line between easterly and westerly water table flow appears to be located just west of Birch Creek. Hydraulic conductivities in the water table zone range from $1.5x10^{-3}$ to $5.68x10^{-3}$ centimeters per second (cm/s).

Under natural conditions, groundwater flow in the Raritan-Magothy Formation was likely toward the Delaware River. However, Solutia has three production wells (West Production Well [MW-30D], East Production Well [MW-31D], and Production Well No. 3 [MW-37D]) that pump from the upper portion of this deeper aquifer at a permitted rate of 1,800 gallons per minute (Ref. 7). The location of these production wells is depicted on Figure 9 in the Description of Current Conditions Report (Ref. 6). As a result of sustained on-site pumping, groundwater in this unit now moves radially inward from all directions around the withdrawal wells. The cone of depression associated with pumping at Solutia appears to extend as much as two miles beyond the site property, drawing groundwater toward the site from adjacent and nearby properties (Ref. 6). Because overall flow in this unit is from the property boundary inward, the possibility of groundwater moving off site in the confined aquifer is remote as long as pumping continues (Ref. 6). Although pumping increases the potential that water table groundwater will migrate

[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).

vertically toward the deeper aquifer, low permeability in the confining unit beneath the water table (with hydraulic conductivities of 10^{-6} to 10^{-7} cm/s) substantially reduces this possibility (Ref. 7). Monitoring well data collected to date indicates that pumping from the production wells has had no observable effect on the water table aquifer.

Groundwater Quality

Groundwater quality data have been collected for the Solutia site since 1974, as part of various hydrogeologic investigation efforts and ongoing monitoring required by the NJPDES-DGW permit. A total of 60 groundwater wells are currently included in the site groundwater monitoring program and are being monitored on a semi-annual basis as part of the NJPDES-DGW permit. Collectively, the well network monitors the site perimeter, the general site interior, SWMUs 1 through 4, SWMU 7, SWMU 13, and SWMU 14.

Data collected for groundwater beneath the Solutia site prior to 1997 were compared to federal Maximum Contaminant Levels (MCLs) to gauge groundwater quality. Prior to 1997, ten organic constituents were found to be in excess of the MCLs, including benzene, toluene, ethylbenzene, pentachlorophenol (PCP), tetrachloroethylene (PCE), TCE, 1,1-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, and PCBs. Most of these organic detections were reported in wells associated with SWMU 1 (PDA No. 1) and well MW-31S at SWMU 8. Several inorganic constituents were also reported above relevant standards, including arsenic, cadmium, lead, manganese, and mercury. According to approved documentation, because the detections were largely limited to the northwestern corner of the site, and because the observed metals do not reflect the composition of wastes disposed on site, inorganic contamination is attributable to dredge spoils from the Delaware River (Ref. 6). The spoils are “well documented” in published literature as containing high concentrations of the metals of concern, but no specific concentrations have been referenced to date by Solutia (Ref. 6).

Groundwater samples collected during the semi-annual site-wide monitoring event in May 1997 indicated a marked decline in both contaminant concentrations and the number of COCs in all areas of the Solutia site (Ref. 7). In May 1997, only one organic compound (vinyl chloride in well MW-1D) was reported above its MCL, and none exceeded the applicable New Jersey Groundwater Quality Criteria (NJ GWQC). The presence of vinyl chloride was attributed to a broken underground sewer/waste treatment line in the area, and vinyl chloride has not been detected in the well since the pipeline was repaired (Ref. 14). Three inorganic compounds (arsenic, cadmium, and manganese) found during the May 1997 sampling round were present at concentrations consistent with previous results, supporting the contention that dredge spoils are the local source of inorganic impacts. None of the perimeter monitoring wells indicated contamination above the screening criteria in May 1997. Semi-annual sampling of three perimeter wells (MW-112, MW-113, and MW-114), installed in March 1999 to monitor groundwater discharges to the Delaware River, indicate no elevated constituent concentrations (Ref. 13). In addition, supplemental sampling of surface water and sediment pore water in August 2005 indicated no significant groundwater to surface water discharge concerns for these Delaware River media (Ref. 16).

Although groundwater sampling results from 2001 reported a wider variety and areal extent of contamination above NJ GWQC, more recent data from May and November 2002 indicated only four COCs across five Solutia SWMUs (Ref. 15). Specific concentrations and well locations are indicated in Table 1 below.

Table 1: Maximum Detected COC Concentrations by SWMU During 2002 Groundwater Monitoring Events (in μg/L)

SWMU Area	Constituent	Well	NJ GWQC *	May 2002 Concentration	November 2002 Concentration
SWMU 1	Benzene	MW-53-1	1	NE	22 J
	Toluene	MW-53-1	1,000	4,220	1,700
SWMU 2	Benzene	MW-50S	1	2.04 J	NE
SWMU 3	Vinyl Chloride	MW-27D	5	58.7	NE
SWMU 4	M&P Xylenes	MW-63	40	55 NJ	NA
SWMU 7	M&P Xylenes	MW-105	40	442 NJ	NE

Source: Reference 15.
J: Estimated concentration.
NA: Sample not collected from this well during the November 2002 monitoring event.
NE: Constituent not detected or not reported above NJ GWQC.
NJ: Tentatively identified and estimated concentration.
* NJ GWQC listed is the established groundwater quality criteria or the practical quantitation level (PQL), whichever is higher.

Because xylene was only tentatively identified during the May 2002 sampling round, and because the xylene exceedance at well MW-105 was not repeated during the November 2002 sampling round, xylene will not be considered further in this EI determination. Similarly, the vinyl chloride exceedance reported in well MW-27D during the May 2002 sampling round was not repeated in November 2002. Furthermore, the source of this contamination (i.e., the broken underground sewer/waste treatment line) has been repaired and concentrations are expected to continue to naturally decline. No other deep wells at the Solutia site reported vinyl chloride (or other) contamination in 2002. As a result, vinyl chloride in Solutia groundwater will also not be considered further in this EI determination. Finally, although chloride and total dissolved solids were also detected above NJ GWQC in various wells in 2002, these parameters are not listed as RCRA hazardous constituents and do not warrant additional consideration in this CA750 EI determination.

References:

1. Revised RCRA Facility Assessment, Monsanto Delaware River Plant, Bridgeport, New Jersey. Dated 1987.
2. Fax from Don Hoegel, Monsanto Delaware River Plant, to Agathe Nadai, USEPA, re: PDA No. 1 Background. Dated May 4, 1992.
3. Remedial Investigation Report for PDA No. 1 (1979 to 1992), Monsanto Chemical Company, Bridgeport, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated July 16, 1992.
4. Remediation Plan for Final Closure of PDA-1, Monsanto Delaware River Plant, Bridgeport, New Jersey. Prepared by DuPont Environmental Remediation Services. Dated March 1, 1995.

5. Letter from Andrew Bellina, USEPA, to Donald Hoegel, Monsanto Chemical Company, re: Comments to Monsanto Chemical Company Delaware River Plant on HSWA Permit Issues. Dated February 21, 1996.
6. Task 1 Description of Current Conditions Report, Monsanto Company Delaware River Plant, Bridgeport, New Jersey. Prepared by Smith Technology Corporation. Dated January 1997.
7. SWMU/AOC Sampling and Analysis Report, Solutia Delaware River Plant, Bridgeport, New Jersey. Prepared by BCM Engineers. Dated January, 1998.
8. Letter from Barry Tornick, USEPA, to Donald Hoegel, Solutia Delaware River Plant, re: RCRA Facility Investigation Report Approval. Dated September 30, 1998.
9. Letter from Glenn Randall, BCM Engineers, to Agathe Nadai, USEPA, re: Quarterly Progress Report No. 18 (June 10, 1999 Report Date) for Solutia Delaware River Plant. Dated June 28, 1999.
10. Letter from Glenn Randall, BCM Engineers, to Agathe Nadai, USEPA, re: Groundwater Data for Environmental Indicators; Groundwater Control Determination for Solutia Delaware River Plant. Dated November 2, 2000.
11. Personal Communication with Agathe Nadai, USEPA, re: Current Status of Solutia Delaware River Plant as it Pertains to Achievement of the Environmental Indicator for Groundwater. March 28, 2001.
12. Letter from Glenn Randall, URS Corporation to Gregory Zalaskus, NJDEP, re: Results of Second Half 2000 Semi-Annual Groundwater Monitoring Program, Solutia Delaware River Plant, Bridgeport, New Jersey. Dated March 30, 2001.
13. Facsimile from URS Corporation to Agathe Nadai, USEPA, re: Year 2000 Second Round Semi-Annual Groundwater Monitoring Detected Results for Solutia, Bridgeport, New Jersey. Dated April 10, 2001.
14. Personal Communication with Agathe Nadai, USEPA, re: Historical Detections of Vinyl Chloride in Well MW-1D as they Pertain to Achievement of the Environmental Indicator for Groundwater. April 27, 2001.
15. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 2003.
16. Email from Glenn Randall, URS Corporation, to Sameh Abdellatif, USEPA, re: Solutia PDA-1 Sediment Pore Water Results. Dated August 29, 2005.

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:

As stated in the response to Question 2, data obtained during the November 2002 groundwater monitoring rounds indicated concentrations of benzene and toluene above their respective NJ GWQC at well MW-53-1 (Ref. 4).

Shallow groundwater in the vicinity of well MW-53-1 moves north toward the Delaware River. Given the limited depth of this aquifer (i.e., 1.5 feet to 14 feet below the ground surface) and the depth of the dredged channel bottom in the Delaware River at this location (i.e., 40 feet deep), it appears that the shallow groundwater moving northward from the vicinity of well MW-53-1 completely discharges to surface water (Ref. 3). Thus, benzene and toluene exceedances in shallow well MW-53-1 are not expected to move laterally beyond the existing area of impacts (i.e., the shallow water table aquifer).

Groundwater in the water table aquifer is effectively separated from the deeper confined aquifer by the Raritan-Magothy Formation, which appears to be continuous across the site (Refs. 1 and 2). Consequently, benzene and toluene exceedances in shallow well MW-53-1 are not expected to move vertically beyond the existing area of impacts (i.e., the shallow water table aquifer).

References:

1. Description of Current Conditions Report. Prepared by Smith Technology Corporation. Dated January 1997.
2. SWMU/AOC Sampling and Analysis Report, Solutia Delaware River Plant, Bridgeport, New Jersey. Prepared by BCM Engineers. Dated January 1998.

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[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.

3. Sampling and Analysis Report for Phase II RFI and Corrective Measures Evaluation. Prepared by URS Corporation. Dated December 2001.
4. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 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.

Rationale:

The Delaware River forms the site boundary to the north and northwest and drains a large area in New York, New Jersey, and Pennsylvania prior to passing the Solutia site. The Delaware River is tidally influenced in the vicinity of the site and river water is fresh/brackish along the property boundary. The river channel is approximately 6,000 feet wide and a dredged channel bottom is maintained to a depth of 40 feet. River flow rate in the area of the Solutia site has been estimated at approximately 13,000 cubic feet (Ref. 2). Birch Creek bisects the property from south to north and drains to the Delaware River. The creek is also tidally influenced.

Based upon available documentation, groundwater in the shallow Cape May aquifer (1.5 feet to 14 feet bgs) is well connected to the surface water regime of the Delaware River. Groundwater in the lower Raritan-Magothy aquifer is not connected to the local surface water bodies (Ref. 1).

References:

1. Description of Current Conditions Report. Prepared by Smith Technology Corporation. Dated January 1997.
2. Sampling and Analysis Report for Phase II RFI and Corrective Measures Evaluation. Prepared by URS Corporation. Dated December 2001.

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 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 ecosystems at these concentrations)?

_X_ 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," 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.

____ 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 assess potential impacts on Delaware River surface water quality, benzene and toluene exceedances in well MW-53-1 were compared to relevant New Jersey Surface Water Quality Criteria (NJ SWQC) for saline coastal and saline estuary waterways (benzene = 71 µg/L, toluene = 200,000 µg/L). Given that the November 2002 concentrations of benzene (22 µg/L) and toluene (1,700 µg/L) in well MW-53-1 were below their respective NJ SWQC, there is no indication that discharges of impacted shallow groundwater will cause adverse impacts to the Delaware River.

To further assess potential water quality impacts on the Delaware River, surface water and sediment pore water samples were collected from the intertidal zone near the Solutia shoreline in August 2005 (Ref. 2). These samples were analyzed for nine VOCs and two SVOCs. No COCs were reported in any of the 15 sediment pore water samples, or in two of the five surface water samples (Ref. 3). Three of the five surface water samples contained toluene at levels ranging from 2.1 to 6.5 µg/L. Because these concentrations are less than the NJ SWQC for toluene (1,700 µg/L), the concentrations of toluene detected in surface water and sediment pore water are considered insignificant for purposes of this EI determination.

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

References:

1. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 2003.
2. Email from Glenn Randall, URS Corporation, to Barry Tornick and Sameh Abdellatif, USEPA, re: Solutia PDA-1 Pore Water Sampling Update. Dated August 12, 2005.
3. Email from Glenn Randall, URS Corporation, to Sameh Abdellatif, USEPA, re: Solutia PDA-1 Sediment Pore Water Results. Dated August 29, 2005.

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])?

____ 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:

This question is not applicable. See the response to Question 5.

[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.

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:

A total of 60 groundwater wells are currently included in the site groundwater monitoring program and are being monitored on a semiannual basis as part of the NJPDES-DGW permit. Semi-annual sampling is performed in May and November of each year. All wells included in the program are targeted for sampling in May, while a smaller set is sampled in November. Collectively, the well network monitors the site perimeter, the general site interior, SWMUs 1 through 4, SWMU 7, SWMU 13, and SWMU 14. Specific details on SWMU designations for each well are provided in Attachment 1 to this EI determination.

Monitoring Wells Network *
Sampled in May Semiannual Events
MW-1S, MW-1D, MW-2S, MW-3S, MW-6S, MW-6SS, MW-7S, MW-8S, MW-9S, MW-12S, MW-12M, MW-13S-1, MW-14S, MW-18D, MW-21S, MW-23S, MW-23D, MW-24S, MW-27S, MW-27D, MW-28D, MW-30S-1, MW-30D, MW-31S, MW-31D, MW-32S, MW-34D, MW-36D, MW-37D, MW-39, MW-39S, MW-40S, MW-42-1, MW-42-2, MW-43, MW-45, MW-50S, MW-52-1, MW-52-2, MW-53-1, MW-53-2, MW-57, MW-59, MW-61-1, MW-61-2, MW-63, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107S, MW-108, MW-109, MW-110, MW-111, MW-112, MW-113, MW-114
Sampled During November Semiannual Events
MW-1S, MW-2S, MW-3S, MW-6S, MW-6SS, MW-7S, MW-8S, MW-9S, MW-12S, MW-12M, MW-13S1, MW-14S, MW-21S, MW-23S, MW-24S, MW-27S, MW-27D, MW-31S, MW-39, MW-39S, MW-40S, MW-43, MW-45, MW-50S, MW-53-1, MW-57, MW-59, MW-101, MW-102, MW-103, MW-104, MW-105, MW-106, MW-107S, MW-109, MW-110, MW-111, MW-112, MW-113, MW-114

* Wells with an S or -1 designation monitor the shallow aquifer. Wells with a D, -2, or M designation monitor the deeper aquifer.

Groundwater samples collected as part of this monitoring program are analyzed primarily for VOCs and SVOCs, chloride, pH, dissolved solids, and total organic carbon. Samples from selected wells and/or monitoring rounds are also sampled for metals, PCBs, and phenol.

Reference:

1. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 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 Solutia Delaware River Plant site (formerly Monsanto), EPA ID # NJD001700707, located on State Highway Route 130, Bridgeport, 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
Engineering Consultant
Booz Allen Hamilton

Reviewed by: _____ Date:_____

Connie Crossley
Environmental Consultant
Booz Allen Hamilton

Also reviewed by: _____ Date:_____

Sameh Abdellatif, RPM
RCRA Programs Branch
EPA Region 2

_____ Date:_____

Barry Tornick, New Jersey Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: Original signed by: Date: September 23, 2005

Adolph Everett, P.E., 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: Sameh Abdellatif, EPA RPM
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Attachments

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

- Attachment 1 - Monitoring Well Area Designations
- Attachment 2 - Summary of Media Impacts Table

Attachment 1 -Monitoring Well Designations

Source: Description of Current Conditions Report, Dated January 1997

Wells Monitoring Site Perimeter:

MW-2-S
MW-3-S
MW-7-S
MW-8-S
MW-9-S
MW-18-D
MW-28-D
MW-32-S
MW-34-D
MW-36-D
MW-37-D
MW-40-S
MW-42-1
MW-42-2
MW-43-S
MW-52-1
MW-52-2
MW-53-1
MW-53-2
MW-103-S
MW-109-S
MW-110-S
MW-112
MW-113
MW-114

Wells Monitoring Site Interior:

MW-31-D
MW-31-S

Wells Monitoring SWMU No. 1:

MW-108-S
MW-111-S
MW-59-7
MW-61-1
MW-61-2
MW-109-S
MW-110-S
MW-42-1
MW-42-2
MW-52-1
MW-52-2
MW-53-1
MW-53-2

Wells Monitoring SMWU No. 2:

MW-23-D
MW-23-S
MW-50-S
MW-2-S
MW-3-S

Wells Monitoring SMWU No. 3:

MW-1-D
MW-1-S
MW-107-S
MW-21-S
MW-24-S
MW-27-D
MW-27-S

Wells Monitoring SMWU Nos. 4, 5, and 6:

MW-101-S
MW-102-S
MW-45-1
MW-63-1
MW-103-S
MW-43-S
MW-57-1

Wells Monitoring SMWU No. 7:

MW-104-S
MW-105-S
MW-106-S
MW-39-S

Wells Monitoring SMWU No. 13:

MW-30-S
MW-30-D

Wells Monitoring SMWU No. 14:

MW-12-M
MW-12-S
MW-13-S
MW-14-S
MW-6-S
MW-6-SS
MW-40-S
MW-7-S
MW-8-S
MW-9-S

Attachment 2 - Summary of Media Impacts Table

Solutia Delaware River Plant (formerly Monsanto)
Bridgewater, New Jersey

	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
Groundwater	Yes	NA	NA	NA	NA	NA	NA	▸ Installation of slurry wall around the PDA No. 1 impact area to prevent off-site migration ▸ Operation of a groundwater extraction/injection treatment system within the slurry wall to reduce COC concentrations ▸ Capping of PDA No. 1 to reduce infiltration of precipitation and leaching of contaminants ▸ Ongoing groundwater recovery within the slurry wall to maintain lower hydrostatic head and establish an inward flow direction ▸ Ongoing pumping from three production wells in the confined aquifer to maintain a radially inward groundwater flow direction and eliminate potential off-site migration of groundwater ▸ Ongoing semiannual groundwater monitoring program ▸ Groundwater Classification Exception Area and Declaration of Environmental Restrictions being implemented	VOCs