

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Ferro Corporation. Delaware River Plant
Facility Address: NJ State Highway Route 130, Bridgeport, New Jersey 08014
Facility EPA ID#: NJR 000 035 865

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 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 Ferro Corporation Facility (Ferro) is located on 293 acres in Bridgeport, New Jersey. The facility is bounded to the north by the Solutia facility (formerly known as the Monsanto Delaware River Plant), Shell Oil Company to the east, the Logan Cogeneration Plant to the west, and U.S. Highway Route 130 to the south. The Delaware River is located to the north across the Solutia site which is immediately adjacent to the east bank of the river. All land surrounding the site is zoned for industrial uses, but much of it 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.

The Ferro facility was part of Solutia's 461 acre property before Ferro purchased the business from Solutia in August 2000. Ferro now includes Solutia's production area and all the tank and container storage areas. As part of the transaction, Ferro executed a long term lease of the Ferro facility from Solutia. The purchase agreement also contains provisions to transfer title to Ferro upon Solutia's completion of certain activities. The title has not yet been transferred. Solutia has retained ownership and operating control of the remaining portion of the 461 acres which includes several former waste disposal areas that are currently undergoing RCRA corrective action. Birch Creek bisects the Solutia property from south to north and drains to the Delaware River. Ferro's operational area is situated west of the Birch Creek.

Manufacturing operations began at the Solutia plant in 1961 under the ownership of Monsanto. Solutia manufactured plasticizers, flame retardants and organic industrial chemicals, and dyes. Ferro continues to manufacture the same products with the exception of dyes.

Investigation and corrective action efforts have been in progress at the entire Solutia site since 1983. 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). In addition, Solutia's New Jersey Pollutant Discharge Elimination System-Discharge to Groundwater (NJPDES-DGW) post-closure permit issued in September 1988 requires ongoing monitoring of both shallow and deep groundwater. While several SWMUs and AOCs currently exist on the portion of the property which Ferro purchased in 2000, Solutia will continue to maintain its HSWA responsibility and be accountable for all the contaminated areas at the entire 461 acre site, including the portion currently leased and maintained by Ferro.

While Ferro continues production at the site, on January 23, 2006, NJDEP determined that all of the RCRA units at Ferro had clean closed and that the facility had been removed from the list of hazardous waste facilities.

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?

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):

As stated in the facility description, Ferro acquired 293 acres of the 461 acre Solutia site in 2000, which included all the tanks and container storage areas. This change in operation was reflected in the transfer of the Facility-Wide permit to Ferro by permit modification in 2000. Consequently, several of the fourteen SWMUs and AOCs that were identified in Solutia's 1994 HSWA permit (Ref. 1) are now under the control of Ferro and each is discussed in detail below. A map showing the location of all of the SWMUs and AOCs is provided at Figure 9 in Solutia's Description of Current Condition Report (Ref. 2).

SWMU 7, Raw Waste Equalization Lagoon (RWEL): This unit is located on the western edge of the property. 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 waste water treatment plant (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 a RCRA Facility Investigation (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 and groundwater monitoring in this area showed no contaminants above New Jersey Ground Water Quality Criteria (NJ GWQC) (Ref. 3). This SWMU was approved for no further action in October 1998 (Ref. 4).

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. More than 70% of the process sewer consists of buried piping with some covered manholes effectively closing the system precluding contact with humans. Any maintenance on this system falls within the site confined space entry procedure and/or breaking into process procedure requiring cleaning and purging of the system prior to beginning any work (Ref. 5)

Early groundwater monitoring revealed several volatile organic compounds (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 New Jersey Impact to Groundwater Soil Cleanup Criteria (NJ IGWSSC) 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. 4). A deed notice should be implemented in this location due to VOCs detection in subsurface soil above NJDEP regulated standards.

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. Two constituents, di-n-octylphthalate (183 mg/kg) and bis(2-ethylhexyl)phthalate (up to 4,700 mg/kg), were found in two different surface soil (0 to 6 inches bgs) samples. Bis(2-ethylhexyl)phthalate was detected above the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC) (210 mg/kg), while di-n-octylphthalate and bis(2-ethylhexyl)phthalate were both detected above the NJ IGWSCC (100 mg/kg for both constituents). This AOC was approved for no further action in October 1998 (Ref. 4). A deed notice should be implemented in this location due to detection in subsurface soil above NJDEP non-residential standards.

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 were used to store hazardous wastes generated at the site as follow; Vertical benzyl chloride Tank (14,000 gallons), Horizontal Benzyl Chloride Tank (15,000 gallons) and Benzyl Diethylamine (BDEA) Residue Tank (6,900 gallons). 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. However, as outlined in NJDEP's January 23, 2006 letter to Ferro, NJDEP accepted closure certificates for the 14,000 gallons tank on February 14, 1995, and on January 31, 2000, for the 15,000 gallons tank as they were closed in accordance with the closure plan approved in the permit (Ref. 6).

The HSWA permit also addressed this SWMU by requiring completion of an RFI for soil in exposed areas surrounding the pads. Trichloroethene (TCE) (1.41 mg/kg) was found in one surface soil sample above the NJ IGWSCC (1.0 mg/kg) but below the NJ NRDCSCC (54 mg/kg). Because TCE has not been reported in surrounding 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 (Ref. 3). This SWMU was approved for no further action in October 1998 (Ref. 4). In addition, the BDEA tank (6,900 gallons) was also closed in October 2005. NJDEP reviewed the closure report and the closure certification submitted by Ferro and conducted an inspection of the BDEA tank on November 30, 2005. Based on these submittals and inspection, NJDEP notified Ferro in a letter dated January 23, 2006, that the BDEA tank had been clean closed (Ref. 6).

AOC 12A, Two Removed Aboveground Process Tank: Steamer Overheads Tank (15,000 gallons) and Phosphate Esters Steamers Overheads Tank (6,000 gallons). These ASTs were included in the original RCRA permit issued by NJDEP in June 1988. The tanks were removed from the permit when it was renewed in January 1994 because they were classified as a process tanks rather than a storage tanks. The ASTs are situated within a concrete secondary containment basin in the area of SWMU 12. The bottom of the basin is set approximately 3.5 feet 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. 3 & 4).

SWMU 13, Drum Storage Area: This unit is a RCRA-regulated paved drum storage pad covering 1,160 square feet with a capacity of 23,100 gallons (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 (5.56 mg/kg) was detected in one surface soil sample at a concentration exceeding the NJ NRDCSCC (2.0 mg/kg) but below the NJ IGWSCC (100 mg/kg). Groundwater monitoring conducted in May and November 2008 showed no contaminants above NJ GWQC in this area. This SWMU was recommended for no further action in October 1998 (Ref. 4).

In 2005, Ferro ceased operation at the drum storage area and submitted a closure certification dated October 12, 2005 to NJDEP. NJDEP accepted the closure certification and subsequently issued a letter on January 23, 2006, notifying Ferro that the clean closure of the drum storage area was now complete (Ref.6). As a result and because the drum storage area and the BDEA tank were the only remaining authorized storage areas in the hazardous waste facility, NJDEP determined that all of the hazardous waste facilities activities at Ferro have been closed and Ferro is no longer authorized to store hazardous waste (Ref. 6).

References:

1. HSWA Permit issued to the Monsanto Company Delaware River Plant, Bridgeport, New Jersey. Prepared by USEPA. Dated December 5, 1994.
2. Solutia's Description of Current Conditions Report. Prepared by Smith Technology Corporation. Dated January 1997.
3. Solutia's Delaware River Plant, Environmental Indicator (CA725) determination, Current human Exposures Under Control, Dated May 29, 2003.
4. Letter from Barry Tornick, USEPA, to Donald Hoegel, Solutia, re: Solutia, EPA ID No. NJD001700707. Dated July 17, 1998.
5. Email from Mark Mazanec, ferro Corporation, to Sameh Abdellatif, EPA, re: Ferro CA725. Dated June 5, 2009.
6. Letter from Robert Confer, NJDEP to Ralph Nyland, Ferro Corporation, re: Acceptance of Closure Certifications for Drum Storage Area and BDEA Tank. Dated January 23, 2006.
7. SWMU/AOC Sampling and Analysis Report, Solutia Delaware River Plant, Bridgeport, New Jersey. Prepared by BCM Engineers. Dated January 1998.

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 entire site of Ferro & Solutia. 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. (Ref. 1)

Groundwater in the water table aquifer moves in three general directions at the 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 Solutia’s January 1997 Description of Current Conditions Report (Ref. 1). 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 1.5×10^{-3} to 5.68×10^{-3} centimeters per second (cm/s).

Under natural conditions, groundwater flow in the Raritan-Magothy Formation was likely toward the Delaware River. However, Ferro operates three production wells (formerly utilized by Solutia) “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. 2). The location of these production wells is depicted on Figure 9 in the Description of Current Conditions Report (Ref. 1). 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 Ferro appears to extend as much as two miles beyond the site property, drawing groundwater toward the site from adjacent and nearby properties (Ref. 1 & 2). 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. 1). Although pumping increases the potential that water table

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).

groundwater will migrate 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. 3). 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 entire “Solutia & Ferro” 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 entire site groundwater monitoring program performed by Solutia and are being monitored on a semi-annual basis as part of the NJPDES-DGW permit to monitor the entire site perimeter, the general site interior and other specific SWMUs (Ref 3).

Vinyl chloride was detected a few times in well MW-27D “located on the current Solutia section” since 2001, which extends into the deeper confined Raritan-Magothy Formation, above the NJ GWQC ($1 \mu\text{g/L}$). Given that the vinyl chloride was detected in this deeper unit, and given that the well is located approximately 700 feet away from the West Production Well and within the cone of depression, there is a concern that elevated concentrations of vinyl chloride may be reaching this production well. The three production wells provide water for plant production processes and non-community potable water use (Ref. 1). However, these wells are included in Solutia’s site groundwater monitoring program (sampled in May each year), and recent data conducted in May and November 2008 indicate no exceedences in these wells, except well MW-31D that showed benzene at ($1.4 \mu\text{g/L}$) slightly above NJ GQWC of ($1.0 \mu\text{g/L}$) during the May sampling event. Also, vinyl chloride was detected at Well MW-31S ($20 \mu\text{g/L}$) during the May 2007 sampling event above both the NJ GWQC ($1 \mu\text{g/L}$) and the EPA MCL ($5 \mu\text{g/L}$); however, this detection seems anomalous as vinyl chloride historically was never detected in this well above criteria since 1993 sampling event. Furthermore, vinyl chloride was not detected in well MW-27D during November 2008 groundwater sampling round (Ref. 2)

Solutia also submitted a Classification Exception Area (CEA) Designation Request for the entire Solutia property on March 19, 2002 (Ref. 4); however, NJDEP indicated that the CEA required significant revision in February 25, 2003 (Ref. 5)

References:

1. Description of Current Conditions Report, Monsanto Company Delaware River Plant, Bridgeport, New Jersey. Prepared by Smith Technology Corporation. Dated January 1997.
2. Results of Second-Half 2008 Semi-Annual Groundwater Monitoring Program. Solutia, Delaware River Plant, Dated March 27, 2009.
3. Solutia Delaware River Plant, Environmental Indicator (CA750) determination, Migration of Contaminated Groundwater Under Control, Dated September 27, 2005.
4. Letter from Glenn Randall, URS Corporation, to Gregory Zalaskus, NJDEP, re: Classification Exception Area Designation Request. Dated March 19, 2002.
5. Letter from Raymond Pinkstone, NJDEP, to Glenn Randall, URS Corporation, re: Classification Exception Area Designation request (March 19, 2002). Dated February 25, 2003.

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 response to Question 2, data obtained during the May and November 2008 groundwater monitoring rounds indicated no exceedences in the wells located on the Ferro site with exception of well MW-31D, where benzene was detected (1.4 $\mu\text{g/L}$) slightly above NJ GQWC of (1.0 $\mu\text{g/L}$) (Ref. 1). Based on that, benzene is not expected to move beyond the existing area of impact.

References:

1. Results of Second-Half 2008 Semi-annual Groundwater Monitoring Program. Solutia, Delaware River Plant, Dated March 27, 2009.

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?

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 entire Solutia 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. 1). Birch Creek bisects the property from south to north and drains to the Delaware River. The creek is also tidally influenced.

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. However, groundwater in the lower Raritan-Magothy aquifer is not connected to the local surface water bodies (Ref. 1).

There is no discharge from the portion of the facility that has been leased by Ferro from Solutia (Ref.2). However, due to high groundwater exceedences in wells MW-53-1 and MW-2T located in the northwest quadrant of the Solutia site near SWMU#1 (Past Disposal Area “PDA 1”), surface water and sediment pore water samples were collected from the intertidal zone near the Solutia shoreline in August 2005 to assess potential water quality impacts on the Delaware River (Ref. 2). These samples were analyzed for nine VOCs and two SVOCs. No constituents of concern were reported in any of the 15 sediment pore water samples, or in two of the five surface water samples (Ref. 2). Three of the five surface water samples contained toluene at levels ranging from 2.1 to 6.5 $\mu\text{g/L}$. Because these concentrations are less than the New Jersey Surface Water Quality Criteria (NJ SWQC) for toluene (1,700 $\mu\text{g/L}$), the concentrations of toluene detected in surface water and sediment pore water were considered insignificant.

In addition, the November 2008 concentrations of benzene (22 & 31 $\mu\text{g/L}$) and toluene (36,0001 & 14,000 $\mu\text{g/L}$) in wells MW-53-1 & MW-2T respectively were below their respective NJ SWQC for saline coastal and saline estuary waterways (benzene = 71 $\mu\text{g/L}$, toluene = 200,000 $\mu\text{g/L}$) (Ref. 3). Therefore, there is no indication that discharges of impacted shallow groundwater will cause adverse impacts to the Delaware River. Moreover and as requested by EPA, Solutia is currently conducting additional investigation at SWMU #1 to determine the cause of the ongoing presence of constituents in groundwater monitoring wells near the PDA1. Investigations are consists of, cover inspection and repair, assessment and potential repair to stormwater management system, groundwater

sampling and pore water and surface water sampling. Results of the investigation and along with a proposal for permanent remedy are expected to be submitted to EPA during June 2010 (Ref. 4).

References:

1. Description of Current Conditions Report, prepared by Smith Technology Corporation. Dated January 1997.
2. Solutia Delaware River Plant, Environmental Indicator (CA750) determination, Migration of contaminated Groundwater Under Control, Dated September 27, 2005.
3. Results of Second-Half 2008 Semi-Annual Groundwater Monitoring Program. Solutia Delaware River Plant Dated March 27, 2009.
4. Letter from William Johnson, Solutia Inc., to Sam Abdellatif, EPA, re: Assessment of PDA1 and PEL. Dated December 19, 2008.

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 ecosystems at these concentrations)?

_____ If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected 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 ecosystem.

_____ 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:

This question is not applicable. See the response to question 4.

References:

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

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 implemented⁴)?

_____ 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-assessment⁵, 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.

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 Solutia’s groundwater monitoring program and are being monitored on a semiannual basis as part of the NJPDES-DGW permit. More than 18 of these wells are currently located on the Ferro portion of the site. 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 (Ref. 1 & 2)

Groundwater samples collected as part of this monitoring program are analyzed primarily for VOCs and semi volatile organic compounds (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. (Ref. 1&2)

Reference:

1. Letter from Larry Adams, Solutia, to Barry Tornick, USEPA, re: Groundwater Exceedance Analysis. Dated February 11, 2003.
2. Solutia Delaware River Plant, Environmental Indicator (CA750) determination, Migration of Contaminated Groundwater Under Control, Dated September 27, 2005.

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 Ferro Delaware River Plant site, EPA ID # NJR 000 035 865, 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: _____
Sameh Abdellatif, RPM
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USEPA Region 2

Date: _____

Reviewed by: _____
Barry Tornick, Chief
New Jersey Section
RCRA Programs Branch
USEPA Region 2

Date: _____

Approved by: Original signed by: _____
Adolph Everett, Chief
RCRA Programs Branch
USEPA Region 2

Date: August 12, 2009

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.

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Attachments

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

- ▶ Attachment 1 – Figure 1, showing the approximate boundaries for Ferro and Solutia.
- ▶ Attachment 2 – Figure 9, Site Plan showing the locations of all the SWMUs & AOCs.
- ▶ Attachment 3 – May 2008 Groundwater Semi-Annual Sampling Map.
- ▶ Attachment 4 – November 2008 Groundwater Semi-Annual Sampling Map.

Note: Attachments 2, 3, and 4 available upon request.

— = STATE LINES
 — = RIVER'S EDGE

■ = UPLANDS TO BE CONVEYED TO FERRO
 ■ = UPLANDS TO BE RETAINED BY SOLUTIA
 ■ = RIPARIAN PROPERTY

Solutia Inc. DRP
 Bridgeport, New Jersey

Source: USGS Quadrangle / Marcus Hook, PA-NJ-DE 1987 (Photorevised 1986)

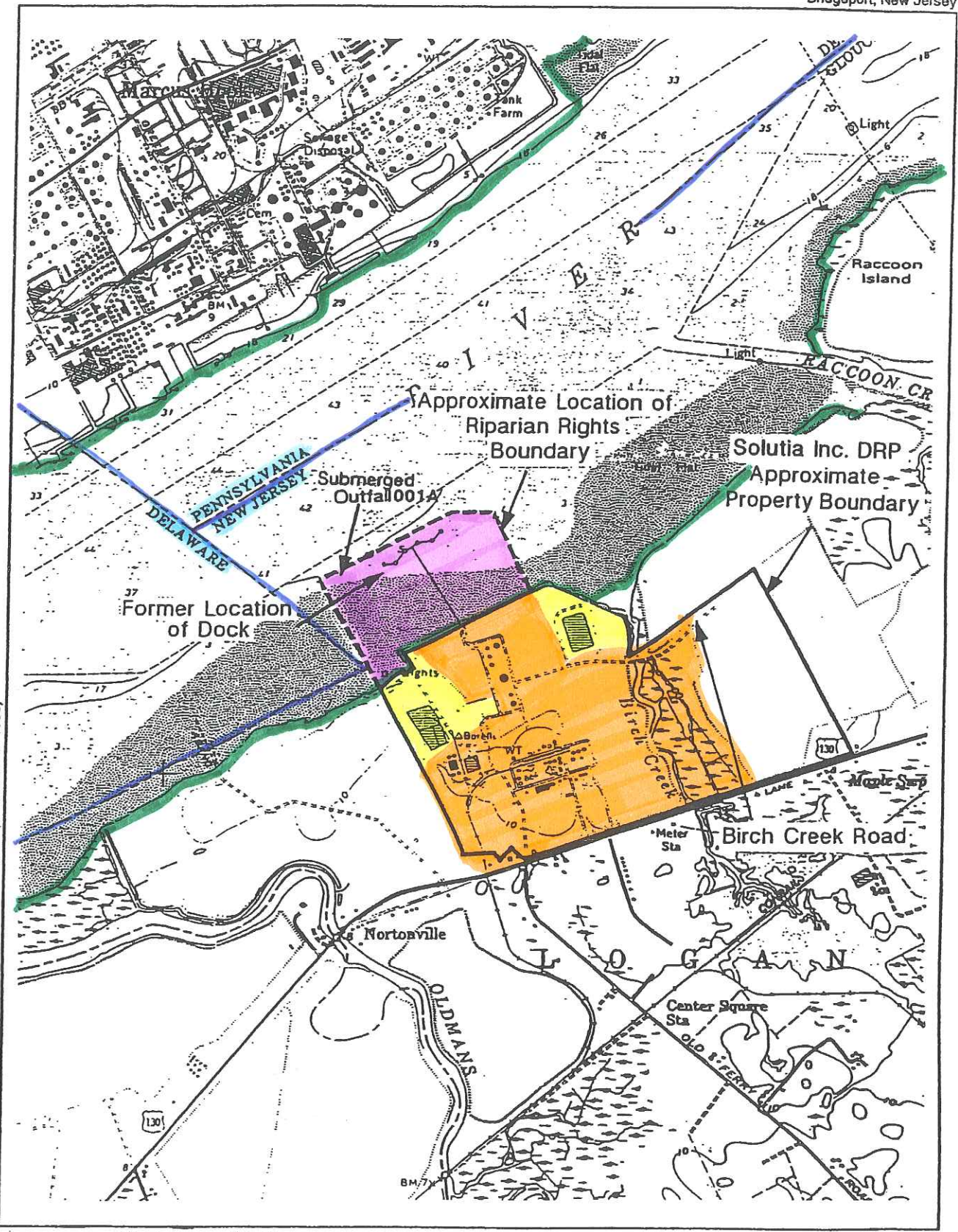


Figure 1
 Facility Location Map