DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: **CP Chemicals, Inc.**
Facility Address: **7 Arbor Street, Sewaren, New Jersey 07077**
Facility EPA ID#: **NJD002141950**

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 CP Chemicals (CP) site is located on a 14 acre parcel in an area of Sewaren, New Jersey that has been zoned as "M-2 Heavy Industrial". The property is bordered to the north and east by the Shell Oil tank farm, to the south by a vacant lot owned by Chevron, and to the west by Woodbridge Creek. The nearest residential property is located approximately 1,000 feet to the northeast. All drinking water and process water in Woodbridge Township is supplied by municipal sources.

Between 1907 and 1964, Vulcan Detinning used the site for secondary smelting operations. CP acquired the site in 1964, and operations shifted to manufacturing of inorganic chemicals including metallic salts, metallic cyanides, and metallic fluoroborates. In addition to raw material sources, CP recycled a variety of chemical wastes to obtain metals required for their manufacturing processes (including cupric chloride solution, copper, zinc, cobalt, nickel, and manganese). These chemical wastes included metal-containing liquids, sludges, and filter cakes received from off-site generators and CP's own manufacturing processes.

CP entered into an Administrative Consent Order (ACO) with the New Jersey Department of Environmental Protection (NJDEP) in March 1991. The ACO directed CP to initiate remedial activities for on-site contamination and contaminated surface water runoff potentially entering Woodbridge Creek. A Hazardous and Solid Waste Amendments (HSWA) Permit was also issued in 1992. CP completed construction of a groundwater recovery system (GWRS) in 1996. The GWRS consists of five recovery wells and a French drain system, and pumping has been ongoing since June 1999 to control migration of metals contamination in groundwater. An asphalt cap and stormwater management system was constructed in 1998 to prevent migration of contaminated runoff from the CP site to nearby Woodbridge Creek.

In accordance with the terms of a June 30, 2000, agreement between the parties, ownership of the CP property has been transferred to the Township of Woodbridge. As indicated in the agreement, Woodbridge Township intended to use the property as a vehicle impound lot (managed by the local police department) and as a testing laboratory (although the specific materials and methods of analysis were not indicated). According to online sources, as of November 2002, the township was using the site as a car impound lot. Nevertheless, CP is still obligated under the 1991 ACO to complete all necessary remedial actions, including continued operation of the GWRS and quarterly monitoring of groundwater quality.

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): The undated RCRA Facility Assessment Report and the HSWA Permit issued in 1992 identified numerous SWMUs and AOCs at the former CP site (listed in Table 1 below). The Permit granted no further action determinations for SWMUs 6 and 13, but required additional investigation for the remainder of SWMUs and AOCs. To satisfy this requirement, CP completed a Remedial Investigation (RI) in the early 1990s. Rather than follow the Permit-specified list of SWMUs and AOCs, however, the 1993 RI Report was organized according to a different list of "areas" of investigation. Where possible, Table 1 links the RI investigation areas to the established SWMUs and AOCs. CP collected a total of 69 soil samples from various locations and depths across the property, and conducted an investigation of shallow and deep groundwater quality. Subsequent remedial activities, including placement of an asphalt cap over the site, appear to have adequately addressed soil contamination. To reduce groundwater contaminant levels and control migration of impacted groundwater, CP installed a GWRS on the property. CP also implemented a quarterly groundwater quality monitoring program (including two rounds of sample collection prior to commencement of GWRS operations).

A facility map depicting the areas of investigation and the associated SWMUs and AOCs was included in Appendix A to the facility's February 2005 Response to Comments document (Ref. 10).

Table 1: SWMUs and AOCs at the CP Chemical Facility in Sewaren, NJ

SWMU or AOC	RI Area	Description
SWMUs 1, 2, 3	S	• Tanks 1C and 1D: 12,000-gallon closed-top tanks • Tank 1E: 7,000-gallon open-top tank • Used for storage of copper waste • Located within a secondary containment area • Evidence of overflow of the containment area
SWMUs 4, 5	T	• Tank 300: 10,000-gallon open-top tank used for storage of copper waste • Tank 2A: 12,000-gallon closed-top tank used for storage of nickel waste • Both tanks equipped with secondary containment • Stains observed on the outside of the tanks indicating potential overflow
SWMU 6	--	• Tank 1: 10,000-gallon closed-top tank used for storing copper waste • Situated on concrete floor inside the Finish Product Warehouse (Building 44) • No evidence of contamination, and no further action required

SWMU or AOC	RI Area	Description
SWMU 7	D	• RCRA container storage area constructed of concrete pads and walls • Equipped with a collection sump to drain liquids to the on-site wastewater treatment plant (WWTP) • Most waste containers in this area contained nickel sulfamate solution, nickel sludges, cupric chloride solution, and copper sludges • Although there were no known or documented releases at this unit, NJDEP was concerned about potential incompatibility between the concrete structure and corrosive wastes stored in this area.
SWMU 8	A	• Former Large Lagoon located in the northwest corner of the site, approximately 25 feet from Woodbridge Creek • Until the early 1980s, the unit received filtrate from on-site precipitation processes and cyanide-containing wastewater from the small lagoon (SWMU 9). Wastewater was allowed to evaporate, producing a metal-rich sludge which was considered hazardous due to heavy metal content. • In 1983, approximately 4 million pounds of lagoon sludge was excavated from SWMUs 8 and 9
SWMU 9	B	• This former unlined Small Lagoon received cyanide waste (5% solution) generated from copper cyanide manufacturing operations • Overflow was directed to the Large Lagoon (SWMU 8) • In 1983, approximately 4 million pounds of lagoon sludge was excavated from SWMUs 8 and 9
SWMU 10	K	• Large waste pile of sludge generated during excavation of SWMUs 8 and 9 • Located inside the Raw Materials Warehouse (possibly on the dirt floor)
SWMU 11	E	• Waste pile of sludge generated during excavation of SWMUs 8 and 9 • Located behind Building 18 • Uncovered and unlined from 1983 to at least 1986, at which time a concrete containment structure was installed
SWMU 12	L	• Waste pile of sludge generated during excavation of SWMUs 8 and 9 • Located at the far southeast corner of the CP property • Uncovered and unlined
SWMU 13	--	• Kiln operated from 1986 to 1988 to roast sludge from SWMUs 10, 11, and 12 • Located on a concrete pad in the Raw Materials Warehouse • Liberated copper from the roasting process was sold to outside purchasers • No reports of releases or discharges from this SWMU
SWMU 14	C	• Former pit discovered by NJDEP in 1977 • Dimensions: 4 feet deep, 20 feet wide, and 40 feet long • Contained rusted 55-gallon drums and spilled chemical solids
SWMUs 15, 16, 17	V	• Former drum storage areas identified in 1986 • Used to store a large number of drums directly on the ground surface
AOC A	M	• Elevated levels of arsenic found in soil, the upper aquifer, and the lower semi-confined aquifer at the northeast portion of the site • Suspected to be the result of leaching from the cinder component of the fill layer across the site
AOC B	J	• Geophysical anomalies identified during an electromagnetic induction investigation conducted in 1988 suggested presence of buried materials in the southeastern portion of the site
AOC C	H	• Two underground storage tanks (USTs) which have been abandoned in place.
AOC D	N	• Former location of four USTs near the facility entrance (removed)
AOC E	P	• Former location of two USTs near the main processing building (removed)
AOC F	Q	• Two 20,000-gallon USTs formerly used to store No. 2 fuel oil

References:

1. RCRA Facility Assessment. Prepared by C. Whittaker, NJDEP Bureau of Planning and Assessment. Undated.
2. Preliminary Assessment Report. Prepared by NJDEP. Dated March 1986.
3. Letter from Susan Goetz, Sadat Associates, to Permits Branch, USEPA, re: Submittal of site map. Dated June 16, 1992.
4. HSWA Permit. Prepared by USEPA. Dated December 9, 1992.
5. Letter from Thomas Sherman, NJDEP, to Bruce Venner, NJDEP, re: Revision to Environmental and Health Impact Statement for CP Chemicals, Inc. Dated January 20, 1994.
6. Final Remedial Investigation Report. Prepared by Sadat Associates, Inc. Dated December 23, 1993.
7. Fact Sheet. Prepared by NJDEP. Dated August 23, 1999.
8. Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, re: Amendment to General Information Notice. Dated June 9, 2000.
9. Letter from Ian Curtis, NJDEP, to Margaret Carmeli, Giordano, Halleran & Ciesla, re: Amendment to General Information Notice. Dated June 20, 2000.
10. Response to Comments for CP Chemicals, Inc. Prepared by Sadat Associates, Inc. Dated February 2005.
11. Letter from Ed Cacace III, CP Chemicals, to Barry Tornick, USEPA, re: HSWA Addendum to the Quarterly Progress Report. Dated January 30, 2008.

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:

The CP site is underlain by an upper hydraulic unit of perched groundwater and a lower hydraulic unit known as the Farrington Sand Aquifer. The Farrington Sand aquifer is the only water-bearing unit defined regionally in the vicinity of the CP property. The Farrington Sand aquifer is first encountered locally at depths ranging from approximately 20 to 40 feet below ground surface (bgs). The Farrington Sand aquifer is confined by an overlying low permeability meadowmat layer in areas nearest Woodbridge Creek, but this layer of peat thins across central and eastern portions of the site. Prior to CP's ownership, a fill layer of sand, gravel, and silt was deposited above the peat layer for industrial development of the low-lying property. This fill layer is approximately 8 to 10 feet thick, with the greatest thickness in areas closest to the creek. The upper hydraulic unit is perched in this fill layer and is first encountered in on-site wells at depths ranging from approximately 5 to 18 feet bgs. This perched groundwater unit is bounded by the underlying peat layer and a cutoff wall keyed into that peat layer along and upgradient of Woodbridge Creek (Refs. 3 and 10).

Shallow groundwater contamination (i.e., elevated levels of arsenic, copper, cyanide, lead, nickel, and zinc) was initially identified in monitoring well samples from the former CP site as early as 1981. However, the first extensive groundwater studies were conducted as part of the 1993 RI (Ref. 3). During that investigation, two rounds of samples were collected from 16 on-site monitoring wells. Analysis of these samples indicated significant metals contamination in groundwater beneath the CP site, consistent with historic usage of the property. Certain volatile organic compounds (VOCs) were also detected above screening levels. No semi-volatile organic compounds (SVOCs), pesticides, or polychlorinated biphenyls were found at levels of concern in groundwater at the CP site.

Two groundwater monitoring events, including 14 shallow wells and eight deep wells, were also completed in 1999. Based on results of the RI, all groundwater monitoring samples were analyzed for metals and VOC constituents. This sampling was conducted prior to commencement of pumping operations at the GWRS, and the data were used to establish a baseline for evaluation of groundwater corrective actions. Groundwater monitoring results were similar to those observed during the RI.

A map showing the location of the GWRS, cutoff wall, and sitewide groundwater monitoring wells is included in Appendix A to Reference 11. It should be noted that the indicated direction of shallow

[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 flow does not reflect current conditions, including the expanded cutoff wall and French drain system and operation of the GWRS. Current shallow groundwater flow is toward the recovery wells due to pumping of the GWRS, as will be further discussed in the response to Question 3 below.

Volatile Organic Contamination in Groundwater

During the RI groundwater investigation (August and September 1992), VOCs were sporadically detected above their respective New Jersey Groundwater Quality Standards (GWQS) for Class IIA groundwater: trichloroethene (TCE), tetrachloroethene (PCE), benzene, chloroform, 1,1-dichloroethene (DCE), and 1,1,1-trichloroethane (TCA). The highest VOC concentrations were reported in shallow well MW-12 on the eastern portion of the property. In this location, TCE and PCE were detected at approximately three orders of magnitude above their respective GWQS. VOC detections remained elevated above relevant screening criteria in the center of the property, but significant decreases were observed moving westward across the site (Ref. 11). The two groundwater monitoring events conducted in April and May 1999 identified a similar suite of VOCs above their GWQS (i.e., those listed above plus carbon tetrachloride and with the exception of chloroform). As shown in Table 2 below, TCE and PCE were still present at the highest levels, and VOC contamination was still centered around shallow well MW-12 (Ref. 11).

Table 2: Maximum Detections of VOCs Above Relevant GWQS (April and May 1999)

Constituent	GWQS (µg/L)	Maximum Shallow Conc. (µg/L)	Shallow Well	Maximum Deep Conc. (µg/L)	Deep Well
PCE	1	1,300	MW-12	10	MW-19
TCE	1	3,300	MW-12	27	MW-19
1,1-DCE	2	22	MW-12	83	MW-13
1,1,1-TCA	50	52	MW-12	84	MW-13
Carbon Tetrachloride	2	8.3	MW-12	14	MW-13
Benzene	1	85	MW-32S	NE	--

NE: No exceedances
Source: Ref. 11

In the RI Report and subsequent Response to Comment documentation (Refs. 3 and 10), CP asserts that sporadic VOC detections in soil and groundwater across the property are attributable to off-site sources. To support this claim CP present several lines of evidence:

- <u>No Allowable VOC Usage</u> – All of the materials previously reclaimed and processed by CP were metallic oxides, including metal cyanides. These compounds are highly reactive to organohalogens, and the accidental introduction of chlorinated solvents into recycling operations would have resulted in generation of toxic cyanide fumes. According to CP, there has never been a report of any such release at the facility and an extensive quality assurance and quality control program was in place to prevent such an occurrence. Finally, a review of product line details in CP's operating permit confirmed that no VOC-bearing products were used in facility operations.

- <u>Alternative VOC Sources</u> – According to the NJDEP mapping tool i-MapNJ, a total of 50 sites with known environmental contamination are located within one mile of the CP site. A total of 90 known contaminated sites are present within 1.5 miles of the site. Of these, 16 are being evaluated under the NJDEP Bureau of Underground Storage Tanks program. Three major oil companies, including neighboring Shell Oil and Chevron, have petroleum storage or refining facilities in this same heavily industrialized radius. Another 35 sites are auto-related and could be potential sources of the documented VOC contamination. Finally, six more sites are identified as dry cleaners which are typically heavy users of chlorinated solvent products. Record files for the neighboring Shell site clearly indicate a pattern of spills (large- and small-scale) and discharges of petroleum and chlorinated solvents to groundwater and surface water. With groundwater in the shallow perched water zone being pulled radially onto the CP site due to ongoing operation of the GWRS, and with groundwater in the deep aquifer naturally flowing across the site from the northeast as it makes its way toward Woodbridge Creek (see further discussion in Question 3), VOC contamination associated with off-site sources appears to be migrating onto the CP property in groundwater.

- VOC Distribution in On-site Groundwater – Ongoing operation of the GWRS results in multidirectional, competing groundwater flow from the Shell facility (i.e., from the north and south) in the area of well MW-12. This convergence of flow is likely responsible for the relatively high organic contamination historically reported in shallow groundwater at this well. In addition, GWRS pumping of well MW-12 creates a cone of depression extending into the deeper groundwater zone and generating an upward hydraulic gradient. VOC-impacted deep groundwater flowing toward Woodbridge Creek from the northeastern portion of the property around well MW-19 (where some of the highest VOC concentrations were observed in the deeper groundwater unit) is likely intercepted by the cone of depression, carried upward into the shallow groundwater zone, and measured in samples from shallow well MW-12. VOC impacts in other areas of the site are associated with preferential flow of off-site contaminated groundwater along the gravel pack of the cutoff wall. Finally, topographic maps support CP's contention that significant VOC contamination associated with spills and releases at the neighboring Shell facility is carried onto the CP property in stormwater runoff. This method of contaminant transport appears to be is responsible for the sporadic VOC detections in soil and underlying groundwater, particularly in areas of the CP site that are commonly flooded during rain events.

Because they are attributable to off-site sources rather than historic CP operations, VOC contamination in groundwater will not be considered further in this EI determination. After review of the relevant groundwater data, NJDEP has concluded that "organic groundwater contamination in the deeper aquifer that is impacting the former CP Chemical property is migrating from the adjacent Shell Oil property". Consequently, NJDEP intends to require Shell Oil to further investigate and implement any remedial activities necessary to address this contamination pursuant to the Technical Requirements for Site Remediation. Furthermore, NJDEP also determined that CP was adequately controlling site-related groundwater contamination and that "there are no other outstanding groundwater issues for which CP Chemical is responsible" (Ref. 15).

Metals Contamination in Groundwater

As stated previously, metals were reported in groundwater during both the RI and subsequent pre-GWRS groundwater monitoring events. CP continues to monitor inorganic constituents in groundwater on a quarterly basis to assess the effectiveness of GWRS operations. The most recent sampling round for which data are available was conducted during the first quarter of 2008 (Ref. 14). The highest concentrations of RCRA inorganic constituents reported in shallow and deep wells during this event are presented in Table 3. All data are provided in micrograms per liter (µg/L).

Table 3: Maximum Exceedances of Inorganic Hazardous Constituents (First Quarter 2008)

Constituent	GWQS (µg/L)	Maximum Shallow Conc. (µg/L)	Shallow Well	Maximum Deep Conc. (µg/L)	Deep Well
Antimony	6	86	MW-11	ND	–
Arsenic	3	2,270	MW-11	NE	–
Beryllium	1	4	MW-12	5	MW-23D
Cadmium	4	159	MW-23S	217	MW-23D
Lead	5	18	MW-10	13	MW-23D
Nickel	100	70,100	MW-14	64,100	MW-23D

ND: No detections; NE: No exceedances
Source: Ref. 14

Antimony exceedances reported during the first quarter of 2008 were limited to the far north and northeast edges of the CP site in an area where process materials were historically stockpiled (at shallow wells MW-11 and MW-21). No antimony was detected in the deep groundwater during this round. Arsenic was identified at the highest concentrations in the same general area at shallow wells MW-11. Lower levels of arsenic were widely distributed in the shallow groundwater unit, with exceedances reported inside the GWRS cutoff wall and outside the cutoff wall at shallow well MW-32. No arsenic exceedances were reported in the deep groundwater wells during the first quarter of 2008. Beryllium exceedances are limited to the eastern portion of the site in shallow wells MW-12, MW-17, and MW-23S. The only deep well beryllium exceedance was found in well MW-23D. Cadmium was widely distributed across the eastern and central portions of the site, with two of the three highest concentrations in shallow wells outside the cutoff wall (MW-14 and MW-30S). Lead was widely distributed across the site with the highest shallow detections reported at the north and south property boundaries in wells MW-10 and MW-14 (outside the cutoff wall), respectively. The highest deep lead detection during this quarter was found in well MW-23D on the eastern edge of the site. Nickel was reported in several wells along the eastern and southern portions of the property. The highest concentrations in shallow and deep groundwater inside the cutoff wall were reported at well MW-23. However, the highest nickel concentration reported during this round was reported outside the cutoff wall at the southwestern corner of the property (at shallow well MW-14).

<u>References</u>:

1. RCRA Facility Assessment. Prepared by C. Whittaker, NJDEP Bureau of Planning and Assessment. Undated.
2. Letter from Christopher F. Zwingle and William J. St. Pierre, Soils Engineering Services, Inc., to Ed Blain and Roy Parks, CP Chemicals Inc., re: Description of Clay Barrier and Drainage Collector Components of Decontamination Program. Dated June 22, 1982.
3. Final Remedial Investigation Report. Prepared by Sadat Associates, Inc. Dated December 23, 1993.
4. Revised Draft Remedial Action Work Plan. Prepared by Sadat Associates, Inc. Dated August 12, 1994.
5. Letter from Thomas L. Moran, CP Chemicals, Inc., to Ian Curtis, NJDEP, re: Final Remedial Investigation Report. Dated April 29, 1994.
6. Groundwater and Surface Water Modeling Analysis Report. Prepared by Sadat Associates, Inc. Dated February 8, 1995.
7. Letter from Gary Czock, NJDEP, to Ian Curtis, NJDEP, re: CP Groundwater Monitoring Program and Quarterly Monitoring Report. Dated November 18, 1998.

8. Letter from Thomas Moran, CP Chemicals, Inc., to Ian Curtis, NJDEP, re: HSWA Addendum to the Quarterly Progress Report for the Period of January 1, 2000 through March 31, 2000. Dated May 1, 2000.
9. Letter from Thomas Moran, CP Chemicals, Inc., to Ian Curtis, NJDEP, re: Groundwater Remedial Activities. Dated May 11, 2000.
10. Evaluation of GWRS Report. Prepared by Sadat Associates, Inc. Dated June 29, 2001.
11. Response to Comments for CP Chemicals, Inc. Prepared by Sadat Associates, Inc. Dated February 2005.
12. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period October 1, 2007 through December 31, 2007. Dated January 30, 2008.
13. Letter from Ed Cacace III, CP Chemicals, to Barry Tornick, USEPA, re: HSWA Addendum to the Quarterly Progress Report. Dated January 30, 2008.
14. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period January 1, 2008 through March 31, 2008. Dated April 30, 2008.
15. Email from Ian Curtis, NJDEP, to Barry Tornick, USEPA, re: CP Chemical CA750 Determination. Dated May 16, 2008.

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, the CP site is underlain by an upper hydraulic unit of perched groundwater and a lower hydraulic unit known as the Farrington Sand Aquifer. Both groundwater units have been impacted by metals contamination associated with CP's historic manufacturing operations.

Implemented Remedial Actions for Groundwater

Efforts to control groundwater contamination beneath the former CP property have been in progress since the early 1980s, when a clay cutoff wall and French drain system was installed. This system was intended to prevent discharge of contaminated surface water runoff and shallow groundwater into Woodbridge Creek. The vertical clay barrier was keyed into the natural low permeability meadowmat layer described in the response to Question 2. Impacted groundwater moving toward Woodbridge Creek is intercepted by the passive drainage system. In 1994, NJDEP concluded that the cutoff wall and French drain system was acting as only a partial barrier to contaminant migration in shallow groundwater (Ref. 7). CP conducted aquifer tests in 1995 and concluded that: (1) extension of the French drain system approximately 190 feet in the northwestern corner of the property would prevent off-site migration from the upper hydraulic unit to the northwest, and (2) addition of a pump/sump in the western corner of the property would facilitate removal of groundwater from the system and conveyance to the on-site wastewater treatment plant (WWTP). These system modifications were implemented between 1995 and 1997. Two submersible pumps and the associated piping system now convey accumulated groundwater and surface water from the drain sumps to the WWTP. Effluent from the WWTP is pumped to an off-site pumping station before being discharged into the regional sewer system (Ref. 33).

As a second step in groundwater remediation, CP designed and installed a GWRS in the eastern and central portions of the property. The GWRS was designed to control potential vertical migration of contaminated groundwater from the shallow groundwater unit to the lower Farrington Sand aquifer. (In the western portion of the property, the natural peat layer inhibits vertical migration of groundwater.)

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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.

Between 1995 and 1997, submersible pumps were installed in five existing monitoring wells for groundwater recovery, and a hydraulic piping system was installed to transport extracted groundwater to the on-site WWTP. Shallow wells MW-12, MW-17, MW-23, MW-27, and MW-28 were selected as extraction wells based on aquifer yield, location, vertical hydraulic gradient, proximity to the highest contaminant concentrations, and ability to achieve the required drawdown. Pumping activities were initiated in June 1999 and continue to date.

In order to address soil contamination concerns and minimize groundwater recharge in the immediate area, CP installed an asphalt cap across the site. A stormwater management system, including two lined detention basins, was also installed. Construction activities were completed in June 1998. Inspection of the cap is conducted on a biennial basis as required by an approved Deed Notice and Engineering Control agreement with NJDEP. The most recent inspection results were submitted to NJDEP on May 30, 2007 (Ref. 34).

After implementation of these groundwater remedial actions, CP conducted a three-day continuous monitoring event to assess the extent and effectiveness of hydraulic control. Results of this evaluation were presented in the June 2001 Evaluation of Groundwater Remediation System Report (GRSR) and further discussed in the February 2005 Response to Comments document (Refs. 32 and 33, respectively). The evaluation considered contaminant migration into off-site areas (including Woodbridge Creek), as well as downward from the shallow groundwater unit to the deeper Farrington Sand aquifer.

Vertical Groundwater Control

Groundwater level measurements and aquifer tests indicate that the shallow groundwater unit is hydraulically isolated from the deep aquifer on the western portion of the CP property where the low-permeability meadowmat layer is present. However, the shallow unit and the deep aquifer are connected in the central and eastern portions of the property where the peat layer thins out. GWRS pumping of shallow wells in this portion of the property (MW-12, MW-23S, and MW-27S) creates cones of depression around the wells and results in upward flow of groundwater from the deep aquifer to the shallow unit. Relative differences in piezometric head between the upper and lower hydraulic units at these wells are approximately 2.6 feet, 2.7 feet, and 3.5 feet, respectively (Ref. 33). These positive values indicate strong upward hydraulic gradients and capture of deep aquifer groundwater by the existing GWRS.

Horizontal Groundwater Control

Although regional shallow groundwater flow is toward Woodbridge Creek, installation of the impermeable cutoff wall and pumping of the GWRS appear to pull shallow groundwater onto the site from all portions of the property not bounded by the cutoff wall. Figure 3 from the GRSR (revised for technical accuracy in February 2004) shows shallow groundwater flow lines toward each of the five extraction wells in the eastern and central portions of the property. Lower than expected pumping rates and minimal depth of the water table at well MW-27 suggest that pumping has also resulted in almost complete dewatering of groundwater above the meadowmat layer at the center of the site (Refs. 32 and 33). Furthermore, even at the current low pumping rates, VOC-impacted groundwater from off-site areas is being pulled onto the CP site for capture by the GWRS. Water level comparisons between shallow well pairs on opposite sides of the cutoff wall confirm the wall’s effectiveness as a hydraulic barrier on the western side of the site. Despite their proximity, wells MW-29S and MW-30S reported a difference of 2.5 feet in average piezometric head, and wells MW-14 and MW-26S reported an average difference of 0.59 feet.

Regional groundwater flow in the Farrington Sand aquifer is also toward Woodbridge Creek, and tidal studies confirm a hydraulic connection between the deep aquifer and nearby surface water. During periods of low tide, the deep aquifer appears to discharge to the creek. However, during periods of high tide, a minor reversal of groundwater flow direction is observed in the deep aquifer, and net flow is toward well MW-23D. Because GWRS pumping lowers groundwater levels in the shallow unit below those of the deep aquifer, deep groundwater is also expected to flow radially toward each of the five shallow extraction wells.

Current Status of Stabilization

Based on all available information, it appears that the cutoff wall, French drain, and GWRS effectively control contaminant migration within the shallow groundwater unit across most of the CP site. These remedial actions also appear to have a strong impact on flow within the deep aquifer. Nevertheless, shallow groundwater outside the cutoff wall remains in contact with and is expected to discharge into Woodbridge Creek immediately adjacent to the site. During periods of low tide, groundwater from the deep aquifer also appears to discharge into the Creek at the southwestern corner of the property. In these instances, surface water appears to act as a hydraulic barrier to migration of contamination in groundwater at the CP site.

References:

1. RCRA Facility Assessment. Prepared by C. Whittaker, NJDEP Bureau of Planning and Assessment. Undated.
2. Letter from Landi Weast and William St. Pierre, Soils Engineering Services, Inc., to Rajni Parikh, CP Chemicals, Inc., re: Subsurface Investigation and Installation of Monitoring Wells. Dated January 9, 1981.
3. Letter from Christopher Zingle and William St. Pierre, Soils Engineering Services, Inc., to Ed Blain and Roy Parks, CP Chemicals, Inc., re: Description of Clay Barrier and Drainage Collector Components of Decontamination Program. Dated June 22, 1982.
4. Preliminary Assessment Report. Prepared by NJDEP. Dated March 1986.
5. Letter from Susan Goetz, Sadat Associates, to Permits Branch, EPA Region 2, re: Submittal of Site Map. Dated June 16, 1992.
6. HSWA Permit Issued to CP Chemicals, Inc. Prepared by USEPA. Dated December 9, 1992.
7. Final Remedial Investigation Report. Prepared by Sadat Associates, Inc. Dated December 23, 1993.
8. Letter from Gary Czock, NJDEP, to Ian Curtis, NJDEP, re: Final RI Report for CP Chemicals, Inc. Dated February 4, 1994.
9. Letter from Ian Curtis, NJDEP, to Thomas Moran, CP Chemicals, Inc., re: Remedial Action Work Plan. Dated May 13, 1994.
10. Revised Draft Remedial Action Work Plan. Prepared by Sadat Associates, Inc. Revised August 12, 1994.
11. Letter from Andrew Bellina, EPA, to Ian Curtis, NJDEP, re: Draft Remedial Action Work Plan for CP Chemicals, Inc. Dated September 19, 1994.
12. Groundwater and Surface Water Modeling Analysis Report. Prepared by Sadat Associates, Inc. Dated February 8, 1995.
13. Letter from Ian Curtis, NJDEP to Thomas Moran, CP Chemicals, re: Ground Water and Surface Water Modeling Analysis Report Comments. Dated May 8, 1995.
14. Preliminary GWRS Design Report. Prepared by Sadat Associates, Inc. Dated May 9, 1995.
15. Letter from Gary Czock, NJDEP, to Ian Curtis, NJDEP, re: CP Chemical Preliminary GWRS Design Report. Dated June 29, 1995.

16. Letter from Thomas Moran, CP Chemicals, Inc., to Ian Curtis, NJDEP, re: Summary of October 3, 1995 Conference Call Concerning NJDEP's Comments on the Preliminary GWRS Design Report. Dated October 27, 1995.
17. Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, re: Final Cap Design. Dated December 17, 1995.
18. Letter from Gary Czock, NJDEP, to Ian Curtis, NJDEP, re: CP Chemical Final Cap Design. Dated January 31, 1996.
19. Letter from Ian Curtis, NJDEP, to Thomas Moran, CP Chemicals, Inc., re: GWRS Implementation/Cap Design Drawings. Dated February 21, 1996.
20. Letter from Thomas Moran, CP Chemicals, Inc., to Michael Kramer, EPA Region 2, re: Proposal for Management of Excavated Soils. Dated April 8, 1997.
21. Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, re: HSWA Addendum to the Quarterly Progress Report for the Period of October 1, 1997 through December 31, 1997. Dated January 30, 1998.
22. Letter from Gary Czock, NJDEP, to Ian Curtis, NJDEP, re: CP Chemical Groundwater Monitoring Program Report and Quarterly Progress Report. Dated November 18, 1998.
23. Letter from Ian Curtis, NJDEP, to Thomas Moran, CP Chemicals, Inc., re: Groundwater Monitoring Program Report and Quarterly Progress Report. Dated December 4, 1998.
24. As-Built Site Plan. Prepared by Sadat Associates, Inc. Dated February 25, 1999.
25. CP Chemicals Fact Sheet. Prepared by NJDEP. Dated August 23, 1999.
26. Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, re: Proposed Deed Notice. Dated March 1, 1999.
27. Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, re: Proposed Deed Notice. Dated September 16, 1999.
28. Letter from Thomas Moran, CP Chemicals, to Andrew Parks, USEPA, re: HSWA Addendum to the Quarterly Progress Report. Dated May 1, 2000.
29. Remedial Action Work Plan Implementation Schedule. Prepared by CP Chemicals, Inc. Dated May 8, 2000.
30. Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, re: Groundwater Remedial Activities. Dated May 11, 2000.
31. Letter from Ian Curtis, NJDEP, to Margaret Carmeli, Giordano, Halleran & Ciesla, re: Amendment to General Information Notice. Dated June 20, 2000.
32. Evaluation of GWRS Report. Prepared by Sadat Associates, Inc. Dated June 29, 2001.
33. Response to Comments for CP Chemicals, Inc. Prepared by Sadat Associates, Inc. Dated February 2005.
34. Letter from Ed Cacace III, CP Chemicals, to Barry Tornick, USEPA, re: HSWA Addendum to the Quarterly Progress Report. Dated January 30, 2008.

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:

Woodbridge Creek is located immediately adjacent to the southwestern edge of the CP property. As a freshwater tributary to Arthur Kill, Woodbridge Creek is classified as a FW2-NT surface water body.

Groundwater level measurements, aquifer tests, and tidal studies confirm a hydraulic connection between the deep aquifer and nearby surface water in Woodbridge Creek (Refs. 3 and 4). Although some tidal reversal of groundwater flow direction is observed in the deep aquifer, the draft Groundwater and Surface Water Modeling Analysis Report (Ref. 1) found that surface water flow into the groundwater system during high tide was insignificant compared to groundwater flow discharged to surface water during periods of low tide. Active groundwater seeps have also been observed in the creek's bank (Ref. 2). Such seeps are likely fed by groundwater from both the deep aquifer and that portion of the shallow groundwater unit which lies outside the cutoff wall and immediately upgradient of Woodbridge Creek.

References:

1. Groundwater and Surface Water Modeling Analysis Report. Prepared by Sadat Associates, Inc. Dated February 8, 1995.
2. Letter from Ian Curtis, NJDEP to Thomas Moran, CP Chemicals, re: Ground Water and Surface Water Modeling Analysis Report Comments. Dated May 8, 1995.
3. Evaluation of GWRS Report. Prepared by Sadat Associates, Inc. Dated June 29, 2001.
4. Response to Comments for CP Chemicals, Inc. Prepared by Sadat Associates, Inc. Dated February 2005.

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)?

___ 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 judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or ecosystem.

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

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

Rationale:

In determining whether groundwater to surface water discharges are significant for EI purposes, reported contaminant concentrations closest to the point of discharge are compared to relevant GWQS, multiplied by a factor of ten to account for dilution, dispersion, and other mitigating factors. This evaluation is conducted to ensure that surface water quality is acceptable for various activities, which may include human consumption, primary and secondary contact recreation, and industrial or agricultural usage.

Table 4 below provides a comparison between the adjusted groundwater quality criteria and the highest levels of groundwater contamination that could be discharging to surface water. The table includes the most recent data for inorganic hazardous constituents exceeding their GWQS in shallow wells between the cutoff wall and Woodbridge Creek and deeper Farrington Sand aquifer wells immediately upgradient of surface water. Note that wells MW-25D and MW-26D are not included in the table because no hazardous constituents were reported above their respective GWQS in these wells during the first quarter of 2008 sampling round.

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

Table 4: Exceedances of Inorganic Hazardous Constituents Upgradient of Woodbridge Creek – Shallow and Deep Groundwater Units (First Quarter 2008)

Well	Contaminant	Concentration (µg/L)	10 x GW Criteria (µg/L)	Discharge of Potential Concern?
Shallow Groundwater Unit				
MW-14S	Cadmium	**144**	40	**Yes**
MW-14S	Lead	15	50	No
MW-14S	Nickel	**70,100**	1,000	**Yes**
MW-30S	Cadmium	**55**	40	**Yes**
MW-30S	Nickel	**3,340**	1,000	**Yes**
MW-32S	Arsenic	**192**	30	**Yes**
Deeper Farrington Sand Aquifer				
MW-13	Nickel	**1,100**	1,000	**Yes**

Bolded concentrations exceed the adjusted groundwater screening criteria.
Source: Ref. 1

As shown, three inorganic hazardous constituents in groundwater (i.e., arsenic, cadmium, and nickel) exceeded their adjusted groundwater quality criteria in at least one shallow well adjacent to the creek (outside the cutoff wall). Nickel was present in shallow groundwater at a concentration over 70 times greater than its adjusted GWQS. Arsenic and cadmium also exceeded their adjusted GWQS levels, but by lesser margins than nickel. In the deeper aquifer, nickel slightly exceeded its adjusted GWQS. All three of these constituents have the potential to discharge to and negatively impact surface water quality in Woodbridge Creek.

References:

1. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period January 1, 2008 through March 31, 2008. Dated April 30, 2008.

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

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

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

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

Rationale:

Woodbridge Creek is located in an area with a long industrial history, and numerous industrial and municipal dischargers (past and present) have been identified. CP itself formerly maintained an NJDPES permit to discharge process wastewater to Woodbridge Creek through two outfalls (Permit No. 0003867). According to the RFA (Ref. 1), the permit was revoked by NJDEP after discharge monitoring reports submitted by CP for the period 1986-1988 indicated exceedances of effluent permit limits.

Surface water samples collected in Woodbridge Creek between 1987 and 1989 indicated the presence of nickel in surface water both upstream and adjacent to the site (Ref. 1). However, reported nickel concentrations in upstream samples (150 ppb) were higher than those collected in the vicinity of the CP site (ranging from 30-130 ppb), suggesting potential upstream sources for the observed contamination. A separate set of surface water samples were collected from Woodbridge Creek on December 2002, as part of the RCRA Facility Investigation (RFI) for the Chevron Perth Amboy Refinery (Ref. 4). Figure 9-9

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

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

from the Chevron RFI Report (Ref. 4) presents the 2002 surface water sampling locations and resultant metals data. Although it was not specifically indicated on the figure, the CP property is located on the eastern bank of Woodbridge Creek, opposite and northeast of the Chevron facility's North Field Basin. Surface water in Woodbridge Creek flows in a southeasterly direction until it reaches and empties into Arthur Kill. Spa Spring Creek flows in an easterly direction until it meets and discharges into Woodbridge Creek upstream of the CP site. Thus, samples SW-7-C through SW-11-C reflect surface water quality upstream of the CP site, and samples SW-3-C through SW-6-C reflect downstream surface water quality.

Of the three metals potentially discharging to the creek in CP groundwater, only nickel was detected in surface water at concentrations above NJDEP's Surface Water Quality Standards (SWQS). As indicated in the Chevron RFI Report (Ref. 4), the chronic and acute SWQS for nickel are 8.2 and 74 µg/L, respectively. The highest surface water concentration of nickel in 2002 was detected in upgradient sample SW-10-C (52.2 µg/L). Lower concentrations (ranging from 13.9 to 41.2 µg/L) were observed at the downstream sample locations. These results suggest that the most significant source of nickel in area surface water is located upstream of the CP site, and that groundwater discharges from the CP property itself are not having a significant impact or water quality in Woodbridge Creek.

Table 5 presents a comparison of nickel concentrations in CP groundwater immediately upgradient of Woodbridge Creek around the time of the Chevron sampling event (encompassing 12 individual sampling rounds) and over the last year.

Table 5: Comparative Metals Concentrations Over Time

Constituent	Maximum Detection from February 2000 to December 2002 (µg/L)	1st Qtr 2007 Conc. (µg/L)	2nd Qtr 2007 Conc. (µg/L)	3rd Qtr 2007 Conc. (µg/L)	4th Qtr 2007 Conc. (µg/L)	1st Qtr 2008 Conc. (µg/L)
Shallow Well MW-14S						
Arsenic	27	ND	ND	NS	ND	NE
Cadmium	340	228	184	NS	190	144
Nickel	93,200	48,600	49,200	NS	56,900	70,100
Shallow Well MW-30S						
Arsenic	24.7	ND	ND	ND	4	ND
Cadmium	1,030	86	72	171	316	55
Nickel	17,900	4,590	3,910	5,220	6,210	3,340
Shallow Well MW-32S						
Arsenic	3,730	979	912	1,130	906	192
Cadmium	58.4	49	ND	ND	ND	ND
Nickel	3,250	NE	NE	NE	NE	NE
Deep Well MW-13						
Arsenic	8.5	ND	ND	ND	ND	ND
Cadmium	163	24	10	ND	ND	NE
Nickel	5,340	2,720	1,970	1,950	1,750	1,100
Deep Well MW-25D						
Arsenic	12	ND	ND	ND	ND	ND
Cadmium	12	17	ND	ND	ND	ND
Nickel	NE	NE	NE	NE	NE	NE
Deep Well MW-26D						
Arsenic	10.2	ND	ND	ND	NE	NE
Cadmium	13	25	ND	ND	ND	ND
Nickel	660	NE	NE	NE	238	NE

ND – Not detected; NE – Detected concentration does not exceed applicable GWQS; NS – Well not sampled during the subject quarter
Source: Refs. 5-8 and 10

As shown in the table, concentrations of arsenic, cadmium, and nickel in wells closest to Woodbridge Creek have generally decreased from the maximum concentrations measured prior to the Chevron surface water sampling event. During the first quarter of 2007, cadmium levels increased slightly from the maximum detected prior to the 2002 surface water sampling event in deep wells MW-25D and MW-26D. However, the increases remained within an order of magnitude of the earlier maximum value shown in the table and dropped to nondetected levels for the remaining three quarters of 2007 and the first quarter of 2008. Because metals concentrations in groundwater upgradient of the creek have been decreasing since 2002, metals concentrations in adjacent surface water (attributable to groundwater discharge from the CP site) are also expected to have decreased or stabilized. In light of the industrialized nature of the area and background sources of nickel contamination in Woodbridge Creek, current groundwater to surface water discharges from the CP site are not expected to be significant.

References:

1. RCRA Facility Assessment. Prepared by C. Whittaker, NJDEP Bureau of Planning and Assessment. Undated.
2. Groundwater and Surface Water Modeling Analysis Report. Prepared by Sadat Associates, Inc. Dated February 8, 1995.
3. Letter from Ian Curtis, NJDEP to Thomas Moran, CP Chemicals, re: Ground Water and Surface Water Modeling Analysis Report Comments. Dated May 8, 1995.
4. Full RFI Report for the Chevron Perth Amboy Refinery. Prepared by Chevron. Dated November 2003.
5. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period January 1, 2007 through March 31, 2007. Dated April 30, 2007.
6. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period April 1, 2007 through June 30, 2007. Dated July 30, 2007.
7. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period July 1, 2007 through September 30, 2007. Dated October 30, 2007.
8. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period October 1, 2007 through December 31, 2007. Dated January 30, 2008.
9. Letter from Ed Cacace III, CP Chemicals, to Barry Tornick, USEPA, re: HSWA Addendum to the Quarterly Progress Report. Dated January 30, 2008.
10. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period January 1, 2008 through March 31, 2008. Dated April 30, 2008.

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:

CP is specifically obligated to continue groundwater monitoring in accordance with the approved Remedial Action Work Plan (Ref. 1) and the Deed Notice recorded with Middlesex County. Section 4.5 of the Revised Draft Remedial Action Work Plan outlines performance monitoring of the GWRS and ongoing monitoring of both shallow and deep groundwater beneath the CP property. Groundwater monitoring is conducted on a quarterly basis, with results provided in the HSWA Addendum to each Quarterly Progress Report. The current quarterly monitoring program includes 18 shallow wells and eight deep wells, as indicated below and in Reference 2:

> Shallow wells MW-10, MW-11, MW-12, MW-14, MW-16, MW-17, MW-18, MW-20, MW-21, MW-22S, MW-23S, MW-24S, MW-26S, MW-27S, MW-28, MW-29S, MW-30, and MW-32.
>
> Deep wells MW-13, MW-19, MW-22D, MW-23D, MW-24D, MW-25, MW-26D, and MW-27D.

The most recent sampling round for which data are available was conducted during the first quarter of 2008 (Ref. 2).

References:

1. Revised Draft Remedial Action Work Plan. Prepared by Sadat Associates, Inc. Revised August 12, 1994.
2. Letter from Ed Cacace III, CP Chemicals, to Ian Curtis, NJDEP, re: Quarterly Progress Report for Activities During the Period January 1, 2008 through March 31, 2008. Dated April 30, 2008.

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 CP Chemical site, EPA ID# NJD002141950, located at 7 Arbor Street in Sewaren, Middlesex County, 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 reevaluated when the Agency becomes aware of significant changes at the facility.

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

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

Completed by: ______________________________ Date:____________________

Michele Benchouk
Environmental Consultant
Booz Allen Hamilton

Reviewed by: ______________________________ Date:____________________

Lucas Kingston
Environmental Consultant
Booz Allen Hamilton

Also reviewed by: ______________________________ Date:____________________

Alan Straus, Project Manager
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: June 12, 2008

Adolph Everett, 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 U.S. EPA, Region 2.

Contact telephone numbers and e-mail: Alan Straus
(212) 637-4160
straus.alan@epa.gov

Attachments

The following attachment has been provided to support this EI determination.

Attachment 1 - Summary of Media Impacts Table

Attachment 1: Summary of Media Impacts Table

CP Chemicals, Inc.
NJ4213720275

AEC or SWMU	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
Groundwater	Yes	No	No	Yes	No	No	No	• Placement of asphalt cap over exposed soil sitewide • Deed Notice for cap maintenance • Installation of a French drain and clay cutoff wall along the southwestern portion of the site to minimize discharge of impacted groundwater to surface water • Implementation of a Groundwater Recovery System at five wells to extract groundwater and control contaminant migration • Pretreatment of extracted groundwater prior to discharge to local sewer system • Ongoing quarterly groundwater monitoring • Proposed Classification Exception Area for groundwater	Inorganics (arsenic, cadmium, nickel)