DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures 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 EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no unacceptable human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all contamination subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, (GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action programs overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determination status codes should remain in the 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

CP Chemicals (CP) is located on a 14 acre parcel in Sewaren, New Jersey. CP purchased this site in 1964 from the Vulcan Detinning Company which operated as a secondary smelter since 1907. The area

in which the facility is located is zoned "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 the Woodbridge Creek. The nearest residential property is located approximately 1,000 feet to the northeast. All drinking water and process water in the Woodbridge Township is supplied by municipal sources.

CP is involved in the manufacturing of inorganic chemicals. Specifically CP produces nickel, copper, cobalt and zinc salts, metallic cyanides, and metallic fluoroborates. The types of metals involved in the manufacturing processes include copper, zinc, cobalt, nickel, and manganese. CP obtains metals for its manufacturing processes through the use of relatively pure chemical compounds and relatively impure chemical wastes from various sources. The impure chemical wastes are metal-containing liquids, sludges, and filter cakes which CP receives from both other manufacturers and its own manufacturing process. Treatment processes at the CP site include the treatment of hazardous waste from outside generators to form the following: cupric chloride solution, and liquid salts of metals, predominantly nickel, copper, cobalt, zinc, and manganese.

CP entered into a Administrative Consent Order (ACO) with the 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. In June of 2000, ownership of the CP property was transferred to the Town of Woodbridge. CP is still obligated under the 1991 ACO to complete all remedial actions necessary at the site.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from 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 #6 and enter IN (more information needed) status code

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs): The following SWMUs and AOCs were identified in the RCRA Facility Assessment Report (no date provided) and the HSWA Permit issued in 1992. The Remedial Investigation Report identified different "areas" of investigation. When possible, SWMUs and AOCs have been linked to their associated investigation areas. A facility map depicting the areas of investigation and the associated SWMUs and AOCs has been provided in Attachment 1.

SWMU 1, 2, and 3, Tanks 1C, 1D, and 1E/Area S, Hazardous Waste Treatment/Storage Area #5: These units are operating RCRA-regulated above-ground storage units. Tanks 1C and 1D are both 12,000 gallon closed top tanks that store copper containing wastes. Tank 1E is a 7,000 gallon open top tank which also stores copper-bearing waste. All three tanks are located in a secondary containment area with a total volume of 12,000 gallons. A 1989 visual site inspection (VSI) by NJDEP indicated the tanks and containment area were in good condition; however there was some evidence of overflow of the containment area. Therefore, an RFI for the surrounding soil and groundwater was recommended.

SWMU 4 and 5, Tanks 300 and 2A/Area T, Hazardous Waste Treatment/Storage Areas #1 and #7: These units are operating RCRA-regulated above ground storage units. Tank 300 is a 10,000 gallon open top, above-ground storage tank (AST) which stores copper-bearing waste. Tank 2A is a 12,000 gallon closed top AST which stored nickel-bearing waste. Both tanks have a secondary containment system. During the 1989 NJDEP VSI stains were observed on the outside of the tanks indicating potential contaminant overflow. Therefore, an RFI for surrounding soil and groundwater in this area was recommended.

SWMU 6, Tank 1: This unit is an operating RCRA-regulated above ground storage unit. The unit is a 10,000 gallon, closed top, AST which stores copper-bearing wastes. This unit is located entirely inside the Finish Product Warehouse - Building 44, atop the concrete floor. The RFA and HSWA permit indicated there was no evidence of the migration of hazardous waste in this area. Therefore, a no further action determination was rendered.

SWMU 7, Hazardous Waste Container Storage Area/Area D, Former Drum Storage Area: This unit is an active RCRA-regulated hazardous waste container storage area (CSA) which has the capacity to house a maximum of 300, 55-gallon drums. SWMU 7 is located immediately adjacent to Area D. Based upon a review of the limited information available on

Area D, it appears Area D was an unregulated storage area which has been replaced by SWMU 7. The current CSA (SWMU 7) contains concrete pads, walls, and a collection sump. Any waste associated with the collection sump is directed to the waste water treatment plant (WWTP). Most incoming waste containers received in this area contain nickel sulfamate solution, nickel sludges, cupric chloride solution and copper sludges. The RFA and HSWA permit indicate that no known or documented releases have occurred from this unit. However, the NJDEP has indicated that the concrete pad may be incompatible with the corrosive nature of the contaminants stored in this area. Therefore, an RFI for surrounding soil and groundwater in this area was recommended.

SWMU 8, Former Large Lagoon/Area A, Former Location of Large Sludge Lagoon: This unit was a non-regulated unit that was located in the northwest corner of the site, approximately 25 feet from the Woodbridge Creek. The length of operation for this unit is unknown. Until approximately 1981-82, filtration from precipitation processes was piped to this unit. The unit also received cyanide wastewater from the small lagoon (AOC 9). The filtrate received was allowed to evaporate, producing a metal rich sludge. Sludge from the lagoon was considered a hazardous waste based upon its heavy metal content. In 1983, approximately 4 million pounds of lagoon sludge was excavated from this area and stored in three waste piles (SWMU 10, 11, 12, Areas E, K, L) until July 1986. Roasting of the sludge occurred in the Raw Materials Warehouse (SWMU 13, Area K, Bldg 12) beginning in 1987, and the resultant "stones" were drummed and stored on a cement pad adjacent to Building 12. Based upon the history of this unit, an RFI for groundwater and soil in this area was recommended.

SWMU 9, Former Small Lagoon/Area B, Former Location of Small Lagoon: This unit was a non-regulated unlined lagoon which received cyanide waste (5% solution) generated from the manufacturing of copper cyanide. When the unit reached capacity, overflow was directed to the Large Lagoon (SWMU 8). Sludge materials were handled in the same fashion as those in SWMU 8 (see previous discussion). Based upon the history of this unit, an RFI for groundwater and soil in this area was recommended.

SWMU 10, 11, and 12, Wastepile 1, 2 and 3 (respectively): These units were non-RCRA regulated hazardous waste piles generated in 1983 as a result of the excavation of the Large and Small Lagoons (SWMU 8 and 9). Beginning in 1987, sludge from each of these waste piles was roasted in Sludge Roasting Kiln (SWMU 13), and the resultant "stones" were drummed and stored on a cement pad adjacent to Building 12. Each wastepile is described below:

> **Wastepile 1/Area K, Former Location of Pile #1:** This was the largest pile located in Raw Materials Warehouse. The RFA and HSWA Permit indicate that it is unclear whether this material was stored directly on the dirt floor of the building.
>
> **Wastepile 2/Area E, Former Location of Pile #2:** This pile was located behind Building 18. The wastepile was uncovered and unlined from 1983 to at least 1986, at which time a concrete containment structure waste installed for the waste.
>
> **Wastepile 3/Area L, Former Location of Pile #3:** This pile was located at the far southeast corner of the property. This pile was unlined and uncovered.

Based upon the history of these units, an RFI for groundwater and soil in these areas was recommended.

SWMU 13, Sludge Roasting Kiln: This unit was a non-RCRA regulated unit. The unit was located on a concrete pad in the Raw Materials Warehouse and was operated from 1986 to 1988 to roast the sludge materials in SWMUs 10, 11, and 12. The sludge contained copper and cyanide which were supposed to be burned off during the incineration process. The liberated copper from this process was sold to outside purchasers. The "rocks" generated from the process were drummed and stored outside of the Raw Materials Warehouse. The RFA and HSWA permit did not identify any reports of releases or discharges from this area, therefore, no further action was recommended.

SWMU 14, Pit Area/Area C, Former Location of Southwest Containment Area: This was a non-RCRA regulated pit that was discovered by NJDEP in 1977 during an on-site investigation. This pit was 4 ft deep x 20 ft wide x 40 ft long. During the inspection, investigators observed rusted 55-gallon drums and spilled chemical solids buried in the pit. An RFI for groundwater and soil in this area was recommended.

SWMU 15, 16, 17, Former Drum Storage Areas: These areas were non-RCRA regulated. The areas were identified in 1986 during the RFA conducted by NJDEP. The areas were used to store a large number of drums directly on ground surface. An RFI for groundwater and soil in this area was recommended. This area was investigated as part of Area V in the Remedial Investigation (RI) Report.

AOC A (AOC 18), Phase I Engineering Investigation Area/Area M, Area of Phase I Engineering Investigation: According to the HSWA Permit, during a groundwater and soil investigation in a small section of the northeast portion of the site in 1985, elevated levels of arsenic were found in soil, the upper consolidated aquifer, and the lower semi-confined aquifer. This contamination was suspected to be a result of leaching of the cinder component of the fill layer at the site. An RFI for soil and groundwater in this area was recommended to fully delineate the extent of contamination.

AOC B (AOC 19), Geophysical Investigation Area/Area J, Area of Geophysical Investigation: According to the HSWA Permit, a geophysical investigation was conducted in 1988 in the southeastern portion of the site. The investigation utilized electromagnetic induction techniques for subsurface exploration to collect data on the potential presence of subsurface inorganic contamination. Although the 1988 investigation was inconclusive, certain anomalies suggested the potential for buried materials in this area. Therefore, an RFI for soil and groundwater in this area was recommended to fully delineate the extent of contamination.

AOCs C, D, E, F (AOCs 20, 21, 22, 23), Underground Storage Tank Areas/Area H, N, P, and Q, Location of Abandoned Underground Fuel Oil Tanks, Former Location of Underground Gas Tanks and Pump Island, Former Location of Underground Fuel Oil Tanks, and Location of Existing Underground Fuel Oil Tanks (respectively): This area consists of four underground storage tank (UST) areas. One area contains two UST which have been abandoned in place (Area H). Another area contains two 20,000 gallon UST used to store No. 2 Fuel Oil (Area Q). The two other areas are where tanks have been removed from the

property. Specifically, four tanks near the facility entrance, and two tanks near the main processing building (Areas N and P). The HSWA permit recommended an RFI for soil and groundwater in these areas.

In Summary all SWMUs/Areas required further investigation with the exception of SWMUs 6 and 13, which were given a no further action determination in the 1992 HSWA Permit. Results of the soil investigation conducted as part of the 1993 RI (which was conducted to satisfy the RFI requirements discussed above) for each area are outlined in the response to Question No. 2. A site wide groundwater investigation was conducted as part of the RI, and results are also discussed in the response to Question No. 2.

References:

(1) Preliminary Assessment Report, prepared by NJDEP - March, 1986.
(2) Letter from Susan Goetz, Sadat Associates, to Permits Branch, USEPA, Re: submittal of site map - June 16, 1992.
(3) HSWA Permit, prepared by USEPA - December 9, 1992.
(4) Final Remedial Investigation Report, prepared by Sadat Associates, Inc. - December 23, 1993.
(5) Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, Re: Amendment to General Information Notice - June 9, 2000.
(6) Letter from Ian Curtis, NJDEP, to Margaret Carmeli, Giordano, Halleran & Ciesla, Re: Amendment to General Information Notice - June 20, 2000.
(7) RCRA Facility Assessment, prepared by C. Whittaker, Bureau of Planning and Assessment - No Date Provided.

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

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

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

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

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

Rationale:

Groundwater

Hydrogeological studies have indicated the presence of two aquifers beneath the site. The upper hydraulic unit, encountered at depths ranging from approximately 5 to 18 feet below ground

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

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

surface (bgs), consists of perched water in a fill material. This fill material consists of sand, gravel, and silt. Inorganic constituents in the shallow aquifer have been detected in all areas of the site, but are mostly concentrated in the western portion of the property near areas of historic industrial activity. Arsenic however, has been found at the highest concentrations in the vicinity of Area L, the former location of a waste pile which may have contained high levels of arsenic. Based upon available information it appears that all contamination in the shallow aquifer is currently concentrated within site boundaries, with the exception of arsenic which may have migrated slightly beyond the eastern boundary of the site. The documented regional direction of groundwater flow in the shallow unit is towards the creek (southerly). It is now influenced by the vertical cutoff wall and french drain system that were installed in the early 1980s. CP also installed a groundwater recovery system which began operating in June 1999. Review of contour maps developed during the RI for the shallow hydraulic unit indicates the presence of a groundwater mound in the southwest corner of the property near the pump house. This mounding causes shallow groundwater to flow away from, rather than toward, the cutoff wall and french drain system for removal. The current flow is therefore, the north/northeast, away from the creek.

The lower hydraulic unit is known as the Farrington Sand Aquifer. Near Woodbridge Creek, the upper hydraulic unit is bound by the underlying peat layer and the cutoff wall to the west and southwest. In the center and eastern portions of the property where the peat layer is not present, the upper hydraulic unit is underlain by a cohesive, coarse- to find- grained silty sand unit, approximately 27.5 feet thick. The Farrington Sand Aquifer is partially confined by the sand unit. Groundwater in the shallow geological unit is not hydraulically connected to the Creek and the deep aquifer in the vicinity of the cutoff wall where the peat layer is present. However, the shallow unit and the Farrington Sand Aquifer appear to be hydraulically connected at the central to eastern portion of the property where the peat layer is absent. Groundwater contour maps developed for the lower hydraulic unit show that flow in this unit is toward Woodbridge Creek, southwest of the site. It also shows that the flow reverses direction to the north-northeast during high tide events; however, the net flow of the aquifer is toward the Creek.

Groundwater studies were conducted as part of the 1993 RI and based upon the extensive amounts of data the site was divided into four sections: the eastern portion of the property, the southern and eastern perimeters of the property, the center portion of the property, and the western portion of the property. Contaminants in groundwater were screened against the higher of either the NJ Groundwater Quality Criteria (GWQC) or the Practical Quantitation Level (PQL) for Class II-A potable groundwater. Contaminants detected above these criteria are identified below:

Eastern Portion: trichloroethene, tetrachloroethylene, arsenic, lead.
Southern and Eastern Perimeters: methylene chloride, chloroform, 1,2-dichloropropane, trichloroethylene, bis[2-ethylhexyl]phthalate, cadmium, lead.
Center Portion: chloroform, trichloroethylene, lead.
Western Portion: methylene chloride, chloroform, benzene, 1,1-dichloroethene, 1,1,1-trichloroethane, cadmium, lead, cyanide.

Based upon the results of the RI, semi-volatile organic compounds (SVOC), pesticides, and polychlorinated biphenyls (PCB), are generally not present at the property at levels above the

relevant screening criteria. This is consistent with both current and past operating practices at the facility. Certain organic compounds (e.g., trichloroethene and tetrochloroethylene) have been sporadically detected above relevant screening criteria. However, based upon information reported in the RI, the presence of these compounds do not appear consistent with the historical use of chemicals and chemical operations at the site. Therefore, it is thought that these organic compounds are related to other industrial sources that either currently and/or historically have surrounded the CP property. Contamination in deep groundwater monitoring wells is consistent with contaminants detected in shallow wells (i.e. metals and minimal VOCs). Pursuant to the State ACO and EPA HSWA Permit, additional sampling investigations are currently ongoing to fully characterize the contamination in the lower aquifer.

Air (Indoors)

Groundwater and soil contamination at the site consists primarily of metals contamination, with some intermittent detections of VOCs. Despite the limited VOC detections on site, the Johnson-Ettinger Model was used to calculate the incremental risk and hazard values associated with the potential migration of volatile contaminants into indoor air. The maximum concentrations of VOCs detected on site, were used to calculate conservative risk and hazard estimates. The maximum concentrations detected on site and used in the model have not, however, been detected beneath buildings on site. Use of these maximum detected values, therefore, provides conservative calculated risk and hazard values. Other site specific input parameters used in the model included: the contaminants detected, their concentrations, and the depths below the surface to groundwater. The default values were used for those parameters whose site specific values were not readily available. The input value for "depth below grade to water table" differs for each parameter and correlates with the depth to groundwater in the samples where the input concentration was detected (i.e., 180 cm to 350 cm for shallow wells, 600 cm to 1500 cm for deep wells.)

Residential exposure assumptions (i.e., averaging time, exposure duration, exposure frequency) were used in the calculations, even though future residential use of this site is not possible due to the implementation of the DER. Calculation the risk and hazard values using residential exposure parameters assures conservative estimates of risks and hazards at this site. Finally, it should also be noted that industrial buildings generally have high air circulation due to lack of enclosed areas. Generally, this high air circulation decreases the potential risks associated with migration of volatile contaminants into indoor air.

Table 1 identifies the volatile contaminants detected on-site above relevant screening criteria and the calculated Incremental Risk Value (IRV) or Hazard Quotient (HQ) for each contaminant for vapor intrusion into indoor air.

Table 1 - Calculated Incremental Risk Values and Hazard Quotients

Constituent	Calculated Incremental Risk Value (IRV)/Hazard Quotient (HQ)

Shallow Wells

1,1-dichloroethene	4.1E-7 (IRV)
1,1,1-trichloroethane	2.2E-4 (HQ)
carbon tetrachloride	3.9E-7 (IRV)
trichloroethene	5.8E-6 (IRV)
tetrachloroethene	1.2E-6 (IRV)
benzene	4.4E-7 (IRV)
cis-1,2-dichloroethene	5.1E-4 (HQ)

Deep Wells

1,1-dichloroethene	7.6E-6 (IRV)
1,1,1-trichloroethane	1.8E-4 (HQ)
carbon tetrachloride	3.5E-7 (IRV)
1,2-dichloropropane	1.8E-3 (HQ)

The calculated IRVs and HQs for each organic constituent are below or within the USEPA acceptable risk range of 1.0E-04 to 1.0E-06 and below the target HQ of 1.0. In addition, cumulative risks associated with exposure to carcinogenic compounds falls within the EPA acceptable risk range of 1.0E-04 to 1.0E-06, and the noncarcinogenic hazard index, considering all noncarcinogens and their target organs, does not exceed one. Based upon these conservative estimates, volatilization of groundwater contaminants into indoor air at the CP site does not appear to pose an unacceptable risk. See Attachment 3 for Johnson-Ettinger Model results for the compounds which present the highest risk values.

Surface/Subsurface Soil

During the 1993 RI, soil throughout the CP site was analyzed for VOCs, SVOCs, pesticides, PCBs, metals and total petroleum hydrocarbons (TPH). Analytical results were compared to the New Jersey Soil Cleanup Criteria (NJSCC) for residential surface soil and the Impact to Ground Water Criteria for subsurface soil. In general, metals were the main constituents detected throughout the site-wide soils, as outlined below:

- **Area A, Former Location of Large Sludge Lagoon:** arsenic, cadmium, chromium, copper, lead, nickel, zinc, cyanide.
- **Area B, Former Location of Small Lagoon:** arsenic, copper, lead, nickel, zinc, cyanide.
- **Area C, Former Location of Southwest Containment Area:** arsenic, cadmium, chromium, copper, lead, nickel, zinc
- **Area D, Area Former Drum Storage Area:** benzo(a)pyrene, copper, arsenic, lead
- **Area E, Former Location of Pile #2:** arsenic, copper, lead, nickel, zinc

- **Area F, Waste Water Treatment Plant (WWTP) (not designated as a SWMU):** arsenic, copper, lead, zinc
- **Area G, Former Rolloff Storage Area (not designated as a SWMU):** benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, arsenic, copper, lead, nickel, zinc - surface; trichloroethylene, tetrachloroethene - subsurface
- **Area H, Location of Abandoned Underground Fuel Tanks:** copper, lead, nickel
- **Area J, Area of Geophysical Investigation:** arsenic, cadmium, chromium, chromium VI, copper, lead, nickel, zinc.
- **Area K, Former Location of Pile #1:** zinc, copper, lead
- **Area L, Former Location of Pile #3:** copper
- **Area M, Area of Phase I Engineering Investigation:** arsenic, copper, lead, zinc
- **Area N, Former Location of Underground Gas Tanks and Pump Island:** chromium, copper
- **Area P, Former Location of Underground Fuel Tanks:** benzo(a)pyrene,
- **Area Q, Location of Existing Underground Fuel Tanks:** None
- **Area R, Area North/Northeast of WWTP (not designated as a SWMU):** copper, lead
- **Area S, Hazardous Waste Treatment/Storage Area #5:** benzo(a)anthracene, chrysene arsenic, beryllium, chromium, copper, lead, nickel, zinc, cyanide
- **Area T, Hazardous Waste Treatment/Storage Area #1 and #7:** copper
- **Area V, Former Drum Storage Area:** benzo(a)pyrene, copper
- **Sub-areas 1U, 2U, and 7U:** arsenic, copper, lead, zinc, chromium VI

Based upon the results of the 1993 RI, it appears that organic contaminants (i.e., VOCs, SVOCS, pesticides, and PCBs) are generally not present in soils above relevant screening criteria. This is consistent with information on both the current and historical use of chemicals at the site. The parameters most frequently detected in both surface and subsurface soils are: arsenic, copper, lead, nickel, zinc, and cyanide. In general, these substances tend to be concentrated in the western portion of the property and to a lesser extent in the southeast portion of the property.

Surface Water

Woodbridge Creek is located adjacent to the facility. It is a tributary to the Arthur Kill which empties into Newark Bay. No surface water samples were collected during the remedial investigation. However, surface water samples were collected in the Woodbridge River by CP on several other occasions between 1987 and 1989 (Reference No. 3). These sample results indicated the presence of nickel and lead in surface water both upstream and adjacent to the site. Levels in upstream samples for nickel (150 ppb) and lead (20 ppb) were higher then those collected adjacent to the CP site. Specifically, the nickel concentrations detected adjacent to the site ranged from 30 to 130 ppb, while the lead concentrations ranged from 5 to 5.6 ppb. The highest nickel concentrations (130 ppb) detected in Woodbridge Creek in the vicinity of the CP site is below the NJ Surface Water Quality Standard of 516 ppb. The highest lead concentration (5.6 ppb) is slightly above the NJ Surface Water Quality Standard of lead of 5 ppb. Although lead concentrations in Woodbridge Creek in the vicinity of the CP slightly exceeded the NJ Surface Water Quality Standard, CP has assumed that the site is not significantly impacting Woodbridge Creek. CP's assumption is based on the fact that lead and nickel concentrations detected upstream of the CP site were significantly higher than those detected in the vicinity of the CP site.

The 1993 RI Report provides shallow and deep groundwater monitoring results collected outside of the cutoff wall and immediately adjacent to the Woodbridge Creek.. Results indicate inorganic constituents are present in shallow and deep groundwater samples at levels that are greater than 10 times the NJ GWQC. Constituents detected in groundwater samples are provided below in Table 2:

Table 2 - Constituents Detected in Groundwater

Contaminant	New Jersey Groundwater Quality Criteria (NJ GWQC)	Maximum Concentration (ppb)
Arsenic	8	4,000
Cadmium	4	601
Lead	10	1,870
Mercury	2	29.3

Based upon these detected concentrations, it appears that significant levels of inorganic constituents may be discharging to Woodbridge Creek. Based on the surface water quality results (e.g. lead and nickel concentrations) discussed above, and considering the significant levels detected in groundwater samples coollected adjacent to Woodbridge Creek, it appears that past RCRA activietes at the CP site may have degraded the surface water quality in Woodbridge Creek.

Sediment

CP conducted sediment sampling in the Woodbridge River as part of the 1993 RI investigation. Samples were collected upstream, adjacent to, and downstream of the property. In addition, sediment samples were collected adjacent to the former NJPDES discharge points DSN001 and DSN002. Detected concentrations in the sediment samples were compared to the National Oceanic and Atmospheric Administration (NOAA) Effects Range - Low (ER-L) concentration level and Effects Range - Medium (ER-M) concentration level. The results are summarized in Table 2.

Table 2 - Summary of Sediment Sample Results (ppm)
(Reference No. 1, Final RI Report)

Parameter	**NOAA ER-L**	**NOAA ER-M**	**SED - 1** 1500' upstream	**SED - 2** within 30' of DSN001	**SED - 3** within 30' of DSN002	**SED - 4** immed. downstream	**SED - 5** 500' downstream
Arsenic	33	85	7.67	< 2.6	5.3	13	<2.6
Copper	70	390	413	56	390	399	240
Lead	35	110	116	57	130	150	62
Nickel	30	50	49.2	11	79	130	23
Zinc	120	270	306	118	470	519	180

As outlined in the Table 3, copper, lead, nickel, and zinc, were all detected at concentrations above both the ER-L and ER-M values in all the samples. Woodbridge Creek has had a long history of industrial use dating back as early as the 1800s. The intent of the sediment sampling was to determine if there was a marked degradation of the sediment quality in Woodbridge Creek which could be directly attributed to the activities at CP. Based upon the presence of metals at similar concentrations in sediment upstream (away from the Arthur Kill) and downstream (toward the Arthur Kill) from the facility, the RI concluded that there was no marked degradation of sediment quality in Woodbridge Creek that could be directly attributed to the activities at CP Chemicals. However, based upon a review of Table 2, nickel and zinc are detected at levels higher than those detected in upstream samples at location SED-3 and SED-4, which are adjacent and immediately downstream of the site. Copper is also detected at comparable levels to the upstream results in these two samples. Furthermore, because Woodbridge Creek adjacent to the CP property has been under tidal influence, the comparison of the sediment data collected from the upgradient and downgradient does not provide the degradation of the sediment quality in the Creek which could be directly attributed to the activities at CP. Therefore, based upon the review of these results, and the significant concentrations of inorganic constituents detected in groundwater samples adjacent to Woodbridge Creek, it appears that past RCRA activities at CP site may have impacted, and may potentially still be impacting, sediment quality in Woodbridge Creek.

Air (Outdoors)

There is no reason to believe outdoor air has been contaminated based upon the nature of contamination at the site (i.e., metals) and considering the fact that an asphalt cap has been installed over a majority of the exposed contaminated areas at the site.

References:

(1) Final Remedial Investigation Report, prepared by Sadat Associates, Inc. - December 23, 1993.
(2) Revised Draft Remedial Action Work Plan, prepared by Sadat Associates, Inc. - Revised August 12, 1994.
(3) Groundwater and Surface Water Modeling Analysis Report (Draft), prepared by Sadat Associates, Inc. - February 8, 1995.
(4) RCRA Facility Assessment, prepared by C. Whittaker, Bureau of Planning and Assessment - No Date Provided.

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

Summary Exposure Pathway Evaluation Table
*Potential **Human Receptors** (Under Current Conditions)*

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food[3]
Groundwater	No	No	No	No	–	–	No
Air (indoor)							
Surface Soil (e.g. < 2 ft)	No	No	No	No	No	No	No
Surface Water	No	No	–	–	No	No	No
Sediment	No	No	–	–	No	No	No
Subsurface Soil (e.g., > 2	–	–	–	No	–	–	No
Air (outdoors)							

Instruction for Summary Exposure Pathway Evaluation Table:

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

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

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

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

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

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

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

Rationale:

Groundwater

According to the Preliminary Assessment report, there is no potable groundwater in Woodbridge Township. All drinking water and process water supplied to industrial facilities and residents in the area of CP is supplied by municipal sources. Therefore, there is no potential for on- or off-site direct exposure through ingestion. In addition, exposure to contaminated groundwater on-site through direct contact is unlikely as a result of the restrictions placed upon the facility by the HSWA permit to keep the asphalt cap intact. Therefore, intrusive subsurface activities are unlikely to occur at this site without the proper notification and health and safety protocol. In addition, potential exposure for a construction worker to off-site arsenic contamination in the vicinity of Area L is unlikely considering that depth to groundwater along the eastern boundary of the site is approximately 14 feet below ground surface (bgs).

The vertical cutoff wall and french drain system were installed in the early 190s and a groundwater recovery system was installed and began operating in June 1999. Quarterly monitoring of the groundwater system has been occurring since that time. CP also has plans to initiate the implementation of a groundwater Classification Exception Area (CEA) after obtaining one year of quarterly groundwater monitoring data (Reference No. 13).

Surface/Subsurface Soil

All soil contamination related to the CP site appears to exist within property boundaries (i.e., fenceline). As a result, no off-site exposure is possible. In order to mitigate potential on-site exposure to receptors, an asphalt cap has been installed over all open areas of contaminated soil (Reference No.10). This asphalt cap was completed in June of 1998. In Areas A and C two on-site stormwater detention basins have been installed to control surface water runoff from the asphalt cap. During the construction of these two basins a total of approximately 2,700 cubic yards of contaminated soil was removed from these areas, placed in Area J, and then covered by the asphalt cap. According to the Proposal for Management of Excavated Soil (Reference No. 11), prepared by CP Chemicals, this action removed contaminated soil that was in contact with groundwater so that additional migration of soil contaminants to groundwater would be mitigated. Each basin has a 40-mil synthetic liner which mitigates potential direct exposure to any remaining contaminated soil that is not covered by the asphalt cap.

The facility also maintains a site security system that includes perimeter fencing with bilingual warning signs, controlled gate access and 24-hour security. Therefore, it is unlikely that trespassers would be potentially exposed to any contaminated media on site. In addition, a Declaration of Environmental Restriction (DER) (currently known as a Deed Notice) was recorded on June 2, 1999. This DER is intended to ensure that the property is not used for residential purposes both currently and in the future. It allows the property to only be used for industrial purposes.

Surface Water/Sediment

Metals have been detected in surface water and sediment in the vicinity of the CP site. However, based upon results of upstream surface water and sediment samples, the RI Report indicates that activities at the CP site have not significantly impacted surface water and sediment quality near the site. Although groundwater adjacent to Woodbridge Creek may still be exceeding applicable standards for inorganics, the current extent of this impact is unclear. However, the vertical cutoff wall and french drain system, which were installed in the early 1980s, and the groundwater recovery system, which was installed and began operating in June 1999 reduce or prevent groundwater contamination from flowing into Woodbridge Creek. Nevertheless, Woodbridge Creek has been classified by the State of New Jersey as a FW2-NT/SE3 surface water body. This designates the use of the creek for only secondary contact, maintenance of fish and wildlife populations, and migration of diadromous fish. This classification precludes the use of Woodbridge Creek for recreational uses, such as swimming (Reference No. 9). Since human exposure to Woodbridge Creek is controlled, exposure to contaminants in the sediment and surface water is not possible. In addition, the fence installed along the site boundary adjacent to Woodbridge Creek prevents workers on the CP site from possible exposure to contamination in the Creek. Therefore, human exposure to elevated metals concentrations detected in surface water and sediment in Woodbridge Creek at the vicinity of the site appears unlikely.

Reference(s):

(1) Preliminary Assessment Report, prepared by NJDEP - March, 1986.
(2) Letter from Susan Goetz, Sadat Associates, to Permits Branch, USEPA, Re: submittal of site map - June 16, 1992.
(3) HSWA Permit, prepared by USEPA - December 9, 1992.
(4) Final Remedial Investigation Report, prepared by Sadat Associates, Inc. - December 23, 1993.
(5) Revised Draft Remedial Action Work Plan - prepared by Sadat Associates, Inc. - Revised August 12, 1994.
(6) Groundwater and Surface Water Modeling Analysis Report (Draft), prepared by Sadat Associates, Inc. - February 8, 1995.
(7) Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, Re: Final Cap Design - December 17, 1995.
(8) Letter from Andrew Bellina, USEPA, to Ian Curtis, NJDEP, Re: Draft Remedial Action Work Plan - September 19, 1994.
(9) Letter from Ian Curtis, NJDEP to Thomas Moran, CP Chemicals, Re: Ground and Surface Water Modeling Analysis Report Comments - May 8, 1995.
(10) Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, Re: Summary of 5/13/96 Conference Call Regarding NJDEP Comments to Final Cap Design - September 13, 1996.
(11) Letter from Thomas Moran, CP Chemicals, to Michael Kramer, USEPA, Re: HSWA Permit, Proposal for Management of Excavated Soils - April 8, 1997.
(12) NJDEP CP Chemicals Fact Sheet Memo - August 23, 1999.
(13) Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, Re: Proposed Deed Notice - March 1, 1999.
(14) Letter from Margaret Carmeli, Giordano, Halleran & Ciesla, to Ian Curtis, NJDEP, Re: Proposed Deed Notice - September 16, 1999.
(15) Letter from Thomas Moran, CP Chemicals, to Andrew Parks, USEPA, Re: HSWA Addendum to the Quarterly Progress Report - May 1, 2000.

(16) Letter from Thomas Moran, CP Chemicals, to Ian Curtis, NJDEP, Re: Groundwater Remedial Activities - May 11, 2000.

(17) Letter from Ian Curtis, NJDEP, to Margaret Carmeli, Giordano, Halleran & Ciesla. Re: Amendment to General Information Notice - June 20, 2000.

(18) RCRA Facility Assessment, prepared by C. Whittaker, Bureau of Planning and Assessment - No Date Provided.

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

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

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

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

Rationale and Reference(s):

This question is not applicable. See response to question #3.

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

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

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

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

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

Rationale and Reference(s):

This question is not applicable. See response to question #3.

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

_X_ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the CP Chemicals, Inc. Facility, EPA ID#NJD002141950, located at 7 Arbor Street, in Sewaren, New Jersey, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

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

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

Completed by: _original signed by_ Date: 10/10/00

Kristin McKenney
Risk Assessor
Booz Allen & Hamilton

Reviewed by: _original signed by_ Date: 10/10/00

Mace Barron
Sr. Risk Assessor
Booz Allen & Hamilton

original signed by Date: 10/12/00

Andy Park, RPM
RCRA Programs Branch
EPA Region 2

original signed by Date: 10/12/00

Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: _original signed by_ Date: 10/13/00

Raymond Basso, Chief
RCRA Programs Branch
EPA Region 2

Locations where references may be found:

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Andy Park, EPA RPM
(212) 637-4184
park.andy@epamail.epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Attachments

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

Attachment 1 - SWMU/AOC Map

Attachment 2 - Summary of Media Impacts Table

Attachment 3 - Well Location Map

Attachment 4 - Johnson-Ettinger Model Results

Attachments Truncated, see facility file (MSS, 06/12/02)