

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

Interim Final 2/5/99

**RCRA Corrective Action**

**Environmental Indicator (EI) RCRIS code (CA750)**

**Migration of Contaminated Groundwater Under Control**

Facility Name: Cresticon, Inc. (formerly Pfaltzgraff Co./formerly Cole Office Environments)  
Facility Address: 1201-1209 Eden Road (formerly 640 Whiteford Road), York, PA 17402  
Facility EPA ID #: PAD052917846

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units [SWMU], Regulated Units [RU], and Areas of Concern [AOC]), been considered in this EI determination?

- If yes – check here and continue with #2 below.
- If no – re-evaluate existing data, or
- If data are not available skip to #6 and enter “IN” (more information needed) status code.

**BACKGROUND**

**Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for nonhuman (ecological) receptors is intended to be developed in the future.

**Definition of “Migration of Contaminated Groundwater Under Control” EI**

A positive “Migration of Contaminated Groundwater Under Control” EI determination (“YE” status code) indicates that the migration of “contaminated” groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original “area of contaminated groundwater” (for all groundwater “contamination” subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

**Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The “Migration of Contaminated Groundwater Under Control” EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

**Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in 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).

**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 2

2. Is groundwater known or reasonably suspected to be "contaminated"<sup>1</sup> above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

  X   If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

       If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

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

**Rationale and Reference(s):**

**General Facility Information**

The former Pfaltzgraff/Cole Office Environments Facility is located in Springettsbury Township in York County, near York Pennsylvania. The subject property is located on the south side of Arsenal Road (Rt. 30) and north of the Harrisburg-Baltimore Expressway (Rt. 83). The property was undeveloped until the early 1960s when it was purchased by Cole Division, Litton Corporation. Construction of the Facility building began in 1965 with additions in 1967-1968. From the late 1960s up until 1989, the property was used for the fabrication of parts and the assembly of office furniture which included zinc, nickel and chromium electroplating, iron phosphatizing and painting operations. Between 1989 and 1991, the building was vacant and the property was not used. From 1991 to 1993, a skid repair business operated in the western-most extension of the Facility, and from 1990 to 1998, approximately 40,000 square feet of the Facility was rented to Pfaltzgraff Company for use as a warehouse. Currently, the property is owned by Kinsley Properties (under K/G Whiteford Limited Partnership) and leased to Worthington Industries, Inc. who manufactures steel pallets and custom steel packaging materials. The site, which is located in an industrial area, is occupied by one building, paved parking lots, grass areas, trees, and small brush areas

On July 6, 1997, the former Pfaltzgraff/Cole Office Environments Facility submitted Notices of Intent to Remediate (NIR) (1) chromium and nickel in soil and groundwater, (2) volatile organic compounds (VOCs) in regional groundwater, and (3) paint thinner constituents in soils in accordance with the provisions of Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2). To maintain consistency with prior PADEP Act 2 documentation, the former Pfaltzgraff/Cole Office Environments Facility will be referred to as Cole Office Environments or Facility throughout this report

**Groundwater Contamination**

*Former Solvent UST Area (Area B)*

The former solvent UST Area included four steel underground storagetanks (USTs): two (2) 2,000-gallon USTs, one (1) 6,000-gallon paint thinner UST, and one (1) 6,000-gallon aromatic 100 solvent UST. All of the USTs were excavated, cleaned, and removed from the site in October 1991. During removal, one of the 6,000gallon USTs was observed to have visible holes on the bottom and both ends of the tank. The remaining three (3) USTs were rusted and pitted. Following removal of the USTs, visibly stained soil or soil with positive photoionization detector readings was excavated and disposed. The excavation was backfilled with clean soil and gravel. Groundwater monitoring results showed that the groundwater was not impacted by paint thinning compounds however, tetrachloroethylene (PCE) and trichloroethylene (TCE) were detected at concentrations of 40.8 ppb and 69.7 ppb, respectively, in MW-7 and determined to be from an off-site source. The PCE and TCE groundwater contamination will be discussed further below.

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<sup>1</sup> "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).

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 3

*Former Nickel-Chrome Plating Area (Area F)*

In 1990, elevated concentrations of chromium (max. of 5,800 ppm) and nickel (max. of 5,400 ppm) were first detected in subsurface soils beneath the former metals plating sump area during a Phase I Investigation. The source of the contamination was determined to be the former nickel-chrome plating operations that were active at the site between 1968 and 1989. Chromium and nickel were dissolved in an acidic plating solution used in the electroplating process. In 1989, the plating operation ceased and the plating equipment was decommissioned and removed from the site. From 1990 to 2000, numerous soil and groundwater samples have been collected in the vicinity of the former metals plating area to characterize the extent of chromium and nickel contamination in the subsurface media. Soils, as well as shallow and bedrock groundwater sample analytical data indicated that chromium and nickel concentrations in the former metals plating area exceed medium-specific concentrations (MSCs) established for non-residential soil and groundwater standards.

Groundwater samples were historically collected from monitoring wells installed in the area of soil with elevated chromium and nickel concentrations (i.e., P-1, DMW-1, MW-5, MW-6, GM-1S, and GM-1D). The groundwater samples were analyzed for total and dissolved chromium and nickel. The highest concentrations of chromium and nickel were detected in P-1; 1,400 mg/L of total chromium and 1,300 mg/L of dissolved chromium, and 150 ng/L of total nickel in 1992. A review of the chromium and nickel groundwater analytical results indicate that the presence of these metals in groundwater at concentrations above the method detection limits are located to the immediate area near the former metals sump. Groundwater with concentrations of chromium above 0.1 mg/L does not extend beyond an area approximately 250 feet in diameter, and groundwater with concentrations of nickel above 0.1 mg/L does not extend beyond an area approximately 150 feet in diameter.

*PCE and TCE Site-Wide Groundwater Contamination*

In 1991, groundwater was first sampled (from P-1) and analyzed for VOCs, and PCE and TCE were detected. PCE and TCE, which were not historically used at the former Cole Office Environments site, were not detected in any of the soil samples. Between 1991 and 2000, concentrations of PCE and TCE were detected in the groundwater at all monitoring wells across the site, with the exception of the downgradient monitoring wells MW2 and MW-4. A review of PADEP files for the Harley-Davidson facility located upgradient and north of the former Cole Office Environments property, showed that PCE and TCE were first discovered in groundwater at the Harley-Davidson site in 1986. Since that time, numerous investigations have been conducted at the Harley-Davidson site. The source of the PCE and TCE on the Harley-Davidson property was reportedly caused by the application of these chemicals on the ground for purposes of weed control in the late 1960s.

In 1997, R.E. Wright Environmental, Inc. (REWEI) conducted a study to determine groundwater flow directions and contaminant migration across the southern boundary of the Harley-Davidson property. The report was entitled the *Final Southern Property Boundary Area Interim Study Report* (REWEI 1997). Based on the results of the investigation in the southern property boundary area of the Harley-Davidson property, the following conclusions were presented in the report:

- "Groundwater containing total VOC concentrations exceeding 2 mg/l, consisting of TCE and PCE appears to be migrating off-site and to the south/southwest in the carbonate aquifer."
- "The combination of groundwater quality data and groundwater levels indicate the likelihood of migration of TCE and PCE with groundwater across the eastern portion of Harley-Davidson's southern property boundary."

These findings, coupled with the fact that PCE and TCE are detected in groundwater along the upgradient property boundaries, conclude that the presence of these compounds in groundwater are not a result of releases from the former Cole Office Environments Facility. The PCE and TCE groundwater contamination is being addressed by the Harley-Davidson facility, EPA ID Number PAD001643691, via EPA Region III's Corrective Action Program. For additional information regarding the Harley-Davidson site, please review the Fact Sheet for this facility at <http://www.epa.gov/reg3wcmd/ca/pa/pdf/pad001643691.pdf>.

**References:**

- (1) Phase II Investigation, September 1990
- (2) Remedial Investigation Report for Cole Office Environments, September 1997

**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)  
Page 4**

- (3) Final Report, Attainment of Background Standards for Volatile Organic Compounds in Groundwater for Cole Office Environments, July 2000
- (4) Final Report, Attainment of Statewide Health Standards for Heavy Metals in Groundwater for Cole Office Environments, July 2000
- (5) Remedial Investigation and Site Specific Final Report for Heavy Metals in Soils for Cole Office Environments, October 2000
- (6) Site Specific Remedial Investigation and Statewide Health Standards Final Report for Paint Thinner Constituents in Soil for Cole Office Environments, October 2000

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**

Page 5

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"<sup>2</sup> 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"<sup>2</sup>.

       If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) - skip to #8 and enter "NO" status code, after providing an explanation.

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

**Rationale and Reference(s):**

*Former Nickel-Chrome Plating Area (Area F)*

EPA has determined that the migration of chromium and nickel contaminated groundwater in the vicinity of the former metals plating area has stabilized. This determination was made based on a review of historical groundwater monitoring data, which shows that the chromium and nickel groundwater contamination is limited to the immediate area near the former metals plating sump. The explanation for the limited migration of chromium and nickel from the former metals plating sump is related to the chemistry of these metals.

Chromium and nickel were originally dissolved in an acidic plating solution. Under low pH conditions, metallic ions have high solubility limits and low distribution coefficients ( $K_d$ ). When the plating solution reached the subsurface soils, the solution became neutralized by the natural geochemistry of the subsurface soils. This changed the physical properties of the metals by lowering their solubility limits, increasing  $K_d$ , and transforming chromium from the hexavalent (toxic) to the trivalent (non-toxic) oxidation state. Each of these processes resulted in the precipitation of metals onto the soil substrate. This also resulted in the formation of a localized zone of high-adsorbed concentrations. The low dissolved concentrations are a result of equilibrium partitioning with this adsorbed material and the absence of observed mobility is caused by precipitation of metals onto the soil matrix when transported downgradient. These processes essentially bind the metals to the soil substrate so that they are effectively immobile and not likely to dissolve in and migrate with groundwater. Furthermore, the building concrete floor and rubber-coated roof overlying the sump area prevents precipitation or surface water from percolating through the soil and transporting the metals downward through the shallow soil zone into the groundwater.

In addition to the information presented above, a fate and transport analysis was also conducted to evaluate whether the highest observed concentrations in groundwater (1,400 mg/L chromium and 150 mg/L nickel) beneath the sump, at P-1, have the potential to migrate to the downgradient property boundary (Monitoring Wells MW-11 and MW-12) in the foreseeable future. The analysis was based upon site-specific soil-to-groundwater partitioning coefficients and estimated chemical-retardation coefficients that were calculated using site-specific parameters supplemented with appropriate literature values. The values used in the analysis affect calculated mobility. For each parameter, if a range of values was identified, the value that would result in the greatest calculated mobility was used as a conservative measure. The results of the fate and transport analysis indicate that chromium and nickel concentrations in groundwater at P-1 will not migrate off-site at level above the respective MSCs in at least 30 years time. Furthermore,

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<sup>2</sup> "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.

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 6

groundwater samples were collected from MW-11 and MW-12 between May 1999 and April 2000 and analyzed for dissolved total chromium and dissolved total nickel. The analytical results show that dissolved total chromium and dissolved total nickel were not detected in any of the groundwater samples at concentrations above method detection limits.

**References:**

- (1) Phase II Investigation, September 1990
- (2) Remedial Investigation Report for Cole Office Environments, September 1997
- (3) Final Report, Attainment of Background Standards for Volatile Organic Compounds in Groundwater for Cole Office Environments, July 2000
- (4) Final Report, Attainment of Statewide Health Standards for Heavy Metals in Groundwater for Cole Office Environments, July 2000
- (5) Remedial Investigation and Site Specific Final Report for Heavy Metals in Soils for Cole Office Environments, October 2000

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 7

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

\_\_\_\_\_ If yes - continue after identifying potentially affected surface water bodies.

  X   If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

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

**Rationale and Reference(s):**

The elevation of the subject site is approximately 360 feet above mean seal level (msl) on land that slopes downward to the south toward Mill Creek. Mill Creek is located approximately 500 feet south of the facility and Codorus Creek is located approximately 2,800 feet west of the facility. Mill Creek flows east to west and is a tributary of the Codorus Creek. Based on a review of the water-level elevation contour map for data collected on January 11, 2000, groundwater in the area of the former metals plating sump flows to the southwest under a horizontal hydraulic gradient. Monitoring wells MW-2, MW-8, MW-11 and MW-12 at the subject site are located along the south and southwest property boundaries. A review of historical groundwater monitoring analytical results for each of these monitoring wells shows that dissolved and total chromium and dissolved and total nickel concentrations have not been detected above the method detection limit. Therefore, EPA has been determined that chromium and nickel contaminated groundwater at the former Cole Office Environments facility does not discharge into surface water bodies.

**Reference:**

- (1) Final Report, Attainment of Statewide Health Standards for Heavy Metals in Groundwater for Cole Office Environments, July 2000

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 8

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

\_\_\_\_\_ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

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

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

**Rationale and Reference(s):**

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



**Migration of Contaminated Groundwater Under Control  
Environmental Indicator (EI) RCRIS code (CA750)**

Page 9

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 eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented)?

\_\_\_\_\_ 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 eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR

2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater can not be shown to be ‘**currently acceptable**’) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

\_\_\_\_\_ If unknown - skip to 8 and enter “IN” status code.

**Rationale and Reference(s):**

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

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

**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 10

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

  X   If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

       If no - enter "NO" status code in #8.

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

**Rationale and References:**

In order to verify that chromium and nickel contaminated groundwater has not migrated outside of the previously defined area of contamination in the former metals plating area, EPA is planning to collect groundwater samples from select monitoring wells at the site in the near future. Such samples will be analyzed for total and dissolved chromium and nickel.



**Migration of Contaminated Groundwater Under Control**  
**Environmental Indicator (EI) RCRIS code (CA750)**  
Page 11

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).

**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 Former Cole Office Environments facility, EPA ID # PAD052917846, located at 1201-1209 Eden Road, York, PA 17402. 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 if 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	(signature)	<u></u>	Date	<u>8/12/10</u>
	(print)	<u>Jeanna R. Henry</u>		
	(title)	<u>Remedial Project Manager</u> <u>Office of Pennsylvania Remediation</u>		
Supervisor	(signature)	<u></u>	Date	<u>8-13-10</u>
	(print)	<u>Paul Gotthold</u>		
	(title)	<u>Associate Director</u> <u>Office of Pennsylvania Remediation</u>		
	(EPA Region or State)	<u>EPA Region III</u>		

Locations where References may be found:

USEPA Region III  
Land and Chemicals Division  
1650 Arch Street  
Philadelphia, PA 19103

PADEP  
Southcentral Regional Office  
909 Elmerton Avenue  
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