DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: Witco Corporation (currently known as Crompton Corporation)
Facility Address: 1000 Convery Boulevard, Perth Amboy, New Jersey 08826
Facility EPA ID#: NJD002165561

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 Witco Corporation (currently Crompton Corporation) site is a 44.7-acre active manufacturing facility located in Perth Amboy, New Jersey. The facility is bounded to the north by Spa Spring Creek and

manufacturing facilities on the Russell Stanley property, to the east by single-family residences on Amboy Avenue, to the south by Chevron Oil Company and high-rise multi-family housing, and to the west by commercial and single-family property along Convery Boulevard. The Witco facility is locally zoned as M-1 and M-3 (manufacturing).

Until the late 1970's, Witco's Performance Chemicals (Organics) Division and Asphalt Division operated concurrently at the property. Presently, only the Performance Chemicals (Organics) Division is operational. The facility currently manufactures polyester resins, blended emulsifiers, sulfosuccinates, lusterniary compounds, alkane sulfonates, anionic surfactants, specialty amides, and non-metallic and metallic stearates.

Polychlorinated biphenyls (PCBs) were used at the facility as a heat transfer medium for polyester process heaters until 1972. During the period when PCBs were utilized at the facility, various media were impacted including soil, sediments (drainage ditches), and groundwater. In addition, off-site locations such as the Perth Amboy Sewer system and associated surcharges, Spa Spring Creek, and Cranes Creek were impacted by PCBs emanating from the Witco facility. The State of New Jersey filed suit against Witco in 1983 for clean up of the on- and off-site contamination and Witco responded by entering into a Stipulation of Settlement with the State in September 1985 and an Amendment to the Stipulation of Settlement in January 1993. These settlements defined PCB cleanup levels and placed the responsibility for investigation and clean up at the site on Witco Corporation. Remedial actions, including excavation and disposal of impacted soil and closure of former process areas (e.g., fuel tanks, heater pads, lagoon), have been occurring at the facility since 1983, in order to address the contamination both on- and off-site.

Witco has controlled all off-site migration of contamination. The Perth Amboy Sewer system and associated discharges are no longer being impacted by the Witco facility due to the remedial activities that have been conducted at the site. In addition, Witco constructed and activated a wastewater collection and treatment system in 1993 to treat wastewater before it is discharged to the Perth Amboy Sewer system. Witco has also performed remedial activities in Cranes Creek and was granted a No Further Action designation from NJDEP for this area on November 30, 1995. Remedial activities conducted in the Spa Spring Creek have been completed.

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): While conducting the Remedial Investigation (RI) at the property, the site was divided into different AOCs. In general, the specific AOCs consist of areas where releases occurred or where materials were disposed or buried. During the early 1980s, releases of PCBs from heat exchangers at the property contaminated surrounding environmental media. PCBs were also found in demolition rubble piles, at a former burial site for two large vanadium pentoxide catalytic reactors, in buried drums of waste polyester stearates and surfactants, and in soil surrounding an underground solvent storage tank which has since been removed. Soil excavation and removal has been implemented at most of the areas outlined below; specific remedial actions, soil screening criteria, and residual soil contamination levels are presented in greater detail in the CA725 for the Witco facility. All excavated areas have been backfilled with at least two feet of clean soil and restored to their pre-remedial condition with regard to topography, surface hydrology, and vegetation. A map indicating the location of the AOCs identified below is provided in Attachment 1.

AOC A: This is a 15.5-acre wooded area on the eastern side of the property, including the drainage ditches located along Amboy Avenue and the Spa Spring Creek and associated wetlands. Elevated levels of PCBs have been detected in soil and sediment in this area. Approximately 850 tons of non-TSCA[1] soil and sediment have been removed as part of remedial activity at this unit. Sample results indicate remaining constituents are below relevant standards for subsurface soil and sediment. Witco has installed an asphalt cover over one small area that contained surface soil above the 2 mg/kg site-specific standard. During investigation and remedial action, this area was further subdivided into:

AOC A-1: A geophysical survey conducted at the site detected an anomaly in this area, leading to the excavation of test pits 11 and 12. Buried drums were found, along with volatile organic compounds (VOCs) and metals contamination above industrial standards. The buried drums and approximately 450 tons of TSCA soil were removed from this area. Post-excavation samples indicated metal and VOC results were below industrial standards.

[1] Toxic Substances Control Act (TSCA) soil refers to soil contaminated with PCBs above 50 mg/kg, while non-TSCA soil refers to soil contaminated with PCBs above 2 mg/kg but below 50 mg/kg.

AOC A-2: On September 24, 1996, a tar-like substance was noted seeping from the ground in this area. Results indicated elevated levels of methylene chloride and total petroleum hydrocarbons (TPH). Visually impacted soil was excavated and confirmatory sampling concluded that the contaminated material had been removed.

AOC A-3: A geophysical survey conducted at the site also detected an anomaly in this area, leading to the excavation of test pit one (1). No garbage or debris was encountered and post-excavation samples indicated constituents were below relevant standards.

AOC A-4: A geophysical survey conducted at the site also detected an anomaly in this area, leading to the excavation of test pit two (2). Upon initial excavation, a variety of construction debris and 55-gallon steel drums were encountered. Elevated levels of lead, PCBs, benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected. Post-excavation samples indicated constituents were below relevant standards.

AOC B: A geophysical survey conducted at the site detected an anomaly in this area. The area consists of a two-acre rubble pile that was fully surrounded by AOC A. The pile was found to contain soil, demolition rubble, asphalt, and coal tars with elevated levels of PCBs. Seven soil excavation areas (hot spots) were removed in this area, and the soil was managed as TSCA waste. Confirmation samples indicated that remaining constituents were below relevant standards.

AOC C: This is a six-acre area that includes the former asphalt manufacturing, storage, administrative, and service buildings. A geophysical survey conducted at the site detected an anomaly in this area. A test pit was excavated, and elevated levels of PCBs were detected. Approximately 1,924 tons of TSCA soil and 740 tons of non-TSCA soil were excavated from this area. Post-excavation sampling confirmed that remaining constituents were below relevant standards. During investigation and remedial activity, this area was further subdivided into:

AOC C-1: This area is the former location of the above-ground No. 6 fuel oil storage tank removed in 1996. During tank removal, a small soil excavation was conducted in the area of the tank and associated piping. Additional sampling of this area was conducted as part of the 1997 RI. Analytical results indicated that no constituents exceeded industrial standards for any of the Target Compound List/Target Analyte List constituents.

AOC D: This is a 1.5-acre area surrounding and including the polyester building, drum filling building, and hot oil heater areas. Test pits excavated in this area indicated that elevated levels of PCBs were present. Approximately 7,600 tons of TSCA soil and 2,800 tons of non-TSCA soil were excavated. All confirmatory sample results were within or below relevant standards. During investigation and remedial activity, this area was further subdivided into:

AOC D-1: A geophysical survey conducted at the site detected an anomaly in this area. Test pits T1A, D1A, T1B, and D1B were excavated, and buried drums were found. All

of the buried drums were excavated and removed and confirmatory sampling revealed that remaining constituents in soil were below relevant standards.

AOC D-2: This area consisted of the heater pad area which, based upon RI sampling results, apparently released PCBs to surrounding soil. In February 1999, two areas of contaminated subsurface soil surrounding this unit were excavated. A 40-mil PVC liner and water collection system was placed in each excavation, and the excavations were backfilled and topped with a concrete cap. Due to structural stability difficulties encountered during the excavation, some soil with PCB concentrations above the site-approved industrial subsurface standards (50 mg/kg) was allowed to remain in place under the capped area, per NJDEP and USEPA approval.

AOC E: This area consists of the remaining 19.7 acres at the site, including the active manufacturing, storage, administrative, and service buildings. According to the Remedial Action Report (Reference No. 3, pg. 4-27), a settling lagoon located in this area was closed following removal of PCB-contaminated sediments, backfilling of the area with clean soil, and grading. Elevated levels of PCBs were found throughout the AOC and, in total, approximately 300 tons of TSCA-regulated soil and sediment and 990 tons of non-TSCA-regulated soil were excavated and removed. Confirmatory sample results indicated that remaining constituents in subsurface soil are below relevant standards. Witco has installed an asphalt cover over one small area that contained surface soil above the 2 mg/kg site-specific standard.

AOC F: This AOC consists of the contaminated groundwater underlying the facility. Witco maintains a network of 28 monitoring wells to analyze groundwater conditions at the site. Contaminants that have been detected in groundwater include PCBs, VOCs, semivolatile base neutral acid-extractable compounds (BNAs), and metals. However, the ongoing monitoring program identifies only a few constituents above relevant screening criteria. These constituents include 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), benzene, xylene, PCBs, lead, chromium, nickel, barium, cadmium, arsenic, and TPH. Groundwater investigation activities performed to date have demonstrated that contamination is maintained within property boundaries. Groundwater is currently monitored on an annual basis, and four complete rounds of data are currently available. NJDEP has conditionally approved natural attenuation as the remedial action for AOC F (Reference 9, page 1). Witco is also in the process of establishing a groundwater Classification Exception Area (CEA) encompassing the entire 44.7-acre site. The natural attenuation remedy and CEA require four additional annual rounds of monitoring through June 2004 to ensure that natural attenuation is adequately controlling and reducing contaminant concentrations in groundwater. A pilot study is also in progress to determine if nutrients added to the subsurface environment can enhance biodegradation of the observed contaminants.

All excavation and removal actions at AOC A through AOC E are completed. Witco is currently in the process of filing a Deed Notice with local agencies as part of the Remedial Action Plan for these AOCs. A No Further Action determination from NJDEP is imminent for all remedial actions at the site associated with soil, sediment, and surface water (Reference 9, page 1). Remedial Actions at AOC F are underway and will occur over the next four years. The CEA will be filed with the local agencies as soon as the final

elements of the natural attenuation remedial action and monitoring program are agreed upon between Witco, NJDEP, and USEPA.

References:

(1) Stipulation of Settlement between NJDEP and Witco, dated September 10, 1985.
(2) Second Amendment to the Stipulation of Settlement between NJDEP and Witco, dated January 12, 1993.
(3) Remedial Action Report, prepared by Foster Wheeler Environmental Corporation (Foster Wheeler), dated November 1998.
(4) Remedial Action Report Addendum, prepared by Foster Wheeler, dated July 1999.
(5) Memo from David Kaplan, NJDEP, to Gary Lipsius, NJDEP, Re: Witco Remedial Action Report Addendum, dated August 18, 1999.
(6) Memo from Andrew Marinucci, NJDEP, to Gary Lipsius, NJDEP, Re: Review of Remedial Action Report Addendum, dated September 14, 1999.
(7) Letter from Stephen Kohlhase, Witco, to Gary Lipsius, NJDEP, Re: Submittal of Remedial Action Report Addendum No. 2, dated December 17, 1999.
(8) Memo from Andrew Marinucci, NJDEP, to Christopher Kanakis, NJDEP, Re: Review of Draft Deed Notice, dated March 29, 2000.
(9) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum Dated July 1999, dated July 27, 2000.
(10) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum No 2 (December 1999), dated July 27, 2000.

2. Is **groundwater** known or reasonably suspected to be "**contaminated**"[2] 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:

During the two phases of Remedial Investigation and Feasibility Study (RI/FS) work at the Witco facility, a total of 29 groundwater monitoring wells were installed. These wells are screened in perched water, in the shallow water-table aquifer within the Woodbridge Member (Woodbridge water-table aquifer), and in the deep sand aquifer within the Farrington Member (Farrington aquifer). Table 1 lists the wells, their respective screen intervals, and the formation monitored. Between 1995 and 1998, groundwater beneath the Witco site was sampled semiannually. Groundwater samples collected during the January rounds were analyzed for PCBs only. Samples collected during the June rounds were analyzed for VOCs, TPH, PCBs, BNAs, pesticides, and total and dissolved metals.

Table 1 – Groundwater Monitoring Well Detail
(Reference No. 2, Table 5-2)

Well	Screened Interval (feet bgs)	Screened Formation
MW-1S	21-31	Woodbridge
MW-2S	3-13	Woodbridge
MW-2D	40-45	Farrington
MW-2F	52-62	Farrington
MW-3S	7.7-17.7	Woodbridge
MW-3D	34.6-44.6	Farrington
MW-4S	11-21	Woodbridge

[2] "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).

MW-4D	36-41	Farrington

Table 1 – Groundwater Monitoring Well Detail (continued)

Well	Screened Interval (feet bgs)	Screened Formation
MW-5S	10-20	Woodbridge
MW-5D	39.3-44.3	Farrington
MW-5F	67-74	Farrington
MW-6S	13-23	Woodbridge
MW-6F	70-80	Farrington
MW-7S	20-30	Woodbridge
MW-7P	3-13	Woodbridge
MW-8S	17-27	Woodbridge
MW-8D	32-37	Farrington
MW-8P	3-13	Woodbridge
MW-9S	25-35	Woodbridge
MW-9F	60-70	Farrington
MW-10S	25-35	Woodbridge
MW-11S	3-13	Woodbridge
MW-11D	27-32	Farrington
MW-12S	4-14	Woodbridge
MW-13S	14.6-24.6	Woodbridge
MW-13F	48.5-58.5	Farrington
MW-14S	20-30	Woodbridge
MW-14P	3-13	Woodbridge
MW-15S	25-35	Woodbridge

S – shallow Woodbridge water-table aquifer; P – perched groundwater;
D or F – deep Farrington aquifer

During the RI/FS, NJDEP and Witco established site-specific groundwater quality standards (SSGWQS). For all constituents which remain a concern for the Witco site, only the PCB standard varies from the generic NJ Ground Water Quality Criteria (GWQC), as published in N.J.A.C. 7:9-6. The SSGWQS for

PCBs is 1.0 ug/L, whereas the NJ GWQC standard is 0.5 ug/L. Constituents present in groundwater at concentrations below the SSGWQS are not expected to pose unacceptable risks to human health or the environment and no longer remain a concern for the facility.

Throughout the four-year monitoring period, a number of constituents have been reported above the SSGWQS or the practical quantification limit, whichever is higher. Four localized groundwater contamination plumes have been identified at wells MW-1S, MW-6S, MW-11S, and MW-14P. Nevertheless, data trends show overall reductions in observed contaminant concentrations over the four-year monitoring period. Specific groundwater findings are discussed below according to chemical class.

Volatile Organic Compounds

VOC contamination is limited to perched and shallow groundwater at the Witco facility. There appear to be four separate localized areas which exceed applicable VOC standards; these areas surround MW-1S, MW-6S, MW-11S, and MW-14P. Concentrations reported during the June 1998 monitoring round, as compared to applicable GWQC, are presented in Table 2.

Chlorinated solvents have been found above relevant screening levels at MW-1S and MW-14P. TCE and its associated breakdown products (1,1-DCE and cis-1,2-DCE) were found in MW-1S above GWQC throughout the four years of sampling. TCE was also reported slightly above the GWQC during the last three rounds of sampling at MW-14P.

Benzene and xylene were reported above the screening criteria at MW-6S and MW-11S. Although several VOCs were reported in well MW-6S above GWQC during the four-year sampling period, only benzene was still present in the well in June 1998. At MW-11S, benzene and xylene exceeded GWQC between 1995 and 1998.

Table 2 -- VOC Concentrations Observed in Groundwater Above GWQC in June 1998 (in ug/L)

Well	Constituent	Observed Concentration	Applicable GWQC
MW-1S	1,1-DCE	10	2
MW-1S	cis-1,2-DCE	11	10
MW-1S	TCE	280	1
MW-6S	Benzene	6.3	1
MW-11S	Benzene	15	1
MW-11S	Xylene	3,500	100
MW-14P	TCE	1.1	1

S – shallow Woodbridge water-table aquifer; P – perched groundwater

Total Petroleum Hydrocarbons

Applicable GWQC require a finding of no noticeable TPH in groundwater. No petroleum product has been observed in any of the facility's monitoring wells, but laboratory analysis reported several positive detections, as shown in Table 3 below. Overall, TPH concentrations appear to be decreasing as a result of drum removal and soil remediation activities near well MW-6S in the winter of 1995/1996. Concentrations in well MW-11S appear to increase following test pit investigations in late-1995, but begin to decline upon completion of soil remediation at Test Pit 2 in Spring 1997.

Table 3 – Observed TPH Concentrations in Groundwater (in ug/L)

Well	June 1995 Round	June 1996 Round	June 1997 Round	June 1998 Round
MW-3D	ND	12,500	ND	1,100
MW-6S	79,000	7,100	14,300	5,000
MW-11S	870	2,700	6,800	2,600

S – shallow Woodbridge water-table aquifer; D – deep Farrington groundwater

Semivolatile Organic Compounds and Pesticides

Based on the results of recent groundwater sampling rounds, the Remedial Action Report dated November 1998 concluded that BNAs and pesticides are not constituents of concern for groundwater at the Witco site (Reference No. 2, pages 5-9 and 5-10).

Polychlorinated Biphenyls

From October 1995 to June 1996, PCB-contaminated soil was excavated from various locations at the Witco site. Prior to and during soil excavation efforts, PCBs were reported in eight groundwater monitoring wells, up to 13 ug/L. Following contaminant source removal, PCBs were reported only in well MW-8P. The observed PCB concentration of 1.1 ug/L in June 1998 is only 0.1 ug/L above the established site-specific standard of 1.0 ug/L.

Total and Dissolved Metals

Twelve total and eight dissolved metals have been detected above the GWQC during the four years of monitoring. Aluminum, iron, manganese, and sodium were reported above the GWQC in both total and dissolved forms, but are most likely related to background levels. Total antimony and total zinc were each detected only once (in June 1996 and June 1995, respectively); these constituents are believed to represent anomalous data based on the one-time occurrence, the lack of similar detections in surrounding wells, and no exceedances in the dissolved analyses (Reference No. 2, page 5-10). These six constituents are not considered a concern for groundwater at the Witco site.

Of the twelve metals identified at the site, six are being retained for ongoing monitoring:

- **Arsenic** has been reported in several shallow wells during the four-year monitoring period. In June 1998, the GWQC of 8 ug/L was exceeded in wells MW-3S, MW-5S, and MW-11S;

observed concentrations ranged from 8.9 to 93.9 ug/L. Since the soil remediation was conducted in the vicinity of MW-11S in 1997, the arsenic concentrations in the well have decreased from a maximum of 33.4 ug/L to 16.4 ug/L in the total concentration, and from 12 ug/L to below the GWQC in the dissolved concentration.

- The GWQC for **barium** of 2,000 ug/L has been exceeded during the last three rounds of monitoring in well MW-6S. No other wells appear to have been impacted. In June 1998, the observed total and dissolved barium concentrations were 3,170 and 3,310 ug/L, respectively. Since the drum removal action was performed near MW-6S in 1995/1996, the barium concentrations appear in a downward trend.

- In June 1998, **cadmium** was reported above its GWQC of 4 ug/L in wells MW-5D (4.8 ug/L total), MW-6F (4.6 ug/L total), and MW-14P (12.3 ug/L total and 4.7 ug/L dissolved). A downward trend has also been observed with regard to cadmium concentrations.

- Six wells have reported excessive **chromium** concentrations at least once during the four-year monitoring period, ranging from 110 to 730 ug/L. In June 1998 however, the chromium GWQC of 100 ug/L was exceeded only in well MW-4S with an observed total concentration of 439 ug/L. No dissolved chromium results exceeded the GWQC.

- Six wells exceeded the **lead** GWQC of 10 ug/L during the most recent groundwater monitoring round available (June 1998), with observed total concentrations ranging from 10.2 to 138 ug/L. These wells include MW-3D, MW-5D, MW-6F, MW-7S, MW-9S, and MW-11S. No dissolved lead results exceeded the GWQC.

- In the June 1998 round, total **nickel** exceeded the GWQC of 100 ug/L only in well MW-4S (315 ug/L). Monitoring well MW-4S was also the only well with concentrations of dissolved nickel (239 ug/L in June 1998) exceeding the GWQC.

Based on the groundwater monitoring data above, the contaminants of concern for groundwater at the site consist of 1,1-DCE, cis-1,2-DCE, TCE, benzene, xylene, PCBs, lead, chromium, nickel, barium, cadmium, arsenic, and TPH.

References:

(1) Letter from E.J. Malley, Witco, to Gary Lipsius, NJDEP, Re: Remedial Action Proposal and Revised Remedial Action Work Plan, dated January 24, 1995.
(2) Remedial Action Report, prepared by Foster Wheeler, dated November 1998.
(3) Remedial Action Report Addendum, prepared by Foster Wheeler, dated July 1999.
(4) Memo from David Kaplan, NJDEP, to Gary Lipsius, NJDEP, Re: Witco Remedial Action Report Addendum, dated August 18, 1999.
(5) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum Dated July 1999, dated July 27, 2000.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[3] 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:

Local Hydrogeology

The Witco site is underlain by a regional water-table aquifer (Woodbridge water-table aquifer) which generally corresponds to sandy lenses within the clayey Woodbridge Member of the Raritan Formation. The shallow clays of the Woodbridge Member in some cases cause localized shallow perched water-table units to form in the overlying glacial drift and fill material. The Woodbridge water-table aquifer overlies a leaky confined aquifer in the Farrington Member (Farrington aquifer). The Farrington aquifer is confined by Woodbridge Member clays. On-site monitoring wells have been screened across both the Woodbridge and Farrington aquifers and within individual perched water table units.

Groundwater flow in the Farrington aquifer is generally to the north-northeast at a typical gradient of 0.005 feet/foot or less. In-situ aquifer slug testing indicates hydraulic conductivities in this unit ranging from 2.5E-4 to 1.5E-2 cm/sec. The higher end of this range is likely more representative of the unit's bulk permeability, considering its coarse-grained composition. Wells advanced into this formation generally encounter groundwater at depths of 30 feet or more below ground.

Flow in the Woodbridge water-table aquifer is also generally to the north-northeast at a higher potentiometric level than that of the Farrington aquifer, except at the northern end of the site where the Farrington aquifer has a higher potentiometric level. In some wells, this aquifer has been observed within 10 feet of the ground surface. Hydraulic conductivities determined from in-situ testing range from 6.1E-5 to 3.37E-2 cm/sec. These values are higher than those normally associated with clay, but the monitoring

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[3] "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.

wells used for slug testing are screened within the most productive sandy layers of the Woodbridge Formation. Since contamination being monitored generally resides in the lower conductivity clay component of the formation, the lower end of this range is more likely to be representative of relevant site conditions (Reference No. 2, page 13). Vertical permeabilities in the Woodbridge clay range from 2.0E-8 to 4.3E-5 cm/sec.

Some recharge from on-site precipitation reaches the perched zones and the regional water-table aquifer through the more permeable lenses. In areas where that water table is higher than the Farrington potentiometric surface, the Farrington aquifer receives recharge from the Woodbridge water-table aquifer. The Woodbridge water-table aquifer likely also contributes to the flow in Spa Spring Creek, which flows northeastward along the northern end of the property (Reference No. 1, page 2-4).

Addendum 1 to the Remedial Action Report presents BIOSCREEN modeling data developed to support the selection of natural attenuation as a remedy for VOC and BTEX contamination remaining in groundwater (Reference No. 2, pages 12-14). An average groundwater flow velocity of 7.3 feet per year was calculated using the model and measured data from the site (Reference No. 2, page 19). The average groundwater flow gradient across the site was calculated as approximately 0.03 feet/foot. Based on the fact that downgradient monitoring locations from the four wells modeled (MW-1S, MW-6S, MW-11S, and MW-14P) do not exhibit elevated contaminant concentrations, VOC and BTEX plumes at the Witco site are believed to be localized with the plume extent estimated at 100 feet in the vicinity of each well (Reference No. 2, page 13).

A one-mile radius well search was conducted for the facility in 1999, based on information obtained from the NJDEP Water Supply Element Bureau of Water Allocation. The well search results indicate that local groundwater is not used for municipal or potable purposes. However, the Woodbridge aquifer is used for industrial purposes, with the closest downgradient industrial well approximately 500 feet from Spa Spring Creek on the Russell Stanley Corporation property. No information is provided in the available documentation to indicate the current total number of nearby industrial wells drawing on this aquifer or the volume of groundwater withdrawn per year. Nevertheless, Remedial Action Report Addendum No. 1 indicates that the Woodbridge unit in general is not considered productive in terms of groundwater, and it is unlikely that future uses for the unit exist (Reference No. 2, page 22).

Completed Soil Remedial Actions and Institutional Controls

Remedial actions associated with soil and sediment have been completed, and appropriate engineering controls have been implemented at the site to prevent contact with contaminated soil and minimize continued leaching of contaminants to groundwater. As required by the NJDEP-approved Remedial Action Work Plan, all contaminated surface soil (0 to 2 feet bgs) above the site-specific cleanup criterion (2 mg/kg) has been excavated and removed from the site, and the excavated areas were backfilled with at least two feet of clean soil. Witco has installed asphalt covers over two areas of concern that contained surface soils above the 2 mg/kg standard. In all areas, except AOC D-2, subsurface soils contaminated with PCBs above the 50 mg/kg level have been excavated and removed and covered with two feet of clean soil. With NJDEP and EPA concurrence, some soil contaminated above the 50 mg/kg level remains in place in the heater pad area so as not to compromise the integrity of site structures.

All sediments contaminated above 2 mg/kg from 0 to 2 feet bgs have been excavated and removed from AOCs A and E (i.e., drainage ditches, Spa Spring Creek, wetlands areas, and the settling lagoon). All remaining sediments at depths greater than 2 feet bgs are within the range of 2 mg/kg to 50 mg/kg. Sediment excavation areas were backfilled with clean soil in accordance with the erosion and sedimentation control plan (Reference 1, Page 4-26). Witco has prepared a Deed Notice to notify potential site users of the contamination that remains in this area. This Deed Notice also requires that contaminated sediment and soil areas not be disturbed without the appropriate notification and health and safety procedures.

Current Groundwater Conditions and Natural Attenuation

The facility groundwater monitoring program has produced four years of contaminant data. Based on existing groundwater monitoring data, the contaminants of concern for groundwater at the site consist of 1,1-DCE, cis-1,2-DCE, TCE, benzene, xylene, PCBs, lead, chromium, nickel, barium, cadmium, arsenic, and TPH. However, source removal actions have resulted in significant reductions in observed organic contaminant levels at the four primary impacted wells.

Wells MW-1S and MW-14P

During the June 1998 sampling round, chlorinated solvents (TCE and its breakdown products) were reported in wells MW-1S and MW-14P above applicable screening criteria, as discussed in the response to Question 2. Attachments 2 through 4 show decreasing VOC contamination trends in both wells following soil remediation activity. Most dramatically, between June 1995 and June 1998, the TCE concentration in well MW-1S dropped from 940 ug/L to 280 ug/L, corresponding to a 70 percent reduction (Reference No. 1, page 5-4). The data collected in January 1999 show elevated chloride and methane concentrations at MW-1S and MW-14P, and the presence of TCE and its potential daughter product, dichloroethylene (DCE), at MW-1S. Furthermore, monitoring wells downgradient of these wells show no TCE or DCE. Based on these findings, migration of the localized contaminated groundwater appears effectively controlled (Reference No. 2, page 17).

Wells MW-6S and MW-11S

Also during the June 1998 sampling round, well MW-6S was found to be impacted by benzene, and MW-11S reported elevated levels of benzene and xylene.

Attachment 5 shows that benzene concentrations in well MW-6S have been decreasing since 1996, when buried drums were removed from an area immediately upgradient of the well. Between June 1996 and June 1998, a 60 percent decrease in benzene levels has been observed in the well (Reference No. 2, page 10). Natural attenuation data collected at MW-6S indicate a significant decrease in the oxidation-reduction potential and increases in sulfate, ferrous iron, and methane concentrations. These findings suggest that benzene is being naturally biodegraded via oxidation. Furthermore, downgradient wells MW-1S and MW-8S have not reported benzene contamination. It can therefore be concluded that either the benzene plume has not reached the downgradient wells, or that the contaminant has been degraded prior to reaching those wells. Using the BIOSCREEN model, Witco has estimated that in June 1998, elevated benzene concentrations extended between 15 and 45 feet beyond the well. By June 2004, the model

shows that benzene will have been totally degraded and no longer present (Reference No. 2, pages 14 and 15).

Attachments 6 and 7 show decreasing trends in benzene and xylene at well MW-11S following soil excavation at nearby test pit 2 in March 1997. Concentrations of xylene increased slightly following the remedial effort, but have decreased significantly over the four years of monitoring, from 7,100 ug/L in June 1995 to 3,500 ug/L in June 1998, corresponding to a 51 percent reduction (Reference No. 2, page 10). Again, natural attenuation data collected at MW-11S indicate that biodegradation is occurring. Evaluation of data from the downgradient location, Spa Spring Creek, shows no indication of BTEX contamination, and Witco concludes that either the BTEX plume has not reached the creek, or that the contaminants have been degraded prior to reaching it. Using the BIOSCREEN model, and assuming first order contaminant decay and dispersion, Witco has estimated that the BTEX plume associated with this well extended approximately fifteen feet beyond the well in June 1998 and will no longer be present in June 2004 (Reference No. 2, pages 15 and 16).

As indicated in the Remedial Action Report (Reference No. 1, pages 5-9 through 5-11), although additional contamination (i.e., sporadic and/or low-level detections of TPH, PCBs, and inorganics) has been observed in groundwater at the Witco site, these findings do not appear to be of significant concern. This determination was based on observed downward trends in a number of wells for most constituents, exceedances only slightly above relevant GWQC or SSGWQS, and the occurrence of most inorganic contamination in suspended solids in groundwater samples. For example, TPH has been observed in well MW-3D only twice during the last four sampling rounds, with concentrations decreasing dramatically from 12,600 ug/L in June 1996 to 1,100 ug/L in June 1998. In addition, total lead has been reported in well MW-3D above the GWQS of 10 ug/L during the four recent sampling rounds, but none of the dissolved lead results exceeded the standard. As a result, the Remedial Action Report concludes that the total lead detections across the site are associated with suspended particulate matter in the samples, rather than groundwater itself (Reference No. 1, page 5-10). Furthermore, with the exception of the June 1998 analytical result, total lead concentrations in well MW-3D were stable, fluctuating within the same order of magnitude. (It should be noted that, although the Remedial Action Report finds that observed TPH and lead contamination in this well and the deep aquifer as a whole is insignificant, MW-3D has been included in the ongoing groundwater monitoring program for the Witco facility to follow-up on constituent concentrations observed during the most recent sampling round.)

A comparison of data from plume wells and downgradient wells at the northeastern corner of the Witco site is provided in Table 4 below to further illustrate the fact that contaminant migration in groundwater is being adequately controlled. It is clear that concentrations in the plume wells are generally higher than those in the downgradient wells, where a number of non-detected results appear.

Groundwater Remedial Action

As discussed in Addendum 1 to the Remedial Action Report (Reference No. 2), Witco is pursuing a natural attenuation remedy for organic contamination in groundwater. All conditions of the Technical Requirements for Site Remediation (specific remedial action requirements for natural groundwater remediation) in N.J.A.C. 7:26E-6.3(d) have been met. Given the background and historic data, and the physiological, geological, and hydrological nature of the site, this is a viable option for contamination in groundwater beneath the site (Reference No. 2, page 8). On July 27, 2000, NJDEP approved the

selection of natural attenuation as the remedial action associated with this unit (Reference Nos. 9 and 10).

As a component of this remedial action, Witco is in the process of establishing and filing a groundwater CEA with local agencies, which will encompass the entire 44.7-acre site. Approval of the CEA proposal and monitoring program is expected in the very near future. The proposed longevity of the CEA is four years (2000 through 2004), by which time the BIOSCREEN modeling results project that most, if not all of the observed organic contamination will have been degraded. Groundwater monitoring will continue on an annual basis at select wells for specific constituents of concern discussed in the response to Question 2 and presented in Table 5. Upon completion of the fourth additional sampling round in June 2004, the Mann-Whitney U-test will be applied to each of the thirteen constituents of concern to determine whether the natural attenuation remedy is working, and the issue will be readdressed if necessary. Although there had been some initial concern among regulators as to the validity of the BIOSCREEN modeling data and natural attenuation conclusions, the decision was made to proceed with the natural attenuation remedy, since the CEA will require ongoing monitoring of groundwater quality and because a No Further Action decision will not be issued for groundwater until all appropriate GWQC have been achieved (Reference No. 11).

To enhance the natural attenuation process and hasten remediation of site groundwater even further, the facility is conducting a voluntary short-term pilot study involving introduction of biological nutrients into impacted well MW-1S. Limited quantities of aqueous nitrate salts (in a proprietary nutrient solution) will be amended to the groundwater to facilitate anaerobic dehalogenation of TCE (Reference No. 7). The subject well, and downgradient well MW-8S, will be monitored throughout the pilot study period (approximately 6 to 18 months) for VOC content, biogeochemical parameters and microbiological parameters to determine the effectiveness of the operation and to ensure that no negative impacts result. The proposed pilot study was accepted by NJDEP, and a permit-by-rule was established for implementation of the pilot study on July 14, 2000 (Reference No. 8). The current status of this effort is unknown, and no related documentation has been submitted to date.

Table 4 – Comparison of Plume and Downgradient Well Data
(concentrations observed in June 1998, presented in ug/L)

	Plume Wells							Downgradient Wells			
Constituent	**1S**	**3D**	**4S**	**6S**	**8S**	**11S**	**14P**	**8D**	**12S**	**13S**	**SW-4**
1,1-DCE	10	U	U	U	U	U	U	U	U	U	NA
cis-1,2-DCE	11	U	U	U	U	U	U	U	U	U	U
TCE	280	U	U	U	U	U	1.1	U	U	U	NA
Benzene	U	U	U	6.3	U	15	U	U	U	U	NA
Xylene, total	U	U	U	9.5	U	3500	U	U	U	U	U
PCBs	U	U	U	U	U	U	U	U	U	U	NA
Arsenic, total	U	U	U	U	U	16.4	U	U	4.1	U	U

Barium, total	96.7	80.1	156	3170	59.7	193	46	36.2	61.9	57	76.5
Cadmium, total	U	1.1	U	U	U	U	12.3	U	U	U	NA
Chromium, total	4.8	25.9	439	U	3.7	3.7	2.2	2.6	2.3	6.5	U
Lead, total	U	138	3.1	U	U	50.5	3.1	U	U	6.2	3.2
Nickel, total	79.9	24.6	315	20.3	23.4	5.2	36.4	5.6	10.5	9.7	2.5
TPH	U	1100	U	5000	U	2600	U	U	U	U	U

NA – not analyzed; U – not detected

References:

(1) Remedial Action Report, prepared by Foster Wheeler, dated November 1998.
(2) Remedial Action Report Addendum, prepared by Foster Wheeler, dated July 1999.
(3) Memo from David Kaplan, NJDEP, to Gary Lipsius, NJDEP, Re: Witco Remedial Action Report Addendum, dated August 18, 1999.
(4) Memo from Andrew Marinucci, NJDEP, to Gary Lipsius, NJDEP, Re: Review of Remedial Action Report Addendum, dated September 14, 1999.
(5) Letter from Stephen Kohlhase, Witco, to Gary Lipsius, NJDEP, Re: Submittal of Remedial Action Report Addendum No. 2, dated December 17, 1999.
(6) Memo from Andrew Marinucci, NJDEP, to Christopher Kanakas, NJDEP, Re: Review of Draft Deed Notice, dated March 29, 2000.
(7) Letter from Marie Pittignano, Crompton, to Chris Kanakis, NJDEP, Re: Proposed Anaerobic Bioremediation Pilot Study, dated June 27, 2000.
(8) Letter from Patricia Conti, NJDEP, to Marie Pittignano, Crompton, Re: Proposed Anaerobic Bioremediation Pilot Study Letter Dated June 27, 2000, dated July 14, 2000.
(9) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum Dated July 1999, dated July 27, 2000.
(10) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum No 2 (December 1999), dated July 27, 2000.
(11) NJDEP Report of Phone Call from Andy Park, USEPA, to Patricia Conti, NJDEP, dated August 31, 2000.

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:

Spa Spring Creek, located in the northern section of the property, flows northeastward and discharges to estuarine Woodbridge Creek (a tributary of Arthur Kill) approximately 1,500 feet east of the northern tip of the site. As stated previously, the water-table (Woodbridge) aquifer likely contributes to the flow in Spa Spring Creek (Reference No. 1, pages 2-4 and 5-8). However, contamination plumes beneath the Witco facility appear to be localized and are not expected to reach the creek within a reasonably projected time frame. Therefore, at the point of discharge into the creek, it does not appear that groundwater has been or will be "contaminated." This conclusion is verified thus far by the lack of groundwater-related contamination in Spa Spring Creek.

Surface water samples have been collected annually from four sampling locations (SW-001, SW-002, SW-003, and SW-004) in Spa Spring Creek between June 1995 and June 1998. In general, no hazardous constituents have been consistently detected above the NJ Surface Water Quality Criteria (SWQC). Bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was the only organic constituent observed above applicable SWQC during the four-year period. No organic contaminants were detected in the creek during the last two sampling rounds (June 1997 and June 1998). The only exceedance of an inorganic SWQC in the four years of sampling involved a detection of arsenic at 9.6B ug/L during the June 1997 sampling round. The "B" qualifier indicates that the result was below the method detection limit, but above the instrument detection limit. Arsenic was not detected at SW-003 during the June 1998 sampling round. According to the Remedial Action Report (Reference No. 1, page 5-9), it appears that groundwater is not currently impacting surface water quality and that there is no migration of contaminants off site at this part of the facility. Furthermore, as presented in the approved Addendum 1 to the Remedial Action Report, (Reference No. 2, page 21), the BIOSCREEN model predicts that contaminant migration in groundwater from MW-11S (the nearest well to the creek reporting organic contamination) will only extend over a limited area, with contaminants being fully degraded before ever reaching the creek. Other organic contaminant plumes at the site are also expected to remain fairly localized and are not expected to have any impact on Spa Spring Creek.

References:

(1) Remedial Action Report, prepared by Foster Wheeler, dated November 1998.
(2) Remedial Action Report Addendum, prepared by Foster Wheeler, dated July 1999.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[4] 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 judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or ecosystem.

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

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

Rationale:

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

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

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented[5])?

____ 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[6], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including an ecologist) adequately protective of receiving surface water, sediments, and ecosystems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

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

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

Rationale:

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

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[5] 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 waterbodies.

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

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

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

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

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

Rationale:

When implementing a natural groundwater remedy, the Technical Requirements for Site Remediation in N.J.A.C. 7:26E-6.3(e) require that a groundwater monitoring program be implemented to monitor plume characteristics and movement, to estimate the eventual extent of the plume, and to assess the effectiveness of natural attenuation. The program should include wells in the contamination source area, a plume fringe well at the farthest edge of the plume, and a downgradient sentinel well. The wells should be sampled for a total of eight rounds for all contaminants found above the GWQC or SSGWQS. Each monitoring well should be sampled and analyzed only for those constituents exceeding the Class IIA GWQC in that particular well. At the end of the monitoring period, the Mann-Whitney U-test is applied to each constituent of concern in each impacted well to determine whether the natural attenuation remedy is working.

At the Witco facility, four rounds of sampling have already been conducted. As indicated in the approved Remedial Action Report Addendum, annual groundwater sampling will continue for an additional four years from June 2000 through June 2004, after which time groundwater remedial progress will be reevaluated. June 2000 data was not yet available for inclusion in this EI determination. This monitoring program will also provide data for monitoring the proposed CEA.

Based on results from the most recent sampling round available (June 1998), the Witco natural remediation monitoring program currently includes thirteen constituents, eleven wells, and one surface water sampling location, as summarized in Table 5 below.

The wells which will continue to be monitored at the Witco facility under the proposed CEA include:

- Six Areas of Local Exceedance (AOLE) Monitoring Wells: MW-1S, MW-3D, MW-6S, MW-8P, MW-11S, and MW-14P
- One Fringe Monitoring Well: MW-8S
- Two Sentinel Wells: MW-12S and MW-13S

- One Sentinel Surface Water Sampling Location: SW-004
- One Upgradient Monitoring Well: MW-4S.

Groundwater samples will also be analyzed for a number of natural attenuation indicator parameters (e.g., methane, ethylene, nitrate, chloride, ferrous iron, dissolved total organic carbon, pH, oxidation-reduction potential). Water table elevations will be measured across the site and in Spa Spring Creek to monitor movement of groundwater beneath the facility.

Table 5 – CEA Monitoring Wells and Parameters

Constituent	1S	3D	4S	6S	8S	8P	11S	12S *	13S *	14P	SW-004
1,1-DCE	X		X		X			X	X		X
cis-1,2-DCE	X		X		X			X	X		X
TCE	X		X		X			X	X	X	X
Benzene			X	X			X	X	X		X
Xylene (total)			X				X	X	X		X
PCBs			X			X		X	X		X
Arsenic			X				X	X	X		X
Barium			X	X				X	X		X
Cadmium			X					X	X	X	X
Chromium			X					X	X		X
Lead		X	X				X	X	X		X
Nickel			X					X	X		X
TPH		X	X	X			X	X	X		X

* Specific monitoring parameters have not been called out in the referenced documentation for sentinel wells MW-12S and MW-13S. This table assumes that the wells will be monitored for all constituents of concern, as will the sentinel surface water sampling location.

This program is largely sufficient to monitor the four localized plumes discussed previously in this EI determination, and to follow-up on elevated constituent levels observed during the June 1998 sampling round. Nevertheless, to monitor the complete natural biodegradation process, the suite of analytes for the ongoing monitoring program will be expanded to include intermediate daughter products and byproducts generated during decomposition (e.g., vinyl chloride). Because some intermediate products may pose

greater health risks than the original compounds, Witco will monitor groundwater for such constituents and clearly document that the selected natural remediation scenario continues to completion. In addition, a downgradient sentinel well in the deep aquifer should be added to the monitoring program to allow for monitoring of contamination migration, if any of significance, from well MW-3D.

All data will be verified and submitted to NJDEP for review to ensure that groundwater conditions during the natural attenuation period do not pose a threat to human health or the environment.

References:

(1) Remedial Action Report, prepared by Foster Wheeler, dated November 1998.
(2) Remedial Action Report Addendum, prepared by Foster Wheeler, dated July 1999.
(3) Memo from David Kaplan, NJDEP, to Gary Lipsius, NJDEP, Re: Witco Remedial Action Report Addendum, dated August 18, 1999.
(4) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum Dated July 1999, dated July 27, 2000.
(5) Letter from Patricia Conti, NJDEP, to Stephen Kohlhase, Crompton, Re: Remedial Action Report Addendum No 2 (December 1999), dated July 27, 2000.

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 Witco Corporation (currently known as Crompton Corporation) facility, EPA ID# NJD002165561, located at 1000 Convery Boulevard, in Perth Amboy, New Jersey. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

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

____ IN - More information is needed to make a determination.mistak

Completed by: __original signed by_____ Date:__03/23/01_____

Michele Benchouk
Environmental Engineering
Booz Allen & Hamilton

Reviewed by: __original signed by_____ Date:__03/26/01_____

Pat Shanley
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Andy Park, RPM
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Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: __original signed by_____ Date:__03/28/01_____

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@epa.gov

Attachments

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

Attachment 1 – Site and AOC Map

Attachment 2 – TCE Trend Plot for MW-1S

Attachment 3 – 1,1-DCE and cis-1,2-DCE Trend Plots for MW-1S

Attachment 4 – TCE Trend Plot for MW-14P

Attachment 5 – Benzene Trend Plot for MW-6S

Attachment 6 – Benzene Trend Plot for MW-11S

Attachment 7 – Xylene Trend Plot for MW-11S

Attachment 8 – Summary of Media Impacts Table

Attachments truncated, see facility file (MSS, 06/17/02)