DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	Engelhard Corporation
Facility Address:	32 Taunton Street (Route 152), Plainville, MA 02762
Facility EPA ID #:	MAD001190644

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 #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 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 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).

FACILITY BACKGROUND INFORMATION

The former Engelhard Corp. facility, now owned by BASF Catalysts LLC, hereafter referred to as the "Company", is a former metal fabrication and finishing facility located on approximately 45 acres in Plainville, Massachusetts. The Facility was constructed in 1957 on 22 acres of land previously used for agricultural purposes, located east of Rte. 152 (Taunton Street). Between 1957 and 1962, operations at the Facility primarily consisted of rolling and fabricating steel and titanium, and fabricating uranium fuel elements under license from the U.S. Atomic Energy Commission (AEC). The work conducted under the AEC license involved the handling of natural, depleted and enriched uranium. Wastewaters from the uranium fabrication operations were discharged after treatment into leach fields located on the southeastern side of the Facility. Fabrication of uranium fuel elements ceased in 1962 and all nuclear materials and equipment were sold and removed from the Facility. All affected buildings and equipment were decontaminated; and in June 1963, a close-out inspection performed by the AEC confirmed that AEC closure standards had been met.

Following cessation of uranium operations, and up until closure of the Facility in 1993, operations primarily consisted of fabrication and finishing of gold and silver into wire and flatstock for the jewelry and electronics industries. Processes included melting raw materials, mixing metals to make alloys, and heat treating and finishing products. Process waste streams may have contained cyanides, metals (including cadmium and chromium), chlorinated solvents, acids, metal hydroxide sludges, and metal-containing dusts. A wastewater treatment plant operated from 1973 to 1981; however, due to insufficient capacity and operational inefficiencies, this plant was replaced by the pretreatment plant that is currently operating at the site. After a five-year shutdown period starting in 1993, a smaller wire manufacturer commenced operations at the facility along with a second tenant who is using the building for storage of industrial equipment and packaging materials.

The Facility is bordered by Turnpike Lake to the west and south, wetlands and residential properties to the south and east, and a forested and wetland area owned by the Natural Resources trust of Plainville to the north. Across Rte 152 to the east, the Company owns five vacant lots and a former drive-in theater, totaling 23 acres. An occupied residence with an adjoining large garage, which is used for a commercial contracting business, is located across Rte. 152 to the southeast.

Turnpike Lake is a shallow man-made impoundment covering approximately 115 acres. Turnpike Lake has two surface outlets, one from the embayment immediately south of the Facility, and one approximately 0.13 miles to the north. Both outlets form small streams that flow to the low-lying areas east of Route 152. Drainage from the low-lying areas eventually enters Lake Mirimichi, located approximately 0.8 miles northeast of the Facility. The small streams (Sawmill Brook and Turtle Brook) and Lake Mirimichi are classified by the Massachusetts Department of Environmental Protection (DEP) as Zone A surface water protection areas. Lake Mirimichi recharges two downstream water supply wells along the Wading River which provide approximately one million gallons per day of drinking water to the City of Attleboro (LFR, 2005). In addition, the Town of Plainville has developed a shallow wellfield at the southwestern shore of Lake Mirimichi, located hydraulically downgradient of the facility, that has been approved by the MA DEP for a combined withdrawal of 0.4 million gallons per day (Massachusetts Water Resources Commission, 2004). There are three relatively shallow municipal wells located approximately 0.4 miles southwest of the site on the opposite side of Turnpike Lake, which is hydraulically upgradient of the site. The entire area is considered a potentially productive aquifer by MADEP, although the facility and nearby properties are serviced by a municipal water supply and sewer. Groundwater in the bedrock, which is largely contained in fractures within the upper 200 feet of bedrock, is used as private residential water supplies in areas east and northeast (downgradient) of the facility, in the vicinity of Lake Mirimichi.

INVESTIGATION HISTORY

In March 1986, USEPA issued a RCRA 3007 letter to Engelhard requesting information about SWMUs and releases of hazardous constituents to the environment. Engelhard submitted a response in September 1986 and voluntarily conducted three initial phases of environmental investigations beginning in August 1987. Phase I was completed in 1987. Phase II was initiated in August 1988 and a report containing the results of Phases I and II was submitted in March, 1989. The Phase III field work was conducted in 1989. Investigations included installation of overburden and bedrock wells; sampling and analysis of soils, soil gas, groundwater, surface water and fish; aquifer testing and groundwater modeling. Four additional rounds of groundwater monitoring were conducted in June 1990, March 1991, November 1991 and December 1992.

Engelhard surveyed existing private water wells in the vicinity of the site in March 1989. Bedrock wells from the 94 homes identified in the survey were sampled and analyzed for volatile organic compounds (VOCs). No pattern of contamination potentially attributable to the Site was found. Only one well was found to contain any chemicals; 1,1,1-trichlorethane (1,1,1-TCA) was detected at 6 μg/l in the sample collected from 2 Mirimichi Street. This house is hydraulically cross-gradient of the site.

Engelhard also sampled indoor air in six homes located directly across Route 152 east of the facility and detected concentrations of 1,1-dichloroethene (1,1-DCE), 1,2-dichlorethene (1,2-DCE), 1,1-dichloroethane (1,1-DCA), trichloroethene (TCE), tetrachloroethene (PCE) and 1,1,1-TCA in five of the homes. Engelhard later purchased and demolished the five affected homes. The southern most home, located at 31 Taunton Street, is situated above the southern edge of the groundwater plume and remains occupied.

In 1993, USEPA and Engelhard signed a RCRA 3008(h) Consent Order requiring the Company to conduct an RFI, assess potential human health and ecological risks, and implement the following four RCRA Stabilization Measures: 1) removal, treatment, and/or capping of contaminated soils at the south side of the facility (AOC B); 2) reduction or elimination of contaminated roof drain runoff to Turnpike Lake; 3) installation of a groundwater pump and treat system along a 540 foot long area extending south to north, to significantly reduce the migration of contaminated groundwater moving off the facility; and 4) installation of a fence at Turnpike Lake to restrict access to the facility property by recreational users of the lake.

To date, Engelhard has successfully completed three of the four stabilization measures including construction of a chain link fence in 1995, demolition of all buildings with contaminated roof drains in the mid 1990's and installation of a groundwater pump and treat system in 1997. The pump and treat system or Groundwater Stabilization Measure (GSM) consists of a 540 foot long, vertical high density polyethylene (HDPE) barrier membrane installed into the top of bedrock (approximately 22 - 30 feet deep) and six groundwater extraction wells installed in bedrock. The treatment system includes chemical pretreatment, air stripping and carbon adsorption; treated groundwater is discharged to Turnpike Lake under an EPA NPDES discharge permit. The effectiveness of the pump and treat system was evaluated in 2003 and 2004 and a detailed report was prepared in June 2004. The report concluded that the southern end of the GSM was not effectively preventing the offsite migration of contaminated groundwater. Following additional investigation in August-November 2004, a GSM Upgrade Report containing design recommendations to improve the effectiveness of the GSM was prepared in 2005. These recommendations were implemented from late 2005 to mid 2006. Preliminary data show that the modified pumping rates and system maintenance activities have enhanced ground water control at the southern end of the GSM.

The RFI was conducted in two phases. Phase I was conducted primarily in 1995 and summarized in a Phase I Interim Report submitted to EPA in August 1995. The Phase II investigation was conducted in 1997. The Phase I and Phase II field investigations provided a comprehensive evaluation of on-site and off-site media including soil, ground water, surface water, sediment, and fish. A summary of the Phase I and II results was submitted to EPA in September 1999 in the form of a Draft Final RFI Report which contained both human health and ecological risk assessments. EPA issued comments on the Draft Final Report in February 2002. In response to these comments a Supplemental RFI Work Plan was submitted in March 2004 and revised and re-submitted in March 2005. Investigation activities began in May 2005 and were completed in August 2006. A comprehensive Final RFI Report is currently being prepared and should be submitted in the late fall of 2006.

A Conceptual Design for the stabilization of contaminated soils in AOC B was initially submitted in 1997. This was followed by submission of a Preliminary Design in 2001 to EPA and the Massachusetts Department of Public Health (MADPH), which oversees the radiological component of the site investigation and cleanup. In response to agency comments, a Supplemental Design Investigation (SDI) work plan was prepared in December 2002 for AOC 7, the courtyard area, which is considered to be part of the AOC B area. Initial results (Round 1) of the SDI program were received in December 2003 and demonstrated the need for additional investigations (Round 2), particularly in the area of a newly discovered dry well. Round 2 activities were conducted in the spring of 2004 and included excavation of test pits, advancement of soil borings and installation of additional monitoring wells. Results of the two rounds of data collection were summarized in a July 2004 report and additional investigation including pilot testing of a dual-phase soil gas and groundwater extraction system was recommended for the area.

A limited pilot study of a dual-phase extraction system was conducted in November 2004 and followed by an expanded pilot test beginning in September 2005. Initial results of the expanded pilot test showed that the system was incapable of lowering the groundwater table sufficiently to allow vapor extraction from the contaminated soils near the bedrock surface and the test was abandoned in favor of evaluating other alternatives such as excavation and offsite disposal. Results of the expanded test are contained in a March 2006 report.

HYDROGEOLOGIC SETTING

The site geology includes 18 to 36 feet of glacial till overlying fractured bedrock. Two lithologies were observed in bedrock borings: a dark shale and a feldspathic sandstone (greywacke), with interbedding of the two rock types. The dip of the fractures ranged from 45 degrees to nearly vertical. The bedrock surface follows the topography and slopes downward to the east toward the low-lying wetlands area.

Depth to groundwater varies from approximately 13 feet on the west side of the facility to approximately 2 feet in the wetlands to the east of Route 152. Groundwater in the shallow, overburden, and bedrock aquifers flows from east to west across Rte 152 and subsequently to the north-northeast. Deeper groundwater may be influenced by the north/south trending Mirimichi fault and east-west bedrock fractures, which appear to be present in this area. Vertical hydraulic gradients are generally downward beneath the facility and generally upward in the low-lying area to the east.

The available groundwater elevation data, the observation of active ground water seeps and the results of chemical analyses of sediments and surface waters provide support that ground water from beneath the Facility is discharging into the low-lying area to the east of Route 152 and south and east of the Drive-In property.

Estimates of ground water flow rates yield values of 30 to well over 100 feet per year in the overburden and bedrock zones. Given the extent of CVOCs observed in the overburden and bedrock zones when the Facility investigations first began in the late 1980s, it is likely that selected fractured zones in the bedrock exhibit migration rates in the upper end of this range; although, the precise pattern and rates of migration are difficult to predict with this highly fractured flow system. A travel time assessment is being refined as part of the RFI to better estimate how long and to what extent VOCs in ground water have been moving since their release into the subsurface environment.

References used in preparing this EI include the following documents:

ENVIRON Corporation 1990. Phase III Summary Report. Engelhard Corporation, Plainville Massachusetts.

ENVIRON Corporation. 1995a. RCRA Facility Investigation, *Phase I Interim Report*, Engelhard Corporation, Plainville, Massachusetts. August 31.

ENVIRON Corporation. 1999. Draft RCRA Facility Investigation (RFI). Engelhard Corporation, Plainville, Massachusetts. September 2.

Massachusetts Water Resources Commission. 2004. Water Resources Commission Decision - Interbasin Transfer Application, Plainville Water Department, Lake Mirimichi Well Field. March 11.

ECS. 2004. Groundwater Stabilization Measure Report - Engelhard Corporation Site, Plainville, MA. Document No. 05-04-270. June 24.

ECS. 2004. Supplemental Design Investigation – Courtyard Area (AOC 7). Engelhard Corporation Site, Plainville MA. July 9.

LFR Levine-Fricke. 2005. 2004 Annual Groundwater Compliance Monitoring Report (DRAFT). Engelhard Corporation, 30 Taunton Street, Plainville Massachusetts. April.

LFR Levine Fricke. 2005. Monitored Natural Attenuation Report – 30 Taunton Street, Plainville Massachusetts. October 4.

ENVIRON Corporation. 2006. March 15 Letter Report to Bob Brackett Re: Project Status Report No. 5 – January and February, 2006, Supplemental RCRA Facility Investigation, Engelhard Corporation, Plainville Massachusetts.

ENVIRON Corporation. 2006. Conceptual Site Model for the Engelhard Facility, Plainville MA. August.

ENVIRON Corporation. 2006. Draft RCRA Corrective Action Environmental Indicator (EI) RCRIS code CA750 Form, September 5.

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

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

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

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

The "appropriate levels" being used to compare groundwater quality for question 2 are Federal MCLs and the Massachusetts MCP GW-1 (protective of drinking water) and GW-2 (protective of the groundwater to indoor air pathway) standards.

Chlorinated volatile organic solvents (CVOCs) and their degradation by-products have been consistently detected in overburden and bedrock wells since investigation activities began in September 1987. PCE and 1,1,1-TCA are the two primary CVOCs detected in groundwater onsite, and were used as degreasing agents. The highest concentrations of CVOCs have been detected near and downgradient of AOCs associated with the historical vapor degreasing operations including AOCs 5 and 29 in Building 8, AOC 22 and the newly discovered dry well in

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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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

the Upper Courtyard area of AOC 7. Elevated levels of CVOCs in soil vapors and ground water have also been observed downgradient of AOC 14.

Groundwater concentrations of PCE and 1,1,1-TCA in monitoring wells located near and downgradient of these AOCs (particularly AOCs 7, 14, and 22) have been detected in the 10 – 100 mg/L range, and as high as 150 mg/L for PCE alone at AOC 7. This indicates that residual dense non-aqueous phase liquids (DNAPLs) may have historically migrated through the overburden and into the fractured bedrock in these areas. Lower concentrations of PCE, 1,1,1-TCA and their degradation products have also been found in groundwater across much of the remaining property and have spread downgradient into the wetland area east of Route 152. Degradation by-products that have been consistently detected in groundwater include TCE, cis-1,2-DCE, 1,1-DCE and 1,1-DCA. Vinyl chloride, chloroethane and trans-1,2-dichlorethene have also been detected, but less frequently.

Based on the most recent round of ground water sampling, the highest CVOC concentrations detected in monitoring wells located near the AOCs associated with vapor degreasing in 2005 are reported in Table 1.

Table 1. Maximum Concentrations of CVOCs Detected Onsite in 2005 in Groundwater Monitoring Wells

Located Downgradient of the Four Main Source Areas

AOC	Downgradient Monitoring Well Cluster	CVOC Concentration (µg/L)					
		PCE	TCA	TCE	cis-1,2-DCE	1,1-DCE	1,1-DCA
5/29	MW3, MW14, MW16	240	250	48	14	11	36
14	MW12A, MW12B	4,000	1,100	330	76	51	46
22	MW4, MW15, MW17	6,600	2,700	310	86	160	ND
7	PW-21*, MW105*	150,000	115,000	4,630	1,910	720	1,610
MassDEP GW1 Standard		5	200	5	70	7	70
Federal MCL		5	200	5	70	7	NA
MassDEP GW2 Standard		50	4,000	30	100	80	1,000

* last sampled in 2004

CVOCs have also been detected in groundwater monitoring wells downgradient of the GSM and at offsite locations at concentrations exceeding MADEP GW1 and GW2 standards. Maximum concentrations detected in 2005 are shown in Table 2.

Table 2. Maximum Concentrations of CVOCs Detected in Offsite Monitoring Wells in 2005

Chemical	Max Concentration	Monitoring Well
PCE	780	MW-21B
TCA	980	MW-41B
TCE	140	MW-21B
cis-1,2-DCE	70	MW-21B
1,1-DCE	57	MW-21B
1,1-DCA	45	MW-40B

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_X_ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

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

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

Rationale and Reference(s):

2

"existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

The existing area of groundwater contamination is depicted in Figures 2 through 4 for the total CVOC contaminant plume observed in overburden, bedrock and deep bedrock aquifers. The total CVOC concentration contours represent the sum of the concentrations of PCE, TCE, 1,1,1-TCA, cis-1,2-DCE, 1,1-DCE and 1,1-DCA in units of µg/L. These figures are based on the most recent round of ground water sampling conducted in December 2005, supplemented by historic information on select wells that are no longer available for sampling. The figures do not show the location of MW-42, a deep bedrock well which is the furthest downgradient well, located approximately 2,300 feet north-northeast of the facility. No contaminants have been detected in MW-42.

Soon after operation of the GSM commenced in January 1998, groundwater concentrations in monitoring wells located near the GSM increased significantly. This is likely the result of an initial flushing of contaminants that were previously trapped in poorly flushed portions of the bedrock zone upon the commencement of pumping. Over time these concentrations have gradually declined and are currently somewhat below the levels that existed prior to the startup of the GSM (see Figure 5). The recent upgrades to the GSM, and prior pumping action over the past eight years, have yielded lower VOC concentrations in ground water downgradient of the GSM. In addition, ground water control and gradient reversal along the GSM has improved.

Concentrations of CVOCs in offsite monitoring wells are expected to continue to decrease in response to operation of the GSM, particularly with the improvement in capture along the southern end of the GSM beginning in late 2005. In addition, the various hydrogeologic investigations at the Site have demonstrated that the overburden and shallow bedrock ground water beneath the Facility naturally flows to the east and ultimately discharges into the low-lying areas and wetlands east of Route 152 and south and east of the Drive-in property. Evidence of this discharge includes the historic presence of springs along the boundary of the upland areas and the wetland immediately east of the Facility, and the presence of CVOCs in surface water and sediment in the wetlands. This natural discharge process is the result of the location and relative elevation differences between the principal source of water (Turnpike Lake) and the wetlands. Because Turnpike Lake is perennial, and always contains some amount of surface water, this discharge process will persist to a greater or lesser degree throughout the year and during periods of both high rain (and water table) and drought.

The historical ground water quality data also supports a conclusion that the wetlands form an effective sink that prevents the migration of CVOCs in groundwater farther to the northeast towards Lake Mirimichi, even in the deeper bedrock zones. A number of years of monitoring data from sentinel bedrock monitoring wells located along the northern, eastern and southern boundaries of the wetland have consistently shown no detection of CVOCs (other than very low concentrations below MCLs in MW-20B) beyond the principal discharge area south and east of the Drive-In property (see Figures 2, 3 and 4).

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

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

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

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

Rationale and Reference(s):

Ground water originating from beneath the Facility flows in an east-northeast direction and discharges into a low-lying wetlands area east of Route 152. This natural discharge process is the result of the location and relative elevation differences between the principal source of water (Turnpike Lake) and the wetlands. Sawmill Brook, which intercepts the southern surface outlet of Turnpike Lake, runs from south to north across this low-lying wetlands area and is the surface water body that is primarily affected by this discharge. Surface water flow in Sawmill Brook empties into Turtle Brook to the north and eventually enters Lake Mirimichi, approximately one mile to the northeast of the Facility. Surface water features are shown in Figure 1.

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

_X_ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>each</u> 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.

Overburden monitoring well MW41A is screened at a depth of 6 – 16 feet below ground surface (bgs) and is located immediately upgradient of a known seep area along the centerline of

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

the main contaminant plume in the low-lying wetlands east of Route 152. Concentrations of CVOCs detected in MW41A over the past five years are compared to 10x and 100x multiples of the appropriate groundwater levels in Table 3.

Table 3. Concentrations of CVOCs Detected in MW41A

CVOC	Groundwater Concentration (µg/L)					Groundwater Level (µg/L)	
	Dec 01	Dec 02	Oct 03	Nov 04	Dec 05	10 X	100 X
PCE	725	87	320	147	450	50	500
TCE	200	48	69	56.7	57	50	500
1,1,1-TCA	265	22	76	26.5	100	2,000	20,000
cis-1,2-DCE	160	56	260	69.7	22	700	7,000
1,1-DCE	30	3.6	9.3	6.2	4.7	70	700
1,1-DCA	26	4.2	9.1	5.3	7.4	700	7,000

Concentrations of PCE and TCE detected over the past five years generally fall within the range of 10 to 100 times their groundwater level. The only concentration greater than 100 times the groundwater level over the past five years was detected in December 2001. Since that time, concentrations have generally decreased.

MW21A is screened at a depth of 3 - 8 feet bgs and is located immediately downgradient of the seep area. Concentrations of CVOCs detected over the past five years in this well are presented in Table 4 and indicate that only PCE was detected at a concentration greater than 10 times its groundwater level on one occasion. Compared to MW41A, concentrations in MW21A are about one order of magnitude lower, which is consistent with its location downgradient of the seep area.

Table 4. Concentrations of CVOCs Detected in MW21A

CVOC	Groundwater Concentration (µg/L)					Groundwater Level (µg/L)	
	Dec 01	Dec 02	Oct 03	Nov 04	Dec 05	10 X	100 X
PCE	37	7.4	74	20.1	27	50	500
TCE	35	4.3	16	24.7	40	50	500
1,1,1-TCA	12	1.2	7.7	3.2	9.8	2,000	20,000
cis-1,2-DCE	40	6.2	95	33.3	40	700	7,000
1,1-DCE	1.9	ND	ND	0.8	2.2	70	700
1,1-DCA	3.3	1.2	2.8	1.7	2.9	700	7,000

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[4])?

X If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and 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,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including 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.

5Rationale and Reference(s):

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.

The discharge of chemicals in ground water to surface water does not pose a significant ecological risk, and is therefore is considered "currently acceptable." The basis for this conclusion is an interim-assessment based on data collected in 2005 that shows that the concentrations of constituents discharged from ground water to surface water and sediment are not impacting the biological community present in the primary discharge area located in the low-lying wetlands east of Route 152. A final ERA is currently being prepared and should be available in late 2006.

Groundwater discharge to Sawmill Brook eventually enters Turtle Brook and Lake Mirimichi. Lake Mirimichi recharges two downstream water supply wells along the Wading River and these two wells provide approximately one million gallons per day of drinking water to the City of Attleboro (LFR, 2005). In addition, the Town of Plainville has developed a shallow wellfield at the southwestern shore of Lake Mirimichi that has been approved by the DEP for a combined withdrawal of 0.4 million gallons per day (Massachusetts Water Resources Commission, 2004). Surface water samples collected by MADEP on April 21, 1997 at Turtle Brook where it enters Lake Mirimichi reportedly contained only low levels of PCE and 1,1,1-TCA (1.9 µg/L and 1.1 µg/L, respectively). Because these chemicals tend to volatilize from water and undergo significant dilution upon entering Lake Mirimichi, potential impacts on the drinking water supply at Lake Mirimichi are expected to be de minimis.

Interim Ecological Assessment Executive Summary

ENVIRON personnel, including a Certified Ecologist, performed an investigation and interim assessment of surface water, sediment, and the benthic macroinvertebrate community sampled in the primary groundwater discharge area located in the low lying wetlands area east of Route 152. The interim assessment was provided as an attachment to the Conceptual Site Model prepared in June 2006 (ENVIRON, 2006). The results of the interim assessment of these data show that the concentrations of constituents discharged from ground water to surface water and sediment are not impacting the biological community sampled in this area. This conclusion is based on multiple lines of evidence as summarized below.

- Based on USEPA methodology, locations within the influence of the Site are considered "nonimpaired" relative to the reference locations for each habitat type. This indicates that although chemical residues are present in sediment, they are not resulting in measurable impact to the biological community compared, and in fact, locations within the influence of the Site actually scored better than reference locations.
- Metals are bound with sulfides and organic carbon at most of the sampling locations, as demonstrated by AVS-SEM and TOC analyses. Metals bound to sulfides and organic carbon are not biologically available, and as such, do not exert toxicity. Those areas where metals are potentially bioavailable were considered as part of the benthic macroinvertebrate community assessment, and community impacts were not observed.
- Concentrations of chemicals in the wetlands decrease significantly and rapidly with distance from observed groundwater seep areas. The highest surface water/sediment concentrations were detected in samples located nearest to this seep area (i.e. SD-46, SW-15, SD-202).

Given the active groundwater stabilization measure and historical groundwater monitoring data showing an overall decrease in CVOC concentrations in the overburden zone, it is reasonable to conclude that conditions will remain acceptable well into the future.

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 Reference(s):

The Administrative Consent Order (Consent Order) signed by the Company in 1993 requires a groundwater monitoring program for the overburden and bedrock aquifer zones to monitor performance of the Groundwater Stabilization Measure (GSM). The groundwater monitoring program includes hydraulic head measurements and collection of samples to document trends in water quality. Groundwater quality measurements have been collected on an annual basis since 1997.

Presented in Table 5 is a list of offsite perimeter monitoring wells that will be sampled on an annual basis to verify that groundwater contamination will not be migrating beyond the "existing area of groundwater contamination" defined in Figures 2 - 4.

Table 5. Perimeter Monitoring Wells Used to Verify Migration of Contaminated Groundwater Under Control

Overburden Zone	Shallow Bedrock Zone	Deep Bedrock Zone
MW-9A	MW-9B	MW-9C
MW-20A	MW-20B	MW-20C
MW-21A	MW-21B	MW-21C
MW-22A	MW-22B	MW-22C
MW-23A	MW-23B	MW-33C
MW-30A	MW-30B	MW-43C
MW-33A	MW-33B	
MW-34	MW-43B	
MW-35		
MW-36		

As long as groundwater concentrations continue to decrease, routine monitoring of surface water and sediment locations is not anticipated.

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 Company facility, EPA ID # MAD001190644, located at 32 Taunton Street, Plainville MA. 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/State 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.

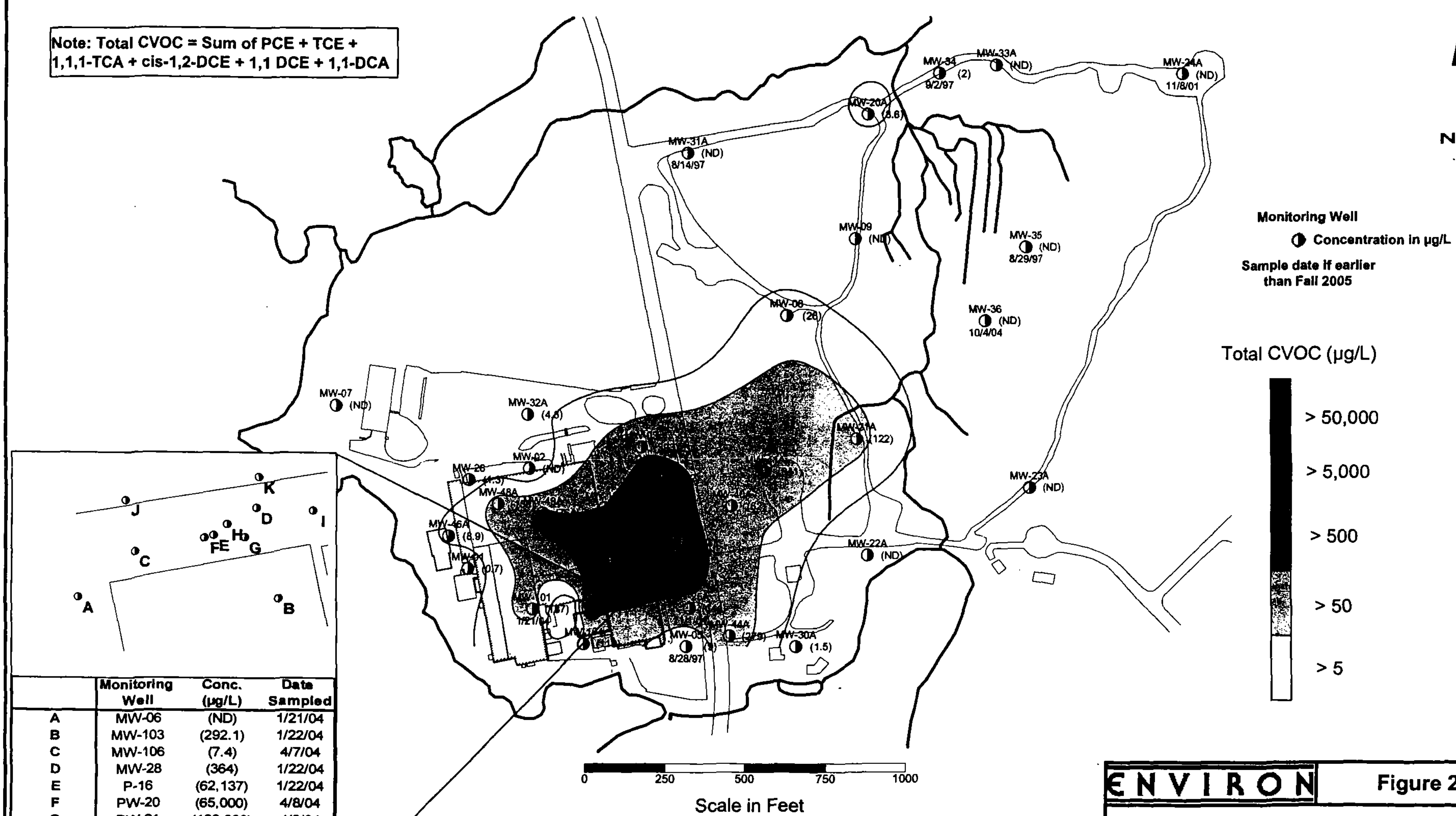
Completed by	(signature)	Robert W. Brackett	Date	9/26/06
	(print)	Robert W. Brackett		
	(title)	RCRA Facility Manager		
Supervisor	(signature)	(see attached signature page) Robert J. Cody	Date	3-21-07
	(print)	Ray Cody		
	(title)	Chief, RCRA Corrective Action Section		
	(EPA Region or State)	EPA Region I		

Locations where References may be found:
1 Congress St., Boston. 1st floor RCRA Records Center.

Contact telephone and e-mail numbers

(name)	Robert W. Brackett
(phone #)	617-918-1364
(e-mail)	Bracket.bob@epa.gov

Note: Total CVOC = Sum of PCE + TCE + 1,1,1-TCA + cis-1,2-DCE + 1,1 DCE + 1,1-DCA



	Monitoring Well	Conc. (µg/L)	Date Sampled
A	MW-06	(ND)	1/21/04
B	MW-103	(292.1)	1/22/04
C	MW-106	(7.4)	4/7/04
D	MW-28	(364)	1/22/04
E	P-16	(62,137)	1/22/04
F	PW-20	(65,000)	4/8/04
G	PW-21	(166,000)	4/8/04
H	PW-23	(39,840)	4/8/04
I	PW-17	(950)	4/7/04
J	MW-102	(3.5)	1/21/04
K	P-15	(10,820)	4/7/04

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Figure 2

Total CVOC Isoconcentration Map of Overburden Zone

Fall 2005-2006

Note: Total CVOC = Sum of PCE + TCE + 1,1,1-TCA + cis-1,2-DCE + 1,1 DCE + 1,1-DCA

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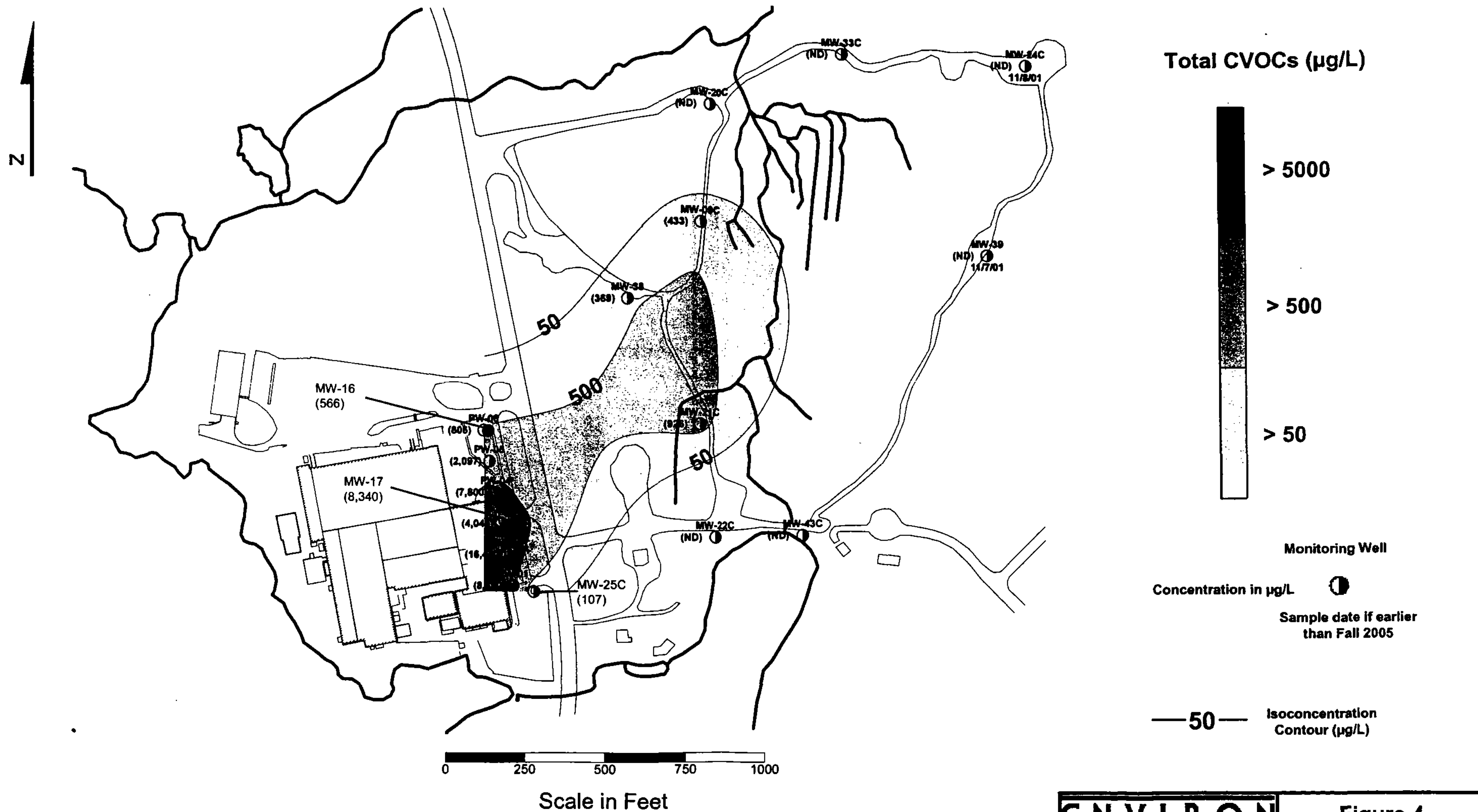
Figure 3

Total CVOC Isoconcentration Map of Shallow Bedrock Zone

Fall 2005-2006



Note: Total CVOC = Sum of PCE + TCE + 1,1,1-TCA + cis-1,2-DCE + 1,1 DCE + 1,1-DCA

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Figure 4

Total CVOC Isoconcentration Map of Deep Bedrock Zone

Fall 2005-2006

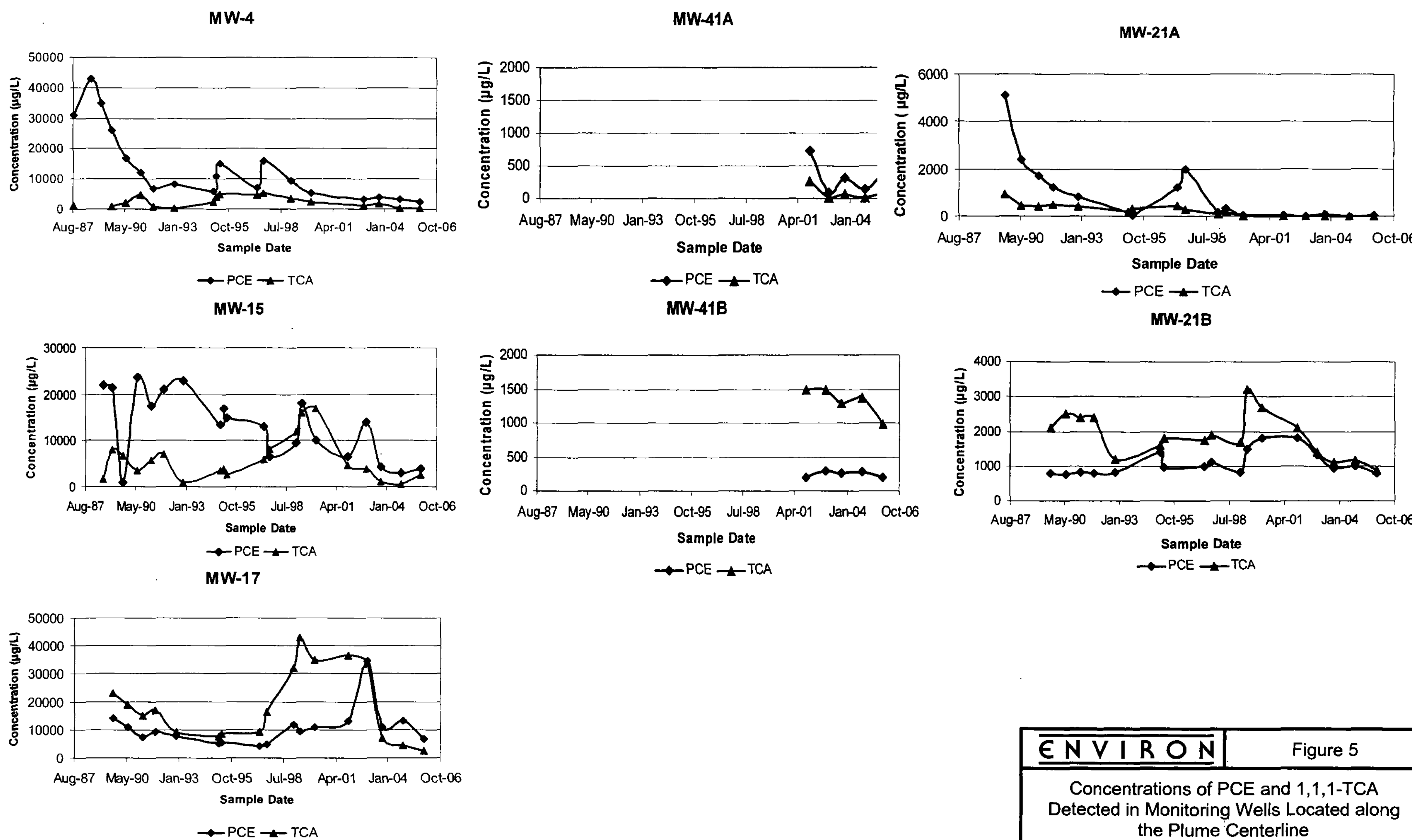

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Figure 5

Concentrations of PCE and 1,1,1-TCA Detected in Monitoring Wells Located along the Plume Centerline