DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

Migration of Contaminated Groundwater Under Control

Facility Name: Synthetic Products
Facility Address: 375 Barnum Avenue, Stratford, CT 06615
Facility EPA ID #: CTD 000844365

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*

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).

RCRA RECORDS
FACILITY Synthetic Prod Co Div of Plastic Spec
I.D. NO. CTD000844365
FILE LOC. R-13
OTHER

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

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

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

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

Rationale and Reference(s):

2.1 Site History

In the 1970s, Ware Chemical (Dart Industries, Inc.) reportedly discharged unreacted and/or partially reacted chemicals generated in a polymer manufacturing batch process, to a dry well leaching system located at the Synthetic Products site (Site). This practice was reportedly discontinued in the late 1970s. In 1983, Dart & Kraft, Inc. (Kraft) divested the Site to Synthetic Products Company (SynPro). During the 1980s and 1990s SynPro manufactured mixed-metal polyvinyl chloride (PVC) heat stabilizers consisting of intermediate metallic salts of barium, cadmium, zinc, and antimony in the building located on the northern portion of the Site. Currently SynPro leases the building (former manufacturing building) at the Site to Hampford Research for general warehousing of dry chemicals and as a general maintenance shop. The Raymark Superfund Site is located directly across the road from the Site, and is a contributor to the groundwater contamination existing on the Synthetic Products Site. The presence of chlorinated organic contaminants in groundwater at the Synthetic Products Site is believed to be a result of groundwater migration from the adjacent, up-gradient Raymark Superfund Site and, as identified to Connecticut Department of Environmental Protection (CTDEP), remediation and monitoring activities at the Synthetic Products Site have been conducted on that basis. The conclusion that the presence of chlorinated organic contaminants in groundwater is attributable to the Raymark Superfund Site is supported by the remedial investigation completed for the United States Environmental Protection Agency (USEPA) by Tetra Tech NUS Inc. (Tetra Tech) for the Raymark Site. Details of the remedial investigation are presented in the document entitled "Draft Final Remedial Investigation, Raymark - OU2 - Groundwater, Stratford, Connecticut" (hereafter, RI Report), dated November 2000 and prepared by Tetra Tech.[2] This same document indicates the presence of all six metals detected at elevated concentrations on the Site to be present at significant concentrations on the up-gradient Raymark facility as well. Based on the reviewed report, it appears that most of the inorganic groundwater contaminants historically detected at the Site at elevated concentrations may be due to migration from Raymark.

Site investigations during the 1980s and 1990s confirmed the presence of organic and inorganic compounds and light non-aqueous phase liquids (LNAPL) in soils and groundwater on Site. Corrective measures, including but not limited to excavation and disposal of the dry well leaching

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Footnotes:

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).*

2 Draft Final Remedial Investigation, Raymark - OU2 - Groundwater, Stratford, Connecticut. Dated November 2000 and prepared by Tetra Tech, Inc. for US EPA.

system and contaminated soil; groundwater extraction and treatment; free product recovery; excavation of contaminated soil within and adjacent to the former manufacturing building as part of SynPro's RCRA closure activities; and construction and operation of a soil vapor extraction (SVE) system have been implemented at the Site.

Kraft constructed the SVE system at the Site in May 1999, and has conducted operation, maintenance, and monitoring activities associated with the SVE system since that time. Based on the results of a 48-hour SVE system shut-down test conducted in June 2001 and the results of monthly and quarterly SVE system monitoring conducted since that time, Kraft believes that the SVE system removal rate of volatile organic compounds (VOCs) in the soils beneath the former manufacturing building at the Site is at or near steady state asymptotic conditions and that continued operation of the SVE system will not result in significant further reduction of Site-related VOCs in soil. This conclusion has been identified to CTDEP in the last several Quarterly Monitoring Reports, with no response received back from CTDEP. Kraft's intention to terminate operation of the SVE system was identified to CTDEP in quarterly monitoring reports submitted to CTDEP on March 25, 2002, July 2, 2002, September 18, 2002, and December 30, 2002, however, no response has been received back from CTDEP. The last quarterly monitoring event of the SVE system was conducted on June 14, 2002, and the results are consistent with the results of the last several monitoring events, indicating that continued operation of the SVE system will not result in significant further reduction of Site-related VOCs in soil. Accordingly, the June 2002 quarterly monitoring event of the SVE system was the last monitoring event where soil vapor samples were collected and submitted for chemical analyses. The SVE system will continue to operate, with monthly monitoring for operation and maintenance related parameters only, until the time of the March 2003 semi-annual groundwater monitoring event, at which time the SVE system will be shut down.

Kraft has also conducted quarterly groundwater monitoring at the Site from August 1999 to September 2001. In the summer of 2001 Kraft proposed to CTDEP that, in accordance with the provisions of a letter from Conestoga-Rovers & Associates (CRA) to CTDEP dated April 22, 1998, the frequency of groundwater monitoring be revised from quarterly to semi-annually. As no response was received from CTDEP, commencing with the September 2001 groundwater monitoring event the frequency of groundwater monitoring was reduced to semi-annually. The most recent semi-annual groundwater monitoring event was conducted in September 2002. In accordance with the letter from CRA to CTDEP dated April 22, 1998, groundwater monitoring at the Site is to continue for a maximum of 2 years following shut-down of the SVE system. Assuming the results of the semi-annual groundwater monitoring continue to be generally consistent (or show lower concentrations of Site-related contaminants) with recent groundwater monitoring results, it is anticipated that the final semi-annual groundwater monitoring event will be conducted in March 2003. Thereafter, it is currently anticipated that groundwater monitoring will be conducted on a frequency yet to be negotiated with CTDEP, to monitor groundwater conditions at the Site.

2.2 Assessment of Groundwater Contamination

The following three numerical standards for groundwater have been established by the CTDEP and incorporated in the State Remediation Standard Regulations (RSR)[3]: Groundwater Protection Criteria (GWPC), Volatization Criteria for Groundwater (VCGW), and the Surface Water Protection Criteria (SWPC).

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3 State of Connecticut Department of Environmental Protection Remediation Standard Regulations. January 1996.

The Site is located within a CTDEP "GB" Water Classification Area. A "GB" Water Classification Area is defined as, "*Groundwater within highly urbanized area of intense industrial activity and where public water is available. May not be suitable for direct human consumption due to waste discharges, spills or leaks, of chemicals and land impacts. The goal is prevent future degradation by preventing any additional discharges which could cause irreversible contamination*"[4]. As identified in the RI Report, groundwater in the Site vicinity is not used as a potable source. Considering the "GB" classification, and the presence of existing groundwater contamination, groundwater in the vicinity of the Site likely will not be used as such in the foreseeable future. As a result, there is no potential for the contaminated groundwater detected beneath the Site to migrate to any downgradient potable water supply well. Therefore, the GWPC is not an applicable protective level to evaluate the groundwater resource at the Site.

The VCGW is used to evaluate volatile contaminants in groundwater near or beneath buildings and is directly related to the contaminants' ability to volatilize and potentially affect indoor air and present a human exposure risk via inhalation. Since this Groundwater Environmental Indicator (EI) is not intended to be a direct measure of human risk, the VCGW are not discussed herein. Existing groundwater data for the Site are compared to the VCGW under separate cover in the EI document for "Current Human Exposures Under Control".

The appropriate protective level that is applicable to this Site in this Groundwater EI is the CTDEP SWPC, which is designed to evaluate a groundwater plume which discharges to a surface water body. The only potential surface water receptor of groundwater flowing from beneath the Site is the Housatonic River, as is described further below.

Groundwater elevation contours historically developed for the Site demonstrate that groundwater flow generally is directed from north to south across the Site[5]. Groundwater elevation contours were developed based on the groundwater elevations measured on June 27, 2001, March 12, 2002, and September 18, 2002 at the shallow Site monitoring wells (shallow groundwater contours were not developed for the September 26, 2001 monitoring event because groundwater elevations could not be measured at all Site monitoring wells on this date). The shallow groundwater elevation contours for these monitoring events are presented on the attached Figures 2.1, 2.2 , and 2.3, and demonstrate that groundwater flow generally is directed southward across the Site, consistent with the general groundwater flow direction based on groundwater elevation contours historically developed for the Site. Based on the RI Report[2], which includes hydraulic monitoring data from a large number of monitoring wells in the area surrounding the Site, the regional direction of groundwater flow in the shallow overburden aquifer is to the southeast, towards the Housatonic River. A plot in the RI Report showing the concentration of benzene, a Synthetic Products Site-related parameter, in groundwater downgradient of the Raymark Superfund Site indicates benzene migration to the southeast of the Site consistent with a regional southeast groundwater flow direction towards the Housatonic River.

Groundwater samples are currently being collected from Site monitoring wells on a semi-annual basis and analyzed for the compounds benzene, toluene, ethylbenzene, xylenes (BTEX), and heptane. The attached Table 2.1 presents a summary of the groundwater quality data for the Site collected from June 1995 to September 2002 for the parameters that are analyzed in groundwater samples collected during the current semi-annual groundwater monitoring program. In comparison to historically detected concentrations, the groundwater quality data demonstrate a general declining trend in groundwater concentrations of benzene and toluene, the only monitored parameters that are detected

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4 Murphy, J.E., 1987. Water Quality Classification Map of Connecticut, Connecticut Natural Resources Atlas Series, Connecticut Department of Environmental Protection, Water Compliance Unit.

5 Supplemental Hydrogeologic Investigation Report, Synthetic Products Company, Stratford, Connecticut, dated May 1996 and prepared by CRA. Figures 5.4 and 5.5.

with any regularity at the Site. This is particularly true at monitoring wells CRA5S-95 and CRA6S-95 located within and downgradient, respectively, of the former leach field at the Site. This supports the occurrence of a reduction in the groundwater contamination beneath the Site due to the corrective measures that have been implemented (e.g., excavation and disposal of the dry well leaching system and contaminated soil; groundwater extraction and treatment; free product recovery; excavation of contaminated soil within and adjacent to the former manufacturing building as part of RCRA closure activities; and construction and operation of a SVE system). In addition, the Site-related organic compounds predominantly are petroleum hydrocarbons (i.e., benzene, toluene, ethylbenzene, and xylenes) that are utilized by bacteria indigenous to the subsurface as a substrate (i.e., carbon or energy) source. As a result, there is significant potential for the occurrence of natural biodegradation processes in groundwater beneath the Site. The declining trend in the detected groundwater concentrations in relation to historical levels supports the occurrence of this natural attenuation mechanism.

In Table 2.1, the detected concentrations of Site-related compounds are compared to the CTDEP (SWPC) presented in the RSR, 22a-133k-3 (b)[3]. Only benzene is detected above the SWPC. A review of the historical groundwater quality data for the Site indicates that 1,1-dichloroethene (1,1-DCE) is the only other organic compound (not presently analyzed for in the current groundwater quality monitoring program) detected by Kraft above the SWPC[5]. Historically, the results for groundwater samples collected during Kraft's June 1995 and September 1995 investigations indicate that the following total metals were also above the SWPC: arsenic, cadmium, copper, lead, zinc, and nickel[5]. These SWPC exceedances were attributed to the natural chemistry of the groundwater based on the background concentrations detected in the Site soil, and the significant levels of turbidity in the groundwater samples. Furthermore, all six metals are present in groundwater at elevated levels on the up-gradient, adjacent Raymark site, as documented in the RI report[2]. Accordingly, metals analyses are not included in the current groundwater quality monitoring program. Furthermore, by excavating the areas beneath the former RCRA storage units during SynPro's RCRA closure activities, and replacing those areas with clean fill, arsenic and cadmium contamination in Site soils was effectively removed[6].

The State of Connecticut Remediation Standard Regulation 22a-133k-3 (b) (3) (A)[3] describes a methodology to develop Site-specific Alternative Surface Water Protection Criteria (ASWPC) as follows:

$$\text{ASWPC} = \text{WQS} \times \left(\frac{0.25 \times 7Q_{10}}{Q_{plume}} \right) \qquad (1)$$

where:

WQS - the lower of the human health or aquatic life criteria reported in Appendix D of CTDEP's Water Quality Standards[7] appropriate for the receiving surface water body. The Housatonic River southeast of the Site is classified by CT DEP as saline (Class "SB/SC") and the appropriate human health and aquatic life criteria that was used correspond to the criteria for human consumption of organisms and chronic exposure for salt water aquatic species, respectively.

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6 RCRA Closure Plan, Parts II and III, Synthetic Products Company, Stratford, Connecticut, dated February 2001 and prepared by HRP.

7 Water Quality Standards, Connecticut Department of Environmental Protection, Appendix D, effective December 17, 2002.

$7Q_{10}$ - the lowest 7 consecutive day mean stream discharge rate with a recurrence interval of 10 years [cubic feet per second (ft^3/s)] for the receiving water body. A value of 264 ft^3/s is applied for the Housatonic River as reported by USGS in CRA's correspondence to CTDEP dated June 1, 1998[8]; and

Q_{plume} - the average discharge of contaminated groundwater through the groundwater plume (ft^3/s). A value of 0.003 ft^3/s applied as calculated in Table 2.2.

Equation (1) considers only dilution mechanisms within the receiving water body and does not account for the attenuation mechanisms of biodegradation, dispersion, and retardation occurring within groundwater along the groundwater flow path toward the receiving water body. As a result, the development of Site-specific ASWPC using Equation (1) is considered to be a conservative approach.

The calculation of the Site-specific ASWPC for benzene and 1,1-DCE are presented in Table 2.2. The Site-specific ASWPC are compared in Table 2.2 to the maximum benzene concentration detected on Site during the most recent groundwater sampling event, and the maximum 1,1-DCE concentration historically detected on Site by Kraft. The maximum detected benzene and 1,1-DCE concentrations are well below the calculated Site-specific ASWPC. Therefore, it is concluded that organic contamination detected in groundwater beneath the Site does not pose an adverse impact to the surface water quality of the Housatonic River.

Similarly, the ASWPC calculated for the metals that were historically detected above the SWPC in Site groundwater are included in Table 2.3. The maximum detected concentrations or arsenic, cadmium, lead, nickel, copper and zinc are well below their respective Site-specific ASWPC. Therefore, the concentrations of metals detected in groundwater beneath the Site do not pose an adverse impact to the surface water quality of the Housatonic River.

3. *Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[9] 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"[7]).*

____ *If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[7]) - skip to #8 and enter "NO" status code, after providing an explanation.*

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

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8 Letter from Scott Green of CRA to William Coleman of CTDEP, dated June 1, 1998.

9 "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.

Rationale and Reference(s):

3.1 Migration of Contaminated Groundwater Stabilized

As identified in Section 2.2, the regional direction of groundwater flow in the shallow overburden aquifer is to the southeast towards the Housatonic River. Additionally, as identified in Section 2.2 groundwater quality data demonstrates a general declining trend in groundwater concentrations of benzene and toluene, the only monitored parameters that are detected with any regularity at the Site.

Of the Site-related compounds currently monitored for, only benzene exceeds the default SWPC. A review of the historical groundwater quality data for the Site indicates that 1,1-DCE (a compound attributed to the Raymark Superfund Site across the road and hydraulically upgradient of the Synthetic Products Site, and accordingly, not currently monitored for at the Site) is the only other organic compound detected above the default SWPC. Also as identified in Section 2.2, however, the maximum benzene concentration most recently detected during the September 2002 monitoring event (in fact, the maximum benzene concentration ever detected in any of the Site monitoring wells, in November 1999) and the maximum 1,1-DCE and metals concentrations historically detected by Kraft in groundwater beneath the Site are well below their respective calculated Site-specific ASWPC. Consequently, the groundwater impact detected beneath the Site does not pose an unacceptable risk to the surface water quality of the Housatonic River.

Furthermore, the general declining trend in groundwater concentrations of benzene and toluene, the only monitored parameters that are detected with any regularity at the Site, supports the occurrence of a reduction in the groundwater contamination beneath the Site due to the corrective measures that have been implemented (e.g., excavation and disposal of the dry well leaching system and contaminated soil; groundwater extraction and treatment; free product recovery; excavation of contaminated soil within and adjacent to the former manufacturing building as part of RCRA closure activities; and construction and operation of a SVE system). In addition, the Site-related organic compounds detected in groundwater are petroleum hydrocarbons that are readily biodegradable by bacteria indigenous to the subsurface. The general decline in benzene and toluene concentrations relative to historically detected levels demonstrates the occurrence of this naturally occurring attenuation process in groundwater beneath the Site. Considering the occurrence of biodegradation processes in addition to other naturally occurring attenuation processes such as dispersion and retardation, it is likely that the Site-related organic contaminant concentrations detected in groundwater beneath the Site would be substantially, or entirely, dissipated prior to migrating the approximate 1,300-foot distance to the Housatonic River downgradient from the Site; this is supported by the results of USEPA's remedial investigation, as presented in the RI Report. Accordingly, it can be concluded that the migration of contaminated groundwater has stabilized, as evidenced by the general declining trend of Site-related compound concentrations.

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

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

Rationale and Reference(s):

4.1 Discharge of Groundwater to Surface Water Bodies

There are no surface water bodies on Site. As identified in Section 2.2, the only potential surface water receptor of groundwater flowing from beneath the Site is the Housatonic River, located approximately 1,300 feet southeast.

As detailed in Sections 2.2 and 3.1, of the compounds currently monitored in groundwater at the Site only benzene is detected at concentrations exceeding the default SWPC. Of compounds historically monitored by Kraft, only 1,1-DCE and several metals were detected at concentrations above the default SWPC. Detected concentrations of benzene, 1,1-DCE, and metals on Site, however, are well below the Site-specific ASWPC calculated for these parameters. Further, as a result of biodegradation and natural attenuation processes, it is likely that the organic Site-related contaminant concentrations detected in groundwater beneath the Site would be substantially or entirely dissipated prior to migrating the approximately 1,300-foot distance to the Housatonic River downgradient of the Site. This is supported by the results of USEPA's remedial investigation, as presented in the RI Report, which indicate that significant benzene concentrations emanating from the Site have attenuated prior to reaching the Housatonic River. Accordingly, it is concluded that Site-related groundwater contamination above appropriately protective levels does not enter surface water bodies.

5. *Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration[10] of each contaminant discharging into surface water is <u>less than 10 times</u> 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[10] 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.*

   ___ *If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[10] 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[10] 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.*

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

Rationale and Reference(s):

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[11])?*

   ___ *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,[12], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.*

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

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

Rationale and Reference(s):

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*

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11 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.

12 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.

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):

7.1 Future Groundwater Monitoring

Quarterly groundwater monitoring was conducted at the Site from August 1999 to September 2001. As identified to CTDEP, due to the overall general consistency of BTEX and heptane data over time in the groundwater samples, the frequency of the groundwater sampling events was revised from quarterly to semi-annually, with the first semi-annual groundwater sampling event being conducted in March 2002. The next semi-annual groundwater sampling event will be conducted in March 2003.

In accordance with a letter to CTDEP dated April 22, 1998, groundwater monitoring on a semi-annual basis is to be conducted for a maximum of 2 years following discontinuing operation of the SVE system at the Site. Kraft constructed the SVE system at the Site in May 1999, and has conducted operation, maintenance, and monitoring activities associated with the SVE system since that time. Based on the results of a 48-hour SVE system shut-down test conducted in June 2001 and the results of monthly and quarterly SVE system monitoring conducted since that time, Kraft believes that the SVE system removal rate of VOCs in the soils beneath the former manufacturing building at the Site is at or near steady state asymptotic conditions and that continued operation of the SVE system will not result in significant further reduction of Site-related VOCs in soil. The last quarterly monitoring event of the SVE system was conducted on June 14, 2002, and the results are consistent with the results of the last several monitoring events, indicating that continued operation of the SVE system will not result in significant further reduction of Site-related VOCs in soil. Accordingly, the June 2002 quarterly monitoring event of the SVE system was the last monitoring event where soil vapor samples was collected and submitted for chemical analyses. The SVE system operation will continue to operate, with monthly monitoring for operation and maintenance related parameters only, until the time of the March 2003 semi-annual groundwater monitoring event, at which time the SVE system will be shut down. Assuming the results of the semi-annual groundwater monitoring continue to be generally consistent (or show lower concentrations of Site-related contaminants) with recent groundwater monitoring results, it is anticipated that the final semi-annual groundwater monitoring event will be conducted in March 2003. Thereafter, it is currently anticipated by Kraft that groundwater monitoring will be on a frequency yet to be negotiated with CTDEP to monitor groundwater conditions at the Site. It is anticipated that monitoring well locations and parameters will be consistent with the existing semi-annual groundwater monitoring program being implemented at the Site.

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 Synthetic Products facility, EPA ID #CT000844365, located at 375 Barnum Avenue, Stratford, Connecticut 06615. 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.*

Completed by (signature) Raphael J. Coby *Date* 8-25-03
(print) RAPHAEL J. COBY
(title) RPM

Supervisor (signature) Matthew R. Hoagland *Date* 8/25/03
(print) Matthew R. Hoagland
(title) Section Chief
(EPA Region or State) Reg I

Locations where References may be found:

References 5, and 8 - Jay Churchill, Conestoga-Rovers & Associates, Chicago, Illinois, (773) 380-9933.
Reference 6 - Rick McFee, HRP Associates, Inc., Plainville, Connecticut, (860) 793-6899.

Contact telephone and e-mail numbers

(name) *Mr. Phil McAndrew, Kraft Foods North America*
(phone #) *(847) 646-6801*
(e-mail) *pmcandrew@Kraft.com*

(name) *Mr. Jamie Kalanta, Cookson Discontinued Operations Group*
(phone #) *(203) 795-0554*
(e-mail) *jkalanta@cookson.com*

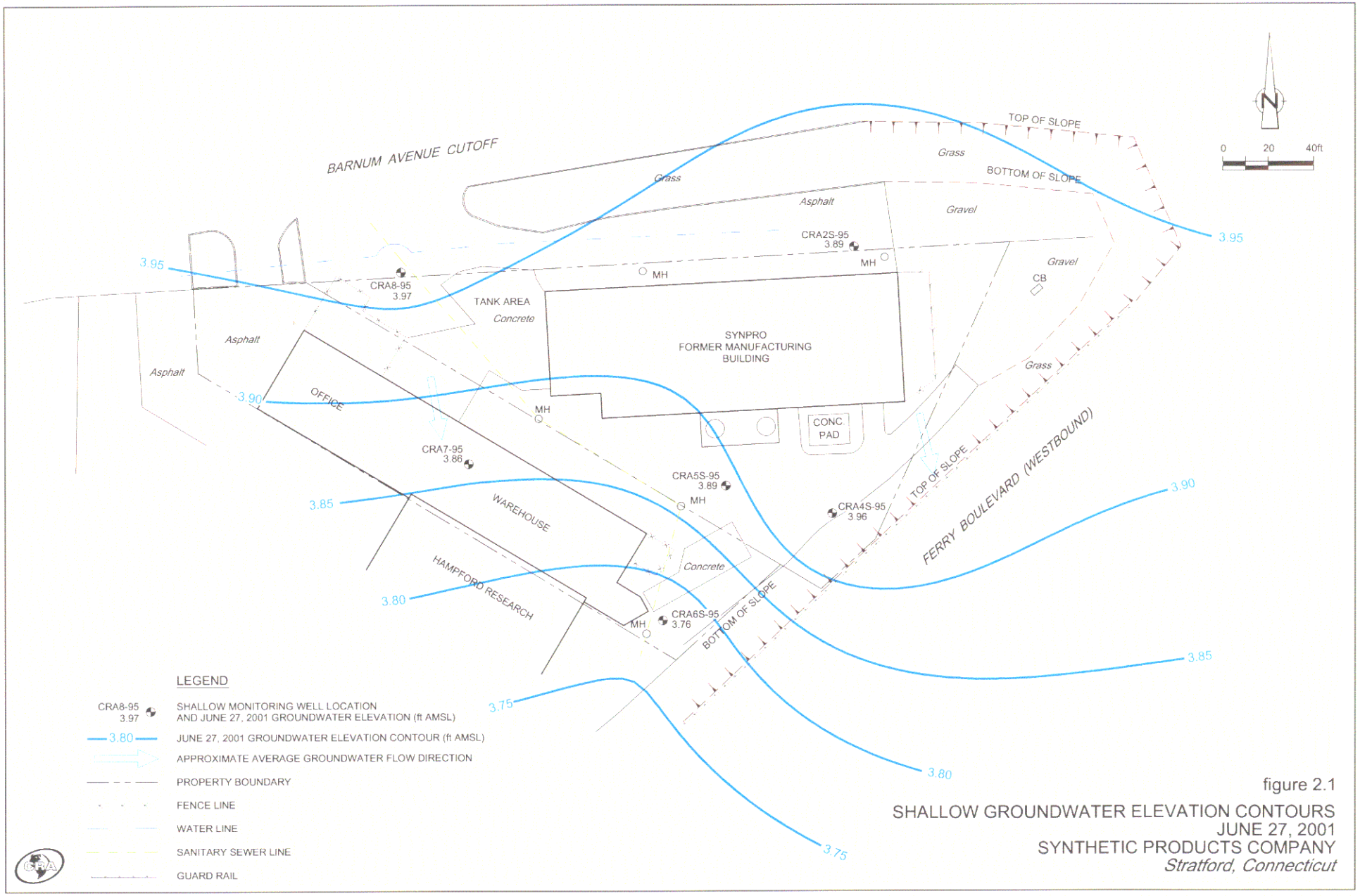

figure 2.1

SHALLOW GROUNDWATER ELEVATION CONTOURS
JUNE 27, 2001
SYNTHETIC PRODUCTS COMPANY
Stratford, Connecticut

03627-00(008)GN-WA002 FEB 20/2003

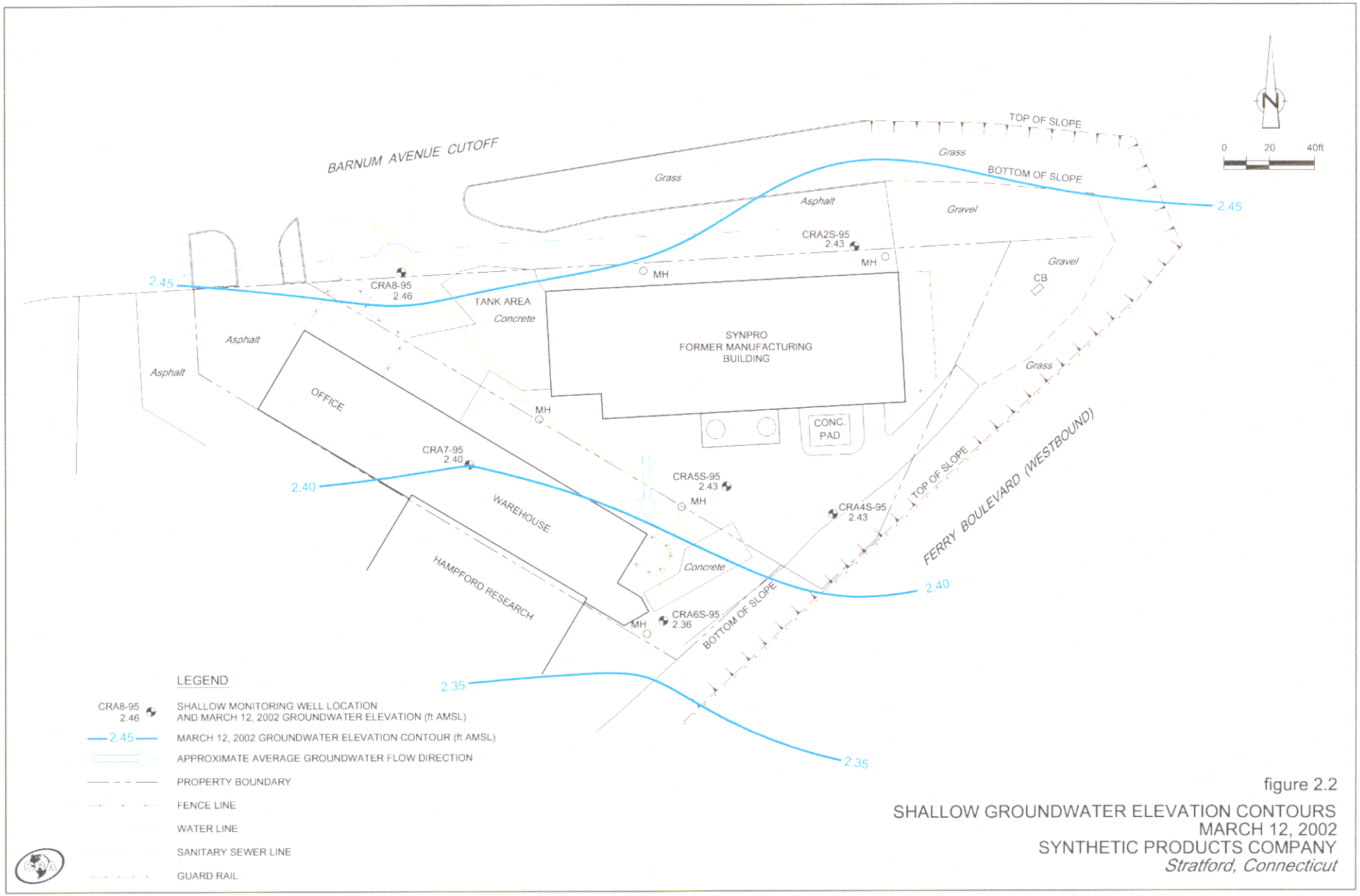

figure 2.2

SHALLOW GROUNDWATER ELEVATION CONTOURS
MARCH 12, 2002
SYNTHETIC PRODUCTS COMPANY
Stratford, Connecticut

03627-00(008)GN-WA003 FEB 20/2003

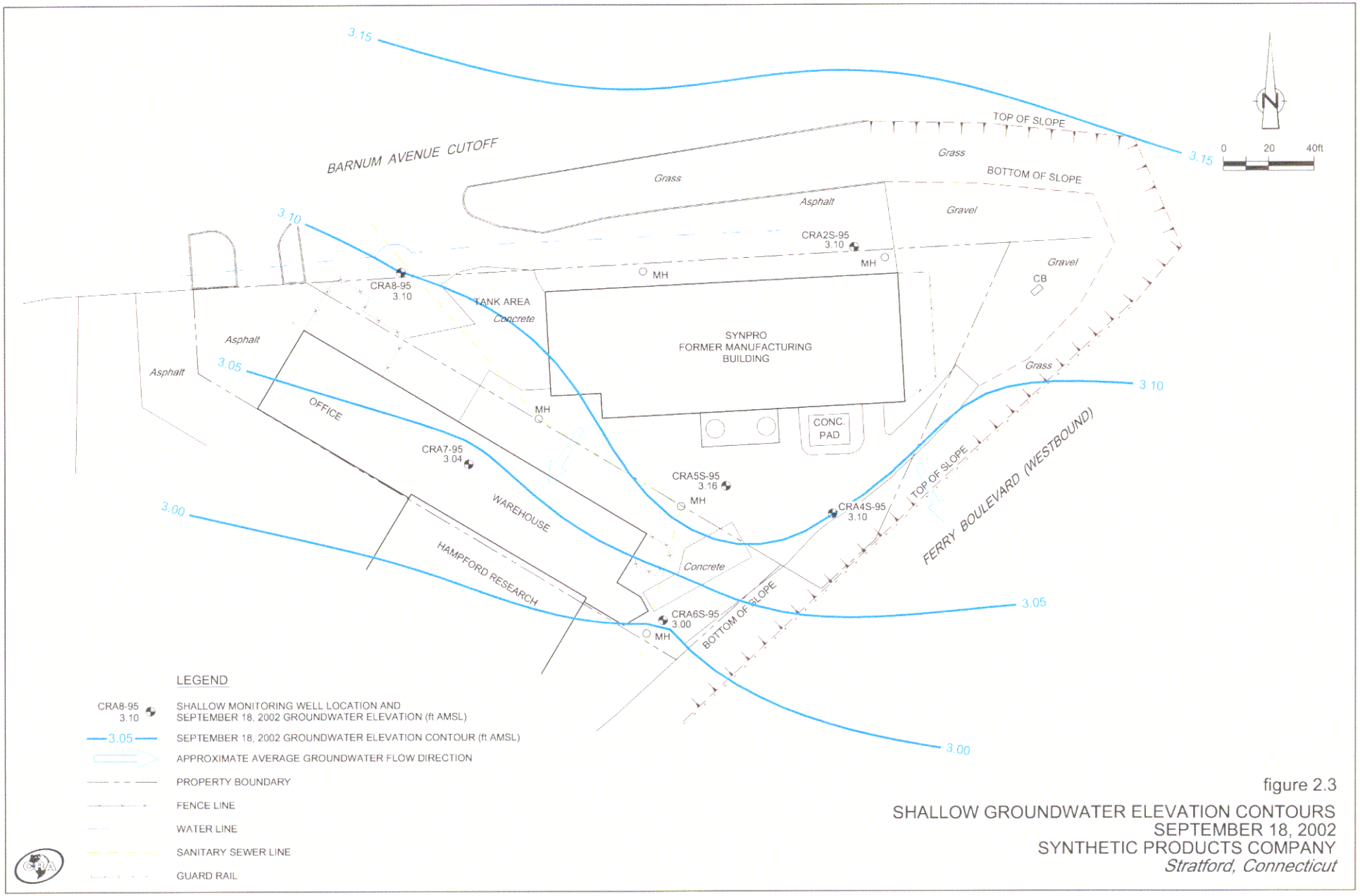

figure 2.3

SHALLOW GROUNDWATER ELEVATION CONTOURS
SEPTEMBER 18, 2002
SYNTHETIC PRODUCTS COMPANY
Stratford, Connecticut

03627-00(008)GN-WA004 FEB 20/2003

TABLE 2.1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS SUMMARY
SYNTHETIC PRODUCTS COMPANY
STRATFORD, CONNECTICUT

Monitoring Well ID	*Date Sampled*	*Benzene*	*Toluene*	*Ethylbenzene*	*Xylenes*	*Heptane*
CTDEP Surface Water Protection Criteria		*710*	*4,000,000*	*580,000*	*NV*	*86 (1)*
CRA2S-95	6/1/95	46	ND (7.1)	ND (7.1)	ND (7.1)	NA
	9/13/95	ND (83)	ND (83)	ND (83)	ND (83)	NA
	8/17/99	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	11/16/99	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	3/16/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	6/8/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/12/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	12/19/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	3/28/01	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	6/27/01	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	9/26/01	ND (1.0J)	ND (1.0J)	ND (1.0J)	ND (1.0J)	ND (5.0J)
	3/12/02	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/18/02	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
CRA2D-95	6/1/95	ND (83)	ND (83)	ND (83)	ND (83)	NA
	9/13/95	ND (83)	ND (83)	ND (83)	ND (83)	NA
	8/17/99	ND (20)	ND (20)	ND (20)	ND (20)	ND (100)
	11/16/99	ND (20)	ND (20)	ND (20)	ND (20)	ND (100)
	3/16/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	6/8/00	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/12/00	ND (1.0J)	ND (1.0J)	ND (1.0J)	ND (1.0J)	ND (5.0J)
	12/19/00	ND (5.0)	ND (5.0)	ND (5.0)	ND (25)	ND (25)
	3/28/01	ND (10)	ND (10)	ND (10)	ND (50)	ND (50)
	6/27/01	ND (20)	ND (20)	ND (20)	ND (100)	ND (100)
	9/26/01	0.88J	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	3/12/02	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/18/02	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(25)
CRA4S-95	6/1/95	620	2,900	ND (120)	ND (120)	NA
	9/13/95	1,000	3,200	ND (100)	ND (100)	NA
	8/17/99	628	ND (10)	ND (10)	ND (10)	ND (50)
	11/16/99	464	7.4	ND (5.0)	ND (5.0)	ND (25)
	3/16/00	220	2.6	ND (1.0)	ND (1.0)	ND (1.0)
	6/8/00	904	10.0	ND (5.0)	ND (5.0)	ND (25)
	9/12/00	738	7.4	ND (5.0)	ND (5.0)	ND (25)
	12/19/00	770	ND (2.5)	ND (2.5)	ND (12)	ND (12)
	3/28/01	331	30.6	1.0	ND (5.0)	ND (5.0)
	6/27/01	127	5.9	ND (5.0)	ND (25)	ND (25)
	9/26/01	445	35.3	1.3	1.6	ND (5.0)
	3/12/02	758	7.1	ND (5.0)	ND (5.0)	ND (250)
	9/18/02	753	105	1.9	~~2.9~~ 2.7	ND(5.0)
CRA4D-95	6/1/95	47/63	140/190	ND (33)/ND (25)	ND (33)/ND (25)	NA
	9/13/95	ND (120)	ND (120)	ND (120)	ND (120)	NA
	8/17/99	20.0	ND (10)	ND (10)	ND (10)	ND (50)
	11/16/99	ND (10)	ND (10)	ND (10)	ND (10)	ND (50)
	3/16/00	ND (10)	ND (10)	ND (10)	ND (10)	ND (50)
	6/8/00	19.9	ND (5.0)	ND (5.0)	ND (5.0)	ND (25)
	9/12/00	15.5J	ND (1.0J)	ND (1.0J)	ND (1.0J)	ND (5.0J)
	12/19/00	5.1	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	3/28/01	ND (5.0)	ND (5.0)	ND (5.0)	ND (25)	ND (25)
	6/27/01	ND (10)	ND (10)	ND (10)	ND (50)	ND (50)
	9/26/01	164	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	3/12/02	2.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/18/02	0.74J	ND(1.0)	ND(1.0)	ND(1.0)	ND(5.0)

TABLE 2.1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS SUMMARY
SYNTHETIC PRODUCTS COMPANY
STRATFORD, CONNECTICUT

Monitoring Well ID	*Date Sampled*	*Benzene*	*Toluene*	*Ethylbenzene*	*Xylenes*	*Heptane*
CTDEP Surface Water Protection Criteria		*710*	*4,000,000*	*580,000*	*NV*	*86 (1)*
CRA5S-95	6/1/95	9,900	6,200	ND (500)	ND (500)	NA
	9/13/95	16,000/14,000	11,000/9,400	ND (500)/ND (500)	ND (500)/ND (500)	NA
	8/17/99	16,000	ND (50)	ND (50)	ND (50)	ND (250)
	11/16/99	10,500	ND (50)	ND (50)	ND (50)	ND (250)
	3/16/00	3,230	ND (20)	ND (20)	ND (20)	ND (100)
	6/8/00	2,310J	ND (10)	ND (10)	ND (10)	ND (50)
	9/12/00	7,580	ND (20)	ND (20)	ND (20)	ND (100)
	12/19/00	9,460	ND (50)	ND (50)	ND (250)	ND (250)
	3/28/01	6,290	ND (50)	ND (50)	ND (250)	ND (250)
	6/27/01	7,240	ND (50)	ND (50)	ND (250)	ND (250)
	9/26/01	5,680	ND (50)	ND (50)	ND (50)	ND (250)
	3/12/02	4,350J	ND (5.0)	3.0J	ND (5.0)	ND (25)
	9/18/02	2,950	ND (25)	ND (25)	ND (25)	ND (130)
CRA5D-95	6/1/95	1,200	480	ND (42)	ND (42)	NA
	9/13/95	620	ND (12)	ND (12)	ND (12)	NA
	8/17/99	152	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	11/16/99	70.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	3/16/00	8.5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	6/8/00	155	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/12/00	166	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	12/19/00	8.6	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	3/28/01	177	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	6/27/01	223	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)
	9/26/01	132	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	3/12/02	40.1	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
	9/18/02	5.4	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)
CRA6S-95	6/1/95	15,000	ND (830)	ND (830)	ND (830)	NA
	9/13/95	16,000/17,000	ND (620)/ND (620)	ND (620)/ND (620)	ND (620)/ND (620)	NA
	8/17/99	19,400/15,500	ND (100)/ND (100)	ND (100)/ND (100)	ND (100)/ND (100)	ND (100)/ND (100)
	11/16/99	12,400/22,600	ND (50)/17.6	ND (50)/13.2	ND (50)/11.3	ND (250)/ND (5.0)
	3/16/00	2,520/2,510	14.4/12.7	ND (10)/ND (10)	ND (10)/ND (10)	ND (50)/ND (50)
	6/8/00	13,330/12,500	ND (100)/ND (100)	ND (100)/ND (100)	ND (100)/ND (100)	ND (100)/ND (100)
	9/12/00	12,100/12,200	ND (50)/ND (50)	ND (50)/ND (50)	ND (50)/ND (50)	ND (250)/ND (250)
	12/19/00	10,400/11,400	ND (50)/ND (50)	ND (50)/ND (50)	ND (250)/ND (250)	ND (250)/ND (250)
	3/28/01	8,800/8,210	ND (50)/ND (25)	ND (50)/ND (25)	ND (250)/ND (120)	ND (250)/ND (120)
	6/27/01	10,600/8,860	ND (100)/ND (50)	ND (100)/ND (50)	ND (500)/ND (250)	ND (500)/ND (250)
	9/26/01	4,390/5,790	ND (25)/ND (25)	8.1J/9.6J	ND (25)/ND (25)	ND (120)/ND (120)
	3/12/02	4,750/4,530	ND (20)/ND (20)	ND (20)/ND (20)	ND (20)/ND (20)	ND (100)/ND (100)
	9/18/02	3,460/3,670	1.5/ND(20)	11.8/ND(20)	1.1/ND(20)	ND(5.0)/ND(100)

TABLE 2.1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS SUMMARY
SYNTHETIC PRODUCTS COMPANY
STRATFORD, CONNECTICUT

Monitoring Well ID	*Date Sampled*	*Benzene*	*Toluene*	*Ethylbenzene*	*Xylenes*	*Heptane*
CTDEP Surface Water Protection Criteria		*710*	*4,000,000*	*580,000*	*NV*	*86 (1)*
CRA6D-95	6/1/95	3,600/3,800	990/1,100	ND (100/ND (120)	ND (100/ND (120)	NA
	9/13/95	7,100	ND (250)	ND (250)	ND (250)	NA
	8/17/99	3,680	ND (10)	ND (10)	ND (10)	ND (250)
	11/16/99	7,860	ND (50)	ND (50)	ND (50)	ND (50)
	3/16/00	1,770	ND (10)	ND (10)	ND (10)	ND (250)
	6/8/00	8,830	ND (50)	ND (50)	ND (50)	ND (50)
	9/12/00	9,530	ND (25)	ND (25)	ND (25)	ND (120)
	12/19/00	1,220J	ND (5.0)	ND (5.0)	ND (25)	ND (25)
	3/28/01	775	ND (5.0)	5.7	ND (25)	ND (25)
	6/27/01	2,570	ND (20)	ND (20)	ND (100)	ND (100)
	9/26/01	6,990	ND (50)	ND (50)	ND (50)	ND (250)
	3/12/02	1,670	ND (10)	ND (10)	ND (10)	ND (50)
	9/18/02	4,660	ND(20)	ND(20)	ND(20)	ND(100)

Notes:

(1) - Heptane Surface Water Protection Criteria was developed by CRA as presented in CRA's correspondence to CTDEP dated June 1, 1998.
Concentrations in micrograms per liter (µg/L).
ND ( ) - not detected at reporting limit stated in parentheses.
NA - not analyzed.
J - indicates an estimated value.
4,390/5,790 - sample result/duplicate sample result.
NV - No Surface Water Protection Criteria value available.
[ ] - Detected concentration exceeds Surface Water Protection Criteria.

TABLE 2.2

ALTERNATIVE SURFACE WATER PROTECTION CRITERIA
SYNTHETIC PRODUCTS COMPANY
STRATFORD, CONNECTICUT

Compound of Concern	*CTDEP Surface Water Aquatic Life Criteria (1) (µg/L)*	*CTDEP Surface Water Human Health Criteria (2) (µg/L)*	*Maximum Detected Concentration Throughout Site During Most Recent Groundwater Sampling Event*			*Alternative Surface Water Protection Criteria (5) (µg/L)*
			(µg/L)	*Location*	*Date*	
Compounds Detected Above CTDEP Surface Water Protection Criteria in Most Recent Groundwater Sampling (3)						
Benzene	--	71	4,660	CRA6D-95	Sept. 18/02	1,537,203
Compounds Detected Above CTDEP Surface Water Protection Criteria in Historical Groundwater Sampling (4)						
1,1-Dichloroethene	--	3.2	570	CRA4S-95	Sept./95	69,282

Notes:
-- No criteria available.
(1) CTDEP surface water aquatic life criteria presented in the Water Quality Standards, Appendix D, saltwater chronic criteria (CTDEP, December 17, 2002).
(2) CTDEP surface water human health criteria presented in the Water Quality Standards, Appendix D, criteria for consumption of organisms (CTDEP, December 17, 2002).
(3) Groundwater sampling results presented in the CRA correspondence to CTDEP dated December 30, 2002.
(4) Historical groundwater sampling results presented in the Supplemental Hydrogeologic Investigation Report, dated May 1996 and prepared by CRA.
(5) Alternative surface water protection criteria developed in accordance with the State of Connecticut Remediation Standard Regulation 22a-133k-3 (b)(3) procedure of multiplying the lower of the human health or aquatic life criteria by the the quantity $[(0.25*7Q_{10})/Q_{plume}]$ where $Q_{plume}=K*i*W_{plume}*B_{plume}$ using the following input parameters:

Input Parameter	Value	Basis
Lowest seven day river flow with a 10 year recurrence interval, $7Q_{10}$ (ft^3/s)	264	USGS
Aquifer Hydraulic Conductivity, K (ft/d)	43.1	Geometric mean of hydraulic conductivity vales determined from single-well response tests (CRA, 1996).
Hydraulic Gradient, i (ft/ft)	0.00058	Average of horizontal hydraulic gradients between monitoring well pairs CRA2S-95/CRA6S-95 and CRA8-95/CRA6S-95 on June 27, 2001, September 26, 2001, March 12, 2002, and September 18, 2002.
Width of Groundwater Plume, W_{plume} (ft)	200	Approximate width of on-Site groundwater impact perpendicular to the average groundwater flow direction.
Depth of Groundwater Plume, B_{plume} (ft)	52.3	Average depth to bedrock below water table observed on Site.
A_{plume} (ft^2)	10,453.3	Equals $W_{plume}*B_{plume}$
Q_{plume} (ft^3/s)	0.0030	Equals $K*i*W_{plume}*B_{plume}$

TABLE 2.3

ALTERNATIVE SURFACE WATER PROTECTION CRITERIA FOR HEAVY METALS
SYNTHETIC PRODUCTS COMPANY
STRATFORD, CONNECTICUT

Compound of Concern	*CTDEP Surface Water Aquatic Life Criteria (1) ($\mu g/L$)*	*CTDEP Surface Water Human Health Criteria (2) ($\mu g/L$)*	*Maximum Detected Concentration Throughout Site During Most Recent Groundwater Sampling Event*			*Alternative Surface Water Protection Criteria (4) ($\mu g/L$)*
			($\mu g/L$)	*Location*	*Date*	
Compounds Detected Above CTDEP Surface Water Protection Criteria in Historical Groundwater Sampling (3)						
Arsenic	36	0.021	29/38	CRA6S-95	Sept./95	455
Cadmium	9.3	10,769	540	CRA4D-95	Sept./95	201,352
Copper	3.1	--	180/230	CRA5S-95	Sept./95	67,117
Lead	8.1	--	74	CRA4D-95	Sept./95	175,371
Zinc	81	68,740	3,100	CRA4D-95	Sept./95	1,753,710
Nickel	8.2	4,600	1,900	CRA8-95	Sept./95	177,536

Notes:

-- No criteria available.

(1) CTDEP surface water aquatic life criteria presented in the Water Quality Standards, Appendix D, saltwater chronic criteria (CTDEP, December 17, 2002).

(2) CTDEP surface water human health criteria presented in the Water Quality Standards, Appendix D, criteria for consumption of organisms (CTDEP, December 17, 2002).

(3) Groundwater sampling results presented in the Supplemental Hydrogeologic Investigation Report, dated May 1996 and prepared by CRA.

(4) Alternative surface water protection criteria developed in accordance with the State of Connecticut Remediation Standard Regulation 22a-133k-3 (b)(3) proceedure of multiplying the lower of the human health or aquatic life criteria by the the quanitity $[(0.25*7Q_{10})/Q_{plume}]$ where $Q_{plume}=K*i*W_{plume}*B_{plume}$ using the following input parameters:

Input Parameter	Value	Basis
Lowest seven day river flow with a 10 year recurrence interval, $7Q_{10}$ (ft^3/s)	264	USGS
Aquifer Hydraulic Conductivity, K (ft/d)	43.1	Geometric mean of hydraulic conductivity vales determined from single-well response tests (CRA, 1996).
Hydraulic Gradient, i (ft/ft)	0.00058	Average of horizontal hydraulic gradients between monitoring well pairs CRA2S-95/CRA6S-95 and CRA8-95/CRA6S-95 on June 27, 2001, September 26, 2001, March 12, 2002, and September 18, 2002.
Width of Groundwater Plume, W_{plume} (ft)	200	Approximate width of on-Site groundwater impact perpendicular to the average groundwater flow direction.
Depth of Groundwater Plume, B_{plume} (ft)	52.3	Average depth to bedrock below water table observed on Site.
A_{plume} (ft^2)	10,453.3	Equals $W_{plume}*B_{plume}$
Q_{plume} (ft^3/s)	0.0030	Equals $K*i*W_{plume}*B_{plume}$