DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RDMS DocID 00100104

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

Facility Name: Conrac Cramer
Facility Address: 139 Mill Rock Road East, Saybrook, CT
Facility EPA ID #: CTD001162114

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).

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): Chlorinated solvents have been detected at levels above the CT Groundwater Protection Criteria (GWPC) in groundwater at the facility. Figures showing groundwater plumes and tables providing groundwater monitoring results can be found in the references listed at the end of this checklist. The key contaminant exceeding GWPC is trichloroethene (TCE). TCE was detected at concentrations up to 100 μg/L in the November 2002 round of groundwater monitoring.

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).

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): In response to previous concerns that the vertical extent of the trichloroethene (TCE) plume had yet to be determined, an additional deep groundwater monitoring well, B4-MW, was installed adjacent to well MW98-7. Well B4-MW was installed to a depth of 35 feet at which a competent granitic bedrock unit was encountered. The well was fitted with a five-foot well screen in the 30 to 35 feet below ground surface (bgs) interval. Analysis of samples collected in May and November of 2002 resulted in detections of TCE at concentrations of 27 ug/l and 25 ug/l, respectively. Samples collected from well MW98-7 during these periods resulted in detections of TCE at 75 ug/l (5/02) and 100 ug/l (11/02). These results appear to support the conclusion that the higher concentration portion of the TCE plume currently falls within the intermediate portion of the overburden aquifer. Although TCE concentrations at depth exceed GWPC, the plume appears to be migrating in a relatively horizontal flow path within the stratified drift deposits (i.e., with relatively insignificant vertical migration). Additionally, the glacial till and competent granitic bedrock likely serve to limit vertical contaminant migration.

In the southwestern portion of the site, groundwater monitoring wells representing shallow, intermediate and deep portions of the aquifer are present which define the southern extent of the TCE plume . Wells MW97-1, B3-MW and MW99-3 are screened from eight to 18 feet bgs, 20 to 25 feet bgs and 25 to 30 feet bgs, respectively. Based on available analytical data, no detections of volatile organic compounds (VOCs) at concentrations greater than 1 ug/l have been identified in groundwater samples from these wells. Since July 1998, groundwater quality data for well MW97-1 have consistently revealed either the lack of detection of TCE or TCE concentrations below the GWPC, a single detection of MTBE (2.2 ug/l) below its GWPC, and sporadic detections of various inorganics at concentrations below GWPC. Since its installation in October 2000, well B3-MW, monitored only for VOCs, has revealed no detections of TCE or other VOCs in groundwater. Monitoring of well MW99-3 has revealed no detectable concentrations of VOCs in groundwater (i.e., during the July and October 1999 monitoring events). Based on the lack of detection of TCE or detection of trace TCE levels below the GWPC, a single MTBE detection, and sporadic detections of inorganics all below GWPC, it appears that this portion of the plume has been bounded to the south.

Monitoring wells MW-H, MW99-2 and MW-G appear to bound the most highly contaminated portion of the plume to the north. Since July 1998, several quarterly monitoring events have revealed non-detectable concentrations of TCE and other VOCs at well MW-H, and sporadic detections of various inorganics below GWPC. For quarterly monitoring events from April 1998 through July 1999, sampling at well MW-G has resulted in the lack of detection of TCE and other VOCs, and sporadic detections of various inorganics below

GWPC. Monitoring of well MW99-2 has revealed no detectable concentrations of VOCs in groundwater (i.e., during the July and October 1999 monitoring events). Based on the lack of detection of TCE and sporadic decreasing detections of inorganics, it appears that this portion of the plume has been bounded to the north. Historical analytical results for facility wells located further to the north of the TCE plume near the northern facility boundary (MW-3, MW-10, MW-97-2 and MW-97-8) also revealed analyte concentrations below GWPC.

In addition, groundwater elevation data appear to suggest a westerly to southwesterly groundwater flow direction. Historical groundwater elevations, including elevations recorded at MW99-3, suggest a slight northerly groundwater flow component. However, more recent groundwater elevation data suggest a slight southwesterly component of groundwater flow. It should be noted that groundwater elevations were not recorded for MW99-3 during recent monitoring events. Based on these results, groundwater appears to flow predominantly to the west in the overburden aquifer, with a southwesterly component of flow inferred in the downgradient portion of the TCE plume.

In the western (downgradient) portion of the facility, the TCE plume appears to extend into an immediately adjacent tidal (saltwater) wetland. The Oyster River is located within the tidal wetland approximately 500 feet west of the facility. Monitoring wells MW99-1, MW99-2 and MW-G are located near the boundary of the tidal wetland.

[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.

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): Based on the proximity of the tidal wetland, the contaminant distribution for TCE in the most downgradient portion of the overburden plume, and the overburden groundwater flow directions, it appears that the downgradient extent of the TCE plume is within the proximate portion of the tidal wetlands, with the wetlands serving as the likely downgradient boundary for the plume. In addition, it is likely that groundwater flow in the vicinity of the Oyster River will turn to the south, following the flow of the river and possibly discharge to downstream portions of the river. It is unclear whether deep groundwater discharges to the tidal wetland and/or the Oyster River.

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)?

__x__ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or 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[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

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

Rationale and Reference(s): Groundwater results appear to indicate that TCE concentrations have decreased over the past several years and that the extent of the TCE plume has decreased. Currently, the highest concentrations of TCE currently measured in on-site wells located within the TCE plume are below the Surface Water Protection Criteria (SWPC) for TCE, and recent detections of TCE at wells adjacent to the tidal wetland were approximately two orders of magnitude below the SWPC for TCE. Therefore, it is unlikely that the tidal wetland or Oyster River would be impacted by the TCE plume.

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

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ 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 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):

[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.

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): Semi-annual monitoring will be conducted at wells B2-MW, MW 98-7, 99-1, and B4-MW for VOCs. EPA strongly recommends that M.H. Rhodes develop a Quality Assurance Project Plan (QAPP) for this monitoring. A QAPP is an overall plan for obtaining the type, quantity, and quality of data needed to support environmental decision-making. It will be very important to have data of documented quality in order to verify achievement of this environmental indicator and, in the future, to support a final remedy decision.

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 Former Cramer Company facility , EPA ID # CTD001162114, located at 139 Mill Rock Road in Old Saybrook, CT. 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) _____ Date 6/26/03
(print) Stephanie Carr
(title) RCRA Facility Manager

Supervisor (signature) _____ Date 9/30/03
(print) Matthew R. Hoagland
(title) Chief, RCRA Corrective Action Section
(EPA Region or State) EPA Region I

References:

Final RCRA Facility Assessment Report, TRC. 1993.
Supplemental Subsurface Investigation Report for Cramer Company, EP&S, Inc. August 1998
Summary Report of Additional Soil and Groundwater Investigations for Cramer Company, EP&S, Inc. December 1999
Year 2000 Groundwater Monitoring Report, ALTA Environmental, February 2001
Environmental Indicator Report, ALTA Environmental, February 2002
Environmental Indicator Report, ALTA Environmental, December 2002
ALTA Environmental Corporation letter dated May 1, 2003 with revisions to semi-annual monitoring program

Locations where References may be found:

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