DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code ([redacted])

Facility Name: Ethyl Corporation – Houston Plant
Facility Address: 1000 N. South Street, Pasadena, Texas
Facility EPA ID#: TXD-008096158-0

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 only as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

p1-7 from company (received by Project Manager)

2. Is groundwater known or reasonably suspected to be "contaminated" 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):

Affected groundwater exceeding drinking water MCLs is present within the EL-20 Ft, EL-60 Ft, and EL-110 Ft Sands (see Table 1 and Figures 2a, 2b, 3a, and 3b). The constituents with the highest concentrations are lead and ethylene dichloride (EDC, also known as 1,2-dichloroethane). Other constituents that are present at one or more locations include 1,1-dichloroethane (1,1-DCA); 1,2-dichloropropane; 1,1,1-trichloroethane (1,1,1-TCA); vinyl chloride; chloroethane; and naphthalene (see Reference 1 on attached reference list).

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" 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").

_____ 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):

Ethyl Corporation operates and maintains groundwater recovery and treatment systems at the North Plant Area and South Plant Area for recovery of affected groundwater from the EL-20 Foot Sand. (See a list of recovery wells on Table 2 and recovery well locations on Figure 2A.) Downgradient monitoring wells at the North Plant Area (MW-6, MW-14, MW-25, and MW-37) and the South Plant Area (MW-54) indicate non-detectable or relatively low concentrations of the organic and inorganic constituents of concern. The groundwater monitoring system for the EL-20 Ft Sand at the North Plant Area will be expanded in the near future, in accordance with requirements of the Compliance Plan renewal dated October 6, 1999 (see Reference 2).

The Compliance Plan renewal also requires recovery of affected groundwater from the EL-60 Ft Sand at MW-63, in the North Plant Area, and investigation of groundwater conditions within the EL-180 Ft Sand at the North Plant Area. (Note that affected groundwater has not been detected in the EL-60 Ft Sand at the South Plant Area.) The limits of affected groundwater within the EL-60 Ft Sand and the EL-110 Ft Sand are not completely defined at the North Plant Area, and Ethyl Corporation is in the process of evaluating the groundwater monitoring systems for those zones.

Footnotes:

[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 "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):

There is some potential for discharge of contaminated groundwater from the EL-20 Ft Sand into the Houston Ship Channel, as discussed on page 5 of this form.

The section of the Houston Ship Channel adjacent to the facility is within Segment 1007 – Houston Ship Channel Tidal Zone, located within the San Jacinto River Basin, as described in 30 TAC 307.10, Appendix C. The designated water uses for Segment 1007 are navigation and industrial supply, and do not include contact or non-contact recreation, aquatic habitat, or domestic water supply.

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):

Monitoring wells MW-6, MW-25, and MW-37 are located adjacent to the Houston Ship Channel and are screened in the EL-20 Ft Sand. Groundwater sampling results from these wells for March 1999 indicated the presence of low concentrations of EDC (0.020 mg/L, 0.033 mg/L, and 0.065 mg/L, respectively). Analytical results for these three wells for June 1999 were <0.005 mg/L, 0.050 mg/L, and 0.009 mg/L, respectively. The MCL for EDC is 0.005 mg/L. Therefore, the average EDC concentration detected in these monitoring wells is at a level considered to be "insignificant " as defined above.

A groundwater recovery system is currently operating in the El-20 Ft Sand to control the hydraulic gradient and prevent off-site discharge of affected groundwater. However, if discharge of affected groundwater were to occur to the Houston Ship Channel in the absence of such gradient control measures, available data suggest that the discharged "contamination" would be at an "insignificant" concentration. In addition, the volume of groundwater discharged from this low-flow groundwater-bearing sand would be insignificant compared with the surface water flow in the Ship Channel. Therefore, no significant potential exists for unacceptable impacts to surface water associated with the affected groundwater zone.

Footnotes:

[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 interm-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):

Note: ***Because the response to question 5 was "yes," this question is not applicable for the Ethyl Corporation – Houston Plant***

Footnotes:

[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):

Ethyl Corporation conducts periodic monitoring of groundwater using a network of monitoring wells screened in the EL-20 Ft, EL-60 Ft, and EL-110 Ft Sands. The downgradient wells that are used to monitor and confirm plume stability for the EL-20 Ft Sand include wells MW-6, MW-14, MW-25, and MW-37 (North Plant Area) and MW-54 (South Plant Area). Ethyl Corporation plans to expand the groundwater monitoring network for the EL-20 Ft Sand at the North Plant Area, as required by the Compliance Plan Renewal.

At the North Plant Area the limits of affected groundwater within the EL-60 Ft Sand and the EL-110 Ft Sand are not completely defined, and Ethyl Corporation is in the process of evaluating the groundwater monitoring systems for those zones. Affected groundwater has not been detected in the EL-60 Ft Sand at the South Plant Area. The downgradient monitoring wells for the EL-60 Ft Sand at the South Plant Area are MW-43 and MW-44.

As noted previously, Ethyl Corporation plans to install a monitoring well within the EL-180 Ft Sand at the North Plant Area, as required by the Compliance Plan renewal, in order to complete the vertical delineation of affected groundwater at the North Plant Area.

Footnotes:

[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.

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 Ethyl Corporation facility, EPA ID #TXD008096158-0, SWRN 30465, located in Pasadena, TX. 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.

(1) **Incomplete information**
(2) **Reports in house, yet to be reviewed**
(3) **Unfamiliar site**

For "NO" or "IN" determination, expected date of "YE" determination _____

Completed by (signature) Maureen Hatfield Date 01/13/00
(print) Maureen Hatfield
(title) Project Manager

Supervisor (signature) Cathy Remmert Date Jan 24, 2000
(print) Cathy Remmert
(title) Supervisor
(EPA Region or State) TNRCC

Locations where References may be found:

see attached

If "YE" Code is assigned then attach a copy of database, highlight the reports which support"YE"determination.

Contact telephone and e-mail numbers

(name) Mr. Hank Ramm - Ethyl Corp.
(phone #) 713-740-8317
(e-mail) hank_ramm@ethyl.com