DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Facility Name: Rohm and Haas Texas, Inc.

Facility Address: 1900 Tidal Road, Deer Park, Texas 77536

Facility EPA ID#: TXD065096273

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?

   √ 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 EIs developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater under Control" EI

A positive **"Migration of Contaminated Groundwater under Control"** EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term 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).

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?**

Yes 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):

Area	Contaminant	Maximum Concentrations	Groundwater Protection Standard (2)	Reference
Groundwater		mg/L	mg/L	
Acetone Spill Area	Acetone	≈40,000	3.65 (MSC)	CP-50102, 1/2/02 and Annual Site Activity Reports
Landfill 003	Ammonia	≈60,000	15 (ACL)	
	Sulfate	≈130,000	28,902 (ACL)	
Semi-Works Loading Rack	Primene 81R Product	16.9	0.61 (MSC)	Semi-Works Process Area Risk Assessment Report, 4/12/02
W/AS Former Process Area	Acetone	244	10 (MSC)	W/AS Former Process Area RFI Final Report, 6/5/02

Note: MSC= Media Specific Concentration for Groundwater based on Standard No. 2 of Texas Risk Reduction Rules,
ACL= Alternate Concentration Limit,
BG= Background Concentration.

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)?

Yes 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):

Acetone Loading Area, Corrective Action Program Under CP-50102-000: A groundwater remediation system, consisting of three recovery wells, has been in operation since 1989. The plume of dissolved-phase acetone is fully captured by the operation of the remediation system. The extent of the plume and acetone concentration has decreased markedly over the 12-year period of system operation. Requirements of system operation are listed in the facility Compliance Plan. Current capture zone and acetone plume concentrations are included in the most recent Annual Site Activity Report required by the Compliance Plan.

Landfill No. 003, Corrective Action Program Under CP-50102-000: The groundwater remediation system at Landfill No. 003 consists of two groundwater recovery trenches and one freshwater infiltration trench. The recovery trench located on the OxyVinyls golf course has been operational since July 1, 1996. The recovery trench located on the R&H property and the infiltration trench located on the OxyVinyls golf course have been operational since April 1997. Migration of the plume of dissolved ammonia and sulfate is controlled by operation of the remediation system. Plume concentrations and the configuration of the groundwater capture zone are included in the most recent Annual Site Activity Report required by the Compliance Plan.

Semi-Works Loading Rack, Area of Concern: The area with contaminated shallow groundwater at the Semi-Works Loading Rack is located within the groundwater capture zone maintained by operation of the Acetone Loading Area Corrective Action System.. The TNRCC has requested a monitoring report describing the status of the groundwater remediation at the Semi-Works Loading Rack Area by May 1, 2005 (TNRCC letter dated 7/26/02).

W/AS Former Process Area, Area of Concern: The area with contaminated shallow groundwater at the W/AS Former Process Area is located within the groundwater capture zone maintained by operation of the Landfill No. 003 Corrective Action Remediation System. The TNRCC has requested a monitoring report describing the status of the groundwater remediation at the W/AS Former Process Area by May 1, 2005 (TNRCC letter dated 7/26/02).

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?

_____ If yes – continue after identifying potentially affected surface water bodies.

No 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):

Acetone Loading Area: There are no surface water bodies in the vicinity of the delineated acetone plume. Consequently, discharge to a surface water body is not occurring. See Annual Site Activity reports required by Compliance Plan CP-50102-000 for plume maps.

Recovered acetone-laden groundwater is routed to the Rohm and Haas Main Waste Water Treatment Plant for treatment. The treatment system discharges to a monitored NPDES outfall.

Landfill No. 003: The plume of dissolved ammonia and sulfate has been delineated. Two surface water bodies are potentially susceptible to discharge of contaminated groundwater: 1) the 003 Outfall ditch that traverses the west side of Landfill No. 003 and 2) the East Fork of Patrick's Bayou, which is located southwest and hydraulically down-gradient of Landfill No. 003. Operation of the R&H groundwater recovery trench maintains the groundwater level so that it is below the bottom of the 003 Outfall ditch, thereby preventing groundwater discharge to the ditch. The East Fork of Patrick's Bayou is located beyond the leading edge of the plume of dissolved-phase ammonia and sulfate. Operation of the groundwater recovery system and remediation of the plume, required by the Compliance Plan, will prevent unacceptable concentrations of ammonia and sulfate from reaching and potentially discharging to the East Fork of Patrick's Bayou. See Annual Site Activity report required by Compliance Plan CP-50102-000 for plume maps.

Recovered groundwater containing dissolved ammonia and sulfate is disposed of by routing to the R&H waste water treatment system, where the ammonia is used to enhance biodegradation of facility waste water. The treatment system discharges to a monitored NPDES outfall.

Semi-Works Area: There are no surface water bodies in the vicinity of the delineated Primene 81R plume. Consequently, discharge to a surface water body is not occurring. See the Final Report Semi-Works Process Area Risk Assessment, April 12, 2002.

W/AS Former Process Area: The extent or migration of dissolved acetone in shallow groundwater has been delineated. There is no potential for the discharge of acetone-laden groundwater to surface water bodies because the affected groundwater in the W/AS Former Process Area is located within the groundwater capture zone maintained by operation of the Landfill No. 003 Remediation System.

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)?

n/a 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.

n/a 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.

n/a If unknown –enter "IN" status code in #8.

Rationale and Reference(s):

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])?

n/a 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.

n/a If no – (the discharge of "contaminated" groundwater can 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.

n/a If unknown –skip to #8 and enter "IN" status code.

Rationale and Reference(s):

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?"

__Yes__ 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):

For the **Acetone Loading Area Wells and the Landfill No. 003 Wells**, verification that affected groundwater has remained within dimensions of the "existing area of contaminated groundwater" is provided by a semi-annual monitoring program in accordance with provisions of the Corrective Action Program required by Compliance Plan No CP-50102-000. Groundwater samples are collected and analyzed and results are compared to the GWPSs. Depth to water measurements are performed to create groundwater potentiometric surface maps confirming plume capture in the Corrective Action Areas (Acetone Loading Area and Landfill No. 003). Corrective Action Program wells are listed on the table below.

For the **Semi-Works Loading Rack Area**, verification that affected groundwater has remained within dimensions of the "existing area of contaminated groundwater" is provided by a semi-annual sampling program performed in conjunction with the corrective action sampling program at the Acetone Loading Area. Rohm and Haas will submit a final report for Remedy Standard 2 remediation to the TNRCC by May 1, 2005.

For the **W/AS Former Process Area**, verification that the affected groundwater has remained within dimensions of the "existing area of contaminated groundwater" is provided by a semi-annual sampling program performed in conjunction with the corrective action sampling program at Landfill No. 003. Rohm and Haas will submit a final report for Remedy Standard 2 remediation to the TNRCC by May 1, 2005.

Acetone Loading Area Wells	**Presently Sampled**	**Not Presently Sampled[1]**
Point of Compliance Wells	B-1, B-3, AS-106, AS-107, AS-113	
Background Wells	AS-114	
Corrective Action Observation Wells	AS-103, AS-104, AS-110	B-2, B-4, AS-101,AS-102, AS-105 AS-108, AS-111, AS-112, AS-115, AS-204, AS-304, AS-404, AS-504
Corrective Action System Wells	ASR-1, ASR-2, AS-109	

Landfill No. 003 Wells		
Point of Compliance Wells	LF3-101, LF3-102, LF3-107, LF3-201, LF3-111	
Background Wells	LF3-110	
Corrective Action Observation Wells	LF3-105, W-16	LF3-103, LF3-104, LF3-106, LF3-112, LF3-113, LF3-114, LF3-115, W-29-2, W-30-2
Corrective Action System Wells	RH-R-1, RH-R-2, RH-R-3 OXY-R-1, OXY-R-2, OXY-R-3	

[1]**Note:** Water levels are measured semi-annually in all wells listed above. Wells not presently sampled for the Corrective Action Areas were previously sampled and had concentrations less than the Groundwater Protection Standard (GWPS) for two consecutive sample events. These wells will be sampled prior to the conclusion of remediation pumping to confirm that concentrations are less than the GWPS.

Semi-Works Loading Rack Wells	**To Be Sampled**	**Starting Date**
Groundwater Monitoring Wells	AS-101, AS-108, B-4, SW-1	Semi-annual sampling starting October 2002 (last event was May 2003)

W/AS Former Process Area Wells		
Groundwater Monitoring Wells	W/AS-1, W/AS-5, W/AS-6	Semi-annual sampling starting October 2002

[1]**Note:** Water levels are measured semi-annually in all wells listed above. Wells not presently sampled for the Corrective Action Areas were previously sampled and had concentrations less than the Groundwater Protection Standard (GWPS) for two consecutive sample events. These wells will be sampled prior to the conclusion of remediation pumping to confirm that concentrations are less than the GWPS.

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 Rohm + Haas Texas Inc Deer Park facility, EPA ID # TXD065096273 located at 1900 Tidal Rd, Deer Park, 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.

Completed by (signature) A. Kititke Johnson Date 9/27/02
(print) A. Kititke Johnson
(title) Project Manager

Supervisor (signature) Jason Wang Date 9/27/02
(print) JASON WANG
(title) Supervisor
(EPA Region or State) TCEQ

file review/discussion w/ EPA R6 (Dave Hogler) — YE 10/1/02 [signature]

Locations where References may be found:

Attach a copy of this facility's database printout. Highlight the reports which support the "YE" determination.

Contact telephone and e-mail numbers

(name)_____
(phone #)_____
(e-mail)_____

Entered into RI 10/29/02