DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

Migration of Contaminated Groundwater Under Control

Facility Name:	Ashland Chemical Company
Facility Address:	200 Darrow Road, Akron, Ohio
Facility EPA ID #:	OHD 000 723 973

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

____ If no - re-evaluate existing data, or

____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

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

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program, the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA. The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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):

Maximum Contaminant Levels (MCL's) and Drinking Water Equivalent Levels (DWEL) for constituents without MCL's for groundwater contaminants from the shallow saturated zone monitoring wells located on site are given in a table below:

Compound µg/L	Observed On Site Concentration 1982 - 1991	Observed On Site Concentration 2003	Maximum Contaminant Levels used for Screening
1,1-Dichloroethene	222	6.2	7
cis-1,2-Dichloroethene	2800	<1.0	70
1,1,1-Trichloroethane	12200	<1.0	200
Ethylbenzene	1500	<1.0	700
Tetrachloroethene	160	0.017-0.019	5
Toluene	12400	0.92	1000
Xylene	1900	0.492-0.544	10000

All results are in µg/L = Micrograms per liter
Groundwater data was from 1982 - 1991and May 7 - 8, 2002 sampling events.

Historical groundwater data of MW-4RR and MW-13 have shown VOC's contamination above the MCL's for 1,1-dichloroethene and 1,1,1-trichloroethane at 22,000 µg/L and 320,000 µg/L respectively, and August 27, 2003, groundwater data at 9,100 µg/L and 120,000 µg/L respectively.

Other facilities that could contribute to contaminates in the groundwater are historic releases from the Central Oil Asphalt Corporation located north of the facility and the Brittain Yard of the Wheeling and Lake Erie Railroad (Brittain Yard) south of the facility.

References:

Corrective Measures Progress Report No 6, August 5, 2002.
Final Corrective Measures Study Report Revision 1, January 16, 1997.
STL Analytical Report, September 27, 2003.

[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):

There is one saturated zone at the facility, the uppermost aquifer. The unconsolidated aquifer comprises discontinuous layers of clayey silt with sand and gravel, sandy silt to silty sand, and uniform silt. Bedrock shale is the lower confining unit for the aquifer.

A leachate collection system was installed in 1983 to control migration of groundwater, yet some groundwater has continued to seep into a surface water ditch, following this, a groundwater recovery and treatment system was installed in 1992 to supplement the leachate collection system. A soil vapor extraction system pilot test was conducted in 1994 to evaluate effectiveness in soil remediation. A light non aqueous phase continuous operation recovery action was installed in 1995.

Between October and November of 2000, an interceptor trench was installed, which replaced the 1983 leachate collection system and recovery well network. The interceptor trench has three collection points which collects the groundwater. The intercepted groundwater is pumped to an on site groundwater treatment system. The groundwater interceptor trench provides hydraulic containment of impacted groundwater.

A successful chemical oxidation pilot test was conducted on June 18, 2002, to evaluate the effectiveness in reducing concentrations of volatile organic compounds (VOC's) in source areas. Free product in the two target areas ranged from 0 to 1.22 feet in thickness, after the chemical oxidation treatment these thicknesses were reduced to 0 to 0.17 feet. The migration of contaminates have been stabilized by the groundwater interceptor trench and free product mass has been reduced by chemical oxidation.

Residual groundwater contamination in the Brittain Yard remains. Monitoring well's MW-4RR and MW-13 located in the Brittain Yard are down gradient of the groundwater interceptor trench. Monitoring well's MW-15, MW-16, and MW-17 are located south of the Brittain Yard near the Little Cuyahoga River. August 27, 2003, groundwater data of the monitoring wells located by the Little Cuyahoga River indicated the contaminants were below the MCL's. Groundwater data of MW-15 detected 1,1-dichloroethene and 1,1,1-trichloroethane at 6.1 µg/L and at 86 µg/L respectively. No VOC's were detected in groundwater samples for MW-16 and MW-17. Groundwater monitoring data indicates groundwater contamination is decreasing on- and off-site.

References :

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[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.

RCRA Corrective Measures Implementation Monitoring Plan dated June 18, 1999.
Groundwater Interceptor Trench Construction Completion Report, March 27, 2002.
Corrective Measures Progress Report No 7, November 26, 2002.
STL Analytical Report, September 27, 2003.

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):

Groundwater that discharges to the Little Cuyahoga River is not contaminated above the MCL's.

Reference:

STL Analytical Report, September 27, 2003.

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)?

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____ 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):

Not applicable.

Reference:

[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):

Not applicable.

[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):

Ashland submits quarterly progress reports to the US EPA and Ohio EPA as provided for in the Consent Decree. Groundwater monitoring includes sampling locations up gradient and down gradient of the site. To evaluate progress of the remediation, groundwater monitoring well's MW-3R, MW–4RR, MW-5, MW-13, MW-15, MW-16, and MW-17 are used to evaluate the horizontal and vertical extent of the VOC's and semi volatile organic compounds (SVOC's) contamination. To evaluate progress of the remediation, surface water discharged is monitored at three locations up gradient and down gradient at SW-1, SW-2A, and SW-3 for VOC's and SVOC's contamination.

References :

RCRA Corrective Measures Implementation Monitoring Plan, June 18, 1999.
Corrective Measures Progress Report No 6, August 5, 2002.
Final Corrective Measures Study Report Revision 1, January 16, 1997.

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 Ashland Chemical Akron facility, EPA ID # OHD 000 723 973, in Stark County, Akron, Ohio. 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 _____

(print) John Nordine 9/24/03

(title) Geologist

Supervisor (signature) _____ Date _____

(print) George Hamper 9/24/03

(title) Chief, Corrective Action Section

(EPA Region or State) EPA Region 5

Locations where References may be found:
U.S. EPA Region 5, Ashland Chemical Akron, Ohio Facility
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77 W. Jackson, Blvd.
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