

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: CSX Transportation, Inc., Richmond, Virginia
Facility Address: 4005 Charles City Road, Richmond, Virginia 23231
Facility EPA ID #: VAD 00 312 1977

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 #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).

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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: Key contaminants are chemicals of concern determined from RFI and facility risk assessment and include: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, flourene, ideno(1,2,3-cd)pyrene, phenanthrene, naphthalene, pyrene, 2,4,6-trichlorophenol, 2,4-dimethylphenol, 2-methylphenol, 3 and 4-Methylphenol, pentachlorophenol, 4-chloro-3-methylphenol, 2,3,5,6-tetrachlorophenol, 2-methylnaphthalene, acenaphthene, acenaphthylene, total xylenes, and mercury. Appropriate Protective “Levels” to Define “Contaminated Groundwater” include: Federal Maximum Contaminant Levels (MCLs), US EPA Region III risk based concentrations (RBCs), and Site-specific screening level action levels developed in the Human Health Risk Assessment.

References/Supporting Documentation:

RCRA Facility Investigation Human Health Risk Assessment Report dated July 19, 1999, as approved by EPA via letter dated December 21, 1999 (See Sections 2 and 5 and Tables 2-3, 5-16).

Final RFI Report dated October 29, 1996, as approved by EPA via letter dated January 22, 1997.

Draft Corrective Measures Study Report dated March 9, 2001 (See Section 2.5 and Table 2-4).

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).

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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: Both the lateral extent and vertical extent of constituents in groundwater have been determined. The estimated line of no groundwater impact for the uppermost aquifer is depicted on Figure 2-16 of the Draft CMS Report (March 2001). A single contiguous area of impact has been defined within the uppermost aquifer; this area covers approximately 6.5 acres or approximately 13 percent of the total site area. The approximate dimensions of the zone of groundwater impact are a width of 450 feet, length of 800 feet and thickness of 40 feet. The delineated area of groundwater impact extends from an area east of AOC 1 westward to the BFI slurry wall along the western border of the site and southwest from the area of AOC 1 to a point near well pair M-22S/A.

The BFI landfill slurry wall located along the western border of the Site prevents lateral flow of groundwater from the Site to offsite areas to the west and southwest, which is in the general direction of groundwater flow in the treatment area. Vertically, the extent of impacted groundwater is limited to the uppermost flow zones because of the presence of an approximately 80 foot thick confining unit below the surface aquifer which acts as a barrier to deeper migration.

Groundwater monitoring with the current network of wells since 1989 indicates that the plume limits have been stable. An increase in dissolved constituent concentrations over time has not been observed in areas downgradient of source areas. Constituent concentrations decrease with depth within the uppermost aquifer at the site. Offsite migration of the plume is unlikely because of the observed plume stability and the 2,000 foot distance to the downgradient site border. Based on these factors, it is expected that contaminated groundwater will remain within the area of impact that has been documented in the Draft CMS Report.

References:

Final RCRA Facility Investigation Report dated October 29, 1996, as approved by EPA via letter dated January 22, 1997.

RCRA Facility Investigation Human Health Risk Assessment Report dated July 19, 1999, as approved by EPA via letter dated December 21, 1999.

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Draft Corrective Measures Study Report dated March 9, 2001 (See Sections 2.5, 2.6, 2.7 and Figures 2-16, 2-30, 2-31 and 2-32).

Groundwater Statistical Reports (Annual Reports) dated February 2003 and February 2002 for Corrective Action Groundwater Monitoring (prepared for Virginia Department of Environmental Quality Post-Closure Permit).

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.

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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: Discharge of the constituent plume to surface water bodies does not occur at the facility. Groundwater levels in the uppermost portion of the Yorktown-Eastover aquifer are generally 5 to 10 feet below ground surface, with the exception of three areas (Wells M-18S, M-22S, M-26S) where seasonally high groundwater levels are less than 5 feet below ground surface. However, no permanent surface water bodies are contained in these three areas where a groundwater mound and persistent perched water table conditions exist. The area of impacted groundwater is limited to an approximate 6.5-acre area in the northern part of the facility and permanent surface water bodies are not contained within this area.

References:

Final RCRA Facility Investigation Report dated October 29, 1996, as approved by EPA via letter dated January 22, 1997.

RCRA Facility Investigation Human Health Risk Assessment Report dated July 19, 1999, as approved by EPA via letter dated December 21, 1999.

Draft Corrective Measures Study Report dated March 9, 2001 (Section 2.3, Figures 2-1 through 2-5, Figures 2-24 through 2-29 and Figure 2-16).

Draft Baseline Ecological Risk Assessment Report dated March 9, 2001 (Figure 2).

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5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration³ 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)?

_____ If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ 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 concentration³ 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 concentrations³ 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): _____

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

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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 implemented⁴)?

_____ 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.

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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:

The post-closure permit issued by the VDEQ (effective May 5, 2000) requires the facility to conduct quarterly corrective action monitoring of one background well (M-16S) and six compliance wells (M-14S, M-17S, M-18S, M-22S, M-24S, and M-31S). This network of seven wells is designed to verify the delineated extent of the constituent plume associated with the regulated unit (AOC 1) at the facility. The post-closure permit is in effect until May 5, 2010.

The Draft CMS Report (dated March 9, 2001) submitted to EPA has a monitored natural attenuation (MNA) element to the recommended facility-wide remedy, which consists of monitoring both groundwater flow zones of the surface aquifer including:

- **The “S” level (Sand/Silt/Clay Unit, 0 to 20 feet below ground surface), and**
- **The “A” level (Sand and Gravel Unit, 20 to 40 feet below ground surface).**

Upon completion of the review and approval of the Draft CMS Report, MNA may be pursued on a site-wide basis among other remediation measures. EPA will require additional monitoring work to be completed to support further evaluation of the potential use of MNA as part of the final remedy, and to verify the finding that migration of contaminated groundwater is under control. This monitoring work is likely to include the monitoring network of seven wells that is sampled quarterly pursuant to VDEQ’s post-closure permit, as well as other monitoring points considered appropriate for these purposes.

References:

Draft Corrective Measures Study Report dated March 9, 2001

Post-Closure Care Permit, CSX Transportation, Inc., Richmond, VA, EPA ID No. VAD003121997, VDEQ, April 5, 2000.

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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).

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 **CSX Transportation, Inc. (Formerly Koppers Company, Inc. – Formerly Beazer East)** facility, EPA ID # **VAD 00 312 1977**, located at **4005 Charles City Road, Richmond, VA 23231**. 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 _____
Donna M. McCartney
Remedial Project Manager

Date: 04-09-03

Supervisor _____
Robert E. Greaves
Chief, General Operations Branch
EPA Region 3

Date: 04-09-03

Locations where References may be found:

USEPA Region III
Office of RCRA Programs, Waste and Chemicals Management Division
1650 Arch Street
Philadelphia, PA 19103-2029

CSX Transportation, Inc.
Environmental Remediation Department
Jacksonville, FL 32202

Contact telephone and e-mail numbers:

(name) Donna M. McCartney
(phone #) 215-814-3427
(e-mail) mccartney.donna@epa.gov