

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: VDOT Culpeper District Headquarters
Facility Address: 1601 Orange Road, Culpeper, VA 22701
Facility EPA ID #: VAD980715064

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 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:

Routine groundwater monitoring has been conducted at two regulated Hazardous Waste Management Units (HWMUs), the Paint Pit and the Sign Shop Vat, for a number of years, beginning in 1998 for the Paint Pit and in 1997 for the Sign Shop Vat. Both units were clean closed for soils but were issued a post-closure care permit due to groundwater contamination. The primary constituents of concern in groundwater from the Sign Shop Vat and Paint Pit HWMUs are 1,2-dichloropropane (1,2-DCP), trichloroethene (TCE) and tetrachloroethene (PCE). During recent monitoring events, 1,4-dioxane also exceeded its groundwater protection standard (GPS) in some wells. However, there have been decreases in constituent concentrations in groundwater from the time of unit closure to the present as a result of the source removal activities during closure, and the Facility is currently implementing Monitored Natural Attenuation to address ongoing exceedances of the 1,2-DCP, TCE, PCE and 1,4-dioxane GPS. Recent sampling events have indicated that TCE concentrations in all wells are beginning to decline to levels below the Maximum Contaminant Level.

As part of the RCRA Facility Investigation (RFI), additional groundwater samples were collected in 2008 from eight (8) temporary monitoring wells at several Solid Waste Management Units (SWMUs): SWMUs 1-5 [Closed Heating Oil or Gas/Diesel Underground Storage Tanks (USTs)], SWMU 7 [Closed Gas/Diesel Aboveground Storage Tanks (ASTs)] and SWMU 10 (Suspect Waste Disposal Area). Additional groundwater samples were collected near SWMU 10 in 2010 after installing a permanent well to evaluate the impact of turbidity on elevated metals concentrations in groundwater samples collected from the temporary wells. The groundwater results indicated that one out of four monitoring wells at SWMU 7 slightly exceeded the MCL for benzene and one out of two monitoring wells near SWMU 10 exceeded the naphthalene risk-based screening level for tapwater. No metals exceeded the screening values after the permanent well was installed.

REFERENCES:

- Virginia Department of Transportation Culpeper District Headquarters: 2010 Annual Groundwater Compliance Monitoring Report (February 2011, Marshall Miller & Associates, Inc.)
- Results of Well Installation and Sampling, SWMU #10 – Suspect Waste Disposal Area (January 2011, Marshall Miller & Associates, Inc.)
- Revised Phase I RFI Risk-Based Screening Tables (November 2010, Marshall Miller & Associates, Inc.)
- Virginia Department of Transportation Culpeper District Headquarters: January 2010 RCRA Corrective Action Fact Sheet
- Virginia Department of Transportation Culpeper District Headquarters: Phase I RCRA Facility Investigation Report (May 2009, Marshall Miller & Associates, Inc.)

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)?

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:

TCE concentrations in all wells have recently declined to levels below the MCL. The concentrations for other constituents of concern in compliance and corrective action wells have decreased as well. Trends in the concentrations of the constituents of concern over time display a clear and general decline. Additionally, the results verify that source areas have been removed effectively and impacted media left in place do not appear to be contributing substantially to groundwater contamination.

REFERENCES:

Same as above

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.

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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:

The contaminant concentrations in groundwater are low and limited in extent. The nearest perennial stream is an unnamed tributary of Mountain Run located 0.6 miles west of the facility boundary.

REFERENCES:

Same as above

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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 – skip to #8 and enter “IN” status code.

RATIONALE AND REFERENCE(S):

Footnotes:

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 ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
- (2) providing or referencing an interim-assessment⁵, 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 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 – 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.

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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. 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:

Groundwater monitoring will continue at the two regulated HWMUs in accordance with the existing post-closure care permit. Confirmatory samples will be collected at SWMUs 7 and 10 to verify that groundwater contamination will not be migrating beyond the existing area of groundwater contamination.

REFERENCE(S):

Same as above

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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 VDOT Culpeper District Headquarters facility, EPA ID #VAD980715064, located in Culpeper, Virginia. 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 _____ Date 12/1/2011

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FINAL NOTE: THE MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL EI IS A QUALITATIVE SCREENING OF CURRENT GROUNDWATER CONDITIONS AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF GROUNDWATER QUALITY.