

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: Former Kop-Flex Facility
Facility Address: 7565 and 7555 Harmans Road, Hanover, Maryland
Facility EPA ID#: MDD 043373935

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?

- 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):

The contaminants of concern in groundwater above appropriately protective levels at the Kop-Flex site consist of chlorinated VOCs (primarily 1,1,1-TCA, 1,1-DCA, and 1,1-DCE) and 1,4-dioxane. Releases at the former Kop-Flex site are attributable to the historical solvent use during manufacturing operations. Based on analytical data, the highest VOC levels in shallow groundwater are found in the identified source areas below and to the east of the former Kop-Flex manufacturing building, and decrease in the direction of groundwater flow. Based on the evaluation of sampling data, no site-related VOCs appear to be migrating offsite at levels of concern in the shallow portion of the groundwater system. VOC impacts in the deep groundwater extend from the identified source area east of the former Kop-Flex manufacturing building to the off-property areas to the south-southeast. The highest VOC concentrations are detected at monitoring wells located immediately downgradient of this source area and along the southern property boundary.

Contaminant of concern

Chloroethane
1,1,1-TCA
1,1-DCA
1,1-DCE
1,2-DCA
Tetrachloroethane
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
1,4-Dioxane

REFERENCES:

WSP. 2015c. Kop-Flex VCP # 31, Hanover, Maryland, Quarterly Status Report No. 6. August 18.
WSP. 2015d. Groundwater Monitoring Plan, Former Kop-Flex Facility, Hanover, Maryland, VCP # 31. June 2.
Environmental Strategies Corporation, 1996, Phase I Environmental Site Assessment, Kopflex Inc., Hanover, Maryland

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 and Reference(s):

Based on data provided in the Second Quarter 2015 Status Report for the site, recent groundwater sampling results indicates no apparent change in VOC distribution in the surficial (unconfined) zone. Shallow and intermediate-depth perimeter wells (except for locations near the eastern property boundary) continue to show no VOCs at levels of concern. The available sampling results indicate that site-related VOCs are not migrating offsite to the west in the surficial portion of the aquifer. VOC concentrations in samples from surficial zone wells east of the former manufacturing building are also generally consistent with previous monitoring results and reflect the temporal fluctuation in constituent concentrations in the aquifer. The sampling results of deeper monitoring wells screened in the semi-confined portion of the Lower Patapsco aquifer show fluctuating but generally consistent levels of site-related VOCs. The concentrations of VOCs detected in perimeter wells in the onsite and offsite areas indicate no apparent changes in the inferred VOC distribution within the aquifer. Based on the data provided in this quarterly status report, there is no evidence suggesting significant contaminant migration within the identified plume. Therefore, the migration of contaminated groundwater, as defined by the monitoring locations designated at the time of this determination, is considered to be stable. In situ treatment of shallow groundwater has been conducted in the onsite area with the highest VOC concentrations. The removal of VOC-affected soil from the unsaturated, combined with the in-situ degradation of constituents, will reduce potential contaminant flux to and through the surficial portion of the groundwater system. Hydraulic containment via the pumping of VOC containing groundwater has been selected as the response action to address the impacted aquifers. An extraction network of shallow pumping wells screened within the surficial waterbearing zone and deep wells completed in the Lower Patapsco aquifer will serve to contain VOC-affected groundwater to the site. The combined flow from the extraction wells will be treated to remove the VOCs and the treated effluent will be discharged to Stony Run. Onsite and offsite groundwater monitoring activities will be performed in conjunction with the operation of the hydraulic containment systems to ensure their effectiveness. The implementation of these remedial measures will eliminate any potential spreading and associated enlargement of the horizontal and vertical extent of the VOC plumes in the groundwater system.

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.
- 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):

Stony Run is located to west of the former Kop-Flex facility and then crosses the northwestern portion of the site. This perennial stream flows northward and eventually discharges into the Patapsco River. Based on the results of several investigations (WSP, 2015a), there is no evidence that site-related contaminants are discharging to this surface water body. Surface water sample results indicate similar upstream and downstream concentrations or concentrations below applicable water quality criteria.

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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 judgment/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-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 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?”

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):

Onsite groundwater monitoring:

At present, groundwater sampling activities are being conducted on a semi-annual basis for the onsite monitoring wells and quarterly for the offsite monitoring wells to continually evaluate the distribution of site-related VOCs in the surficial (unconfined) zone and deep (semi-confined) portion of the Lower Patapsco aquifer. As part of the proposed onsite remedial action, a groundwater monitoring program will be implemented to assess VOC concentrations in the aquifer system during operation of the hydraulic containment systems. Sampling data from the following monitoring wells will be used to evaluate the distribution of site-related VOCs in the two hydrogeologic units.

Surficial Water-Bearing Zone

MW-03, MW-09, MW-39, MW-44 (new)

MW-04, MW-18, MW-42 (new)

Confined Lower Patapsco Aquifer

MW-22D MW-27D MW-40D (new)

The sampling data will be used to monitor changes in VOC concentrations, and corresponding mass removal, in the well discharge. Groundwater samples collected from the following monitoring wells, which are located in the western portion of the site, will be used to evaluate VOC concentrations in the Surficial Aquifer during operation of the hydraulic containment system.

- MW-03
- MW-05R (replacement)
- MW-18
- MW-38R (replacement)
- MW-39
- MW-42 (new)
- MW-43 (new)
- MW-44 (new)

Wells MW-05R, MW-18, MW-38R, MW-39, MW-42, and MW-43 will be sampled on a semiannual basis. The other wells – MW-03 and MW-44 – are located in unaffected portions of the surficial zone downgradient or cross-gradient of the VOC plume. The groundwater samples will be collected from these wells on an annual basis. The remaining monitoring points for the surficial zone consist of three wells (MW-04, MW-09, and MW-16) that occur within the inferred limits of the VOC plume in the area east (hydraulically upgradient) of the extraction well system. Semi-annual groundwater samples will be collected from these monitoring wells to evaluate changes in COC concentrations in response to groundwater withdrawals from the extraction wells.

For the Lower Patapsco aquifer, groundwater samples from the monitoring wells listed below will be used to assess VOC concentrations in response to groundwater withdrawals from the deep extraction wells.

- MW-1D
- MW-21D

- MW-22D
- MW-24D
- MW-40D (new)

Samples will be collected from these wells semi-annually. Monitoring wells MW-16D and MW-23D are situated within the VOC plume in the area hydraulically upgradient of the extraction wells. These wells will also be sampled semi-annually to evaluate changes in COC concentrations in response to groundwater pumping. Groundwater samples will be collected on an annual basis from well MW-27D located upgradient of the inferred extent of VOC impacts in the aquifer, and MW-41D (new), which will be screened at a depth below the recovery wells in the lower portion of the aquifer. The collection of samples from “background” well MW-27D will be used to monitor the hydrogeochemistry of groundwater flowing on to the site from offproperty areas to the north. Water quality results for MW-41D samples will be evaluated, together with the hydraulic head data, to ensure site-related VOCs are not migrating to deeper portions of the Lower Patapsco aquifer and by-passing the partially penetrating extraction well system. A systematic analysis of the hydraulic capture and containment of the VOC plume will be conducted using both the water level and groundwater quality data. The water level data and groundwater sampling results will be included as part of the Operation, Maintenance and Monitoring (OM&M) reports for the hydraulic containment systems. The information provided in the OM&M reports will include a discussion of the monitoring activities, event-specific and historical data tables, and interpretation of the water level and groundwater quality data in terms of the groundwater remedial objectives and cleanup criteria.

Offsite groundwater monitoring:

In conjunction with the onsite activities, an offsite groundwater monitoring program will be implemented to evaluate the VOC plume to the south of the former Kop-Flex facility. Specific deep monitoring wells that will provide data on the VOC distribution in the aquifer system include existing wells MW-31 and MW-35, and proposed wells MW-29, MW-32, and MW-34.

Long-term groundwater quality monitoring will be implemented after completion of baseline sampling activities. The monitoring frequency for the new offsite groundwater monitoring wells will eventually be consistent with the previously installed monitoring wells. Once a sufficient number of samples have been collected from the monitoring wells, the analytical results will be evaluated to determine whether modifications in the sampling frequency are warranted based on the groundwater quality data. Monitoring wells located outside and down gradient of the plume will continue to be sampled semi-annually to monitor for any changes in the VOC distribution that could potentially impact other private wells in the Severn, Maryland area. Any modification in the groundwater monitoring program will be communicated and approved by MDE and USEPA before being implemented at the site.

Periodic evaluation of the groundwater quality data will continue to be conducted on a regular basis as part of long-term monitoring activities. The groundwater monitoring results will be evaluated to determine relevant water quality trends. Data analysis will first involve the preparation of temporal concentration plots for selected constituents.


The water level data and groundwater sampling results will be included as part of Annual Offsite Groundwater Monitoring reports prepared for the Kop-Flex Site. The information provided in the reports will include a discussion of the monitoring activities, event-specific and historical data tables, and interpretation of the water level and groundwater quality data in comparison to the applicable groundwater quality standards. The monitoring reports will be submitted to the MDE and U.S. EPA on an annual basis.

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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 (insert facility and EPA ID #, located at (insert address)). 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) *Erich Weissbart* Date 09/24/2015
(print) Erich Weissbart
(title) Project Manager

Supervisor (signature)  Date 9/24/2015
(print) Luis Pizarro
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