

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: Southeast Federal Center
Facility Address: Washington, DC
Facility EPA ID #: DC8 47 009 0004

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?

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:

The Southeast Federal Center has been subdivided into two portions: the 44-acre Parcel and the Department of Transportation (DOT) Parcel. References 8. and 9., below, are the GSA RCRA Facility Investigations of contaminants for both parcels. The RFIs have documented benzene, toluene, ethylbenzene, xylenes (total), tetrachloroethene, trichloroethene, vinyl chloride, methyl-tert-butyl ether (MTBE), chlorobenzene, naphthalene and 2-methylnaphthalene, and trihalomethanes contaminants above MCLs and RBCs. Contaminant concentration data from groundwater samples collected were compared to U.S. EPA Region III April 2, 2002 Risk-Based Concentrations (RBCs) for tap water, adjusted for cumulative effects of non-carcinogenic compounds and Maximum Contaminant Levels (MCLs) under the Federal Clean Water Act .

The impact of MBTE to shallow ground water is localized in extent and BTEX was limited to the DOT Parcel and attributed to the former gas station immediately north of the site. The impact of these chemicals is attributed to the former offsite gas station. The remaining VOCs were detected in isolated wells in isolated areas of the site. No SVOCs were detected in the deep groundwater zone during any RFI sampling.

In terms of the frequency of contaminant exceedances in monitoring wells and magnitude of exceedances, benzene, toluene, ethylbenzene, and xylenes (total) are the predominant contaminants. All other contaminants listed above are detected in isolated locations across the site.

For the full facility, only seven metals - arsenic, barium cadmium mercury, thallium selenium - were present in shallow groundwater above respective ARARs. The majority of the exceedances were singular and isolated in nature. Therefore, with the exception of arsenic and barium, these constituents are not likely an indication of overall water quality but may be related to water chemistry. Arsenic and barium are ubiquitous across the entire site. Arsenic, barium, mercury, cadmium, chromium, selenium, and thallium contaminants are attributed to a combination of naturally occurring conditions.

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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Groundwater monitoring was coordinated for both parcels and collected in April 2002 and July 2002. Additional RFI sampling was completed in September 2004. GSA replaced the deteriorated Seawall that also serves as a barrier to migration towards the Anacostia. Near the Seawall, the MTBE concentration continued its decrease from April 2002(4720 ppb) to date (180ppb). The *SEFC RFI -Groundwater EID Re-Evaluation of MTBE in Groundwater Impact*, September 28, 2004- Reference 12., below- concludes with its determination of the negligible impact of MTBE on the Anacostia River.

References:

- 1.- Near Shore River Sediment Sampling Final Data Report, December 2000.
- 2.- Use History and Proposed Investigation of Previously Undocumented Buildings and Areas. February 13, 2001.
3. - Description of Current Conditions and Interim Measures/Site Stabilization, SEFC, April 16, 2001.
4. - RCRA Facility Investigation Report, US DOT headquarters Site SEFC, September 6, 2002.
- 5.- Final SEFC Environmental Impact Statement for Construction, dated October 2, 1992.
6. Environmental Strategies Corporation (ESC), 2003. Interim Measures Workplan, Southeast Federal Center, Washington, D.C. July 25, 2003.
- 7.- USEPA Memo, SEFC Human Health Environmental Indicator(EI), E. Quinn, September 4, 2003.
8. Final-Revision 0, RCRA Facility Investigation, 44-Acre Parcel, Southeast Federal Center, Washington, D.C. June 16, 2004
9. RCRA Facility Investigation, U.S. Department of Transportation Headquarters Site, Southeast Federal Center, Washington, D.C. March 19, 2004.
- 10.- Ecological Habitat Assessment- Revised, SEFC Interim Measures Work Plan, Environmental Strategies Consulting, LLC, March 24, 2004
- 11.- SEFC 9/16/04 GW EI Sampling Analytical Results, D. Sarr, Environmental Strategies Consulting LLC, September 24, 2004.
12. SEFC RFI -Groundwater EID Re-Evaluation of MTBE in Groundwater Impact, September 28, 2004

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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)?

YE 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:

The site is underlain by at least two distinct water-bearing zones separated from each other by a discontinuous low- permeability clay layer that acts as a barrier to the upper migration of groundwater. The *Final-Revision 0, RCRA Facility Investigation, 44-Acre Parcel, Southeast Federal Center, Washington, D.C. June 16, 2004*, Reference 8, Figures 2-5, 2-6, 2-7 and 2-8 illustrate the movement of contaminated groundwater in the shallow and deep zones. Although the regional groundwater flow would be expected to be southward towards the Anacostia River, the groundwater flow in the shallow zone is generally towards the west and northwest, away from the Anacostia River. The exception is in the northeastern portion of the site where the groundwater flow is to the south/ southwest. As an interim measure, GSA replaced the deteriorated Seawall that also serves as a barrier to any migration towards the Anacostia River.

To evaluate the potential for MTBE dissolved in site groundwater to adversely impact the surface water quality, using the RFI maximum detected concentration of MTBE, mass balance calculations were made to estimate the theoretical maximum concentration added to the river and comparing that concentration to surface water quality criteria. Based on Reference 12., *SEFC RFI -Groundwater EID Re-Evaluation of MTBE in Groundwater Impact, September 28, 2004*, the theoretical concentration of MTBE that could possibly be discharged from the SEFC into the Anacostia River is 2.9×10^{-4} ug/ l.

Reference(s): See Page 3., Reference 12.,

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.

No 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 *Final-Revision 0, RCRA Facility Investigation, 44-Acre Parcel, Southeast Federal Center, Washington, D.C. June 16, 2004*, Reference 8, Figures 2-5, 2-6, 2-7 and 2-8 illustrate the movement of contaminated groundwater in the shallow and deep zones. Although the regional groundwater flow would be expected to be southward towards the Anacostia River, the groundwater flow in the shallow zone is generally towards the west and northwest, away from the Anacostia River. The exception is in the northeastern portion of the site where the groundwater flow is to the south/ southwest. As an interim measure, GSA replaced the deteriorated Seawall that also serves as a barrier to any migration towards the Anacostia River.

Reference(s): See Page 3., References 8, 9, and 12

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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)?

YE 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:

Monitoring well MN-SB/MW09 is adjacent to the Seawall, approximately 125-feet from the Anacostia River shoreline. The current MTBE concentration in monitoring well MN-SB/MW09 is less than 100 times the appropriate groundwater level, 7,530 ug/L versus its appropriate groundwater concentration of 2.6 ug/L. The theoretical mass loading of MTBE into the Anacostia River is 4.5×10^{-2} kilograms per year. Further, the monitoring well data indicates that the concentration of MTBE in well MN-SB/MW09 is decreasing.

Reference(s): See Page 3., Reference 12,

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 refuge) 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:

GSA has begun pumping contaminated groundwater, excavating the soil and has established a network of groundwater monitoring wells to monitor the discharge to the NPDES Permit and track progress towards attaining the EPA cleanup standard.

Reference(s): See Page 3.

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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 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 **Southeast Federal Center** facility, EPA ID # **DC8 47 009 0004**, located at **Washington, DC**. 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) _____ /s/ _____ Date 9/29/04
(print) Vernon Butler
(title) RPM

Supervisor (signature) _____ /s/ _____ Date 9/29/04
(print) Bob Greaves
(title) Chief, RCRA Operations Branch
EPA Region III

Rationale: RCRA Facility Investigation will be completed under RCRA Section 3013 Order

References may be found: EPA Region III RCRA File Room

Contact telephone and e-mail numbers

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