

**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:** General Electric Company, Former Appliance Park East facility  
**Facility Address:** Snowden River Parkway, Columbia MD  
**Facility EPA ID #:** MDD 046279311

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).

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2. Is **groundwater** known or reasonably suspected to be “**contaminated**”<sup>1</sup> 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):

Units 2&7: A groundwater plume of trichloroethylene (TCE) contamination is present at levels above the Maximum Contaminant Level (MCL) of 5 : g/l. The extent of the plume, as well as the pump and treat remediation system currently operating, has been investigated in the *RFI Report for Units 2&7* and the *Interim Corrective Measures Implementation Plan*.

UST No. 9: A groundwater plume of benzene and ethylbenzene is present above their respective MCLs of 5 : g/l and 700 : g/l. Groundwater monitoring data can be found in the Quarterly Progress Reports.

Unit 6: TCE was detected in groundwater at a concentration of 670 : g/l (MCL = 5 : g/l) in temporary piezometer P-1. The plume appears to be small and is located under the former Warehouse building. (see *RFI Report for Unit 6* for more information)

Footnotes:

<sup>1</sup>“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”<sup>2</sup> 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”<sup>2</sup>).
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”<sup>2</sup>) - 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):

Units 2&7: GE installed a Pump and Treat remediation system for the TCE plume located in this area. This system has been operating since 11/10/98. As shown in the Quarterly Progress Reports, the treatment system has achieved adequate hydraulic containment of the TCE plume. GE has installed numerous monitoring wells in the saprolite and bedrock to monitor the effectiveness of the treatment system. Based on the Quarterly Progress Reports, the TCE plume appears to be controlled and is not migrating beyond the monitoring well network. This determination is contingent on the final well sampling results of the furthest downgradient wells HRD-1, HRD-2, and HRD-3. These results will confirm that the treatment system continues to provide hydraulic containment of the plume through pumping. The treatment system has needed to be shut down three times for maintenance problems resulting in contaminated groundwater discharge above MCLs. If these problems persist and the characteristics of the plume change, this EI determination will be updated to reflect current conditions.

UST No. 9: In 1992, GE removed a leaking underground gasoline storage tank and 470 cubic yards of contaminated soil. To remediate the BTEX groundwater plume resulting from the leak, GE operated a dual phase extraction and treatment system from Nov. 1996 to May 1997. The treatment system effectively decreases the contaminant levels in the groundwater before it was shut down. However, the final clean up goal for this unit is attainment of MCLs for all constituents throughout the plume. Until these levels are reached, GE will continue to sample the groundwater wells in the area.

Recent groundwater samples (4/29/1999) have reconfirmed that the plume is at steady state and is not migrating. There is a stormwater discharge channel past the downgradient extent of the plume, so GE has two sentinel wells, OBG-17 and OBG-18, to show that no contaminated groundwater is entering the channel. Both of these wells were "non-detect" during 1999 sampling event. It is expected that natural degradation will occur to breakdown the dissolved constituents in the groundwater. GE's current groundwater monitoring program is adequate to show that the plume is controlled.

Unit 6: This is a small TCE plume (approx 100 ft) located under the Warehouse Building. Past groundwater samples (1993-1994) show the plume had not reached the downgradient wells, 6MW-3 & 4. GE removed the TCE contaminated soil which was the source of the groundwater contamination. Based on the limited area of the plume, the low level of TCE present and the elimination of further migration of contaminants to groundwater, it appears that the plume is controlled under the building. Future sampling will be performed to confirm this determination.

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<sup>2</sup> “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.

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):

As described in Question 3 above, there are three areas of contaminated groundwater at this site. At the Units 2&7 area and the Unit 6 area, there are no surface water bodies in the vicinity of the groundwater plumes. At the UST No. 9 area, there is a stormwater discharge channel past the downgradient extent of the plume, so GE has two sentinel wells, OBG-17 and OBG-18, to show that no contaminated groundwater is entering the channel. Both of these wells were "non-detect" during 1999 sampling event. GE will continue to monitor these wells as part of the long term sampling plan.

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5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration<sup>3</sup> 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 concentration<sup>3</sup> 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<sup>3</sup> 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<sup>3</sup> 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):

<sup>3</sup> 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 implemented<sup>4</sup>)?

\_\_\_\_\_ 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,<sup>5</sup> 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):

<sup>4</sup> 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.

<sup>5</sup> 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):

Units 2&7: A Sampling and Analysis Plan has been submitted by GE in January 1998 which describes the proposed groundwater sampling activities. These activities will monitor the effectiveness of the pump and treat system. GE has been following this Plan for the previous quarterly sampling events. EPA has provided comments and revisions to this Plan and GE is preparing an updated version. In future sampling events, all saprolite and bedrock wells in the plume area will be sampled on a semi-annual basis. The SAP can be found in the facility file.

UST No. 9: GE submitted a Post Termination Ground Water Sampling and Analysis Plan for Underground Storage Tank No. 9 dated February 1997 and followed this Plan in their recent sampling events. EPA has provided comments and revision to this Plan. GE has agreed to these changes and are preparing a revised Plan for submission. Annual sampling of the following wells will be performed: ERM-4, ERM-6, ERM-7, TP-7, TP-8, ERM-18, OBG-17, OBG-18, TP-6, and TP-11. GE may elect to perform semi-annual sampling for informational purposes.

Unit 6: GE will verify the 1993-1994 groundwater sampling results to ensure that the small TCE plume has not migrated.

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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).

- 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 General Electric Company Former Appliance Park East facility , EPA ID # MDD 046279311 , located at Columbia, Maryland. 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   2/4/00    
                  (print)        Jennifer L. Shoemaker  
                  (title)        Remedial Project Manager

Supervisor     (signature) \_\_\_\_\_ Date   2/25/00    
                  (print)        Robert E. Greaves  
                  (title)        Chief, RCRA General Oper. Branch  
                  (EPA Region or State) EPA Region III

Locations where References may be found:

U.S. EPA Region III  
Waste and Chemicals Management Division  
RCRA General Operations Branch, 11th Floor  
1650 Arch Street  
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